



Arizona State University

1998–99 General Catalog

All colleges, schools, divisions, and departments establish certain academic requirements that must be met before a degree is granted. Advisors, directors, department chairs, and deans are available to help the student understand these requirements, but the student is responsible for fulfilling them. At the end of a student's course of study, if requirements for graduation have not been satisfied, the degree is not granted. For this reason, it is important for all students to acquaint themselves with all regulations, to be informed throughout their college careers, and to be responsible for completing requirements. Courses, programs, and requirements described in the catalog may be suspended, deleted, restricted, supplemented, or changed in any other manner at any time at the sole discretion of the university and the Arizona Board of Regents. The catalog does not establish a contractual relationship but summarizes the total requirements the student must currently meet before qualifying for a faculty recommendation to the Arizona Board of Regents to award a degree.

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Front Cover

The Charles Trumbull Hayden Library houses the university's largest multidisciplinary collection.

The underground entrance was added in 1989 along with 97,000 additional square feet of service area.

See page 25. (Photo by Jim Richardson.)



President Lattie F. Coor Tim Trumble photo

Dear ASU Students and Prospective Students:

It is my personal pleasure to introduce the Arizona State University *1998–99 General Catalog*. It is intended to put a great deal of important information at your fingertips and serve as a guide through your university experience.

The catalog comprises a rather imposing list of programs, courses, requirements, and services. We hope it is organized in a manner that makes it easy to find the information most applicable to you and your course of studies.

While the catalog will answer many of your questions, nothing will substitute for the guidance your advisor can provide. I strongly encourage you to work closely with an advisor to plan your academic program.

On behalf of Arizona State University, I wish you a challenging and fulfilling experience as you work to achieve your goals.

Sincerely,

Lattie F. Coor
President

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The ASU Web is the online presence of Arizona State University on the World Wide Web. Offering links and guides to almost 30,000 different Web pages housed on ASU servers, the ASU Web is becoming a comprehensive resource for learning about the people and places of Arizona State University. It is the goal of the ASU Web to help all visitors, students, staff, and faculty to make the most of their experiences at ASU while pioneering a new age of communications, research, and education.

ASU home page: www.asu.edu

See “Web Directory,” page 531, for a list of college, department, and school Web sites.

The *General Catalog* is the official source of information for programs and requirements of ASU and its colleges, departments, and schools. For information on determining catalog year and university requirements, see “University Graduation Requirements,” pages 79–83.

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Codes and Abbreviations

Key to Course Listing Codes

Code	Definition
M	ASU Main campus code*
W	ASU West campus code*
GLG	Example of a departmental prefix designation
410	Example of a course number
(3)	Example of course semester hours
F	Course offered fall only
S	Course offered spring only
SS	Course offered summer session only
F, S	Course offered both semesters
A	Course offered once a year
F 1998	Course offered every other year on semester indicated
N	Course not regularly offered

* Campus codes are not used in the catalogs but appear in the fall and spring *Schedule of Classes* and the *Summer Sessions Bulletin*.

Key to General Studies Credit Abbreviations

Code	Definition
L1	Literacy and critical inquiry core courses (intermediate level)
L2	Literacy and critical inquiry core courses (upper division)
N1	Numeracy core courses (mathematics)
N2	Numeracy core courses (statistics and quantitative reasoning)
N3	Numeracy core courses (computer applications)
HU	Humanities and fine arts core courses
SB	Social and behavioral sciences core courses
S1	Natural sciences core courses (introductory)
S2	Natural sciences core courses (additional courses)
C	Cultural diversity in the United States courses
G	Global awareness courses
H	Historical awareness courses
/	or
,	and

Course Prefix Index

The course descriptions in this catalog refer to ASU Main and ASU East courses. For ASU West course descriptions, see the *ASU West Catalog*. For graduate course descriptions, see the *Graduate Catalog*.

AAD	Architectural Administration and Management ...	122	COB	College of Business	149
ACC	Accountancy	150	COE	College of Education ¹	
ADE	Architectural Design and Technology Studios	123	COM	Communication	410
AES	Aerospace Studies	310	CON	Construction	193
AET	Aeronautical Engineering Technology	453	CPP	College of Public Programs	409
AFR	African American Studies	311	CPY	Counseling Psychology ¹	
AGB	Agribusiness	457	CSE	Computer Science and Engineering	219
AJS	Administration of Justice ²		CSH	Chicana and Chicano Studies	324
AMS	American Studies ²		CSS	Chicana and Chicano Studies	324
AMT	Aeronautical Management Technology	442	DAH	Dance History	261
ANP	Environmental Analysis and Programming	123	DAN	Dance	261
APA	Asian Pacific American Studies	408	DCI	Curriculum and Instruction	174
APH	Architectural Philosophy and History	123	DSC	Design	130
ARA	Art Auxiliary	254	ECD	Early Childhood Education	175
ARB	Arabic	353	ECE	Engineering Core	197
ARE	Art Education	254	ECN	Economics	154
ARP	Architecture Professional Studies	124	EDA	Educational Administration and Supervision ¹	
ARS	Art History	254	EDP	Educational Psychology	183
ART	Art	257	EED	Elementary Education	176
ASB	Anthropology	312	EEE	Electrical Engineering	224
ASE	Analysis and Systems	197	EET	Electronics Engineering Technology	446
ASM	Anthropology	314	EMC	Educational Media and Computers	176
AST	Astronomy	374	ENG	English	327
ATE	Architectural Technology	124	EPD	Environmental Design and Planning ¹	
AVC	Architectural Communication	125	EPE	Exercise Science/Physical Education	331
BIO	Biology	316	ERS	Environmental Resources	138
BIS	Bachelor of Interdisciplinary Studies	113	ETC	Engineering Technology Core	440
BLE	Bilingual Education	177	ETM	Environmental Technology Management	450
BME	Bioengineering	206	FAS	Family Studies	335
BUE	Business Education	179	FIN	Finance	157
BUS	Business Administration	152	FLA	Foreign Languages	352
CCS	Chicana and Chicano Studies	324	FON	Food and Nutrition	336
CDE	Child Development	335	FRD	Family Resources and Human Development	337
CED	Counselor Education ¹		FRE	French	353
CEE	Civil Engineering	214	GCU	Cultural Geography	338
CET	Computer Engineering Technology	445	GER	German	355
CGC	Computer Graphic Communications	448	GLB	Global Business ²	
CHE	Chemical Engineering	207	GLG	Geology	341
CHI	Chinese	353	GPH	Physical Geography	339
CHM	Chemistry	322	GRA	Graphic Design	131
CIS	Computer Information Systems	151	GRK	Ancient Greek	355
CLS	Clinical Laboratory Sciences/Medical Technology	367	GRN	Gerontology	284
			HCR	Health Care Related	401

¹ See the *Graduate Catalog*.

² See the *ASU West Catalog*.

HEB	Hebrew	355	MTE	Mathematics Education	365
HED	Higher and Postsecondary Education ¹		MUE	Music Education	271
HEE	Home Economics Education	337	MUP	Music Performance	272
HES	Health Science	333	MUS	Music	275
HIS	History	343	NOR	Norwegian	357
HON	Honors	295	NUR	Nursing	401
HPS	History and Philosophy of Science	371	OPM	Operations and Production Management	163
HRM	Human Resources Management ²		PAF	Public Affairs	420
HSA	Health Services Administration	158	PGS	Psychology	385
HUD	Housing and Urban Development	139	PHI	Philosophy	371
HUM	Humanities	347	PHS	Physical Sciences	375
IAP	Interdisciplinary Arts and Performance ²		PHY	Physics	375
IAS	Integrative Studies ²		PLA	Landscape Architecture	139
IBS	International Business Studies	159	PLB	Plant Biology	378
IDN	Indonesian	355	POL	Politics ²	
IED	Indian Education	178	POR	Portuguese	357
IEE	Industrial and Management Systems Engineering	229	POS	Political Science	381
IMC	Information and Management Core	451	PSY	Psychology	386
IND	Industrial Design	131	PUB	Scholarly Publishing ¹	
INT	Interior Design	132	PUP	Urban and Environmental Planning	140
IPO	International Program Overseas	57	QBA	Quantitative Business Analysis	156, 164
ISM	Information Systems Management ²		RDG	Reading Education	178
ITA	Italian	356	REA	Real Estate	153
ITM	Industrial Technology Management	451	REC	Recreation	423
JAC	Joint Admission Continuous Enrollment	436	REL	Religious Studies	388
JPN	Japanese	356	RUS	Russian	357
JRN	Journalism	415	SBS	Social and Behavioral Sciences ²	
JUS	Justice Studies	418	SCA	Scandinavian	358
LAT	Latin	357	SCM	Supply Chain Management	153
LAW	Law ¹		SED	Secondary Education	179
LES	Legal and Ethical Studies	153	SEM	Science and Engineering of Materials ¹	
LIA	Liberal Arts and Sciences	309	SHS	Speech and Hearing Science	392
LIN	Linguistics ¹		SOC	Sociology	390
LIS	Library Science	178	SPA	Spanish	358
LNT	Learning and Instructional Technology ¹		SPE	Special Education	180
LSC	Life Sciences ²		SPF	Educational Policy Studies	182
MAE	Mechanical and Aerospace Engineering	235	STE	Society, Values, and Technology	198
MAT	Mathematics	363	STP	Statistics and Probability	365
MCB	Molecular and Cellular Biology ¹		SWE	Swedish	360
MCE	Multicultural Education	178	SWG	Social Work ¹	
MCO	Mass Communication	415	SWU	Social Work	429
MET	Manufacturing Engineering Technology	454	TCM	Telecommunication	416
MGT	Management	163	THA	Thai	360
MHL	Music History/Literature	270	THE	Theatre	278
MIC	Microbiology	367	THP	Theatre Performance and Production	279
MIS	Military Science	370	UET	Microelectronics Engineering Technology	447
MKT	Marketing	165	UNI	University	29
MSE	Materials Science and Engineering	209	VTN	Vietnamese	360
MTC	Music Theory and Composition	270	WAC	Writing Across the Curriculum	330
			WST	Women's Studies	395

¹ See the *Graduate Catalog*.

² See the *ASU West Catalog*.

Academic Organization

Organized under ASU Main, ASU East, and ASU West are colleges, schools, departments, and other administrative units whose faculty offer courses.

ASU Main

College of Architecture and Environmental Design

School of Architecture
School of Design
School of Planning and Landscape Architecture

College of Business

Department of Business Administration
Department of Economics
Department of Finance
Department of Management
Department of Marketing
School of Accountancy and Information Management
School of Health Administration and Policy

College of Education

Division of Curriculum and Instruction
Division of Educational Leadership and Policy Studies
Division of Psychology in Education

College of Engineering and Applied Sciences

Del E. Webb School of Construction
School of Engineering
Department of Chemical, Bio, and Materials Engineering
Department of Civil and Environmental Engineering
Department of Computer Science and Engineering
Department of Electrical Engineering
Department of Industrial and Management Systems Engineering
Department of Mechanical and Aerospace Engineering

College of Extended Education

College of Fine Arts

Department of Dance
Department of Theatre
School of Art
School of Music

College of Law

College of Liberal Arts and Sciences

African American Studies Program
Department of Aerospace Studies

Department of Anthropology
Department of Biology
Department of Chemistry and Biochemistry
Department of Chicana and Chicano Studies
Department of English
Department of Exercise Science and Physical Education
Department of Family Resources and Human Development
Department of Geography
Department of Geology
Department of History
Department of Languages and Literatures
Department of Mathematics
Department of Microbiology
Department of Military Science
Department of Philosophy
Department of Physics and Astronomy
Department of Plant Biology
Department of Political Science
Department of Psychology
Department of Religious Studies
Department of Sociology
Department of Speech and Hearing Science
Interdisciplinary Humanities Program
Women's Studies Program

College of Nursing

College of Public Programs

Asian Pacific American Program
Department of Communication
Department of Recreation Management and Tourism
School of Justice Studies
School of Public Affairs
Walter Cronkite School of Journalism and Telecommunication

Division of Undergraduate Academic Services

University 100 Program
Writing Across the Curriculum

Graduate College

School of Social Work

University Honors College

ASU East

College of Technology and Applied Sciences

Department of Aeronautical Management Technology
Department of Electronics and Computer Engineering Technology
Department of Information and Management Technology
Department of Manufacturing and Aeronautical Engineering Technology

East College

School of Agribusiness and Resource Management

ASU West

College of Arts and Sciences

Department of American Studies
Department of Integrative Studies
Department of Interdisciplinary Arts and Performance
Department of Life Sciences
Department of Social and Behavioral Sciences
Women's Studies Program

College of Education

Undergraduate Professional Teacher Preparation
Graduate Programs
Postbaccalaureate Programs for Teacher Certification

College of Human Services

Department of Administration of Justice
Department of Communication Studies
Department of Recreation and Tourism Management
Department of Social Work
Gerontology Program
Nursing (ASU Main program)

Division of Collaborative Programs

Center for Writing Across the Curriculum
Research Consulting Center
University-College Center
University Honors College

School of Management

Accountancy
Business Administration
Global Business

Baccalaureate Degrees and Majors Offered at ASU Main and ASU East

Baccalaureate degrees and majors offered at ASU West are shown on page 534.
Graduate degrees and majors are shown on pages 290–292.

ASU MAIN

Bachelor of Arts

Anthropology

Art

Concentrations:

Art history

Photographic studies

Studio art

Asian Languages (Chinese/Japanese)

Broadcasting

Emphases:

Broadcast journalism

Business/management

Chemistry

Chicana and Chicano Studies

Communication

Economics

English

Family Resources and Human Development¹

Concentrations:

Family resources and human development in business

Family studies/child development

Human nutrition—dietetics

French

Geography

Emphases:

Meteorology-climatology

Urban studies

German

History

Humanities

Concentrations:

Architecture

Architecture, culture, and society

Business

Design

Film studies

Humanities/liberal arts

Justice studies

Planning

Interdisciplinary Studies

Italian

Journalism

Emphases:

News-editorial

Public relations

Visual journalism

Mathematics

Music

Philosophy

Political Science

Psychology

Religious Studies

Russian

Sociology

Spanish

Theatre

Emphases:

Acting

Design/technical theatre

Directing/stage management

History/theory and criticism

Women's Studies

Bachelor of Arts in Education

Early Childhood Education

Elementary Education

Concentration:

Bilingual education/English as a second language

Secondary Education

Academic specializations:

Biological sciences

Business education

Chemistry

Chinese

Communication

Economics

English

Family resources and human development (home economics)

French

Geography

German

History

Japanese

Journalism

Mathematics

Mathematics/chemistry

Mathematics/physics

Physical education

Physics

Physics/chemistry

Political science

Russian

Social studies

Spanish

Selected Studies in Education¹

Special Education

Bachelor of Fine Arts

Art

Concentrations:

Art education

Ceramics

Drawing

Fibers

Intermedia

Metals

Painting

Photography

Printmaking

Sculpture

Dance

Concentrations:

Choreography

Dance education

Dance studies

Performance

Theatre

Concentration:

Theatre education

Bachelor of Interdisciplinary Studies

Bachelor of Music

Music Education

Concentrations:

Choral-general

Instrumental

String

Music Therapy

Performance

Concentrations:

Guitar

Jazz

Keyboard

Music theatre

Orchestral instrument

Piano accompanying

Voice

Theory and Composition

Concentrations:

Composition

Theory

Bachelor of Science

Accountancy

Biology

Concentration:

Biology and society

Chemistry

Emphasis:

Biochemistry

¹ Applications for this program are not being accepted at this time.

² This major requires more than 120 semester hours to complete.

Baccalaureate Degrees and Majors Offered at ASU Main and ASU East (continued)

Clinical Laboratory Sciences	Political Science	Materials Science and Engineering
Communication	Psychology	<i>Emphases:</i>
Computer Information Systems	Real Estate	Biomaterials
Computer Science ²	Recreation	Ceramic materials
Conservation Biology	<i>Concentrations:</i>	Energy systems
Construction ²	Recreation management	Integrated circuit materials
<i>Options:</i>	Tourism	Manufacturing and materials processing
General building construction	Speech and Hearing Science	Mechanical metallurgy
Heavy construction	Supply Chain Management	Metallic materials systems
Residential construction	Women's Studies	Polymers and composites
Specialty construction	Bachelor of Science in Design	Mechanical Engineering
Economics	Architectural Studies	<i>Emphases:</i>
Engineering Interdisciplinary Studies ¹	Design Science ¹	Aerospace
Environmental Resources	Graphic Design	Biomechanical
<i>Concentration:</i>	Housing and Urban Development	Computer methods
Natural resource management	Industrial Design	Control and dynamic systems
Exercise Science/Physical Education	Interior Design ²	Design
<i>Concentrations:</i>	Bachelor of Science in Engineering	Energy systems
Exercise and wellness	Aerospace Engineering	Engineering mechanics
Exercise science	<i>Emphases:</i>	Manufacturing
Physical education	Aerodynamics	Stress analysis, failure prevention, and materials
Family Resources and Human Development	Aerospace materials	Thermosciences
<i>Concentrations:</i>	Aerospace structures	Bachelor of Science in Landscape Architecture
Family resources and human development in business	Computer methods	Bachelor of Science in Nursing
Family studies/child development	Design	Bachelor of Science in Planning
Human nutrition—dietetics	Mechanical	Urban Planning
Finance	Propulsion	Bachelor of Social Work
Geography	System dynamics and control	ASU EAST
<i>Emphases:</i>	Bioengineering	Bachelor of Applied Science
Meteorology-climatology	<i>Emphases:</i>	Bachelor of Science
Urban studies	Biochemical engineering	Aeronautical Engineering Technology ²
Geology	Bioelectrical engineering	Aeronautical Management Technology ²
History	Biomaterials engineering	<i>Options:</i>
Interdisciplinary Studies	Biomechanical engineering	Airway science flight management
Justice Studies	Biomedical imaging engineering	Airway science management
Management	Biosystems engineering	Agribusiness
Marketing	Molecular and cellular bioengineering	<i>Concentrations:</i>
Mathematics	Premedical engineering	General agribusiness
<i>Options:</i>	Chemical Engineering	Preveterinary medicine
Applied mathematics	<i>Emphases:</i>	Electronics Engineering Technology ²
Computational mathematics	Biochemical	<i>Options:</i>
General mathematics	Biomedical	Computer systems
Pure mathematics	Environmental	Electronic systems
Statistics and probability	Materials	Microelectronics
Microbiology	Premedical	Telecommunications
Physics	Process engineering	Industrial Technology ²
<i>Emphases:</i>	Semiconductor processing	<i>Options:</i>
Astronomy	Civil Engineering	Environmental technology management
Option I	<i>Option:</i>	Industrial technology management
Option II	Environmental engineering	Information technology
Plant Biology	Computer Systems Engineering	Manufacturing Engineering Technology ²
<i>Concentrations:</i>	Electrical Engineering	<i>Emphases:</i>
Environmental science and ecology	Engineering Special Studies	Manufacturing engineering technology
Molecular biosciences/biotechnology	<i>Options:</i>	Mechanical engineering technology
Urban horticulture	Manufacturing engineering	
	Premedical engineering	
	Industrial Engineering	

¹ Applications for this program are not being accepted at this time.² This major requires more than 120 semester hours to complete.

University Calendar

April 1998

S	M	T	W	T	F	S
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May 1998

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31						

June 1998

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July 1998

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August 1998

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September 1998

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1998

Summer Sessions

Check the 1998 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 2– Tues., June 2	Registration and drop/add for first five-week session and eight-week session
Mon., Feb. 2– Tues., July 7	Registration and drop/add for second five-week session
Thurs., Apr. 30	Final fee payment deadline for all summer sessions (For students who register after April 30, fees are due daily.)
Mon., June 1	Instruction begins for first five-week session and eight-week session
Mon., June 8	Unrestricted withdrawal deadline for first five-week session and eight-week session
Fri., June 19	Restricted course withdrawal for first five-week session and eight-week session
Fri., June 26	Restricted complete withdrawal deadline for first five-week session
Thurs., July 2	August graduation filing deadline (must be met to have name appear in commencement program) First five-week session ends
Fri., July 3	Classes are excused for Independence Day
Mon., July 6	Instruction begins for second five-week session
Mon., July 13	Unrestricted withdrawal deadline for second five-week session
Fri., July 17	Restricted complete withdrawal deadline for eight-week session
Fri., July 24	Eight-week session ends Restricted course withdrawal deadline for second five-week session
Fri., July 31	Restricted complete withdrawal deadline for second five-week session
Fri., Aug. 7	Second five-week session ends Commencement

1998

Fall Semester

Check the fall 1998 *Schedule of Classes* for details and to confirm these dates.

Thurs., Apr. 2– Fri., Apr. 10	Preregistration
Mon., Apr. 27– Fri., Aug. 28	Drop/add
Wed., Apr. 29– Fri., Aug. 28	Registration
Tues., Aug. 4	Final fee payment deadline for fall 1998 (For students who register after Aug. 4, fees are due daily.)

October 1998

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November 1998

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December 1998

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January 1999

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February 1999

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March 1999

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Thurs., Aug. 20– Sun., Aug. 23	Experiencing ASU: Orientation '98 activities
Thurs., Aug. 20	New Faculty and Academic Professional Orientation and Reception
Mon., Aug. 24	Instruction begins
Mon., Sept. 7	Classes are excused for Labor Day
Fri., Sept. 18	Unrestricted withdrawal deadline
Fri., Oct. 16	December graduation filing deadline (must be met to have name appear in commencement program)
Mon., Oct. 26	Winter session (College of Extended Education [CEE]) registration begins
Fri., Oct. 30	Restricted course withdrawal deadline
Wed., Nov. 11	Classes are excused for Veterans Day
Thurs., Nov. 26– Fri., Nov. 27	Classes are excused for Thanksgiving recess
Thurs., Dec. 3	Restricted complete withdrawal deadline
Wed., Dec. 9	Instruction ends
Thurs., Dec. 10	Reading day
Fri., Dec 11– Sat., Dec. 12; Mon., Dec. 14– Thurs., Dec. 17	Final examinations
Fri., Dec. 18	Commencement
Sat., Dec. 19	Midyear recess begins
Mon., Dec. 28	Winter session (CEE) instruction begins

1999 Spring Semester

Check the spring 1999 *Schedule of Classes* for details and to confirm these dates.

Mon., Nov. 2– Tues., Nov. 10, 1998	Preregistration
Mon., Nov. 30, 1998– Fri., Jan. 22, 1999	Drop/add
Wed., Dec. 2, 1998– Fri., Jan. 22, 1999	Registration
Tues., Dec. 15, 1998	Final fee payment deadline for spring 1999 (For students who register after Dec. 15, fees are due daily.)
Fri., Jan. 1, 1999	Winter session classes are excused for New Year's Day
Thurs., Jan. 14	Orientation and advisement for new transfer students
Fri., Jan. 15	Orientation and advisement for new freshmen
	Winter session (CEE) instruction ends
Mon., Jan. 18	Classes are excused for Martin Luther King Jr. Day
Tues., Jan. 19	Instruction begins
Fri., Feb. 12	Unrestricted withdrawal deadline

April 1999

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May 1999

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June 1999

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July 1999

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August 1999

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Sun., Mar. 14–
Sun., Mar. 21

Classes are excused for spring recess

Fri., Apr. 2

May graduation filing deadline (must be met to have name appear in commencement program)

Restricted course withdrawal deadline

Mon., Apr. 29

Restricted complete withdrawal deadline

Wed., May 5

Instruction ends

Thurs., May 6

Reading day

Fri., May 7–
Sat., May 8;
Mon., May 10–
Thurs., May 13

Final examinations

Fri., May 14

Commencement

1999**Summer Sessions**

Check the 1999 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 1–
Tues., June 1

Registration and drop/add for first five-week session and eight-week session

Mon., Feb. 1–
Tues., July 6

Registration and drop/add for second five-week session

Thurs., Apr. 29

Final fee payment deadline for all summer sessions (For students who register after April 29, fees are due daily.)

Tues., June 1

Instruction begins for first five-week session and eight-week session

Mon., June 7

Unrestricted withdrawal deadline for first five-week session and eight-week session

Fri., June 18

Restricted course withdrawal deadline for first five-week session and eight-week session

Fri., June 25

Restricted complete withdrawal deadline for first five-week session

Thurs., July 1

First five-week session ends

August graduation filing deadline (must be met to have name appear in commencement program)

Fri., July 2

Classes are excused for Independence Day

Mon., July 5

Instruction begins for second five-week session

Mon., July 13

Unrestricted withdrawal deadline for second five-week session

Fri., July 23

Restricted complete withdrawal deadline for eight-week session

Fri., July 23

Eight-week session ends

Restricted course withdrawal deadline for second five-week session

Fri., July 30

Restricted complete withdrawal deadline for second five-week session

Fri., Aug. 6

Second five-week session ends

Commencement

Frequently Asked Questions (FAQ)

How do I apply to ASU Main?

Complete an application and have transcripts and test scores, if needed, sent directly to Undergraduate Admissions. See page 59.

How do I apply to ASU East?

Complete an application. Request transcripts and test scores be sent to Undergraduate Admissions. See page 59. For more information, call 602/727-1142.

How do I apply to ASU West?

Contact the Admissions and Records Office at ASU West. See pages 533-535. For more information, call 602/543-8123.

What if I am a transfer student?

Upon admission, note the number of semester hours on your Certificate of Admission. When registering, consult your department advisor to determine how transfer credits fit into the curriculum (see “Academic Advising,” page 69). Have you met the First-Year Composition requirement (see page 79)? If you have completed 87 or more semester hours, file a program of study or declaration of graduation (see page 81).

What if I have a disability or am a veteran?

If you have a disability and will be requesting academic accommodations, see Disability Resources for Students, pages 39-40. Veteran students using GI benefits, see page 37.

How do I get financial aid?

In addition to applying for admission, complete the FAFSA before March 1. If you meet financial aid program criteria, you receive an award notification after April 15. See pages 37, 48-50.

How do I find a place to live and purchase a meal plan?

Apply early (four to six months in advance of the semester). See pages 37-38 for information on student housing. Meal plans may be purchased in advance for ASU Main or upon arrival on campus. For more information, call Campus Dining Services at 602/965-3464. For ASU East housing, call 602/988-9160, and for ASU East dining call 602/988-2903, or refer to “ASU East” page 435 for more information on dining and housing.

What about orientation?

Attend ASU Main orientation, where questions regarding advisement, class registration, student IDs, on-campus housing, and other pertinent topics are answered. See page 60. Information regarding ASU East orientation can be obtained by calling 602/727-1041.

How do I get an ID, and what about parking?

See page 71 about obtaining an ASU student ID card. If you are planning to park at ASU Main, purchase a parking decal. See page 45. Parking on ASU East campus is free.

What about placement examinations and university testing requirements?

See pages 68-69.

Before I register for classes, how do I get an advisor?

Call the college of your major to schedule an appointment with an academic advisor. See page 69.

When and how do I register?

Refer to the *Schedule of Classes* for registration procedures and dates or access registration information online at www.asu.edu/registrar. Remember that you must first provide proof of measles immunity to Student Health. See pages 59-60.

Once I am registered and ready to go, how can I ensure my success at ASU?

Consider enrolling in UNI 100 Academic Success at the University. See page 30.

Now that the business is over, what's left to do?

Become involved in the university by getting to know professors, joining student organizations, and taking advantage of the myriad of cultural, recreational, and social opportunities. For more information on ASU Main campus life, call Student Life at 602/965-6547, REACH at 602/965-2255, or ASASU at 602/965-3161; for ASU East, call 602/727-3278. Investigate the challenges and advantages of the University Honors College. See pages 293-295.

Academic Definitions

Academic Renewal. An undergraduate who has been readmitted to the university after an absence of at least five years and who has satisfactorily completed a minimum of 12 college-approved additional semester hours in residence at ASU within three semesters after re-entry, with a GPA of 2.50 or higher in those courses and no grades lower than “C,” may, upon petition to the dean of the college, have the former record treated in the same manner as transfer credits. See pages 70–71.

Advanced Placement. Students who have taken an advanced placement course of the College Entrance Examination Board (CEEB) in their secondary school *and* who have taken an Advanced Placement Examination of CEEB may receive university credit. See pages 65–68.

AECP. The American English and Culture Program (AECP) features an intensive, course of study designed for adult international students who desire to become proficient in English as a second language. See pages 65 and 243.

ASU East. ASU East is located at the former Williams Air Force Base. See pages 434–465.

ASU Main. ASU Main is the principal campus of ASU, located in Tempe. See page 24.

ASU West. ASU West is the Phoenix branch campus of ASU, established in 1984 by the Arizona Legislature to serve the educational needs of residents in western Maricopa County. See pages 532–544.

Audit Enrollment. A student who audits a course attends regularly scheduled class sessions but earns no credit. See page 73.

Buckley Amendment. See *Family Educational Rights and Privacy Act* in this section.

CLEP. As part of the College-Level Examination Program (CLEP), students who have taken a College-Level Examination of the College Entrance Examination Board may receive university credit. See pages 66–68.

Comprehensive Exam. A comprehensive examination is intended to permit a student to establish academic credit in a field in which the student has gained experience or competence equivalent to an established university course. See pages 65–68.

Concentration. A concentration is a selection of courses within a major.

Cooperative Education. Cooperative Education is any educational program that requires alternating classroom and work experience in government or industry. The work experience exists for its educational value. See page 72.

Corequisite. A requirement to be met, such as taking a certain course, *while* taking a course is a corequisite. See *prerequisite* in this section.

Course Prefix. The course prefix is the three-letter designation assigned by each instruction unit. The “Course Prefix Index,” on pages 7–8, provides a comprehensive list. Also see *cross-listing* in this section.

Credit Enrollment. One semester hour represents a minimum of one 50-minute class exercise per week per semester. A minimum of 120 semester hours is required for graduation with a baccalaureate degree. To obtain credit, a student must be properly registered and pay fees for the course. See page 73.

Cross-listing. One course may have more than one course prefix and may be offered by more than one department. Some instruction units require students to enroll in a course under a certain prefix in order to receive credit properly. Course descriptions in the *General Catalog* indicate courses that are cross-listed.

Cum Laude. An undergraduate student with a minimum of 60 semester hours of course work at ASU and a cumulative GPA of 3.40–3.59 graduates *cum laude*. See page 83. Also see *magna cum laude* and *summa cum laude*.

Drop/Add. Drop or add is a process in which a student who has registered for courses for a semester or summer session may drop or add courses through the first week of classes in a semester or the first two days of a summer session. See page 73.

Emphasis. An area of emphasis is a selection of courses within a major.

Family Educational Rights and Privacy Act. The Family Educational Rights and Privacy Act of 1974, or Buckley Amendment, sets forth the requirements governing the protection of the privacy of the educational records of students who are or have been in attendance at Arizona State University. See page 78.

Freshman. A student who has earned 24 or fewer hours is a freshman.

General Studies Requirement. The General Studies program consists of five core areas and three awareness areas. The core areas are literacy and critical inquiry, numeracy, humanities and fine arts, social and behavioral sciences, and natural sciences. The awareness areas are cultural diversity in the United States, global awareness, and historical awareness. All undergraduate students must successfully complete a minimum of 35 semester hours of approved General Studies courses. See pages 84–108.

GPA. The ASU grade point average (GPA) is obtained by dividing the total number of ASU grade points earned by the number of ASU semester hours graded. Grade point averages are rounded to the nearest hundredth of a grade point. See page 75.

Grade Points. For the purpose of computing the GPA, grade points are assigned to each of the grades for each semester hour as follows: “A,” four points; “B,” three points; “C,” two points; “D,” one point; and “E,” zero points.

Graduate Catalog. The *Graduate Catalog* describes the procedures and requirements for enrollment in the Graduate College. See pages 282–292 of the *General Catalog* for information on the Graduate College. See pages 290–292 specifically for a complete list of graduate degrees, majors, and concentrations.

Graduate-Level Courses. Courses numbered 500–799 are designed for graduate students. However, an upper-division undergraduate student may enroll in graduate courses with the approval of his or her advisor, the course instructor, the department chair, and the dean of the college or school in which the course is offered. See page 56.

Incomplete. A mark of “I” (incomplete) is given by the instructor only when a student who is otherwise doing acceptable work is unable to complete a course because of illness or other conditions beyond the student’s control. See page 72–73.

Independent Study. The course number 499 has been reserved for independent study courses in each of the instructional departments or divisions of the colleges at the undergraduate level. Independent study courses are honor courses and may be taken only by outstanding senior students who have completed at least one semester in residence. See page 56.

International Baccalaureate. Students who have taken a higher level examination through the International Baccalaureate program may receive university credit. See page 67.

Junior. A student who has earned 56–86 hours is a junior.

Lower-Division Courses. Courses numbered 100–299 are designed primarily for freshmen and sophomores. See page 56.

Magna Cum Laude. A student with a minimum of 60 semester hours of course work at ASU and a cumulative GPA of 3.60–3.79 graduates *magna cum laude*. See page 83. Also see *cum laude* and *summa cum laude* in this section.

Major. A major is a specialized group of courses contained within the program of study. Refer to college and school sections for specific descriptions and requirements.

Minor. A minor is a specialized group of courses contained within the program of study available from some instruction units. Refer to page 109 and to college and school sections for specific descriptions and requirements.

Nonresident Tuition. This term refers to the charge assessed to nonresident students, as established in Arizona Board of Regents’ Policy 4–102. See *resident tuition* in this section.

Omnibus Course. An omnibus course is offered on an experimental or tutorial basis when the course content is new or periodically changes. See page 56.

Option. An option is a selection of courses within a major.

Pass/Fail Enrollment. A mark of “P” (pass) or “E” (fail) may be assigned for this grading option. This grading method may be used at the option of individual colleges and schools within the university. See page 73.

Placement Examination. A proficiency examination is given to: (a) waive a course requirement, (b) validate certain transfer credits in professional programs, or (c) determine a student’s ability in a field where competence is an important consideration. See page 68.

Prerequisite. A requirement to be met, such as completing a certain course, *before* registering for a course is a prerequisite. See *corequisite* in this section.

Probation. A student’s college assumes responsibility for enforcing academic standards and may place any student on probation who has failed to maintain good standing. A student on academic probation is required to observe any rules or limitations the college may impose as a condition for retention. See page 77.

Program of Study. The complete array of courses included in the study leading to a degree make up a student’s program of study. A student must file an Undergraduate Program of Study or a Declaration of Graduation for graduation within the semester he or she earns his or her 87th hour. See page 81.

Resident Tuition. This term refers to the charge assessed to all students who register for classes at ASU. See *non-resident tuition* in this section.

Restricted Complete Withdrawal. From the fifth week to the transaction deadline for a semester and from the seventh day to the transaction deadline for a summer session, students may withdraw from all courses but will receive a mark of “W” only from courses in which the instructor certifies that they are passing at the time of the withdrawal. See page 74.

Restricted Course Withdrawal. From the fifth week to the end of the 10th week of a semester and from the seventh day to the end of the third week of a summer session, students may withdraw with a mark of “W” only from courses in which the instructor certifies that they are passing at the time of withdrawal. See page 73–74.

Senior. A student who has earned 87 or more hours of credit is a senior.

Sophomore. A student who has earned 25–55 hours of credit is a sophomore.

Special Topics. Courses numbered 194, 294, 394, and 494 cover topics of immediate or special interest to a faculty member and students. See page 56.

Summa Cum Laude. A student with a minimum of 60 semester hours of course work at ASU and a cumulative GPA of 3.80–4.00 graduates *summa cum laude*. See page 83. Also see *cum laude* and *magna cum laude* in this section.

TOEFL. The Test of English as a Foreign Language (TOEFL) is taken by students whose native language is not English. See page 64–65. See also *AECF* in this section.

Transcript. An official transcript lists in chronological order all courses taken at ASU. It includes all grades received. It is signed and dated by the Registrar and displays the embossed seal of the university. The Office of the Registrar releases official transcripts only upon written request of the student for a fee of \$1.00 per copy for enrolled students or \$5.00 per copy for nonenrolled students. Additional copies ordered at the same time are \$1.00 each. The Request for Official Transcript form is available online at www.asu.edu/registrar/forms. Unofficial transcripts include all information shown on the official transcript, plus information concerning changes, additions, etc., to the record. Unofficial transcripts may be obtained free of charge in person at the Office of the Registrar, any registrar site, or by mail if a signed release is enclosed. See page 76. Also see *Family Educational Rights and Privacy Act* in this section.

Unrestricted Withdrawal. During the first four weeks of a semester or the first six days of a summer session, a student may withdraw from any course with a mark of “W.” See page 73.

Upper-Division Courses. Courses numbered 300–499 are designed primarily for juniors, seniors, and other advanced students. See page 56.

Accreditation and Affiliation

Arizona State University is accredited by the North Central Association of Colleges and Secondary Schools. Programs in the various colleges, schools, divisions, and departments are accredited by, affiliated with, or members of national bodies as described in the “Academic Accreditation,” “Academic Affiliation,” and “Academic Membership” tables. Some programs in the College of Education are approved by the State Board of Education (Ari-

zona) and the National Association of School Psychologists.

ASU West. ASU West is separately accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools. Professional programs in the various academic areas are accredited by national bodies as described in the “Academic Accreditation at ASU West” table, page 21.

Academic Accreditation

Unit or Program	Accredited by
College of Architecture and Environmental Design B.S.D., Interior Design M.Arch. M.E.P.	Foundation for Interior Design Education Research National Architectural Accrediting Board Planning Accreditation Board
College of Business all programs School of Accountancy and Information Management School of Health Administration and Policy	American Assembly of Collegiate Schools of Business American Assembly of Collegiate Schools of Business Accrediting Commission on Education for Health Services Administration
College of Education M.C., Counseling Ph.D., Counseling Psychology; Ph.D., Educational Psychology with a concentration in school psychology	Council for Accreditation of Counseling and Related Educational Programs American Psychological Association
College of Engineering and Applied Sciences B.S.E., Aerospace Engineering; B.S.E., Bioengineering; B.S.E., Chemical Engineering; B.S.E., Civil Engineering; B.S.E., Computer Systems Engineering; B.S.E., Electrical Engineering; B.S.E., Industrial Engineering; B.S.E., Mechanical Engineering B.S., Computer Science B.S., Construction	Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. Computer Science Accreditation Commission of the Computing Sciences Accreditation Board American Council for Construction Education
College of Fine Arts Department of Theatre School of Music	National Association of Schools of Theatre National Association of Schools of Music
College of Law J.D.	American Bar Association
College of Liberal Arts and Sciences B.A., B.S., Family Resources and Human Development with a concentration in human nutrition—dietetics; M.S., Family Resources and Human Development with a concentration in general family resources and human development (human nutrition and foods area) B.S., Clinical Laboratory Sciences M.S., Communication Disorders Ph.D., Psychology with a concentration in clinical psychology	American Dietetic Association National Accrediting Agency for Clinical Laboratory Sciences American Speech-Language-Hearing Association American Psychological Association

Academic Accreditation (continued)

Unit or Program	Accredited by
College of Nursing B.S.N., M.S., Nursing	American Association of Colleges of Nursing Arizona Nurses Association (American Nurses Credentialing Center's Commission on Accreditation) Arizona State Board of Nursing National League for Nursing
College of Public Programs B.S., Recreation	Council on Accreditation of the National Recreation and Park Association
Master of Public Administration	National Association of Schools of Public Affairs and Administration
Walter Cronkite School of Journalism and Telecommunication	Accrediting Council on Education in Journalism and Mass Communications
College of Technology and Applied Sciences B.S., Aeronautical Engineering Technology; B.S., Electronics Engineering Technology; B.S., Manufacturing Engineering Technology	Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
School of Social Work B.S.W., M.S.W.	Council on Social Work Education

Academic Affiliation

Unit or Program	Affiliated with
College of Architecture and Environmental Design School of Architecture	American Institute of Architects, Central Arizona and Rio Salado Chapters Architectural Research Centers Consortium Association for Computer-Aided Design in Architecture Association of Collegiate Schools of Architecture
School of Design	American Society of Interior Designers Human Factors and Ergonomics Society Industrial Designers Society of America Interior Design Educators Council International Interior Design Association Society of Environmental Graphic Designers
School of Planning and Landscape Architecture	American Planning Association American Society of Landscape Architects Association of Collegiate Schools of Planning Council of Educators in Landscape Architecture Society for Range Management Soil and Water Conservation Society Wildlife Society
College of Education	American Association of Colleges for Teacher Education American Educational Research Association The Holmes Partnership University Council for Educational Administration
College of Public Programs Department of Recreation Management and Tourism School of Justice Studies	American Humanics, Inc. Onati International Institute for the Sociology of Law

Academic Membership

Unit or Program	Membership with
College of Education	American Association of Colleges for Teacher Education Association of Colleges and Schools of Education in State Universities and Land Grant Colleges The Holmes Partnership University Council for Educational Administration
College of Law	Association of American Law Schools
College of Liberal Arts and Sciences	
Department of Anthropology	American Anthropological Association Council for Museum Anthropology
Department of Biology	American Institute of Biological Sciences American Society of Naturalists American Society of Zoologists Animal Behaviorists' Society Sigma Psi
Department of Chemistry and Biochemistry	American Association for Advancement of Science American Chemical Society
Department of Exercise Science and Physical Education	American Society for Advancement of Science American Alliance for Health, Physical Education, Recreation and Dance American College of Sports Medicine American Physical Society Arizona Society of Medical Technology Committee on Allied Health Education National Association for Physical Education in Higher Education North American Society for Sports History North American Society for Sports Psychology and Physical Activity
Department of Family Resources and Human Development	American Dietetic Association
Department of Geography	Association of American Geographers
Department of Geology	American Association of Petroleum Geologists American Geophysical Union American Institute of Professional Geologists Geological Society of America Mineralogical Society of America Society of Economic Paleontologists and Mineralogists
Department of History	American Association for State and Local History American Association of Museums American Historical Association Institute of Historical Research
Department of Languages and Literatures	American Council on Teaching Foreign Language International Studies Association Modern Language Association
Department of Mathematics	American Mathematical Society Mathematical Association of America Rocky Mountain Mathematics Consortium Society for Industrial and Applied Mathematics
Department of Microbiology	American Society of Microbiology
Department of Military Science	Association of U.S. Army
M.S., Ph.D., Molecular and Cellular Biology	American Society of Medical Technology
Department of Philosophy	American Philosophical Association

Academic Membership (continued)

Unit or Program	Membership with
Department of Physics and Astronomy	Acoustical Society of America American Association of Physicists in Medicine American Association of Physics Teachers American Astronomical Society American Crystallographic Association American Physical Society American Vacuum Society International Astronomical Union Materials Research Society Optical Society of America
Department of Plant Biology	American Association of Plant Physiologists Botanical Society of America Mycological Society of America Phycological Society of America
Department of Political Science	American Political Science Association Inter-University Consortium for Political and Social Research
Department of Psychology	American Society of Clinical Psychologists
Department of Sociology	American Sociological Association
Department of Women's Studies	Association for Women in Science National Women's Studies Association
College of Nursing	American Association of Colleges of Nursing Western Institute of Nursing
College of Public Programs	
Department of Communication	Speech Communication Association Western States Communication Association
Department of Recreation Management and Tourism	Arizona American Indian Tourism Association Arizona Heritage Alliance Arizona Park and Recreation Association Arizona State Therapeutic Association National Park and Recreation Association Travel Tourism Research Association
School of Justice Studies	Arizona Justice Educators Association of Criminal Justice Doctoral Programs
School of Public Affairs	National Academic Advising National Association of Schools of Public Affairs and Administration
Walter Cronkite School of Journalism and Telecommunication	Association of Schools of Journalism and Mass Communication Broadcast Education Association
University Honors College	National Collegiate Honors Council

Academic Accreditation at ASU West

Unit or Program	Accredited by
College of Human Services	
Department of Recreation and Tourism Management	National Recreation and Park Association/American Association for Leisure and Recreation
Department of Social Work	Council on Social Work Education
School of Management all programs	American Assembly of Collegiate Schools of Business

General Information

Arizona State University provides an opportunity for students from all racial, cultural, and economic backgrounds to pursue a full range of high-quality academic programs. The university actively seeks to have reflected within its student body and among its employees the rich diversity of cultures found within the state, the nation, and the world.

Active research programs contribute to and expand knowledge, thereby serving the instructional needs of students, contributing to the professional advancement of the faculty, and enhancing economic, social, cultural, and technological progress.

The university's teaching, research, and service programs seek to instill in students sensitivity to other races and cultures and a spirit of critical inquiry and challenge them to seek answers to fundamental questions of human concern. The university's support programs contribute to the academic success and personal development of all students.

The university seeks to expand cultural horizons, enhance respect for human diversity, improve moral and ethical standards, and educate for responsible citizenship while preparing its graduates to accept and perform capably in rewarding careers in our pluralistic society.

MISSION

Arizona State University has emerged as a leading national and international research and teaching institution with a primary focus on Maricopa County, Arizona's dominant population center. This rapidly growing, multicampus public research university offers programs from the baccalaureate through the doctorate for approximately 49,000 full-time and part-time students through ASU Main in Tempe; ASU West in northwest Phoenix; a major educational center in downtown Phoenix; ASU East, located at the Williams Campus (formerly Williams Air Force Base) in southwest Mesa; and other instructional, research, and public service sites throughout Maricopa County. ASU is a modern university that applies its research capabilities to the rapidly evolving needs of Maricopa County and the state.

As a leading public university, Arizona State University's goal is to be-

come a world-class university in a multicampus setting, one of the very best public universities in the nation. The university's mission is to provide outstanding programs in instruction, research, and creative activity, to promote and support economic development, and to provide service appropriate for the nation, the state of Arizona, and the state's major metropolitan area. To fulfill its mission, ASU places special emphasis on the core disciplines and offers a full range of degree programs—baccalaureate through doctorate. To become competitive with the very best public universities, the institution recognizes that it must offer quality programs at all degree levels in a broad range of fundamental fields of inquiry. ASU will continue to dedicate itself to superior instruction, to excellent student performance, to original research, creative endeavor, and scholarly achievement, and to outstanding public service and economic development activities. As a result of this dedication, ASU was awarded the prestigious Research I university status in 1994, recognizing ASU as a premier research institution.

ORGANIZATION

Arizona State University is part of a university system governed by the Arizona Board of Regents, a body corporate and politic with perpetual succession under the constitution and laws of Arizona. The board consists of eight citizens appointed by the governor of the state for terms of eight years, and one student regent serving for one year with the elected governor and state superintendent of public instruction as members *ex officio*.

The regents select and appoint the president of the university, who is the liaison between the Arizona Board of Regents and the institution. The president is aided in the administrative work of the institution by the senior vice president and provost, other provosts, vice presidents, deans, directors, department chairs, faculty, and other officers. Refer to "Academic Organization," page 9, and "Administrative and Academic Personnel," pages 522–527.

The academic units develop and implement the teaching, research, and service programs of the university, aided by the university libraries, museums, and other services.

The faculty and students of the university play an important role in educational policy, with an Academic Senate, joint university committees and boards, and the Associated Students serving the needs of a large institution.

EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION

It is the policy of ASU to provide equal opportunity through affirmative action in employment and educational programs and activities. Discrimination is prohibited on the basis of race, color, religion, national origin, citizenship, sex, sexual orientation, age, disability, special disabled veteran or Vietnam-era veteran status. Equal employment opportunity includes but is not limited to recruitment, hiring, promotion, termination, compensation, benefits, transfers, university-sponsored training, education, tuition assistance, and social and recreational programs.

ASU is committed to taking affirmative action in increasing opportunities at all levels of employment and to increasing participation in programs and activities by all faculty, staff, and students. Affirmative action is directed toward minority persons, women, special disabled veterans, Vietnam-era veterans, and persons with disabilities.

University Policy Prohibiting Discriminatory Harassment

Harassment Prohibited. Subject to the limiting provisions of "Freedom of Speech and Academic Freedom" specified below, it is a violation of university policy for any university employee or student to subject any person to harassment on university property or at a university-sponsored activity.

Harassment Defined. Actions constitute harassment if (1) they substantially interfere with another's educational or employment opportunities, peaceful enjoyment of residence, physical security, and (2) they are taken with a general intent to engage in the actions and with the knowledge that the actions are likely to substantially interfere with a protected interest identified above. Such intent and knowledge may be inferred from all the circumstances.

Freedom of Speech and Academic Freedom. Neither this nor any other university policy is violated by actions that amount to expression protected by the state or federal constitutions or by

related principles of academic freedom. This limitation is further described in the ASU First Amendment Guidelines, the current version of which supplements this policy and is available in the Office of the General Counsel.

Relationship to the Work of the Campus Environment Team. If harassment is discriminatory, it falls within the education, monitoring, reporting, and referral functions of the Campus Environment Team. Harassment is discriminatory if taken with the purpose or effect of differentiating on the basis of another person's race, sex, color, national origin, religion, age, sexual orientation, disability, or Vietnam-era veteran status.

HISTORY OF ARIZONA STATE UNIVERSITY

On February 26, 1885, House Bill 164, "An Act to Establish a Normal School in the Territory of Arizona," was introduced in the 13th Legislative Assembly of Arizona Territory by John Samuel Armstrong. The bill, strongly supported by Charles Trumbull Hayden of Tempe, passed the House on March 6 and the Council on March 11 and was signed by Governor F.A. Tritle on March 12, 1885, thereby founding the institution known today as Arizona State University. Under the supervision of Principal Hiram Bradford Farmer, instruction was instituted on February 8, 1886, when 33 students met in a single room on land donated by George and Martha Wilson of Tempe.

The institution began with the broad obligation to provide "instruction of persons...in the art of teaching and in all the various branches that pertain to good common school education; also, to give instruction in the mechanical arts and in husbandry and agricultural chemistry, the fundamental law of the United States, and in what regards the rights and duties of citizens."

With the growth of the state, especially the surrounding Phoenix metropolitan area, the school has carried forward this charter, accompanied by successive changes in scope, name, and governance.

The Early Years. For the first 14 years, the school was governed by six principals. At the turn of the century and with another new name, Normal School of Arizona, President Arthur John Matthews brought a 30-year tenure of progress to the school.

He assisted in changing the school to an all-college student status; the Normal School had enlisted high school students who had no other secondary educational facilities in Arizona. He embarked on a building schedule that included the state's first dormitories. Of the 18 buildings constructed while Matthews was president, six are still in use. His legacy of an "evergreen campus," with the import of many shrubs and trees and the planting of Palm Walk, continues to this day: the main campus is a nationally recognized arborum.

Matthews also saw to it that the Normal School was accredited outside the state. His service on national education organization boards was conducive to this recognition. The school remained a teacher's college in fact and theory during Matthews' tenure, although the struggle to attain status as a university was ongoing.

An extraordinary event occurred March 20, 1911, when former President Theodore Roosevelt visited the Tempe school and spoke from the steps of Old Main. He had dedicated the Roosevelt Dam the day before and was impressed with Arizona. He noted that construction of the dam would benefit central Arizona's growth and that of the Normal School. It would be another year before the territory became a state.

During the Great Depression, Ralph W. Swetman was hired as president to "sweep clean," firing those faculty who did not have master's or doctoral degrees in order to follow North Central Association of Colleges and Secondary Schools guidelines.

The Gammage Years. In 1933, Grady Gammage, then president of Arizona State Teachers College at Flagstaff, became president of Arizona State Teachers College at Tempe, a tenure that would last for nearly 28 years.

On March 8, 1945, the three state institutions of higher learning came under the authority of one Arizona Board of Regents, which oversees ASU today.

The phenomenal growth of the college began after the end of World War II. Dr. Gammage had foreseen that the G.I. Bill of Rights would flood campuses everywhere with returning veterans. Many of the veterans who had received military training in Arizona had fallen in love with the state and vowed to return after the war. The numbers within one year were staggering: in the

fall semester of 1945, 553 students were enrolled; over the weekend semester break in January 1946, enrollment increased 110% to 1,163 students. Successive semesters saw continuing increased enrollment.

Like his predecessor, Dr. Gammage oversaw the construction of a number of buildings. His greatest dream, that of a great auditorium, came five years after his death. He laid the groundwork for it with Frank Lloyd Wright, who designed what is now the university's hallmark building, Grady Gammage Memorial Auditorium, built in 1964.

Years of Growth and Stature. During the 1960s, with the presidency of Dr. G. Homer Durham, Arizona State University began its academic rise with the establishment of several new colleges (the College of Fine Arts, the College of Law, the College of Nursing, and the School of Social Work) and the reorganization of what became the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Perhaps most important, the university gained the authority to award the Doctor of Philosophy and other doctoral degrees.

The next three presidents—Harry K. Newburn, 1969–71, John W. Schwada, 1971–81, and J. Russell Nelson, 1981–89—and Interim President Richard Peck, 1989, led the university to increased academic stature, expansion of the campuses, and rising enrollment. With approximately 49,000 students, ASU is the fifth largest university in the nation.

On January 1, 1990, Dr. Lattie F. Coor, a native Arizonan, became 15th in the institution's succession of principals and presidents. He has highlighted undergraduate education, research, cultural diversity, and economic development as the "four pillars" of the university's agenda. He has taken steps in these areas by further defining the role of ASU West and by initiating the establishment of ASU East.

Research I Status. ASU was named a Research I university by the Carnegie Foundation for the Advancement of Teaching in early 1994. Nationally, 88 universities have been granted this status, indicating successful garnering of support for research projects and educating future scientists.

Athletics

The original nickname for the Normal School of Arizona athletic teams was the Owls. Athletics other than Sunday hikes and lawn tennis were not part of the early curriculum.

During President Matthews' tenure, some team competition began. The Tempe Bulldogs saw some interesting and rough competition with the University of Arizona Wildcats (almost always on the losing end), but usually they competed against smaller schools around the state.

Dr. Gammage realized that athletics was a way to garner monetary support from the community. With the establishment of the Sun Angel Foundation in 1946, a new era began. The college's teams became the Sun Devils and, with a succession of fine coaches and an increasingly strong commitment to sports, became known worldwide. Today the university attracts students from throughout the world to its athletic programs.

In 1979, the university joined the Pacific-10 Conference. In 1987, ASU became the first Arizona football team to play in the Rose Bowl, defeating the University of Michigan Wolverines 22–15. ASU made its second appearance in 1997 versus Ohio State.

In 1997, Arizona State University finished 13th nationally in the Sears Directors' Cup which recognizes the top athletic programs in the country. The women's golf team won its fourth NCAA championship in five years in 1996–97.

UNIVERSITY CAMPUSES AND SITES

ASU Main. ASU Main is located near the heart of metropolitan Phoenix in the city of Tempe (population 160,000). Nearby are the municipalities that make up the fast-growing Valley of the Sun: Chandler, Gilbert, Glendale, Mesa, Scottsdale, and other communities.

ASU Main comprises more than 700 acres and offers outstanding physical facilities to support the university's educational programs. Buildings are modern, air-conditioned, and attractively designed.

Broad pedestrian malls laid out in an easy-to-follow grid plan, bicycle lanes connecting all parts of the university, and spacious lawns and subtropical landscaping characterize a campus

servicing the physical, aesthetic, and educational needs of students, faculty, and staff.

ASU East. The university's third campus, ASU East, opened at the Williams Campus in the fall of 1996, serving more than 1,000 students in degree programs offered by the College of Technology and Applied Sciences and School of Agribusiness and Resource Management, programs offered at no other Arizona campus. In 1997, East College was created to provide support courses for existing programs and to generate new degree programs at ASU East.

ASU East has joined with Chandler-Gilbert Community College (CGCC) in the New Partnership in Baccalaureate Education that allows students to graduate in four years with an ASU baccalaureate degree earned entirely at the Williams Campus, at some savings in tuition.

The campus includes excellent educational facilities and unique residential opportunities, including a choice of traditional residence halls or two- to five-bedroom homes.

ASU East is a student centered campus that offers many of the features of a small college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area. A shuttle service provides transportation between ASU East and ASU Main. The 600-acre ASU East campus is easily accessible via major interstate routes. For more information, see pages 434–465.

ASU West. ASU West is a campus of Arizona State University that offers upper-division undergraduate and graduate programs in the arts and sciences and in selected professional fields.

The campus is located between 43rd and 51st Avenues on West Thunderbird Road in Phoenix. Immediately west of the campus is the city of Glendale. The core campus was completed in March 1991 and includes the Fletcher Library, the Sands Classroom Building, the Classroom Laboratory/Computer Building, the Faculty and Administration Building, Kiva Lecture Hall, and the University Center Building.

For more information, see pages 532–544 of this catalog. For complete information and course listings, see the *ASU West 1998–99 Catalog*.

ASU Extended Campus. The ASU Extended Campus goes beyond the boundaries of the university's three physical campuses to provide access to academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; plus innovative delivery technologies, including television, the Internet, CD-ROM, and independent learning. The Extended Campus offers programs in partnership with the campuses and colleges of ASU. The Extended Campus also offers a variety of professional continuing education programs and community outreach. The ASU Downtown Center is the anchor location of the Extended Campus. Through the Extended Campus, lifelong learning opportunities are offered to students of all ages via stimulating courses, lecture series, and educational travel. Programs in the Sun Cities area are geared toward the retirement communities and include a wide variety of courses from approximately 30 disciplines. These programs are in the process of expansion throughout Maricopa County.

ASU Downtown Center. Located in downtown Phoenix at the Mercado, 502 E. Monroe, the ASU Downtown Center offers a variety of daytime and evening courses of interest to employees in private businesses and government agencies and to individuals seeking personal growth and enrichment. These courses are offered either in a traditional classroom manner or via interactive television. In addition, microcomputer training classes are taught during daytime and evening hours. Professional continuing education and certificate programs are offered to working professionals. ASU mainframe and Internet access is available through the center's computer lab and library services.

For more information, see page 243.

ASU Research Park. The mission of the ASU Research Park is to enhance Arizona's high value research-based economic development and to build the university's capacity to educate and advance knowledge. To this end, the Research Park serves to attract to Arizona new corporate and regional headquarters and research and development firms that broaden the base for potential research among ASU departments, interact with graduate students, consult with university faculty, cosponsor

seminars on research topics, and provide employment opportunities for graduates at ASU.

Long-term excess revenues from ground leases within this 324-acre park flow back to the ASU foundation to be used for scholarships. The Research Park has several major tenants—Iridium North America, Fiberite, VLSI, Walgreens Healthcare Plus, Motorola University, Motorola Flat Panel Display Division facility, and the National Association of Purchasing Management—who occupy a 50,000-square-foot multitenant building developed by Transamerica Corporation and the Lakeside Technology Center, and a 44,000-square-foot building developed by Price-Elliot Research Park, Inc. The Research Park is part of the ASU effort to become a major research university by attracting high-quality private and public research firms and institutions.

Camp Tontozona. Located in the famed Mogollon Rim country near Kohl's Ranch, northeast of Payson, this continuing education facility of the university serves the needs of academic departments conducting teaching and research in mountain terrain. The camp is also available to faculty, staff, graduate students, and alumni for family use. For more information, call 602/965-6851.

The Arboretum. The Arboretum at Arizona State University is a flourishing oasis of plants from around the world. Dedicated on November 20, 1990, this virtual outdoor classroom includes 162 species/varieties of trees and 172 species/varieties of other woody ornamental and herbaceous plants from diverse geographic regions as well as the Sonoran Desert. It contains one of the best collections of palms and conifers in the desert Southwest and a growing collection of native Southwestern plants.

The Arboretum actually began with Arthur J. Matthews. By the time Matthews' 30-year reign as president was finished, nearly 1,500 trees of 57 varieties and more than 5,700 feet of hedges were planted. One of his most enduring landscape projects was the planting of Palm Walk in 1916, which extends from University Drive south to Orange Mall.

Several Arboretum walking tours are designated on campus, including the historic north campus tour, the green trail tour, and the red trail tour.

UNIVERSITY LIBRARIES AND COLLECTIONS

The collections of the university's libraries comprise more than 3 million volumes, approximately 6.6 million microform units, and more than 36,000 periodical and serial subscriptions. Computer access to commercially and locally produced databases and the ability to borrow research materials from other libraries enhance local resources. ASU is a member of the Association of Research Libraries and the Center for Research Libraries.

For telephone numbers, see the "ASU Main Directory" on pages 528-530.

Charles Trumbull Hayden Library. The Charles Trumbull Hayden Library, designed by Weaver and Drover in 1966, houses the largest multidisciplinary collection. In addition to the open stack areas, separate collections and service areas include Current Periodicals and Microforms; Government Documents; Interlibrary Loan and Document Delivery Services; Labriola National American Indian Data Center; Library Instruction, Systems, and Technology (L.I.S.T.); Reference; Reserve; Special Collections; and Archives and Manuscripts, which includes the Arizona Collection, the Chicano Research Collection, and the Visual Literacy Collection.

Specialized collections include comprehensive holdings of the Pre-Raphaelite period, a 14th-century manuscript on algebra, the child drama collection, the Thomas Mosher collection, the William S. Burroughs collection, and the papers of several major Arizona political figures.

Architecture and Environmental Design Library. The Architecture and Environmental Design Library, located in the College of Architecture and Environmental Design/North building, contains books and periodicals pertinent to areas of study within the college. See page 114 for more information.

Arizona Historical Foundation Library. Under a cooperative agreement with ASU, the Arizona Historical Foundation houses a library of several thousand volumes, manuscript collections, maps, and photographs, and a

large collection of audio/visual materials. Housed in the Charles Trumbull Hayden Library, the collection's focus is on the history of Arizona and the Southwest.

Fletcher Library. Located at the ASU West campus, Fletcher Library utilizes a range of electronic systems, from compact discs to telecommunications networks, to provide access to resources and delivery of materials. Its holdings include over 280,000 volumes, 3,600 serial subscriptions, and 1.4 million microfilms selected to complement ASU West course offerings.

Law Library. The John J. Ross-William C. Blakley Law Library is located on McAllister Avenue. See page 296 for more information.

Music Library. A large collection of music scores, recordings, books, music reference materials, and listening facilities for individuals and groups are located on the third floor of the Music Building, West Wing.

Daniel E. Noble Science and Engineering Library. The Daniel E. Noble Science and Engineering Library houses books, journals, and microforms in the sciences and engineering, the Map Collection, and the U.S. Patent and Trademark Depository.

University Archives. The University Archives collection (1885–present) of university theses and dissertations, administrative records of the university, historical photographs and personal papers of faculty, staff, and alumni as well as student, faculty, and official university publications are available for use at the Luhrs Reading Room in Hayden Library. The historic University Archives Building on Tyler Mall is the home of the 1907 Gallery, which hosts exhibits of historical photographs from the collections of the Department of Archives and Manuscripts.

PERFORMING AND FINE ARTS FACILITIES

Computing Commons Gallery. One of the unique features of the Computing Commons building is an art gallery, located off the main lobby in the northwest corner of the building. The gallery has design features that are unique for

showcasing technology-based artwork and displays. The Computing Commons gallery can support display of national online computer art networks (e.g., via Internet) and holographic displays, as well as more traditional two-dimensional graphic presentations. This is an exciting decade for the arts as new technology-based tools and techniques open new avenues for creativity, as demonstrated by the exhibits in the Computing Commons Gallery.

Dance Studio Theatre. Located in the Physical Education Building East, the Dance Studio Theatre is a 6,000-square-foot dance studio that also serves as a proscenium-style performance space. The 300-seat theatre is devoted to informal and formal showcases of student and faculty choreographic work.

Drama City. Representing a synthesis of the creative energies of the Institute for Studies in the Arts and the Department of Theatre, Drama City is an 1,800-square-foot black-box theatre that serves as a laboratory for the development and presentation of experimental and innovative theatrical and interdisciplinary works.

Gallery of Design. Housed in the College of Architecture and Environmental Design, the Gallery of Design features traveling exhibitions on design and urban issues.

Paul V. Galvin Playhouse. Built to stage the largest productions of the ASU Theatre, the Paul V. Galvin Playhouse is a 496-seat proscenium-stage theatre set at the east end of the Nelson Fine Arts Center. The Department of Theatre's annual season of 12 to 15 plays also includes productions in the Lyceum and Prism theatres and the Fine Arts Center Studios.

Grady Gammage Memorial Auditorium. A versatile center for the performing arts designed by Frank Lloyd Wright and named for the late President Grady Gammage, Grady Gammage Memorial Auditorium seats 3,000 and has won wide acclaim for its design and acoustics. In addition to the great hall and related facilities—including the Aeolian-Skinner organ contributed by Hugh W. and Barbara V. Long—the building contains classrooms and workshops for the College of Fine Arts.

Katzin Concert Hall. Located in the new music building expansion, the Katzin Concert Hall seats 350 people. Primarily used for solo and chamber music recitals, the hall houses a nine-foot Hamburg concert Steinway piano. The acoustics are enhanced by the maple-paneled stage and the multifaceted walls and ceiling.

Louise Lincoln Kerr Cultural Center. Located in Scottsdale, the Louise Lincoln Kerr Cultural Center offers cultural events, especially in the performing arts, to the community.

Lyceum Theatre. A small but technically sophisticated 164-seat proscenium-theatre, the Lyceum Theatre is a theatre laboratory devoted to the work of student playwrights, directors, and actors.

Music Theatre. As part of the music complex, the Music Theatre, modeled after the Wagnerian Theatre in Bayreuth, Germany, rises five stories and seats an audience of 500. This theatre is the home of many opera and musical productions.

J. Russell and Bonita Nelson Fine Arts Center. Designed by Albuquerque architect Antoine Predock, the J. Russell and Bonita Nelson Fine Arts Center is a spectacular, 119,000-square-foot village-like aggregate of buildings that includes five galleries of the ASU Art Museum, the Paul V. Galvin Playhouse, the University Dance Laboratory, seven specialized theatre and dance studios, a video studio, and a variety of scenic outdoor features, including courtyards, fountains, pools, and a 50-by-100-foot projection wall designed for outdoor video.

Northlight Gallery. The Northlight Gallery is dedicated to museum-quality exhibitions of historical and contemporary photography. Located in Matthews Hall, it is open during the academic year.

Organ Hall. Located in the new music building expansion, the Organ Hall houses the Fritts Organ. This tracker-action pipe organ is designed to capture the qualities of baroque European organs. The hall is designed to complement the organ with a barrel-vaulted ceiling and wooden benches to seat 175 persons.

Prism Theatre. The Prism Theatre is an alternative black box space devoted to multiethnic, new, or experimental works.

Recital Hall. Located on the fifth floor of the music building, the Recital Hall is an intimate 125-seat facility that opens onto a rooftop courtyard.

Sundome Center for the Performing Arts. As America's largest single-level theatre, the Sundome Center for the Performing Arts in Sun City West has 7,169 seats. The theatre is equipped with sophisticated and state-of-the-art lighting systems, and a single-span roof affords each seat a clear view. As one of Arizona's premier entertainment venues, the Sundome provides a varied array of top entertainment from Las Vegas concerts to classical ballets to celebrity lectures.

Television Station KAET. KAET, Channel 8, is the university's PBS station. Studios of the award-winning station are located in the Stauffer Communication Arts Building. To operate 24 hours a day, KAET employs more than 50 ASU students and interns. To learn more about KAET-TV, visit its Web site at www.kaet.asu.edu or call 602/965-3506.

University Art Museum. The University Art Museum collections are housed in a large complex of galleries and art study rooms in two locations: the Nelson Fine Arts Center and the second floor of the Matthews Center. The Oliver B. James Collection of American Art ranges from the early 18th century to the contemporary and includes major works by Stuart, Ryder, Homer, and the Ash Can School painters. Master works by great printmakers such as Durer, Rembrandt, Whistler, and Hogarth are often featured in special exhibitions selected from the university's extensive print collection.

The gallery devoted to Latin American art features folk art as well as paintings by celebrated contemporary artists Rivera, Siqueros, and Tamayo. The museum also displays many fine examples of 19th- and 20th-century crafts, paintings, and sculpture.

The contemporary art holdings include works by Vernon Fisher, Leon Golub, Sue Coe, Luis Jimenez, and Robert Colescott. Exhibitions curated by the museum emphasize contempo-

rary art and new media, crafts, and Mexican art.

University Dance Laboratory. A flexible performance space within the Nelson Fine Arts Center, the University Dance Laboratory is designed specifically for experimental dance productions. Along with the Dance Studio Theatre in the Physical Education Building East, the University Dance Laboratory is used by the Department of Dance for its season performances.

Harry Wood Gallery. Housed in the Art Building (ART 120), the Harry Wood Gallery provides temporary exhibitions of the visual arts during the academic year.

COMPUTING FACILITIES AND SERVICES

Computers are a fundamental tool for research, instruction, and learning in every college and department at ASU. A variety of computing equipment and services are available for use by students, faculty, and staff.

Information Technology (IT) services provide programming, statistical, graphics, and other applications for microcomputers and mainframe computing systems. These services, including university-wide electronic mail and the library's online catalog, are accessible through a communications network from many sites and offices on and off campus via telephone connection. Communication with other research facilities is possible through the Internet.

A wide range of information on campus activities and related topics is available online. Faculty, staff, and students can access the ASU Home Page on the World Wide Web at www.asu.edu.

This Web site features a complete source of ASU information with text, photos, audio, and video. Via the Internet, ASU students, faculty, and staff also have access to the thousands of information systems around the world. The ASU server contains such information as a phone and electronic mail directory, the *Schedule of Classes*, the athletic calendar of events, weather forecasts from around the United States, and information from various colleges, departments, and organizations.

Educational services to assist faculty, students, and staff include online documentation, online consulting facilities,

online tutorials, videotaped and written materials, and noncredit seminars.

IT provides the following service centers for the ASU academic community.

Computing Commons. The Computing Commons building (CPCOM) was opened in 1993 to provide the university with an ideal setting to learn and experience the vast new frontier of high-performance computing. The Computing Commons draws together students, faculty, and staff from all disciplines, creating an environment designed to foster maximum interaction. The building and its facilities have drawn national recognition and acclaim as a model facility for the support of instruction and research in a technology-based environment. The Computing Commons houses a 200-workstation computing site, nine electronic classrooms, a Visualization Center, the Computing Assistance Center (COMPASS), a computer store, and a technology-based art gallery.

Computing Assistance Center. The Computing Assistance Center (COMPASS) has a library of reference manuals, computing periodicals, and other information concerning computing systems and software. Self-paced training is available for a variety of subjects on Windows, DOS, Macintosh, and mainframe computers. COMPASS also distributes communication, virus protection, and other site-license software.

Computer Training. ASU faculty and staff may register for hands-on, instructor-led classes on many PC applications, electronic mail, Internet applications, Web page development, statistical applications, and operating systems. Self-paced training is also available to faculty, staff, and students for a variety of subjects on Windows, DOS, Macintosh, and mainframe computers in COMPASS, CPCOM 202. To register for a class or to request a training schedule, call 602/965-2700 or access the training information online at www.asu.edu/it/fyi/help/trainingschedule.html.

Computing Consulting. ASU faculty, staff, and currently enrolled students can obtain computing consulting by calling 602/965-6500 or on a walk-in basis at COMPASS, CPCOM 202.

Consulting services are offered for ASU systems and software, including

1. networks and communications (data communications, utilizing ASU facilities; departmental local area networks; data communications software support);
2. electronic mail (VM/CMS, Exchange/Outlook, or microcomputer based electronic mail software; electronic post office; conferencing software; Internet);
3. microcomputing (support for faculty and staff who use microcomputers in their homes or offices, including assistance with a variety of software [e.g., word processing, spreadsheets, and database management systems]); and
4. research computing (statistical computing [e.g., SAS, SPSS]; programming questions [e.g., FORTRAN and C]; and software use on Academic Workstation Cluster, MVS, UNIX, National Supercomputing Centers, most workstation class machines, and the Visualization Center).

Instructional Support. Instruction Support (is.asu.edu) serves as a development center for the design and delivery of instruction utilizing technology. The Instruction Support Group is composed of interrelated units under which a wide range of talent and expertise is centrally available. Instruction Support is staffed by students, faculty, and researchers skilled in the areas of system design, graphics, interactive software, networked delivery, and digital video. The group facilitates not only the development of instruction within the realm of currently available technology, but also extends the potential to drive innovation and development. From this perspective, Instruction Support takes on the flavor of a research and development unit, a production group, and a training facility, in addition to providing an incubator for technological innovation.

The Instruction Support Group works in collaboration with faculty in the coordination of cross-disciplinary research and production projects relating to the integration of technology with education. Through partnerships with faculty and groups outside ASU, grant writing teams are able to leverage for support that may not otherwise be

attainable by a single academic unit or faculty member. Central to effective support service is the establishment of a partnership among the various support units within the university. Instruction Support coordinates the efforts of groups, including the College of Extended Education, University Libraries, Disabled Student Resources, and the Office of Research and Creative Activities, providing faculty with a wide array of support services.

Instruction Support offers courses tailored toward enhancing the instructional use of technology by the university teaching community. Courses range from an introduction to technology in education through advanced and customized approaches for instructors in specific programs.

Instruction Support (IS) Lab. The IS Lab provides an environment in which faculty may seek and receive one-on-one, guided or independent support for course development and delivery. Expert staff work closely with faculty to refine and develop their skills and confidence in the design and delivery of instruction through a variety of technology supported means, including synchronous and asynchronous learning. Located on the second floor of the Computing Commons, the IS Lab provides faculty, university professionals, and graduate students with a unique opportunity to integrate technology with instruction. The IS Lab sponsors workshops and demonstrations, and serves as a dynamic clearinghouse of information and referrals for effective integration of technology with education.

Research Support. Research Support provides assistance to faculty, staff researchers, and students in both scientific and creative endeavors. Research Support encompasses both processing and operations. Processing involves consulting with software tools and program coding directly related to projects or specific research. Operational activities support the overall work flow of university computing facilities. Activities include consulting for Computation, Statistics, Visualization and Geographical Information System platforms in conjunction with software package installation/use, training, media conversion, and product evaluation.

A variety of computation facilities are provided in support of research and creative endeavors within the ASU community. Computing facilities range from individual workstations to SMP/MPP servers and mainframes. Extended computer capabilities are available through access to national computing centers.

Geographic Information Systems (GIS) Lab and Visualization Center.

The GIS Lab and Visualization Center both seek to establish partnerships with faculty, staff, and students to acquire, create, and enhance research and creative endeavors through the effective use of Visualization and GIS technologies.

The Visualization Center is located in CPCOM 235. The center offers faculty, staff, and graduate students hardware and software resources and services for high-level graphics and visualization used in research. Researchers can receive assistance with interactive viewing of scientific data with topics from both the Liberal and the Performing Arts and other visually related endeavors. The Visualization Center serves as an incubator for developing technologies in software, hardware, and communications.

The GIS Lab staff assists researchers with hardware and software to facilitate the creation of geographic information systems for spatial analysis, query, and display. The Lab supports research from various disciplines and provides additional resources to students who are enrolled in classes for GIS instruction. The GIS Lab, also located in CPCOM 235 serves as a focal point for GIS users to meet and share information and technical expertise.

ALUMNI ASSOCIATION

Founded in 1894, the Alumni Association is a volunteer-led organization committed to serve and unite alumni for the purpose of advancing Arizona State University. The association provides a variety of services for ASU alumni as well as a series of events scheduled around the country.

With more than 200,000 alumni living in every state and throughout the world, the association plays an important role as the university's primary support organization. Comprising more than 40 groups, the campus, college, club, and chapter organizations (4Cs)

of the association provide opportunities for all alumni to stay involved with the part of ASU that interests them most.

Members of the ASU Alumni Association Board of Directors are elected each summer.

The association's professional staff is led by Executive Director Susan Clouse Dolbert.

For information about the association or its board of directors, call 1-800-ALUMNUS or 602/965-ALUM (2586).

PROGRAM ASSESSMENT AND THE OFFICE OF UNIVERSITY EVALUATION

The Office of University Evaluation is a research and service facility that focuses on assessing and improving the effectiveness of the university's academic and support programs. The office conducts, coordinates, and manages research designed to measure the degree to which courses, curricula, and academic programs impart knowledge and skills to students as well as the quality of support provided to students. The results of these studies, or assessments, are used to enhance both the support provided to students and the intellectual integrity of an ASU education.

In order for the university to assess and improve its programs, periodic measurement of student experiences, perceptions, and intellectual growth must be obtained. When asked by the university, students are expected to participate in one or more evaluative procedures, such as the ASU Report Card. These evaluative procedures are designed to assess the efficacy of the total university experience, including teaching and learning and support programs and are not used in individual grading. The information obtained is one of the means used to improve the quality of the educational experience for this and future generations of ASU students.

DIVISION OF UNDERGRADUATE ACADEMIC SERVICES

The Division of Undergraduate Academic Services was formed in 1993 to provide a focus for the university's undergraduate initiative.

The goals of the division are to improve the five-year graduation rate of ASU undergraduates, increase the retention of first-year students, improve

the foundational skills (numeracy and literacy) of undergraduates, and increase employer and graduate satisfaction with an ASU education.

The division includes the Writing Across the Curriculum program (for course listings, see page 330), the Service Learning Project, the University 100 program (see UNI courses below), the Cross-college Advising Services (see page 69), and the Degree Audit Report System (DARS). The Bachelor of Interdisciplinary Studies (B.I.S.) is administered through this division (see pages 110-111).

UNIVERSITY (UNI)

UNI 100 Academic Success at the University. (3) F, S, SS

Mastery in time management, notetaking, test taking, college text reading, university library use, goal setting, and use of university resources. Lecture, discussion, co-op learning. Prerequisite: freshman or sophomore or transfer student standing.

UNI 101 Student Success Seminar. (1) F, S, SS

Understanding human diversity, perspectives, and values as they relate to student success. Orientation to ASU resources, study skills, and academic and social issues for students. Seminar, discussion.

SERVICE LEARNING INTERNSHIPS

Service Learning uses community service to enhance education. The project is based on the concept of reciprocal learning. Service Learning sections of regular courses are linked to credit-bearing internships where students apply what they are learning in the community. For example, English composition classes provide structured academic components for ASU students who contribute one-on-one homework tutoring, reading development, educational enrichment workshops, and learning readiness programs for children and youth from the Roosevelt School District for six hours per week for a full semester. In turn, their community experiences and research form the basis of the tutors' classroom research and papers.

Students in service learning Plant Biology labs for nonmajors are teaching Julian Middle School and Salt River Elementary School fifth-grade students simplified versions of the science and math concepts they are learning themselves.

Students in a 100-level Physical Geography lab also partner with sixth-grade students at the Salt River Elementary School to share their knowledge of the physical environment. ASU students are required to prepare personalized lesson plans for every tutoring session. All one-on-one tutoring is done in an after-school environment at our partner agencies and schools, while the sciences have been written into the core curriculum in two of our partner schools.

Students may enroll in the internships with previous or current enrollment in the following linked courses.

Call 602/965-3097 for internship requirements and enrollment information.

Linked Courses

Composition and Linguistics Courses

ENG 102	First-Year Composition	3
ENG 213	Introduction to the Study of Language	3
ENG 216	Persuasive Writing on Public Issues <i>LI</i>	3
ENG 217	Personal and Exploratory Writing <i>LI</i>	3
ENG 301	Writing for the Professions <i>LI</i>	3
ENG 312	English in Its Social Setting <i>HU/SB</i>	3

See ENG course listings for more details.

Sciences and Additional Courses

GLG 103	Introduction to Geology I—Laboratory	1
GPH 111	Introduction to Physical Geography <i>SI/S2</i>	4
NUR 119	Introduction to Nursing and Health	3
PLB 108	Concepts in Plant Biology	4
SHS 250	Introduction to Phonetics	3
SHS 402	Modifying Communicative Behavior	3

See appropriate course listings for more details.

INTERNSHIPS

ENG 484 Composition Internship. (3) F, S Links courses with internships which involve tutoring children in after-school programs in the community and assisting them with reading, homework, and computer skills. Three afternoons a week from 3:00-5:00 P.M., Monday through Thursday.

GLG 484 Geology Internship. (3) F, S Assist in teaching seventh-grade students a simplified version of the GLG 101 lecture and GLG 103 laboratory in the context of hands-on activities.

GPH 484 Geography Internship. (3) F, S Assist in teaching sixth-grade students a simplified version of the GPH 111 course and laboratory in the context of hands-on activities.

NUR 484 Nursing Internship. (3) F, S

Plan and conduct health issues workshops for high school students at Desert Eagle School.

PLB 484 Science Internship. (3) F, S

Assist in teaching fifth-grade students a simplified version of the PLB 108 lecture in the context of designing and planting decorative, food-producing, and experimental gardens.

SHS 484 Speech and Hearing Internship.

(3) F, S

Observe, test, and develop techniques and theories learned in either SHS 250 or 402. (See Speech and Hearing Science [SHS] course offerings for more details.)

RESEARCH CENTERS, INSTITUTES, AND LABORATORIES

These units serve the university's mission in research. They are overseen by seven of the colleges and the vice provost for Research.

College of Architecture and Environmental Design

Herberger Center for Design Excellence. The Herberger Center for Design Excellence serves the Phoenix area through research, publications, and symposia regarding urban design, design, and environmental planning issues. For more information, call 602/965-6693.

College of Business

Arizona Real Estate Center. The Arizona Real Estate Center, established in 1980, serves a multifunction research and educational role to foster better understanding of the real estate sector of the Arizona economy. Housing, commercial real estate, and construction activity data for Arizona and Maricopa County are collected by the center and are utilized for a variety of ongoing projects, including the calculation of affordability indexes and the computation of housing appreciation figures for the metropolitan Phoenix area. The center's annual outlook series provides a public forum for prominent members of the real estate industry to present their perceptions of market conditions.

For more information, contact the director, Arizona Real Estate Center, BA 319, 602/965-5440. The center's Web site is www.cob.asu.edu/seid/arec.

Bank One Economic Outlook Center. The Bank One Economic Outlook Center (EOC), established in 1985, specializes in economic forecasts of Arizona

and the Western states. The center publishes the *Bank One Arizona Blue Chip Economic Forecast* (monthly), *Greater Phoenix Blue Chip Economic Forecast* (quarterly), *Western Blue Chip Economic Forecast* (10 issues per year), and *Blue Chip Job Growth Update* (monthly), an update of current job growth in the United States. The center also publishes *Mexico Consensus Economic Forecast* (quarterly), a forecast and historical data on the Mexican economy.

For more information, contact the director, Bank One Economic Outlook Center, BA 319, 602/965-5543. The center's Web site is www.cob.asu.edu/seid/eoc.

Center for the Advancement of Small Business. The Center for the Advancement of Small Business (CASB) is the 21st century leader in business education, practice, and research that provides high-quality, relevant programs, and information services focused on small business since 1994. The center enables students and existing small and medium-sized businesses to participate, contribute, and compete in the global economy.

The center provides students from all disciplines with programs and resources that prepare them for positions of leadership in small and medium-sized businesses, and aids small and medium-sized businesses in the continuous improvement of their human resources and business practices. CASB also engages in applied research on entrepreneurship and the emerging changes and trends in small business.

For more information, contact the director, Center for the Advancement of Small Business, BAC 111, 602/965-3962. The center's Web site is www.cob.asu.edu/seid/casb.

Center for Advanced Purchasing Studies. The Center for Advanced Purchasing Studies (CAPS) was established in November 1986 by a national affiliation agreement between the ASU College of Business and the National Association of Purchasing Management (NAPM). It is the first and only program of its kind in the nation and is located in the Arizona State University Research Park, about eight miles south of the main ASU campus. CAPS conducts in-depth research into the problems facing the purchasing profession today and, through its studies, seeks to

improve purchasing effectiveness and efficiency, and the overall state of purchasing readiness.

For more information, call 602/752-2277, or contact

DIRECTOR, CENTER FOR ADVANCED
PURCHASING STUDIES
ASU RESEARCH PARK
2055 E. CENTENNIAL CIRCLE
PO BOX 22160
TEMPE AZ 85285-2160

Center for Business Research. The Center for Business Research (CBR) has been a consistent source of information on the Arizona and metropolitan Phoenix economies since 1951. Both the business community and the public have had access to the economic indicators produced by the ongoing projects of the center, including quarterly net migration estimates for Arizona and Maricopa County, and the metropolitan Phoenix Consumer Price Index. The center also conducts projects under the sponsorship of private and public agencies. Recent examples include the economic impact of Super Bowl XXX, a study of seasonal migration to Arizona, and an analysis of the state's hospital industry. A monthly publication of the center, *AZB/Arizona Business*, plays a major role in disseminating to the public the economic information compiled by the research centers of the College of Business. The staff within the center is available to respond to inquiries and to provide available data.

For more information, contact the director, Center for Business Research, BA 319, 602/965-3961. The center's Web site is www.cob.asu.edu/seid/cbr.

Center for Services Marketing and Management. The Center for Services Marketing and Management (SMM Center) is a leading university-based hub devoted to the study of services marketing and management since 1985. The SMM Center addresses how any company can improve internal service processes and use service and customer satisfaction as a competitive advantage. The center is cross-industry in nature, encouraging firms to share the best ideas and practices for adaptation across industries. Though grounded in marketing, the center's work is also cross-functional, integrating concepts and techniques from marketing, operations, human resources, and management.

The center's areas of expertise include customer retention and loyalty; service quality; service delivery; professional services such as healthcare, accounting and consulting services; customer satisfaction; services strategy; service culture; and service recovery. A leader in the business and academic communities, the SMM Center's work advances the knowledge base in the field and provides applicable frameworks, concepts, and tools.

The SMM Center partners with 26 charter member firms, a who's who list of companies recognized for their service orientation—AT&T, Marriott, Federal Express, Harley Davidson, Xerox, MicroAge, Lucent Technologies, Ford, and Prudential.

The center offers its partner firms top flight executive education in services through the annual "Activating Your Firm's Service Culture" symposium, the annual "Services Marketing and Management" institute, and the annual "Information Technology Services Marketing" course, and provides customized executive education programs and research projects which are tailored to and conducted for charter member firms.

The center also actively supports the College of Business' M.B.A. program that offers a certification in Services Marketing and Management. The services track infuses strong company-based experience and encourages summer internships.

For more information, contact the director, Center for Services Marketing and Management, BAC 440, 602/965-6201.

Center for the Study of Finance. The Center for the Study of Finance (CSF), established in 1986, serves the national financial, policy-making, and academic communities through research, publications, conferences, and educational programs. The focus of such activities is on the changing nature of the domestic and international financial system with such specific areas as the interaction between financial markets, deposit insurance reform, the deregulation of financial institutions, the financing of mergers and acquisitions, and the effect of government policy on financial markets receiving recent attention.

For more information, contact the director, Center for the Study of Finance, BAC 519, 602/965-5229.

Joan and David Lincoln Center for Applied Ethics. The Joan and David Lincoln Center for Applied Ethics (LCAE) has provided training and sponsored research in applied ethics for organizations since 1980. The center's research focuses on the connection between valued-based businesses and their financial performance. Its study of companies with 100 years of consistent dividend payments has been reported in *The Wall Street Journal* and numerous academic and professional journals.

The center sponsors an annual conference on organizational ethics as well as on ethics for lawyers beyond the profession's code and model rules. Examples of topics covered in the center's published research reports include lawyers and ethics, ethics and international labor practices, the rogue employee and ethics in organizations, and ethics and cultural variances in international business.

Each year the center recognizes an outstanding business leader for exemplary ethical standards. Recipients of the Lincoln Center award in the past have been Lewis W. Lehr of 3M, the center's first recipient; Sir Adrian Cadbury of Cadbury Schweppes; Robert W. Galvin of Motorola; James Houghton of Corning Glass Works; R. William Taylor of the American Society of Association Executives; Jerry Junkins of Texas Instruments; Bowen McCoy of Buzz McCoy Associates, Inc.; and Aaron Feuerstein of Malden Mills Industries, Inc.

For more information, contact the director, Joan and David Lincoln Center for Applied Ethics, BA 352B, 602/965-2710.

Manufacturing Institute. See page 32 for information about this joint venture of the College of Business and the College of Engineering and Applied Sciences.

College of Education

Center for Bilingual Education and Research. Bilingual education is an internationally significant field that crosses many disciplines. In 1980, the College of Education formally instituted a Center for Bilingual Education and Research with a multidisciplinary perspective addressing local, national, and international concerns. The center initiates and coordinates research ventures in bilingual/bicultural education

and is responsible for assembling faculty and staff expertise and outside resources to accomplish research goals.

The center also supports instructional activity in bilingual curricula and related program efforts within the college. Because of the cross-disciplinary nature of bilingual education programs, a collegewide effort is necessary to develop, evaluate, and strengthen such programs.

The center is committed to

1. enhancement of broadly based faculty participation in research;
2. acquisition of external research and training resources;
3. enhancement of communication networks with other local, state, national, and international institutions and agencies that can increase the center's ability to achieve its objectives; and
4. development of a scholarly dissemination strategy incorporating colloquia, conferences, and publications.

For more information, contact the director, Center for Bilingual Education and Research, ED 414, 602/965-7134.

Center for Indian Education. The Center for Indian Education is an interdisciplinary research and service center established in 1959. It promotes studies in American Indian policy and administration that contribute to scholarship and effective practices in education, professional training, and tribal capacity building. It is structured to foster relations between the university and sovereign tribes, and to provide training and technical assistance for community programs. The center publishes the *Journal of American Indian Education* and sponsors workshops and colloquia that bring together scholars and tribal community leaders.

The center provides leadership through a group of American Indian faculty and is organized on the basis of scholarly expertise of the faculty. In addition to College of Education faculty, responsibilities are shared by faculty from the School of Social Work, the School of Justice Studies, the College of Liberal Arts and Sciences, and the College of Law. Areas currently studied include administrative leadership, policy analysis, bilingual education, health and welfare policy, justice studies, and program development in professional studies.

For more information, contact the director, Center for Indian Education, ED 415, 602/965-6292.

College of Engineering and Applied Sciences

Center for Innovation in Engineering Education (CIEE). This center, established in September 1994, promotes and encourages visionary approaches to educating engineering students. The center seeks support for the research, development, and assessment of new educational paradigms, unique curricula, improved courses, and new delivery systems that embrace a range of learning models, alternative classroom management strategies, improved pedagogies, and advanced educational technologies. The center also develops and offers workshops and seminars to encourage wide-scale implementation of those approaches that are shown to be effective in developing the attributes that will be needed by graduates.

The vision of the center is that its programs will (1) create and continuously improve educational systems that will develop in graduates the skills, knowledge, and attitudes required for them to quickly and effectively become world-class engineers; and (2) develop an expanding team of scholars that desires to actively explore new and improved educational theories, methods, and technologies to improve teaching and learning.

For more information, contact the CIEE director, EC G205, 602/965-5350.

Center for Research in Engineering and Applied Sciences. The Center for Research in Engineering and Applied Sciences supports the faculty and students in the knowledge creation and discovery mission of the university. The center provides research support services for all research in the college as well as interfacing with the research offices of the university and other colleges. The center area also supports the contribution of the college to the state's economic development through collaborative research partnerships with and technology transfer to industry. Specialized and interdisciplinary efforts are currently in place in such areas as acoustics, air pollution, alternative energy, applied mechanics, artificial intelligence, automated manufacturing, bioengineering, communications, computational microelectronics, computer-

aided design and manufacturing (CAD/CAM), computer-integrated manufacturing (CIM), computer science, control systems, data and information systems, electrical characterization, environmental resources and control, expert systems, fluid mechanics, fuels and combustion, materials, mass transfer, metallurgy, nuclear radiation, photovoltaics, plasma, plastics, power systems, analyses, robotics, semiconductor materials and fabrication, semiconductor processing, signal processing, soil mechanics, solar thermal energy, solid-state electronics and systems design and analysis, telecommunications, thermodynamics, transportation systems, turbines, very-large-scale integrated (VLSI) circuits, waste management, and water resources.

For more information, contact the director, Center for Research in Engineering and Applied Sciences, EC G136, 602/965-1725.

Center for Low Power Electronics.

The technical areas of focus include

1. basic materials, alternative materials, and their fabrication;
2. device design optimization;
3. design of digital, analog, and hybrid low power circuits; and
4. power-based physical design for single and multi-chip VLSI systems.

For more information, contact the director, Center for Low Power Electronics, ERC 115, 602/965-3708.

Center for Solid-State Electronics Research. CSSER focuses on research in the areas of semiconductors crystal growth, both by bulk and epitaxial techniques, device characterization and modeling, defect behavior in semiconductors material characterization, processing, fine line lithography, surface analysis, and transport. Major programs address semiconductor device modeling, transport theory, optoelectronics, ferroelectrics, semiconductor processing, microwave devices, and ultra-submicron devices. New programs address synthetic neural systems and their impact on VLSI design. Research in the specially designed facilities includes various aspects of submicron dimension devices.

For more information, contact the director, Center for Solid-State Electronics Research, ENGRC 115, 602/965-3708.

Manufacturing Institute. The Manufacturing Institute is a joint venture of the College of Business and the College of Engineering and Applied Sciences, established to enhance manufacturing research and industrial collaboration at the interface between the two colleges. The mission of the institute involves integrating aspects of manufacturing in both the business and engineering areas, helping to fulfill the university's goal of becoming one of the leading educational and research institutions in both manufacturing enterprise and manufacturing process technology issues. The institute has two academic codirectors, one each from the College of Business and the College of Engineering and Applied Sciences, and has active industry involvement.

For more information, contact one of the directors in GWC 402, 602/965-3709.

Center for System Science and Engineering Research.

The Center for System Science and Engineering Research has established four focus areas: nonlinear dynamical systems, control theory and its applications, mathematical neuroscience, and scientific computing and interdisciplinary systems engineering. The center is jointly sponsored by the College of Engineering and Applied Sciences and the College of Liberal Arts and Sciences. Its main goals are the creation and enhancement of interdisciplinary and cooperative research, graduate education, and public service programs in the areas of systems science, applied mathematics and computation.

For more information, contact the SSERC director in GWC 606 at 602/965-8382.

Telecommunications Research Center.

Telecommunications play a vital role in home, commercial, entertainment, educational, scientific, and military systems. The Telecommunications Research Center focuses its interests and activities in research and educational programs. The approach is to conduct basic and applied research, develop technologies, and provide education programs in all major areas of telecommunications, from signal generation to reception. The targeted areas of excellence are antennas, propagation, and scattering; microwave circuits, devices, and measurements; optical communications; signal processing; broad-

band switching; and communication systems. Ultramodern laboratories and computational facilities are associated with the center.

For more information, contact the director, Telecommunications Research Center, GWC 411, 602/965-5311.

College of Fine Arts

Institute for Studies in the Arts. As the research center for the College of Fine Arts, the Institute for Studies in the Arts (ISA) serves as a laboratory for the research and development of new art forms, new ideas and concepts, and innovative technologies for artistic expression; a network for communication among creative scholars both within and outside the arts; and a resource base for the documentation, evaluation, and dissemination of research in the arts. ISA addresses the needs of a variety of populations through technical and monetary support and sponsorship of research projects, performances, exhibitions, and symposia.

ISA facilities include an experimental performance studio at Drama City and a state-of-the-art video production and post-production laboratory in Matthews Center. ISA maintains a database of interdisciplinary scholarship in the arts and actively seeks to communicate with researchers from diverse backgrounds in the ASU community and worldwide.

ISA is open to a wide range of research proposals from both faculty and graduate students, provided such proposals address the ISA mission of experimentation and innovation in the arts.

For information, contact the director, Institute for Studies in the Arts, MCENT 252, 602/965-9438, or visit ISA's Web site at researchnet.vprc.asu.edu/isa.

College of Law

Center for the Study of Law, Science, and Technology. Located in the College of Law, the center conducts research, edits the *Jurimetrics Journal of Law, Science and Technology* in cooperation with the American Bar Association Section on Science and Technology, and sponsors seminars, workshops, and conferences. Through these activities, the center seeks to contribute to the formulation and improvement of

law and public policy affecting science and technology and to the wise application of science and technology in the legal system. Current areas of research include communications and telecommunications law, computer-related law, forensic science and statistics, legal issues and biotechnology, law and medicine, and law and social science.

For more information, contact the director, Center for the Study of Law, Science, and Technology, LAW 102, 602/965-2124.

College of Liberal Arts and Sciences

Arizona Center for Medieval and Renaissance Studies (ACMRS). The Arizona Center is a research unit serving affiliate scholars from ASU, Northern Arizona University, and the University of Arizona. It represents a variety of disciplines including history, literature, philosophy, religion, language, music, art, and science. ACMRS enriches academic offerings in medieval and renaissance studies by sponsoring one or two visiting professors each year. Graduate research assistantships are also available through the center.

Significant opportunities for the study of the Middle Ages and the Renaissance exist at ASU. Hayden Library has an extensive microfilm collection and many rare books in medieval and renaissance studies. ACMRS also sponsors a lecture series each semester covering a variety of topics.

Other programs include an annual conference, a public symposium, a summer study abroad program at University of Cambridge (United Kingdom), and student exchange programs with the University of Copenhagen (Denmark) and the University of Kalmar (Sweden).

Since 1996, ACMRS has published *Medieval & Renaissance Texts & Studies (MRTS)*, a major series of editions, translations, and reference works. In collaboration with the University of Massachusetts at Dartmouth and the Medieval and Renaissance Committee of the University of Michigan, ACMRS sponsors and coedits *Mediterranean Studies*, an annual interdisciplinary journal publishing articles on all aspects of the Mediterranean region. ACMRS also sponsors a book series titled "Arizona Studies in the Middle Ages and the Renaissance," published by Brepols (Belgium).

ACMRS also partners with the Renaissance Society of America and the University of Toronto in "Iter," a massive, retrospective, online medieval and renaissance bibliography covering all languages and disciplines, and is the official site of the Medieval Academy of America's online data project offering information on medieval centers, programs, committees, and regional associations in North America.

For more information, contact the director, Arizona Center for Medieval and Renaissance Studies, SS 224, 602/965-5900.

Cancer Research Institute. Significant advances in the treatment of human cancer and other serious medical problems depend upon scientists well trained in organic chemistry, biochemistry, and biology. The Cancer Research Institute provides graduate students with the specialized training necessary for research in the discovery and development of effective anticancer drugs. Among various activities, laboratory personnel are pursuing a unique program concerned with isolation, structural identification, and synthesis of naturally occurring anticancer agents from marine animals, plants, and marine microorganisms.

For more information, contact the director, Cancer Research Institute, CRI 209, 602/965-3351.

Center for Asian Studies. Through its East Asian and Southeast Asian studies programs, the center serves as research coordinator for Asian studies' faculty and graduate students in a variety of disciplines. The center sponsors colloquia and research conferences. It also publishes two scholarly *Monograph Series* and a newsletter on Southeast Asian studies, *Suvannabhumi*, which have an international readership. Graduate students may apply for research assistantships in the center and its program.

The center administers student exchange programs with a number of universities in Asia. The center also sponsors a graduate student colloquium and film series on Asian topics. A reading room is located in the center office suite offering a variety of Asian and English language publications and newspapers from and about Asia.

For more information, contact the director, Center for Asian Studies, WHALL 105, 602/965-7184.

Center for Latin American Studies.

Arizona maintains an ever-growing interest in Latin America that draws upon an extensive experience of historical and geographical ties. The Center for Latin American Studies is the focal point for these interests at ASU.

Through its program, the center serves the university community and maintains strong ties with various Latin American organizations in the state and the nation. Principal activities are coordinating Latin American studies at the undergraduate and graduate levels; sponsoring student exchange programs, organizing events featuring Latin American arts and culture, numerous seminars, and research conferences; publishing a wide range of professional materials; and undertaking and facilitating research about the region.

The center administers student exchange programs with the Catholic University of Bolivia and three Mexican universities—the Autonomous University of Guadalajara, the Autonomous University of Nuevo Leon, and the University of Sonora. Each spring several ASU students are selected to attend courses at the Latin American universities while Bolivian and Mexican students attend ASU.

Each year the center publishes several scholarly books as well as shorter monographs in its Special Studies Series.

The center is a member of the American Modern Language Association, the Consortium of U.S. Research Programs for Mexico, the Consortium for Latin American Studies Association, Pacific Coast Council on Latin American Studies, Rocky Mountain Council for Latin American Studies, Consortium of Latin American Studies Programs, and Conference on Latin American History.

The center directly encourages research, not only through its publications program and research conferences, but also through close coordination with the Latin American collection of Hayden Library and networking with Latin American universities.

For more information, contact the director, Center for Latin American Studies, SS 213, 602/965-5127.

Center for Meteorite Studies. One of the nation's largest collections of extraterrestrial materials is available for research in the Center for Meteorite Studies. Teaching and research on meteor-

ites, meteorite craters, and related areas of space and planetary science are accomplished through the regular academic units in cooperation with the center.

For more information, contact the director, Center for Meteorite Studies, PS C151, 602/965-6511.

Center for Solid-State Science. The Center for Solid-State Science is a research unit within the College of Liberal Arts and Sciences.

The membership comprises faculty and academic professional researchers and research support personnel, most of whom hold simultaneous appointments in affiliated academic units. The Center for Solid-State Science is the ASU focal point for interdisciplinary research on the properties and structures of condensed phases of matter. Current research topics include, among others, electronic materials, ceramics, composites, rare earth oxides, intercalation compounds, and ionic conductors.

Members of the center operate modern and sophisticated research facilities, organize regular research colloquia and symposia, and collaborate extensively with other researchers on projects of mutual interest. The principal topical research area in the center is the science and engineering of materials, with emphasis on the structure and reactivity of interfaces and surfaces; synthesis and processing of new materials; high resolution microstructural and chemical analysis; and research computing, consultation, and analysis with high speed computer graphics for physical modeling and visualization.

The Goldwater Materials Science Laboratories of the center include

1. the Materials Preparation Facility (MPF), which provides a wide range of synthesis and processing capabilities for preparation of specimen materials. MPF also provides thermal analysis for study of solid-state reactions and Auger and X-ray photoelectron spectroscopy for analysis of surface compositions and electronic structure of surfaces;
2. the Materials Science Electron Microscopy Laboratory (MSEML), which provides state-of-the-art electron microscopes for analysis of microstructures, including imaging and diffraction, and high spatial resolution chemical analysis using

energy dispersive X-ray and electron energy loss microspectroscopy;

3. the Ion Beam Analysis of Materials (IBeAM) Facility, which provides compositional and structural determination of the surface and near-surface regions (0–2mm) of solids by ion beam analysis where elemental composition and depth distribution information are needed. Channeling experiments are used to determine crystal perfection and site occupancy;
4. the Facility for High Resolution Electron Microscopy (HREM), which operates several ultra high resolution and ultra high vacuum electron microscopes and supports microscopy methods and instrumentation development, including holography, position- and time-resolved nanospectroscopy and energy-filtered imaging and diffraction. The center provides high-resolution capability for a large external group from other universities and industry; and
5. the Secondary Ion Mass Spectrometry (SIMS) laboratory, which provides depth profile and point composition analysis with very high chemical sensitivity, on the order of one part per billion, including isotopic analysis for many materials. SIMS is also used as a chemical microscope, to image elemental distributions on specimen surfaces.

The Goldwater Materials Science Laboratories of the Center for Solid-State Science are the primary teaching and research resources used by students in the Science and Engineering of Materials interdisciplinary Ph.D. program and the undergraduate option for Materials Synthesis and Processing. They are used for the same purposes by students from affiliated departments.

Special laboratories for other relevant research are available in affiliate departments. These include nuclear and electron resonance spectroscopy laboratories, X-ray diffraction and fluorescence laboratories, mechanical properties measurements capability over a wide range of temperatures, optical (laser) spectroscopy laboratories, and scanning tunneling and atomic force microscope laboratories. Additional laboratories for related research are available in affiliate departments.

For more information, contact the director, Center for Solid-State Science, PS B234, 602/965-4544.

Center for the Study of Early Events in Photosynthesis. This center, located in the College of Liberal Arts and Sciences, was established at ASU in 1988 as part of the USDA/DOE/NSF Plant Science Centers Program. The center serves as an infrastructure supporting ASU scientists who study photosynthesis using a variety of methods and approaches, ranging from molecular biology and biochemistry to organic chemistry, ultrafast laser spectroscopy, X-ray crystallography, and theoretical chemistry. It is designed to enhance undergraduate, graduate, and postdoctoral education through multidisciplinary cooperative research projects.

The ultimate objective of the research is the elucidation of the basic principles governing the biochemical and biophysical processes of photosynthetic energy storage. This goal is being realized via investigation of the early events of photosynthesis, including: light absorption and excitation transfer in photosynthetic antennas; the mechanism of primary photochemistry in plant and bacterial systems; secondary electron transfer processes; structure and assembly of photosynthetic antennas, reaction centers, and electron transfer proteins; pigment-protein interactions; artificial and biomimetic photosynthetic solar energy conversion systems; and mechanisms of biological electron transfer reactions.

The center is equipped with state-of-the-art instrumentation which allows students to do frontier research in a broad range of disciplines. Equipment includes a variety of pulsed lasers for measurements with time resolution ranging from sub-picoseconds to seconds; a 500 MHz NMR instrument; an EPR spectrometer; a protein X-ray facility; spectrophotometers; fluorometers; a protein sequencer; and an amino acid analyzer.

The center sponsors a weekly Photosynthesis Seminar Series and brings in visiting scientists from around the world to carry out collaborative research. Undergraduate, graduate and postdoctoral training programs in the Department of Chemistry and Biochemistry and the Department of Plant Biology are central components of the activities of the center.

For more information, contact the director, Center for the Study of Early Events in Photosynthesis, PS D207, 602/965-1963.

Deer Valley Rock Art Center. Deer Valley Rock Art Center, located two miles west of the Black Canyon Freeway on Deer Valley Road, is operated by the ASU Department of Anthropology in consultation with the Hopi, Yavapai, and Gila River Indian tribes. It includes more than 1,500 petroglyphs that cover the eastern slope of Hedgepeth Hills. For more information, call 602/582-8007.

Exercise and Sport Research Institute. The Exercise and Sport Research Institute (ESRI) is an interdisciplinary research unit located in the Department of Exercise Science and Physical Education and serves, in part, as a research facility for the interdisciplinary doctoral program in exercise science.

The major research areas can be described as follows. *Biomechanics* applies the laws of physics to the study of human movement. It examines internal and external forces applied to the human body and the effects these forces have on the body. *Exercise physiology* studies the acute responses of the body to exercise and its chronic adaptations to training. It also studies the interrelationships among physical activity, performance, and health. *Exercise biochemistry* focuses on the study of subcellular systems involved in the provision and regulation of energy transfer during exercise. *Exercise endocrinology* studies interrelationships of exercise and training with stress, hormones, neurotransmitters, and the immune system. *Motor behavior and sport psychology* study human behavior in fundamental motor activity and sport. *Motor behavior* includes the subdomains of *motor learning, control, and development*. Motor learning focuses on skill acquisition, motor control studies how movement is regulated and controlled via the nervous system in normal and pathological populations, and motor development studies how growth and maturation affect performance and learning across the lifespan. Within the context of sport and exercise, *sport psychology* examines the influence of psychological variables on performance or health and the influence of participation on psychological phenomena.

The ESRI is affiliated with a number of medical institutions in the Phoenix area.

Faculty and graduate students at the ESRI are investigating a wide range of topics concerning human physical activity, including different ages, levels of health, levels of ability and fitness, and environments; and levels and types of training, body composition, nutrition, and physical and emotional stresses. Where applicable, these aspects are studied using an interdisciplinary approach.

For more information, contact the director, Exercise and Sport Research Institute, PEBE 159, 602/965-7473.

Hispanic Research Center. The Hispanic Research Center (HRC) at ASU is an interdisciplinary unit, dedicated to research and creative activities, that is university-wide but administered through the College of Liberal Arts and Sciences. The HRC performs basic and applied research on a broad range of topics related to Hispanic populations, disseminates research findings to the academic community and the public, engages in creative activities and makes them available generally, and provides public service in areas of importance to Hispanics.

Faculty, staff, and advanced graduate students organize into working groups to develop a broad range of specific projects and lines of inquiry within the general categories of Hispanic entrepreneurship, science and technology, information and data compilation and dissemination, the Hispanic polity, and the arts. Ongoing activities of the HRC, primarily funded by external grants, include the Arizona Hispanic Business Survey, the *Bilingual Review Press*, the Coalition to Increase Minority Degrees, the Community Art and Research Outreach (CARO), *Compañeros en la Salud*, Project 1000, and the Western Alliance to Expand Student Opportunities.

CARO sponsors creative activities and action research in collaboration with community-based organizations and ASU faculty.

For more information, contact the director, Hispanic Research Center, CFS 104, 602/965-3990.

Institute of Human Origins. The Institute of Human Origins (IHO), founded in 1981 by Donald Johanson, became part of the College of Liberal

Arts and Sciences in 1997. IHO is a multidisciplinary research organization dedicated to the recovery and analysis of the fossil evidence for human evolution and the establishment of a chronological framework for human evolutionary events. IHO's scientists carry out field research at sites in Africa, the Middle East, and Asia. IHO houses the largest collection of *Australopithecus afarensis* casts (including "Lucy," a 3.2 million-year-old human ancestor) in the world as well as an extensive collection of other fossil hominid casts. IHO's library contains more than 3,000 volumes, numerous journals, videotapes, audiotapes, and slides related to human evolution and fossil sites. IHO produces periodic newsletters, offers lecture series, conducts tours and workshops, and supports numerous informal science education outreach projects.

For more information, visit the Institute of Human Origins, SS 103, or call 602/727-6570.

College of Public Programs

Morrison Institute for Public Policy.

Established in 1981 by the Morrison family of Gilbert, Arizona, the Institute conducts research on public policy matters, informs policy makers and the public about issues of importance, and advises leaders on choices and actions. Morrison Institute offers a variety of services to public and private sector clients and pursues its own research agenda. Services include policy re-

search, program evaluation, and public outreach. The institute's interests, research, and publications span such areas as education, urban growth, human services, workforce development, economic development, and arts and culture.

For more information, call 602/965-4525, visit the Web site at www.asu.edu/copp/morrison, or write

MORRISON INSTITUTE FOR PUBLIC
POLICY
ARIZONA STATE UNIVERSITY
PO BOX 874405
TEMPE, AZ 85287-4405

Vice Provost for Research

Center for Environmental Studies.

Established in 1974, the center encourages and coordinates interdisciplinary environment-related activities in the natural and social sciences within the university.

Research programs within the center emphasize ecosystem and human impact studies; riparian and aquatic studies; wildlife biology; environmental regulation and policy issues; covering environmental risk assessment; hazardous materials; waste management; and studies relating to environmental problems on the U.S.-Mexico border. The center also organizes a variety of training programs for practitioners on current federal environmental regulations.

The center encourages communication among academic, government, and private sectors through research, work-

shops, seminars, and working papers. It manages the Sierra Ancha Research Station for the university. The station is located at an elevation of 5,000 feet in the desert-pine forest transition. It offers research potential in biology, geology, anthropology, resource management, and nuclear engineering. Research space and living accommodations are also available for academic and research organizations.

For more information, contact the director, Center for Environmental Studies, Tempe Center (University and Mill), 602/965-2975.

ASU East

For information on the Center for Agribusiness Policy Studies, see page 455.

CONSORTIUM FOR INSTRUCTIONAL INNOVATION

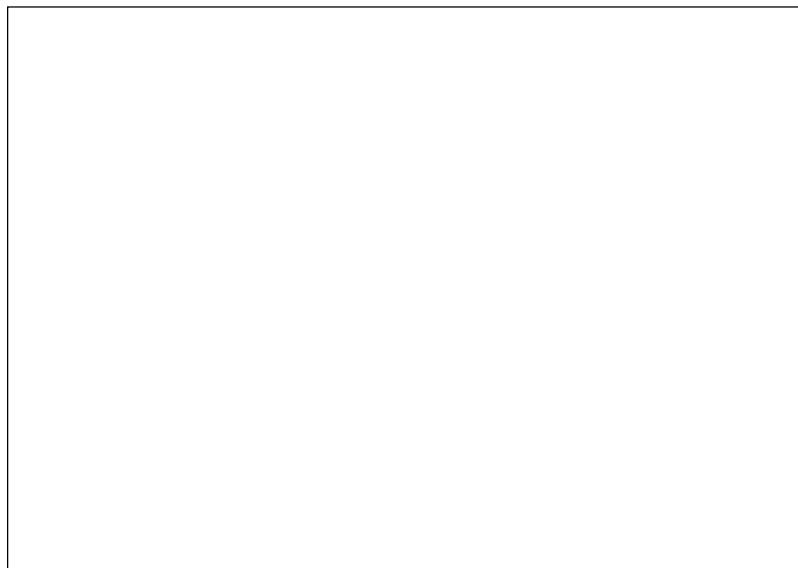
The Consortium for Instructional Innovation (CII) is a multidisciplinary unit committed to developing and supporting new pedagogical and technological approaches to teaching. CII uses a vast system of university resources to provide members of the university teaching community the opportunity to combine their talents and expertise with the latest technologies in producing beneficial new teaching methods.

CII combines existing teaching methods with technological options such as the use of computers, videotape, computer animation, and laser disks to create the best possible instructional methods.

CII offers assistance and financial aid to members of the teaching community who seek to develop projects in improving the quality of education at ASU. In evaluating proposals for curricular innovation, CII considers the applicability of projects to other areas and settings, the impact of projects on both students and faculty, and the commitment from the college or department in support of proposed programs.

In addition to developing teaching methods, CII periodically sponsors workshops and serves as a clearing house for information and referrals.

The units that make up CII are Computer and Network Consulting Services, University Libraries, University Media Systems, the University Program for Faculty Development, and the Writing Across the Curriculum program.



A pedestrian bridge makes crossing University Drive easy and safe for students.

Tim Trumble photo

Student Services

The university is committed to the belief that an education involves more than attending class. While the assimilation of information is a central part of the university experience, learning about others, about independence and leadership, and about living in a complex society are equally important. Student Affairs' services and developmental programs reflect this philosophy.

UNDERGRADUATE ADMISSIONS

For many undergraduates, the first introduction to ASU is through the recruitment and admission programs of Undergraduate Admissions. Personal contact with prospective students through high school and community college visits and through student visits on campus are some of the approaches that provide information about the academic programs and support services available at ASU. A primary goal of Undergraduate Admissions is to identify, inform, motivate, recruit, and enroll students from ethnic groups underrepresented at ASU. Orientation programs ease the students' (and parents') transition to the ASU campus. Undergraduate Admissions also coordinates and supports the ASU Parents Association. For more information, call 602/965-7788.

STUDENT FINANCIAL ASSISTANCE

Approximately two-thirds of the full-time students at ASU rely on some form of financial assistance to meet their educational expenses. The purpose of Student Financial Assistance is to review and award financial resources from a variety of private, federal, state, and institutional sources. Information about and applications for scholarships, grants, loans, and student employment are coordinated by this department. From these types of assistance, 30,400 students received approximately \$225 million in 1996-97.

Computerization and an understanding of students' needs have contributed to the efficient and responsive operation of this student resource. Assistance in student loan counseling and debt management services are innovative programs offered through this agency. ASU is nationally recognized for providing this unique financial aid service. For more information, call 602/965-3355.

REGISTRAR

Management of the registration system and maintenance of academic records are the primary responsibilities of the Office of the Registrar. InTouch, the ASU touch-tone telephone system for registration and fee payment, and the online registration system, accessible at any registrar site, including one at ASU West, ease the enrollment process and make ASU a national leader in the use of computerized registration. The Student Information System stores academic records and improves the quality of data used in academic advising. The Office of the Registrar coordinates applications for graduation and undergraduate readmission, course changes and scheduling, transcript services, applications for residency, and verification of enrollment. Additional information is available on the Web at www.asu.edu/registrar or by phone at 602/965-3175.

Veterans Services

This office offers complete educational services for US veterans and their eligible dependents. Counseling about admissions, registration, and veterans benefits is available. Veterans programs provide service by advising all interested veterans and dependents about educational benefits and their optimum use. Students must apply each semester to receive veterans benefits. The program also assists veteran students in obtaining suitable paid tutors, when needed, using their federal benefits. Veterans must achieve adequate GPAs and semester-hour progress toward their academic programs for continued educational benefits. The university must report this progress each semester. Students receiving veterans educational benefits are not eligible to receive pay for audited courses. The Veterans Services Section is located in SSV B117. For more information, call 602/965-7723.

RESIDENTIAL LIFE

Living in one of the ASU Main residence halls provides students the opportunity to make the most of their college experience. Special residential communities for freshmen, honors students, students participating in fraternities and sororities, and students in particular academic areas offer opportunities to enrich campus life.

ASU East housing includes residence halls as well as two- to five-bedroom homes. Call 602/988-9160 for further information. For additional information about ASU East housing, see page 435.

The Freshman Year Experience program provides a unique environment of classrooms, live-in tutors, academic advisors, and other support services designed to help freshmen develop skills for success.

The Campus Communities program (see the Institute for Cocurricular Programs and Service [ICPS] on this page) provides residential communities for students with interests in a variety of areas. Students who do not want to participate in a campus community can benefit from the activities of other residential communities, including halls that feature apartment-style or single rooms, or one that promotes a study-intensive environment.

Students are encouraged to apply for housing early. While applications are accepted at any time, assignment to a residence hall is not made until a student is admitted to the university. Residence hall assignments are made based upon the date of receipt of both the completed application and deposit. Requests for specially modified rooms for students with disabilities should be noted on the application.

ASU Main residence hall application information may be obtained by calling 602/965-3515 or writing

RESIDENTIAL LIFE
ARIZONA STATE UNIVERSITY
PO Box 870212
TEMPE AZ 85287-0212

Information about ASU Main voluntary meal plans may be obtained by calling 602/965-3464 or writing

CAMPUS DINING
ARIZONA STATE UNIVERSITY
PO Box 871101
TEMPE AZ 85287-1101

Information about ASU Main residential Campus Communities may be obtained by calling 602/965-9600 or writing

INSTITUTE FOR COCURRICULAR
PROGRAMS AND SERVICE
ARIZONA STATE UNIVERSITY
PO Box 870212
TEMPE AZ 85287-0212

STUDENT DEVELOPMENT

Student Organization Resource Center. The Student Organization Resource Center provides opportunities for students to get involved with established campus organizations and helps students start new organizations. The center maintains a list of all registered groups, schedules mall activities, and provides a resource desk where students can get information on student activities and leadership opportunities. The REACH information desk is also in the Student Organization Resource Center located on the third floor of the Memorial Union. For more information, call the center at 602/965-2249 or REACH at 602/965-2255.

Learning Resource Center. The Learning Resource Center (LRC) seeks to provide academic support services to students in an easily accessible manner. Services offered include tutoring, supplemental instruction, peer advising, and computer-assisted instruction. For more information, call 602/965-6254.

Student Leadership Programs. Student Leadership Programs serves as a resource to students interested in leadership development. Resources include a leadership library and information about the ASU Leadership Development Model and other campus, local, and national leadership programs. Staff are available for presentations; workshop facilitation; and advisement, guidance, and coordination of efforts in leadership development. For more information, call 602/965-2249.

Child and Family Services. Child and Family Services (CFS) provides resources and referral services to students, faculty, and staff. Information about the Campus Children's Center (602/921-2737), Child Development Laboratory (602/965-7267), Child Study Laboratory (602/965-5320), and the College of Education Preschool (602/965-2510) may be obtained at CFS or by calling the programs directly. CFS maintains a child care referrals database and coordinates workshops and discussion groups on child and elder care issues. Educational materials and listings of additional on- and off-campus activities, programs, and services for children and their families are available at the CFS office, MU 14C. Appointments are recommended.

For more information, call 602/965-9515.

Fraternities and Sororities. Involvement in a fraternity or sorority is one of the most rewarding aspects of a student's college experience. Twenty-two fraternities and 14 sororities provide opportunities for leadership development, academic success, campus involvement, community service, social interaction, brotherhood/sisterhood, and intramural participation. These organizations are governed by the Interfraternity Council and the Panhellenic Council. The National Panhellenic Council offers nine predominantly African American organizations for involvement with community service, cultural learning, and a deep sense of tradition. The Hispanic Greek Council, consisting of two fraternities and two sororities, offers Hispanic students an opportunity to work on service projects, give back to the Latina/Latino culture, and network within the Hispanic community. In addition to the benefits of life-long membership, many of the fraternities and sororities have chapter houses or residence hall floors that provide a rewarding living/learning option for their members. For more information, call 602/965-2288 or 602/965-2249.

Institute for Cocurricular Programs and Service

Institute for Cocurricular Programs and Service (ICPS) is an interdisciplinary program designed to connect students and faculty who share common interests. The program has both curricular and cocurricular elements, enabling students and faculty to meet in small seminars for course credit, or in informal discussion or workshop settings.

Involvement in the institute's programs enables students to explore real-world issues and gain experience with larger, nonuniversity communities. A number of academically based activities allow for close contact between students and professors, in-depth discussion of interdisciplinary themes, and service or research experiences centered around an interest area. ICPS activities are open to all undergraduate students with an interest in exploring a theme or building community among like-minded students and faculty.

ICPS offers various options for involvement in this program. Students may choose to participate in any or all

aspects of the program, ranging from drop-in participation in seminars to living in a community in one of the university's residence halls.

Residential Communities. Students with a deep commitment to their interest area might choose to live in a community, regularly sponsoring their own programs around their interdisciplinary theme interest. These communities share space in one of the ASU residence halls, participating in regular residential activities, but working through their own leadership and with the Institute for Cocurricular Programs and Service staff to create a sense of place for community residents. In 1996–97, the Institute for Cocurricular Programs and Service offered nine residential communities: The Arts, from performance and studio arts to literature and other creative activities; Athena focuses on architecture, environmental design, and the humanities, from the classical to the cutting edge; Deaf Pride addresses deaf, hard-of-hearing issues and American Sign Language; Diana focuses on how women develop as leaders and creative individuals in our society; El Zócalo studies Chicana/Chicano life; Fitness focuses on exercise, health, and nutrition; Four Winds focuses on Native American issues and culture; 21st Century has emphasis on technology, culture, and society, including the Internet; and UMOJA, the African American experience. Students interested in developing a residential community may propose to live in the community early in spring for the following academic year.

Community Service Internships. Students with a 2.50 GPA from any academic program may enroll for three to six hours of internship credit for working in an area of community service. The Institute for Cocurricular Programs and Service internship program is designed as a service learning experience that brings internship students together with various faculty members regularly during the internship experience to explore topics and issues that relate to community, service, citizenship, and student involvement.

Research Internships. The Institute for Cocurricular Programs and Service provides opportunities for students who wish to assist faculty in research that is

multidisciplinary. Students may register for up to three hours of internship credit for working on specific projects that help them to learn about the research process, methodology, and implications of academic research. The Institute for Cocurricular Programs and Service works in conjunction with various faculty groups that have coordinated multidisciplinary research projects in the greater ASU community.

Seminar Discussion Classes. A highlight of the Campus Communities program is the one-hour seminar discussion course that is offered in multiple sections each semester. These courses meet for a total of 15 hours in one regular semester and are designed as small-group discussion seminars with one or two faculty members, exploring a particular theme. Some discussion seminar participants choose to work on a particular project; others engage in individual study and discussion; still others explore selected readings. Students and faculty are able to propose theme interest areas to the Campus Communities program.

Seminar Series. Throughout the academic year, the Institute for Cocurricular Programs and Service sponsors a series of small group seminars with individual faculty across disciplines to explore theme areas that students indicated as an interest area. Students are invited to propose and develop seminars along with the Institute for Cocurricular Programs and Service staff.

Capstone Course. A three-hour course that explores the nature of academic community; citizenship; what it means to be a college-educated person in the U.S. and world society; and the relationships among service, research, and education. The course is taught by faculty across disciplines and provides students with a service learning opportunity to reinforce the themes explored in class.

Community Theme Programs. As students' interdisciplinary interests bring them together, they often develop their own ideas for group activities. These include such programs as film series, dance and music programs, holiday events with educational components, and joint events with agencies, schools, and groups in the greater ASU community.

Academic transcript recognition for participating in the Campus Communities program is based on fulfilling approved course work, including participation in the Campus Communities seminar series and designating a particular interdisciplinary theme area of interest.

Students interested in participation in Campus Communities may do so by attending a sponsored event, enrolling in a Campus Communities course, or by calling the program office for further information at 602/965–9600. The Institute for Cocurricular Programs and Service is housed in Student Affairs.

EDUCATIONAL DEVELOPMENT

Educational Development comprises four programs designed to assist students with special needs and serves as an educational outreach program for ASU. The ASU/Phoenix Educational Opportunity Center, located off campus, provides information for college admissions and financial aid; the Upward Bound program provides college preparation for high school students that are first generation and low income; Disability Resources for Students is a comprehensive support program for students with disabilities who are attending ASU; and Veterans Upward Bound is a program that prepares veterans for postsecondary enrollment. All Educational Development programs are fully or partially funded by the U.S. Department of Education and are known nationally as TRIO programs.

The ASU/Phoenix Educational Opportunity Center. This community outreach service focuses on low-income individuals. The center has a main office at 1000 E. Apache Boulevard, Suite 118, Tempe, AZ, and satellite offices around Maricopa County. It offers vocational testing and guidance as well as assistance in application for admission, scholarships, and financial assistance at a postsecondary institution suited to particular individuals' needs. Services are free. For more information, call 602/894–8451.

Disability Resources for Students. Disability Resources for Students (DRS) ensures that qualified students with disabilities, upon request, are provided with reasonable and effective accommodations. DRS facilitates equal access to educational and cocurricular

programs, campus activities, and career and employment opportunities for qualified students with disabilities by offering a wide range of academic support services that include, but are not limited to, the following: academic and career consultation; campus and community program coordination and/or referrals; supplemental readers in coordination with Recording for the Blind and Dyslexic (RFB&D); an in-class note taking program; nonstandard academic testing accommodations; specialized equipment for specific disabilities; the Hewlett-Packard Adaptive Technology Center; American Sign Language or oral interpreters; TTY access including campus pay phones; educational materials, e.g., braille/alternative print production, large print, raised line charts and graphs; braille campus map; campus mobility services; and the Access Employment Program. Although students are responsible for their own personal care attendants, DRS does provide an Attendant Management Training Program for students with disabilities and maintains a current listing of applicants (untrained) for personal care attendants. Also, a U.S. Department of Education TRIO Student Support Services Grant allows DRS to incorporate a unique academic enhancement model into the disability support services program for 270 selected students with disabilities who meet TRIO eligibility requirements.

Some classroom accommodations, such as braille, audio tapes, interpreting services, enlarged print, and lab material conversions, require an extended preparation time, i.e., one semester. To ensure the availability of accommodations from the first day of class, students are required to preregister for classes and notify the appropriate DRS program coordinator immediately upon submitting a Course Request Preregistration form. Although DRS will attempt to provide requested appropriate accommodations for students who miss preregistration, they cannot be guaranteed and effective alternatives may be necessary.

Documentation is required and information regarding disabilities is confidential. For more information, call 602/965-1234 (Voice) or 602/965-9000 (TTY).

The Upward Bound Program. This program is designed to increase the academic skills and motivational levels

of participants (low income, potential first-generation college students) to the extent that they will complete high school and enter postsecondary institutions. The year-round program includes summer residential components. For more information, call 602/965-6483.

Veterans Upward Bound. This program is designed for veterans who wish to pursue postsecondary education but whose life experiences did not adequately prepare them for the educational requirements of today. College preparation instruction in writing, reading, mathematics, general science, social science, study skills, and computer literacy are provided to suit each veteran's individual needs. Veterans lacking a high school diploma can also prepare for obtaining their General Education Development (GED) while participating in Veterans Upward Bound. Interest inventory assessments and career advisement are also available. For more information, call 602/965-3944.

STUDENT LIFE

Working closely with a variety of student populations, Student Life strives to increase student involvement in the ASU experience. Opportunities for leadership and community involvement help students prepare for their roles as responsible citizens. Through their involvement in student activities, workshops, community service, and student governance, students learn the qualities of student leadership and the skills to be successful students.

Programs and services are targeted to an increasingly multicultural student community as Student Life places high priority upon the promotion of civic responsibility and the celebration of diversity. An emphasis is placed upon empowerment of individual students and student organizations, including international students, adults re-entering higher education, and commuter students.

ASU and Student Life encourage student volunteerism and community involvement. Concern for the social environment is reflected in the activities of the Cultural Diversity Committee, Student Judicial Affairs, the Re-entry Student Center, and the International Student Office.

Understanding the University Experience (Hispanic Mother/Daughter Pro-

gram) involves precollege women in early preparation for college.

The Student Life staff works closely with the academic- and student-support service areas of the university to make sure that students are aware of and use available resources. Staff members also act as advocates for students with other campus departments. For more information, call 602/965-6547.

COUNSELING AND CONSULTATION

Counseling and Consultation provides confidential counseling services to all ASU students. The psychologists and counselors on staff help students with almost any type of problem or issue related to adjusting to college life. The staff is particularly committed to helping minority students and nontraditional students adjust to campus life.

Counseling and Consultation offers counseling groups for career exploration, relationship difficulties, stress management, depression, assertiveness, eating disorders, family problems, and other common student issues. Individual therapy and couples counseling are offered on a short-term basis. Counseling and Consultation also provides emergency counseling to students experiencing an emotional crisis.

A career interest testing program is available to both students and nonstudents. Other services available to the ASU community include consultation and outreach services to faculty and staff, academic instruction, research, a master's-level practicum training program, and an APA-approved clinical internship program for doctoral students in counseling and clinical psychology. Students may schedule an initial counseling appointment either by phone (602/965-6146) or in person. After an initial personal consultation and four free individual sessions, students are charged \$10.00 per session. Counseling and Consultation is located in SSV B317.

The Multicultural Advancement Program (MAP). This program is a separate component within Counseling and Consultation and is built upon a student development model providing cultural, emotional, and academic support services to the university's minority student populations. MAP counselors provide this support through programs, workshops, summer institutes, academic classes, personal and

educational counseling, and sponsorship of student organizations. Students may schedule an appointment with a MAP counselor by phone (602/965-6060) or in person. The MAP office is located in SSV A361.

Testing Support Services. Testing Support Services (TSS) offers workshops to help students prepare for the following graduate entrance exams: The Graduate Record Exam (GRE), the Graduate Management Admissions Test (GMAT), the Law School Admission Test (LSAT), and the Medical College Admissions Test (MCAT). In addition, students may select individual tutoring sessions or a workshop (Basic Math Review) to enhance their math and/or quantitative analysis skills. Students may sign up for test preparation workshops by phone (602/965-6777) or in person. The TSS office is located in SSV B322.

STUDENT HEALTH

Services. Student Health offers fully accredited outpatient health care to all students enrolled at ASU. The professional staff, consisting of physicians, nurse practitioners, registered nurses, psychiatrists, social workers, counselors, dietitians, and health educators, has special interest and training in college health care. Consultant physicians in dermatology, orthopedics, and ear, nose, and throat are on-site and are available by referral from a member of the Student Health professional staff.

Additional services include comprehensive women's health care, immunizations, a wart clinic, and an allergy clinic for students needing periodic injections. The pharmacy at Student Health provides many prescription and over-the-counter medications. Radiology and laboratory services are also available.

Substance abuse services are available at Student Health for students experiencing problems as a result of the use of alcohol or other substances and wishing to address the problems in a confidential setting.

For information about Student Health Services at ASU East, call 602/222-6568.

Health Education. Student Health provides educational programs on nutrition, stress management, alcohol and other drug use and abuse, sexuality and sexually transmitted diseases, including

the Human Immunodeficiency Virus (HIV). Peer education programs provide students an opportunity to gain experience in health education and to enhance presentation skills. Services and educational brochures are available at Student Health and at various locations throughout the campus.

Hours. Students are strongly encouraged to schedule appointments to minimize waiting time and to allow students the opportunity to establish a relationship with one clinician. Appointments are available by calling 602/965-3349. Patients with urgent health care problems may be seen at Student Health's ASAP clinic.

Days	Hours
Mon., Wed., Fri.	8:00 A.M.–5:00 P.M.
Tues., Thurs.	9:00 A.M.–5:00 P.M.

Fees. Full-time students are not charged for primary care visits at Student Health. Part-time students are charged a visit fee. There are charges for consultant visits, continuing mental health visits, radiological procedures, laboratory procedures, medications, certain special or surgical procedures, and certain health education services. Patients receiving medical treatment off campus, such as consultations, emergency care, and hospitalization, are responsible for any resulting charges.

Insurance. *While Student Health provides comprehensive ambulatory care, it is not a substitute for health insurance.* Medical insurance coverage is strongly recommended for all students and is required for international students. Eligible students and dependents may enroll in health insurance coverage arranged by ASU. Dependents must complete an application and may require underwriting approval by the insurance carrier. The coverage assists students in paying for laboratory and radiology procedures, off-campus consultations, hospitalization, surgery, emergency, and after-hours care. Students may purchase health insurance through InTouch, the ASU touch-tone telephone registration system, or at any registrar site. For more information, call the Student Health insurance office at 602/965-2411.

STUDENT PUBLICATIONS

The activities of Student Publications are most visible in the *State Press*. The campus newspaper, one of the largest daily newspapers in Arizona, is published five days a week by ASU students who make editorial decisions with the support of an experienced university staff director.

The *State Press* provides students with on-the-job training in newswriting, photography, editing, advertising, and production work. The *State Press* also addresses the many informational needs of the university community, not only through stories about the campus, and local and national events, but through paid advertisements by area merchants, campus groups, and university faculty, students, and staff. The *Digiguide* is Student Publications' online community guide and includes complete listings of restaurants, hotels, apartments, transportation, campus maps, and fun places to go within the community surrounding ASU. Visit the site at <http://news.vpsa.asu.edu>.

Student Publications publishes *Hayden's Ferry Review* twice a year. This literary magazine features fiction, poetry, photography, and illustrations submitted from people throughout the country.

Student Publications provides complete prepress services to the university community. For more information, call 602/965-7572.

MEMORIAL UNION

The Memorial Union (MU) is a major center of student, faculty, and staff activity. Students have many opportunities for involvement, including the student-directed MU Activities Board (MUAB). The MUAB plans and delivers programs and daily events through the following committees: Comedy, Culture and Arts, Film, Gallery, Marketing, Recreation, Special Events, and the Executive Board. For more information, call 602/965-6822.

The MU is staffed primarily by students, providing students the opportunity to develop leadership skills and a customer service orientation. Student employment is available in building management, conference room setup, clerical support, film projection, food services, gallery installation, information desk services, and recreation center services.

The MU also sponsors one of the finest intercollegiate bowling programs in the United States, with men's and women's teams competing throughout the country. For more information, call 602/965-3642.

MU facilities include student lounges, a gallery, a cinema, meeting rooms, and ballrooms. Student government and other student organization offices are located on the third floor. Recreational activities include billiards, bowling, and amusement games. The MU provides a diversity of dining options for individual and group needs and provides catering and conference services. The building houses a card and gift shop, copy center, credit union, dry cleaners, hair salon, photo shop, post office, record shop, travel agency, and four automated teller machines (ATMs). The MU operates the university information desk and lost and found. For more information, call 602/965-5728.

ASSOCIATED STUDENTS OF ARIZONA STATE UNIVERSITY (ASASU)

ASASU is the student government of the university and the official representative of the student body in matters of university governance and budgeting. Students can take advantage of the Bike Co-op Repair Service, Campus Clubs and Organizations, College Councils, the Counseling and Health Advisory Committee, Community Support Program, Entertainment Events, Environmental Issues, the Executive Committee, Graduate Research Support Opportunities (GRSO), Homecoming, Info Devils, Lecture Series, the Multicultural Awareness Board, Off-Campus Student Services, Public Relations, the Safety Escort Service, Special Events, State Relations, Student Legal Assistance, and the Student Senate. For more information, call 602/965-3161.

CAREER SERVICES

Career Services provides advisement for individual career planning concerns and offers information about numerous career fields and permanent positions. Students are encouraged to use the Career Development Center throughout their academic careers. A computerized career planning system assists students in evaluating and making career choices. Career Services offers work-

shops and classroom presentations on career planning, interviewing skills, résumé writing, and a myriad of additional career-related topics. Advisors are available to assist students on an individual basis in career planning and employment.

Hundreds of employers from business, industry, government, social service agencies, health organizations, and school districts come to ASU to interview students seeking permanent and career-related summer, intern, and co-op employment. Career Services schedules these interviews for both employers and students to meet each group's needs and interests. In addition, career and job fairs are scheduled throughout the year.

The agency's services support students' career development throughout their college experience, and Career Services encourages participation in programs as early as the student's freshman year. The offices are located in SSV C359 and C363. For more information, call 602/965-2350.

STUDENT RECREATION COMPLEX AND RECREATIONAL SPORTS

Students who want to get involved or meet people with similar interests should visit the Student Recreation Complex (SRC) to learn more about Recreational Sports. Student Affairs' Recreational Sports is one of the largest programs of its kind in the country, serving more than 20,000 students annually. Programs offered include intramural sports, informal recreation, fitness, aquatic and sports skills classes, outdoor recreation, children and family programs, sport clubs, adaptive recreation for individuals with long- or short-term disabilities, a wellness center, safety education, and special events.

Located on the south end of Palm Walk, the SRC is one of the finest student recreation facilities in the United States. Features include a variety of resistance and cardiorespiratory equipment, a 9,000 square-foot weight room, three large gymnasiums, 14 indoor racquetball courts and one squash court, martial arts, aerobics and sport club rooms, outdoor equipment rental, and an adaptive weight area. Outdoor facilities include a lighted, multiuse complex with four fields, a .43-mile perimeter walking and jogging path, four

sand volleyball courts, 14 tennis courts, and a 70-meter swimming pool with two movable bulkheads that allow the pool to be divided into three parts for simultaneous multiuse programming.

For more information, stop by for a tour or call 602/965-8900.

ARIZONA PREVENTION RESOURCE CENTER

The Arizona Prevention Resource Center (APRC) is a partnership among ASU, the Governor's Division of Drug Policy, the Arizona Department of Education, and the Arizona Department of Health Services.

The APRC serves as a centralized source for individuals, schools, and communities throughout Arizona to support, enhance, and initiate programs focused on the prevention of the use of tobacco products and the use and abuse of alcohol and other drugs; gangs and violence; and other areas, such as health promotion, domestic violence, and dropout prevention. The APRC operates in the following program areas:

1. clearinghouse—to provide accurate, timely, and personalized prevention information and materials through in-house collection, access to national sources, and linkages between prevention programs in Arizona;
2. training and technical assistance—to provide high quality, responsive training and technical assistance for organizations and individuals undertaking prevention programs in local communities and schools;
3. evaluation and research—to coordinate and provide leadership for a statewide evaluation strategy for alcohol and other drug prevention programs; to produce an annual inventory of substance abuse prevention, education, and treatment programs in Arizona; to design and conduct contracted evaluations of community-based prevention programs; and to promote quality and accountability in all aspects of APRC operations; and
4. planning and special projects—to promote effective collaboration between prevention and treatment program leadership, to broaden the funding base for prevention programs, and to develop and strengthen partnerships.

For more information, call the APRC at 602/727-2772 or write

ARIZONA PREVENTION RESOURCE
CENTER
ARIZONA STATE UNIVERSITY
PO Box 872208
TEMPE AZ 85287-2208

Information can also be obtained at

ASU DOWNTOWN CENTER
BUILDING B
641 EAST VAN BUREN SUITE B2
PHOENIX AZ
602/727-5400 (FAX)
800/432-2772
(TOLL-FREE IN ARIZONA/TTY)

The Arizona Drug and Gang Prevention Resource Center (ADGPRC), located with the APRC, provides similar information and technical assistance for communities to help them focus strategically on drug and gang prevention issues.

The ADGPRC can be contacted at 602/727-5015 or toll-free at 800/981-3702.

INTERCOLLEGIATE ATHLETICS

The university is a member of the National Collegiate Athletic Association, Division I, and the Pacific-10 Conference. The university has 21 varsity intercollegiate sports and more than 500 participants. Intercollegiate athletics at ASU are governed by a board of faculty, students, and staff under the regulations of the Arizona Board of Regents, the NCAA, the Pacific-10 Conference, and the university. Policies are administered by Intercollegiate Athletics. All athletic grants-in-aid and scholarships are administered in coordination with Intercollegiate Athletics.

RELIGIOUS ACTIVITIES

Various religious centers representing most major religious groups are available near the main campus and provide students with the opportunity to participate in programs of religious worship and to meet other students through social activities. For more information, call the Campus Interfaith Council at Danforth Chapel, 602/965-3570.

OTHER OPPORTUNITIES FOR STUDENT INVOLVEMENT

Dance. The Department of Dance and Dance Arizona Repertory Theatre, a student touring outreach company,

present 12 to 14 faculty- and/or student-directed concerts each year. Interested students should attend open auditions, which are held at the beginning of each semester. For more information, call 602/965-5029.

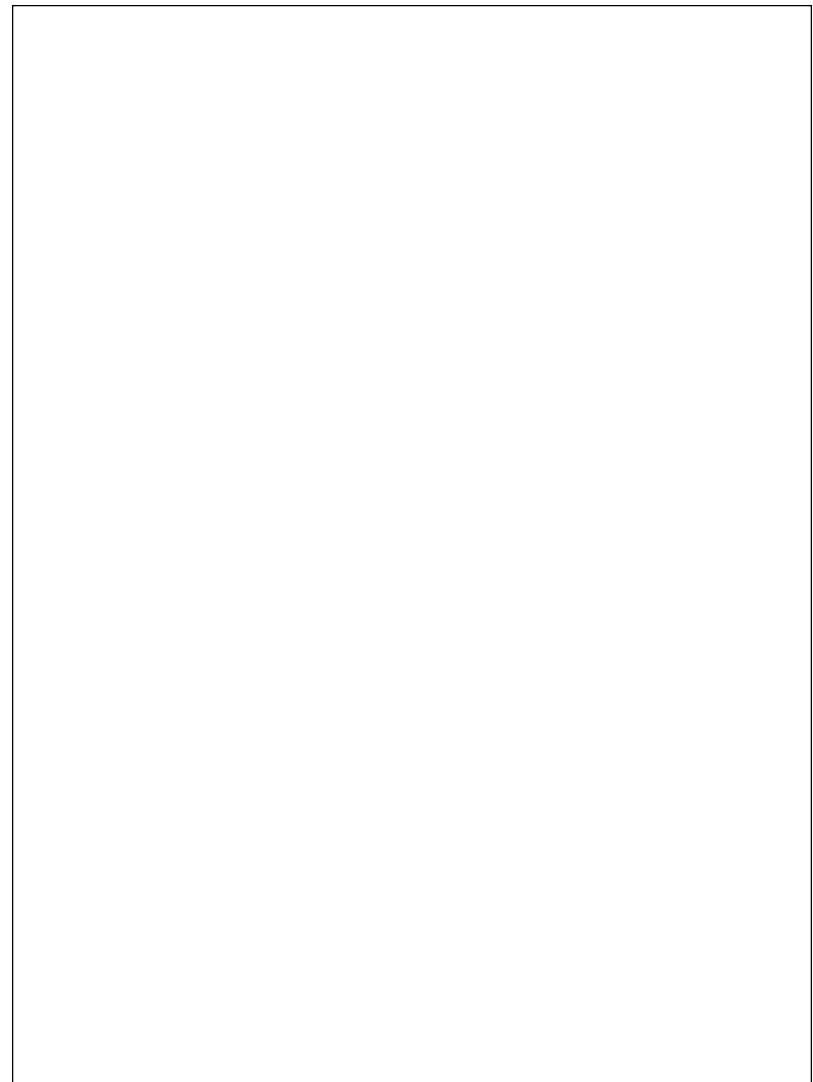
Forensics. The Sun Devil Forensic squad, associated with Pi Kappa Delta, national forensic honorary association, travels to trophy tournaments across the country. For more information, call Dr. Clark D. Olson, director of Forensics, at 602/965-3825.

Interpreters Theatre. Participants write, compile, and perform scripts for presentation in diverse on- and off-campus settings through the Department of

Communication. For more information, call 602/965-4111 or 602/965-5061.

Music. Performing organizations with the School of Music provide opportunities for involvement and credit, including bands, Lyric Opera Theatre, symphony orchestra, and university choral organizations. For more information, call the School of Music at 602/965-3371.

Theatre. The University Theatre presents four to six faculty-directed productions and eight to 14 student-directed productions each year. Audition information is available from the Department of Theatre office, GHALL 232.



Jeremy Veal sees an opening and begins a drive to the basket against UCLA.

Conley Photography

Fees, Deposits, and Other Charges

The Arizona Board of Regents reserves the right to change fees and charges without notice. The current semester *Schedule of Classes* generally reflects up-to-date fee amounts.

The following fees apply to both credit and noncredit (audit) registrations and are subject to change.

DEFINITIONS

Resident tuition refers to the charge assessed to all resident students who register for classes at ASU. *Nonresident tuition* refers to the charge assessed to nonresident students, as established in Arizona Board of Regents' Policy 4-102.

ACADEMIC YEAR TUITION

The resident and nonresident tuition for fall and spring semesters is shown in the "1997-98 Resident and Nonresident Tuition" table on this page. The amounts listed are per semester hour each academic term. For more information on classification for fee status, see "Residency Classification Procedures and Policies," pages 47-48.

Students registered for seven or more hours are considered full-time for tuition payment purposes. See "Enrollment Verification Guidelines," page 72.

Note: The rate for one hour is charged if the student is registered for only a zero-hour class.

College of Business Fee. Beginning with the 1997-98 academic year, an annual program fee will be assessed for resident and nonresident M.B.A. and select professional business master's

degree students who begin their first year in the programs in the fall of 1997 or thereafter (i.e., 1997-98 academic year, \$1,000.00; 1998-99 academic year, \$2,000.00). Contact the College of Business for more information.

College of Law Fee. Effective fall 1998, rates for admitted full-time law students will be \$1,187.50 more per semester than standard resident or nonresident rates. In fall 1999, those rates will increase to \$1,375.00 more per semester. See the current semester *Schedule of Classes* for fee amounts.

College of Nursing Fee. Effective summer 1998, a one-time program fee of \$6,300.00 will be assessed for students admitted into the off-campus Post-Master's Family Nurse Practitioner program. Contact the College of Nursing for more information.

Off-Campus and Independent Learning Courses. For information on fees for off-campus and independent learning courses, see "Instructional Programs" and "Distance Learning," pages 241-242.

Summer Sessions Fees. The 1998 registration fee per semester hour is \$105.00 except for law students. The registration fee per semester hour for law students is \$209.00. For more information on the summer sessions, see page 431 and the *Summer Sessions Bulletin*.

1997-98 Resident and Nonresident Tuition¹

Semester Hours	Resident Tuition ²	Nonresident Tuition
1	\$105	\$ 360
2	210	720
3	315	1,080
4	420	1,440
5	525	1,800
6	630	2,160
7	994	2,520
8	994	2,880
9	994	3,240
10	994	3,600
11	994	3,960
12 or more	994	4,320

¹ Tuition is subject to change for 1998-99.

² In addition to tuition, students are charged other fees (e.g., the Student Recreation Complex fee and financial aid trust fee). Specialized fees adopted by the Arizona Board of Regents for selected graduate professional programs apply to students in the colleges of Business, Law, and Nursing (see above).

OTHER FEES, DEPOSITS, AND CHARGES

Special Class Fees and Deposits. Certain university classes require payment of fees or deposits for materials, breakage, and rentals. These fees and deposits are listed in the *Schedule of Classes* for each semester. See the “Special Class Fees and Deposits” table on pages 51–55.

Student Recreation Complex Fee. All students (except university employees) who take at least one class at ASU Main must pay a mandatory Student Recreation Complex fee. Full-time (seven or more hours) students are charged \$25.00 per semester. Part-time students pay \$12.00 per semester, and summer students pay a per semester hour fee. See the current semester *Schedule of Classes* for more information.

Financial Aid Trust Fee. All students must pay a financial aid trust fee. Full-time (seven or more hours) students are charged no more than one percent of the current tuition. The fee for students enrolled six or fewer hours is half that charged full-time students. The total summer sessions fee does not exceed the amount for a full-time student. Fees collected from students are matched by the State of Arizona and used to create a Financial Aid Trust Fund, from which student grants are awarded under the usual financial aid eligibility criteria available at the ASU Student Financial Assistance office in the Student Services Building.

Arizona Students’ Association (ASA) Fee. The ASA is a nonprofit lobbying organization that represents Arizona’s public university students to the Arizona Board of Regents, State Legislature, and U.S. Congress. During 1997, students at the state universities voted to change the mechanism for funding the ASA. A \$1.00 fee will be charged to each student each semester. Any refunds for this fee will be provided through the ASA Central Office at 602/966–6358.

Late Registration
 Fee assessed on registrations beginning with the first day of each session \$10.00
 A \$10.00 late fee is also assessed on registration payments received after the fee payment deadline but processed before the class enrollment purge.

Transcripts
 Official transcripts for currently enrolled students \$1.00 each
 Official transcripts for nonenrolled students \$5.00/copy
 Additional copies ordered at the same time are \$1.00 each. Requests for official transcripts should be made at least two weeks in advance of the time desired.

Copies of Educational Records Other Than ASU Transcripts

<i>Number of Pages</i>	<i>Total Charge</i>
1 to 5	free
6 to 10	\$2.00
11 to 15	\$3.00

Copies of additional pages cost \$1.00 per each five pages copied.

Graduation Application or Reapplication
 Undergraduate \$12.00
 Graduate \$17.00
 A late fee of \$5.00 is added to the charge noted above if not paid on or before the deadlines shown in the “University Calendar,” pages 12–14.

Comprehensive Examination. This fee is paid by all students seeking to establish credit by examination and is \$7.50 per semester hour.

Private Music Instruction
 One-half hour of instruction weekly \$40.00
 One hour of instruction weekly \$60.00
 More than one hour of instruction weekly—music majors only \$60.00

Musical Instrument Rental Charge
 Charge for use of university-owned musical instruments \$25.00
 Consult the School of Music for specific information.

Binding and Microfilm Fees
 Binding fee for thesis or dissertation \$17.00 per copy
 This fee is subject to change. Additional charges may be required depending on the size and nature of the document.
 Dissertation microfilming fee \$50.00
 This fee is subject to change.

Sun Card/ID Card
 Replacement fee \$10.00

Parking Decals. A parking decal must be purchased, in person or by using the Park Smart touch-tone telephone sys-

tem 602/921–PARK (7275), for motor vehicles parked on campus except in areas where metered parking or visitor lots are available. Photo identification is required. Annual decals range from \$45.00 to \$105.00 for controlled access parking. For more decal sales information, call 602/965–6124.

Each vehicle registered at ASU Parking and Transit Services must comply with Arizona emission standards (A.R.S. § 15–1627G) during the entire registration period. The fee for this emission inspection is \$10.00 to \$20.00 per vehicle.
 Everyone is encouraged to support travel reduction measures by using mass transit, the university shuttle bus, carpooling, bicycling, or walking whenever possible. See “Transportation” on page 46 for more information.

Parking Violations. Due to high demand, parking regulations are strictly enforced. Fines range from \$10.00 to \$50.00. Appeals to parking citations may be filed within 14 calendar days to Parking and Transit Services and, after payment, may be further appealed to the Parking Citation Appeals Board. Unpaid parking citations are delinquent financial obligations subject to provisions of the “Delinquent Financial Obligations” section, page 47. Any person owing three or more unpaid parking citations or \$100.00 in unpaid parking citations is subject to impoundment. A \$85.00 minimum fee is assessed if impoundment is required. For more information, call 602/965–4527.

Returned Checks. Checks returned by a bank are assessed a \$10.00 service charge with repayment needed within five business days of notification. A second \$10.00 service charge is made if the returned check is not repaid within this five-day period. Repayment of a returned check must typically be in cash.

The university may have arrangements with its bank to redeposit automatically for a second time checks for which there are insufficient funds. No service charge is assessed by ASU until a check is returned to ASU; however, the payer may be assessed a service charge by the payer’s financial institution.

Students paying registration fees and tuition with a check that is subsequently not honored by a financial institution are subject to involuntary

withdrawal from the university if repayment is not made. All students involuntarily withdrawn are charged tuition and/or registration fees according to the standard refund schedule as of the involuntary withdrawal date, as determined by the university.

On-Campus Housing. The cost of Main campus housing varies. In 1997–98 the most typical cost is \$2,730.00 per academic year. Meal plans are purchased separately. For more information, see “Residential Life,” pages 37–38 or call 602/965–3515.

TRANSPORTATION

To reduce air pollution and traffic congestion, students are encouraged to travel to and from campus by means other than automobile. Nearby on-campus automobile parking space is limited and tightly controlled.

Alternative transportation modes are used by thousands of ASU students. ASU is served by a Phoenix-area regional bus service; monthly and reduced-fare semester passes are available on campus. In addition, an inexpensive express shuttle runs between ASU Main in Tempe and ASU West in northwest Phoenix; another shuttle runs among ASU Main, Mesa Community College, and ASU East in Mesa; and a Free Local Area Shuttle (FLASH) is available around the periphery of ASU Main.

Bicycle ridership at ASU is estimated to be more than 15,000 students daily. Ample racks in many locations enable the parking and securing of bicycles. Bicycle use is restricted only in those areas of campus where pedestrian traffic is sufficiently heavy to make such use a hazard. The Bike Co-op Repair Service provides assistance with bicycle maintenance.

Also, careful class scheduling, when possible, can reduce a student’s transportation needs. For more information on commute alternatives, call 602/965–1072.

PAYMENT METHODS AND DEADLINES

InTouch. The InTouch system, at 602/350–1500, allows students to register for classes, to drop/add, and to make fee payment from any touch-tone phone. Fees can be paid from any touch-tone phone with available financial aid, debit cards, VISA, and MasterCard. Refer to the *Schedule of*

Classes for available dates and times and more information about the InTouch system.

Debit/Credit Cards. ASU accepts debit cards, VISA, and MasterCard. Debit/credit card payments through InTouch are processed online with the bank. See the *Schedule of Classes* for information about using debit/credit cards by mail or campus payment boxes.

Check. Checks payable for the exact amount of charges and without a restrictive endorsement are generally acceptable, except for students on check use suspension due to a previously returned check.

Financial Aid. Students receiving financial aid may use their expected aid to pay university charges, including tuition and fees. Students who wish to do so must follow specified procedures. See the current semester *Schedule of Classes* for more information.

Veterans Deferred Payment. The Veterans Readjustment Assistance Act allows veterans to apply for deferred payment of registration fees. A Certificate of Eligibility must be presented. Contact the Veterans Services Section for information on meeting the necessary requirements at SSV B117 or call 602/965–7723. The university may deny this privilege to students with previous delinquent obligations.

Payment Deadlines. Fees must be paid by the deadline dates and times indicated or the registration is voided. A fee payment deadline is printed on all Schedule/Billing Statements and in the *Schedule of Classes*.

REFUNDS

Academic Year Resident and Non-resident Tuition. Students withdrawing from school or individual classes receive a refund as follows:

Withdrawal Date	Refund
Before first day of the semester	100% less \$10.00
One through 7 calendar days	80%
8 through 14 calendar days	60%
15 through 21 calendar days	40%
22 through 28 calendar days	20%
After the 28th calendar day	No refund

The university provides a prorated refund for first-time students receiving

financial aid; therefore, the refund schedule is the minimum amount refundable to these students.

Withdrawal occurs on the calendar day that withdrawal is requested, either in person at a registrar site or by phone using InTouch, the ASU touch-tone telephone system for registration and fee payment. Students withdrawing for medical or other extenuating circumstances may contact the Comptroller’s Office Student Fee Payment Section, SSV B235, for refunds that may be available under these circumstances.

Summer Sessions Fees. Students withdrawing from any summer session or individual classes receive a refund as follows:

Withdrawal Date	Refund
Before first day of session	100%*
First and second days of session	80%
Third day of session	60%
Fourth day of session	40%
Fifth day of session	20%
After fifth day of session	No refund

* A \$10.00 processing fee is subtracted per session.

Refunds are based on the session days and not the class meeting dates for any particular class.

Special Class Fees and Deposits. Refunds, if any, are determined by the department offering the course. Refund determination is based on withdrawal date, type of activity, and costs already assessed by the department.

Private Music Instruction. If a student must drop a music course because of illness or other emergency beyond the student’s control, not more than half of the instruction charge may be refunded, as determined by the School of Music.

Late Registration. This fee is not refundable.

Student Recreation Complex Fee. This fee is refundable only upon complete withdrawal in percentage increments per the refund schedule.

Financial Aid Trust Fee. This fee is not refundable.

Official Transcripts. Overpayments by mail of \$5.00 or less are only refunded by specific request.

Graduation Fee. Overpayments by mail of \$5.00 or less are refunded only by specific request.

Residence Halls. Refunds to students departing from ASU Main residence halls before the end of the academic year are computed on the following basis.

Charges and Deposits. Housing payments and deposits are refunded as prescribed by the Residential Life License Agreement that students sign when they apply for residence hall accommodations. Students should refer to this document for specific information on refunds.

Other University Charges. Other university charges are normally not refundable, except for individual circumstances.

Payment of Refunds. Refunds require student identification and are made for the net of amounts due the university. When the last day of a refund period falls on a weekend or holiday, a withdrawal form must be submitted to one of the registrar sites during operating hours on the workday preceding the weekend or holiday. Refunds are normally paid by check and are mailed to the student's local address.

Parking Decals. Prorated refunds are available through the last business day in April.

Forfeiture of Refunds. Refunds are subject to forfeiture unless obtained within 90 days of the last class day of the semester for which the fees were originally paid.

DELINQUENT FINANCIAL OBLIGATIONS

Arizona Board of Regents' Policy 4-103B, which applies to ASU, states the following:

1. Each university shall establish procedures to collect outstanding obligations owed by students and former students.
2. Each university shall maintain a system to record all delinquent financial obligations owed to that university by students and former students.
3. Students with delinquent obligations shall not be allowed to register for classes, purchase parking decals, receive cash refunds, or ob-

tain transcripts, diplomas, or certificates of program completion. The university may allow students to register for classes, obtain transcripts, diplomas, or certificates of program completion if the delinquent obligation is \$25.00 or less.

4. Unpaid obligations shall remain a matter of record until students and former students satisfy their financial obligations or until satisfactory arrangements for repayment are made with the university.
5. The university may write off delinquent financial obligations of students according to accepted accounting principles and after appropriate collection efforts. No such write-off shall operate to relieve the student of liability for the obligation nor shall such write-off entitle the student to release of any transcripts, diplomas, certificates of program completion, or to register for further university classes until such obligation is actually paid.
6. Each university shall include this policy in its bulletin or catalog.

A late charge of \$10.00 is made for any balances due the university not paid within 30 days of the initial due date, with a second \$10.00 late charge being made if these amounts are not paid within 30 days of the first late charge. Procedures to be followed for disputed charges are available from the Accounts Receivable Section of the Business Services Office, located in ADM A109.

RESIDENCY CLASSIFICATION PROCEDURES AND POLICIES

The Arizona Board of Regents is required by law to establish uniform guidelines and criteria for classifying students' residency to determine those students who must pay nonresident tuition. The following is a summary of the general guidelines used to determine residency for tuition purposes. All of the evidence is weighed under the presumption that a nonresident student's presence in Arizona is primarily for the purpose of education and not to establish domicile and that decisions of an individual about the intent to establish domicile are generally made after the completion of an education and not before.

To obtain resident status for tuition purposes, independent students must

establish their residence in Arizona at least one year immediately before the last day of regular registration for the semester in which they propose to attend ASU. Arizona residence is generally established when individuals are physically present in the state with the intention of making Arizona their permanent home.

Mere physical presence in Arizona for one year does not automatically establish residency for tuition purposes. Adult students and emancipated minors must combine physical presence in Arizona for one year with objective evidence of their intent to make Arizona their permanent home. If these steps are delayed, the one-year period is extended until both presence and intent have been demonstrated for one full year. In addition to physical presence and intent, the student must demonstrate financial independence for the two tax years immediately preceding the request for resident classification. The student must demonstrate objective evidence of self-support and that he or she was not claimed as an income tax deduction by his or her parents or any other individual for two years. An adult student is defined as being at least 18 years of age at the beginning of the domicile year. For a complete definition of an emancipated minor, refer to the Arizona Board of Regents' residency classification policies, available in the Residency Classification Section, SSV B115.

No person is considered to have gained or lost resident status merely by attending an out-of-state educational institution.

Aliens. Students who are aliens are subject to the same requirements for resident status as are U.S. citizens. In establishing domicile, aliens must not hold a visa that prohibits establishing domicile in Arizona.

Refugees. Refugees may qualify as resident students by virtue of having been granted refugee status in accordance with all applicable laws of the United States and having met all other requirements for residence in Arizona.

Exceptions to the General Residency Rule

Students may be eligible for resident status for tuition purposes if they can meet one of the following criteria on or before the last day of regular registration.

Legal Dependents. If a student and his or her parents are domiciled in Arizona and have not met the one-year residency requirement but the parents are entitled to claim the student as a dependent for federal and state tax purposes, the student may be eligible for resident status for tuition purposes.

Transferred Employees. If students are domiciled in Arizona and have not met the one-year residency requirement but are employees or spouses of employees who have been transferred to Arizona by their employers for employment purposes, the students may be eligible for resident status for tuition purposes.

Members of the Military. If students are not domiciled in Arizona but are members of the U.S. Armed Forces stationed in Arizona or are the spouses or dependent children of a member (as defined in A.R.S. § 43-1001), the students may be eligible for resident status for tuition purposes. If military service is concluded while they are enrolled, students do not lose resident status while they are continuously enrolled in a degree program. If individuals are domiciled in Arizona immediately before becoming members of the U.S. Armed Forces, they do not lose resident status because of their absence while on active duty with the military as long as they maintain Arizona affiliations and file Arizona state tax.

Native Americans. Students who are members of a Native American tribe whose reservation lies both in Arizona and an adjacent state and who are residents of that reservation may be eligible for resident status for tuition purposes.

Procedures for Establishing Residency Status

All students are responsible for obtaining residency classification for tuition purposes before registering and paying their fees. This procedure requires students to complete and file a domicile affidavit form. This form is required of all new and returning students as part of the admission or readmission process. Students classified as nonresidents who believe they may qualify for resident status must file a petition with the Residency Classification Section. This petition must be filed by the last day of regular registration. A student seeking resident status must also file supporting documentation necessary to provide a basis for resident classification (source[s] of support, driver's license, voter's registration, vehicle registration, etc.). Students whose residency petitions are in process at the fee payment deadline are responsible for paying nonresident tuition and fees. However, an appropriate refund is issued if residency is later granted for that semester.

Any student found to have made a false or misleading statement concerning residency or tuition status is subject to dismissal from the university.

Failure to file a timely written petition for reclassification of residency status for tuition purposes constitutes a waiver of the student's right to apply for the given semester. Petition deadlines are published each semester in the *Schedule of Classes*.

Residency classification is an extremely complex issue. The information presented here is a summary and does not address each individual's situation; therefore, students are encouraged to make a personal visit to the Residency Classification Section to discuss their individual circumstances as soon as possible. Guidelines for determination of residency for tuition purposes are subject to review and change without notice. For more information, call the Residency Classification Section at 602/965-7712.

Financial Aid

The primary responsibility for financing a college education belongs to students and their families. Student Financial Assistance helps students meet this responsibility by evaluating applications through the use of a standard financial need analysis system. Student Financial Assistance determines the cost of a student's attendance as

1997-98 Typical Student Budgets

Item	Dependent on-campus	Dependent off-campus	Dependent with parents	Independent
Rent	\$ 2,700	\$ 3,600	\$ 900	\$ 4,600
Food	1,800	1,800	1,800	2,125
Personal (including loan fees)	<u>2,500</u>	<u>2,500</u>	<u>2,500</u>	<u>3,000</u>
Total living	\$ 7,000	\$ 7,900	\$ 5,200	\$ 9,725
Tuition	\$ 1,988	\$ 1,988	\$ 1,988	\$ 1,988
Special fees	71	71	71	71
Books	<u>700</u>	<u>700</u>	<u>700</u>	<u>700</u>
Resident total	\$ 9,759	\$10,659	\$ 7,959	\$12,484
Nonresident tuition	\$ <u>8,640</u>	\$ <u>8,640</u>	\$ <u>8,640</u>	\$ <u>8,640</u>
Nonresident total	\$16,411	\$17,311	\$14,611	\$19,136

well as how much students and their families can afford to contribute toward that cost. It is the student's responsibility to complete all applications in an accurate and timely manner and to notify Student Financial Assistance of any changes in circumstances that might affect eligibility (e.g., loss of parent's income or change in residency classification). Financial assistance is available as scholarships, grants, loans, and employment. This aid has been made available collectively by the university, alumni, private foundations, civic groups, individuals, and state and federal governments.

To be considered for financial aid, all students must complete an application separate from the admission application. The Free Application for Federal Student Aid (FAFSA) is the only required application. It is not necessary to complete any other application that may require an application fee. The form should be completed in January or February preceding the academic year the student anticipates attending ASU. The priority date for applying is March 1. Applications completed by this date are considered for all grant funds. Applications completed after this date are processed; however, they are considered late applications. Late applications may receive limited grant dollars and a higher proportion of loan or work dollars.

A statement-of-need letter is sent to all applicants. This letter estimates expenses and contribution for the school year and specifies the amount of the applicant's financial need. Students are notified by mail regarding any additional items or documents needed to complete their applications. These items may include copies of federal tax returns, proof of valid visa, and proof of registration with the Selective Service. Students receive a separate Financial Aid Notification. This letter informs them of the types and amounts of aid they are eligible to receive through ASU. Applicants should read carefully all correspondence received from Student Financial Assistance.

Students receiving aid from Student Financial Assistance are required to meet minimum standards of satisfactory academic progress. In addition to maintaining the minimum GPA defined for good academic standing, undergraduate students awarded on a full-time basis must complete a mini-

mum of 24 semester hours within the academic year. Failure to meet these standards results in the suspension of aid funds for subsequent semesters until the deficiency is satisfied.

Students can access personal information regarding financial aid through the Financial Aid Services Through Technology (FASTT) phone system at 602/968-4400 or on the FASTT Web site at www.asu.edu/fastt. Students can check on

1. documents still needed to complete a financial aid file;
2. award information; and
3. financial aid forms, both for printing on a printer for mailing and interactive forms that can be sent across the Web.

For help on how to use the Web, contact ISURF at 602/965-2410.

TYPES OF FINANCIAL AID AND MAJOR PROGRAMS

More than 30,000 students receive financial aid resources that total more than \$225 million. There are four categories of financial aid: scholarships, grants, loans, and employment.

Scholarships

There are two sources of scholarships at ASU: university-funded scholarships and private donor scholarships. Many scholarships are offered on the basis of academic merit. However, financial need criteria may also be included in the selection of recipients. Other considerations are GPA, leadership qualities, and community service.

The Scholarship Office coordinates all scholarship programs. High school students should contact their high school counselors to determine the appropriate process for obtaining a variety of scholarships available to entering freshmen. Other undergraduate students may contact the Scholarship Office. In addition, many academic units provide scholarship funding and select students based on a variety of criteria, which include artistic talent, musical ability, and athletic performance.

Private Donor Scholarships. More than 6,200 students at ASU receive private donor scholarships. Most of these scholarship funds are provided by employers, private individuals, organizations, and corporations. In most cases, the private donor specifies the

criteria used by the Scholarship Office to identify candidates for a particular scholarship.

University Scholarships. More than 5,400 ASU students receive a scholarship from university sources that is generally in the value of tuition and/or fees. The largest source for university scholarships is the waiver program authorized by the Arizona Board of Regents. In addition, many scholarships are funded from a general endowment fund. Some of the typical areas targeted for these scholarships are top academic seniors in Arizona high schools, underrepresented minority students, students who demonstrate leadership, students who demonstrate scholastic or scientific abilities, students with disabilities, and nontraditional students.

Grants

Like scholarships, grants are provided to students without repayment or service obligation. However, the criterion to receive a grant is generally a calculation of financial need. More than 12,000 ASU students receive some form of a grant.

Federal Pell Grant. The Federal Pell Grant program is funded by the federal government and is a basic financial resource to low- and moderate-income students. Eligibility is determined through the financial aid application process by the federal government. Under this program, the university converts entitlements to cash grant payments. A student may be eligible for a maximum grant of \$2,700.00 per year.

Federal Supplemental Educational Opportunity Grant. Funds are received from the federal government by the university, which is required to match the funds. Student Financial Assistance then determines the eligibility of a student based on a specific calculation of exceptional financial need. Generally, recipients of the Federal Pell Grant are eligible to receive a Federal Supplemental Educational Opportunity Grant. Maximum grants are \$800.00.

Arizona State Grant. This program is a three-partner program of federal, state, and university funding. Students with a high financial need may receive this particular form of funding. It is

restricted to residents of Arizona. Maximum grants are \$1,500.00.

Arizona Trust Fund. This grant source is provided in partnership between ASU students and the state legislature. These funds are provided primarily to resident, undergraduate, or underrepresented students with a high financial need. Maximum grants are \$1,500.00.

University Grant. University Grants are generally reserved as the last financial aid program to be used to resolve a student's need. Grants range from \$200.00 to \$2,000.00.

Loans

About 19,000 students borrow approximately \$124 million annually. A variety of loan programs provide assistance to students and, in some cases, parents in the financing of a university education.

William D. Ford Direct Student

Loan. Through the William D. Ford Direct Student Loan program, the federal government loans money to students based on the university's determination of the student's financial need and cost of education, and the student does not begin repayment until after graduation. Under this program students have two loan options: subsidized and unsubsidized. With a Subsidized Direct Student Loan, the federal government pays the interest on the loan principle during the student's in-school status, grace, and other authorized periods of deferment. The school bases eligibility for a subsidized loan on the student's financial need which is determined by subtracting the expected family contribution from the cost of education. The school may determine the student to have eligibility for an Unsubsidized Direct Student Loan. In this program, the federal government does not pay the interest during the student's in-school status, grace, or other authorized periods of deferment; thus, as the student proceeds through school interest will accrue and will be added once the student enters repayment. Otherwise, conditions and terms for the two programs are the same.

There is a variable interest rate that is adjusted every July 1. Interest cannot exceed 8.25%. The federal government provides several options for re-

payment once the student has left school. For students who are considered dependent based on their financial aid application, the following total annual loan limits for subsidized and unsubsidized apply: freshman may borrow up to \$2,625.00 per year; sophomores, up to \$3,500.00 per year; and juniors and seniors, up to \$5,500.00 per year. For students who are considered independent, the following annual loan limits apply: freshman may borrow up to \$6,625.00, of which only \$2,625.00 can be subsidized; sophomores, up to \$7,500.00 of which only \$3,500.00 can be subsidized; and juniors and seniors, up to \$10,500.00, of which only \$5,500.00 can be subsidized.

Federal Perkins Loan. The Federal Perkins Loan program is funded by the federal government; the school is the actual lender, and repayments after graduation are made to the university at a 5% interest rate. Like the Subsidized Student Loan, no interest accrues on the Perkins Loan during the enrollment period. ASU students could be awarded a maximum loan of \$3,000.00. If funding is available, deferment and cancellation provisions may apply to graduates working in community service, qualifying law enforcement, and teaching occupations.

Federal Direct Parent Loan for Undergraduate Students. Under the Federal Direct Parent Loan for Undergraduate Students (PLUS), parents may borrow money from the federal government on behalf of their dependent students. With this loan, interest is not deferred and repayment begins 60 days after disbursement of the loan to the parent. The PLUS approval is based on the parent's credit history. If parents are determined ineligible for a PLUS and students need additional funds, they should contact the Student Financial Assistance office for their eligibility for an Unsubsidized Direct Student Loan. The interest rate for the PLUS loan is variable, but cannot exceed 9% through July 1, 1998. The maximum loan amount is determined by subtracting all other financial aid from the student's cost of education.

Employment

Approximately 7,000 students earn \$26 million from on-campus part-time student employment programs.

Federal Work-Study. Funds for this program are provided on a matching basis by the federal government and the university. Students employed under this program receive the same pay rates as other students being employed at the university. In this program, students must demonstrate a financial need. Employers are encouraged to hire minority and needy students.

University Hourly. The university, with its own resources, hires many students on a part-time basis. Although the jobs are similar to those under the Federal Work-Study Program, the university provides the entire amount of the student's wage.

Part-Time Off-Campus. The university receives requests for assistance from many agencies and corporations throughout the area to help them recruit and hire students on a part-time basis. The referral service at the university provides opportunities for students not only to earn funds to support their education but to gain experience in the areas of their majors or career interests.

Taxability of Financial Aid Programs

Scholarships, grants, fellowships, and stipends (but not loan funds) are taxable income to the recipient, except for the portion of these funds used for tuition, registration, and other university fees, or books, supplies, and equipment required for the courses being taken. Special tax regulations also apply to nonresident alien students and may require withholding of taxes at the time of aid disbursements to these individuals. Information on the taxability of scholarships can be obtained from the following Internal Revenue Service (IRS) publications and forms: *Publication 4—Student's Guide to Federal Income Tax*; *Publication 519—U.S. Tax Guide for Aliens*; *Publication 520—Scholarships and Fellowships*; Form 1040EZ and Instructions—Income Tax Return for Single and Joint Filers with no dependents; and Form 1040NR and Instructions—U.S. Nonresident Alien Income Tax Return.

These publications and forms can be obtained from the IRS at its toll-free number 1-800-829-FORM (3676). These publications and forms can also be accessed online at www.irs.ustreas.gov/prod/forms_pubs.

Special Class Fees and Deposits for ASU Main and ASU East

Refunds of special class fees and deposits are processed automatically if the related course is dropped during the first week of class. After the first week, refunds, if any, are determined by the department offering the course. Refund determination is based on withdrawal date, type of activity, and costs already incurred by the department. For special class fees and deposits at ASU West, see the *ASU West 1998–99 Catalog*. For more information, see “Other Fees, Deposits, and Charges,” pages 44–46, and “Refunds,” pages 46–47.

Special Fees

AMT 222	Instrument Pilot Ground School	\$100.00	ART 407	View Camera	\$25.00
AMT 280	Aerospace Structures, Materials, and Systems	10.00	ART 414	Advanced Life Drawing	25.00
AMT 314	Commercial Pilot Ground School	100.00	ART 415	Art Anatomy	20.00
ART 115	Three-Dimensional Design	10.00	ART 423	Advanced Painting (fall only)	40.00
ART 201	Photography I	25.00	ART 425	Advanced Figure Painting	25.00
ART 214	Life Drawing I	25.00	ART 427	Advanced Watercolor	40.00
ART 227	Watercolor I	40.00	ART 431	Special Problems in Sculpture	40.00
ART 231	Sculpture I	40.00	ART 432	Neon Sculpture	45.00
ART 260	Ceramics for Nonmajors	25.00	ART 436	Architectural Sculpture	40.00
ART 261	Ceramic Survey	25.00	ART 437	Film Animation	20.00
ART 272	Jewelry I	25.00	ART 438	Experimental Systems in Sculpture	40.00
ART 274	Wood I	25.00	ART 444	Computer Art I	40.00
ART 276	Fibers I	25.00	ART 446	Computer Art II	35.00
ART 294	ST: Fibers for Nonmajors	25.00	ART 448	Computer Animation	20.00
ART 294	ST: Introduction to Printmaking	30.00	ART 451	Advanced Intaglio	40.00
ART 301	Photography II	25.00	ART 452	Advanced Lithography	40.00
ART 304	Advanced Photography	25.00	ART 454	Advanced Screen Printing	35.00
ART 305	Color Photography I	30.00	ART 455	Advanced Photo Processes for Printmaking	30.00
ART 314	Life Drawing II	25.00	ART 456	Fine Printing and Bookmaking I	30.00
ART 315	Life Drawing III	25.00	ART 457	Fine Printing and Bookmaking II	30.00
ART 324	Painting III (fall only)	40.00	ART 458	Papermaking	20.00
ART 325	Figure Painting	25.00	ART 459	Monoprinting	20.00
ART 327	Watercolor II	40.00	ART 460	Ceramic Clay	25.00
ART 331	Sculpture II	40.00	ART 463	Ceramic Glaze	25.00
ART 332	Sculpture III	40.00	ART 466	Special Problems in Ceramics	25.00
ART 333	Foundry Casting Methods	40.00	ART 472	Advanced Jewelry	15.00
ART 351	Intaglio I	40.00	ART 473	Advanced Metalworking	15.00
ART 352	Lithography I	40.00	ART 474	Advanced Wood	25.00
ART 354	Screen Printing I	35.00	ART 476	Fibers: Multiple Harness Weaving	25.00
ART 355	Photo Process for Printmaking I	25.00	ART 477	Printed Textiles	30.00
ART 360	Ceramic Throwing	25.00	ART 494	ST: Advanced Sculpture	20.00
ART 364	Ceramic Handbuilding I	25.00	ART 494	ST: Carving	25.00
ART 365	Ceramic Handbuilding II	25.00	ART 494	ST: Color for Jewelry	15.00
ART 372	Jewelry II	15.00	ART 494	ST: Computer Animation II	40.00
ART 373	Metalworking I	15.00	ART 494	ST: Computer Animation III	40.00
ART 374	Wood II	25.00	ART 494	ST: Experimental Paper	25.00
ART 376	Fibers: Loom Techniques	25.00	ART 494	ST: Fibers and Surface	25.00
ART 377	Surface Design	25.00	ART 494	ST: Forging Techniques	15.00
ART 394	ST: Carving	25.00	ART 494	ST: Foundry	40.00
ART 394	ST: Ceramics	15.00	ART 494	ST: Introduction to Printmaking	30.00
ART 394	ST: Fibers Design for Nonmajors	25.00	ART 494	ST: Mold Making and Casting	15.00
ART 394	ST: Relief Printmaking	35.00	ART 494	ST: Neon Workshop	40.00
ART 394	ST: Turning	25.00	ART 494	ST: Photo Design	25.00
ART 401	Nonsilver Photography	30.00	ART 494	ST: Portraiture Photography	25.00
ART 403	Senior Photographic Projects	25.00	ART 494	ST: Print Textiles	25.00
ART 404	Portraiture Photography	25.00	ART 494	ST: Relief Printmaking	35.00
ART 405	Advanced Color Photography	35.00	ART 494	ST: Turning	25.00
			ART 494	ST: Vapor Glazes	15.00

Special Class Fees and Deposits for ASU Main and ASU East (continued)

Special Fees (continued)

ART 494	ST: View Camera	\$35.00	BIO 370	Vertebrate Zoology	\$25.00
ART 494	ST: Watercolor	40.00	BIO 502	Transmission Electron Microscopy	20.00
ART 494	ST: Wood Carving	30.00	BIO 505	Scanning Electron Microscopy	20.00
ART 498	PS: Landscape Photography: Theory	25.00	BLE 401	Teaching Science and Social Studies to Children	5.00
ART 551	Intaglio Projects	40.00	BLE 496	Field Experience	10.00
ART 594	Carving	25.00	BUS 502	Managerial Communication	8.00
ART 594	Turning	25.00	CHI 101	Elementary Chinese	15.00
ART 598	ST: Advanced Color Photography	35.00	CHI 102	Elementary Chinese	15.00
ART 598	ST: Advanced Photo Processes for Printmaking	30.00	CHI 107	Chinese for International Professions I	15.00
ART 598	ST: Advanced Screen Printing	35.00	CHM 101	Introductory Chemistry ¹	15.00
ART 598	ST: Advanced Sculpture	20.00	CHM 107	Chemistry and Society ¹	15.00
ART 598	ST: Architectural Sculpture	40.00	CHM 113	General Chemistry ¹	15.00
ART 598	ST: Art Anatomy	20.00	CHM 114	General Chemistry for Engineers ¹	15.00
ART 598	ST: Ceramic Clay	25.00	CHM 115	General Chemistry with Qualitative Analysis ¹	15.00
ART 598	ST: Ceramic Glaze	25.00	CHM 116	General Chemistry ¹	15.00
ART 598	ST: Experimental Paper	25.00	CHM 117	General Chemistry for Majors I ¹	15.00
ART 598	ST: Experimental Systems in Sculpture	40.00	CHM 118	General Chemistry for Majors II ¹	15.00
ART 598	ST: Fibers and Surface	25.00	CHM 235	Elementary Organic Chemistry Laboratory ¹	15.00
ART 598	ST: Figure Painting	25.00	CHM 319	Organic Chemistry Laboratory for Majors I ¹	15.00
ART 598	ST: Fine Printing and Bookmaking I	30.00	CHM 320	Organic Chemistry Laboratory for Majors II ¹	15.00
ART 598	ST: Fine Printing and Bookmaking II	30.00	CHM 326	Analytical Chemistry Laboratory ¹	15.00
ART 598	ST: Forging Techniques	15.00	CHM 335	General Organic Chemistry Laboratory ¹	15.00
ART 598	ST: Foundry	40.00	CHM 336	General Organic Chemistry Laboratory ¹	15.00
ART 598	ST: Introduction to Printmaking	30.00	CHM 343	Physical Chemistry Laboratory ¹	15.00
ART 598	ST: Jewelry Metalworking	15.00	CHM 367	Elementary Biochemistry Laboratory ¹	15.00
ART 598	ST: Life Drawing	25.00	CHM 422	Instrumental Analysis Laboratory ¹	15.00
ART 598	ST: Lithography	40.00	CHM 424	Separation Science ¹	15.00
ART 598	ST: Mold Making and Casting	15.00	CHM 431	Qualitative Organic Analysis ¹	15.00
ART 598	ST: Monoprinting	20.00	CHM 444	General Physical Chemistry Laboratory ¹	15.00
ART 598	ST: Neon Sculpture	45.00	CHM 452	Inorganic Chemistry Laboratory ¹	15.00
ART 598	ST: Neon Workshop	40.00	CHM 464	Biophysical Chemistry Laboratory ¹	15.00
ART 598	ST: Nonsilver Photography	30.00	CHM 467	General Biochemistry Laboratory ¹	15.00
ART 598	ST: Papermaking	20.00	CHM 480	Methods of Teaching Chemistry ¹	15.00
ART 598	ST: Photo Processes for Printmaking I	25.00	CHM 593	Applied Project: Glass Blowing ¹	25.00
ART 598	ST: Portraiture Photography	25.00	CLS 310	Principles of Clinical Chemistry I	25.00
ART 598	ST: Printed Textiles	30.00	CLS 320	Principles of Clinical Microbiology I	25.00
ART 598	ST: Relief Printmaking	35.00	COM 484	Communication Internship	20.00
ART 598	ST: Screen Printing	35.00	COM 584	Communication Internship	20.00
ART 598	ST: Special Problems in Ceramics	25.00	DCI 396	Field Experience I	10.00
ART 598	ST: Special Problems in Sculpture	40.00	DCI 397	Field Experience II	10.00
ART 598	ST: View Camera	35.00	ECD 496	Field Experience	10.00
ART 598	ST: Watercolor	40.00	EDP 560	Individual Intellectual Assessment	12.50
ART 598	ST: Wood	25.00	EED 320	Teaching Science to Children	5.00
ART 598	ST: Wood Carving	30.00	EED 401	Teaching Science and Social Studies to Children	5.00
ART 621	Studio Problems: Ceramics	25.00	EED 478	Student Teaching in the Elementary School	25.00
ART 621	Studio Problems: Metals	15.00	EED 496	Field Experience	10.00
ART 621	Studio Problems: Printmaking	25.00	EED 578	Student Teaching in the Elementary School	25.00
BIO 181	General Biology	10.00	EED 598	ST: Using Math Manipulatives/ Elementary Schools	5.00
BIO 301	Field Natural History	25.00	EED 598	ST: Using Math Manipulatives/Middle Schools	5.00

¹ Chemistry classes may also carry a deposit. See "Deposits."

Special Class Fees and Deposits for ASU Main and ASU East (continued)

Special Fees (continued)

EPE	105	Physical Education Activity (Archery)	\$15.00	GLG	490	Clastic Sedimentology and Petrology	\$20.00
EPE	105	Physical Education Activity (Bowling)	25.00	GLG	490	Topics in Geology: Moon	10.00
EPE	105	Physical Education Activity (Fencing)	45.00	GLG	490	Topics in Geology: Pyroclastic Rocks	25.00
EPE	105	Physical Education Activity (Golf)	45.00	GLG	490	Topics in Geology: Remote Sensing	10.00
EPE	105	Physical Education Activity (Quest Boxing)	30.00	GLG	490	Topics in Geology: Volcano	25.00
EPE	105	Physical Education Activity (Rock Climbing)	35.00	GLG	510	Advanced Structural Geology	10.00
EPE	110	Movement Analysis Laboratory (Golf)	45.00	GLG	520	Advanced Physical Volcanology	35.00
EPE	110	Movement Analysis Laboratory (Fencing)	45.00	GLG	524	Advanced Igneous Petrology	20.00
EPE	205	Physical Education Activity (Archery)	15.00	GLG	525	Advanced Metamorphic Petrology	5.00
EPE	205	Physical Education Activity (Bowling)	25.00	GLG	591	Volcanology	35.00
EPE	205	Physical Education Activity (Golf)	45.00	GLG	598	ST: Advanced Field Geology	35.00
EPE	205	Physical Education Activity (Golf)	45.00	GLG	598	ST: Clastic Sedimentology and Petrology	20.00
EPE	305	Physical Education Activity (Golf)	45.00	GLG	598	ST: Cordilleran Regional Geology	10.00
EPE	335	Biomechanics	15.00	GLG	598	ST: Geology of Mars	10.00
EPE	340	Physiology of Exercise	15.00	GLG	598	ST: Ore Deposits	20.00
EPE	345	Motor and Developmental Learning	15.00	GLG	598	ST: Petrology-Petrography	5.00
EPE	370	Advanced First Aid	8.00	GLG	598	ST: Principles of Stratigraphy	20.00
EPE	505	Applied Exercise Physiology Techniques	15.00	GLG	598	ST: Sedimentology	15.00
FON	142	Applied Food Principles	35.00	GLG	598	ST: Volcanology	35.00
FON	341	Introduction to Planning Therapeutic Diets	15.00	GPH	111	Introduction to Physical Geography	8.00
FON	442	Experimental Foods	15.00	GPH	211	Landform Processes	15.00
FON	445	Quantity Food Production	15.00	GPH	418	Landforms of the Western United States	20.00
FON	446	Human Nutrition Assessment Lecture/ Laboratory	25.00	GPH	491	Geographic Field Methods	20.00
FON	545	Recent Developments in Institutional Feeding	15.00	HEB	101	Elementary Modern Hebrew	15.00
FON	598	Research Methods in Nutrition	15.00	HEB	102	Elementary Modern Hebrew	15.00
FRE	101	Elementary French	15.00	HEB	201	Intermediate Modern Hebrew	15.00
FRE	102	Elementary French	15.00	HEB	202	Intermediate Modern Hebrew	15.00
FRE	107	French for International Professions I	15.00	HES	394	ST: Step Aerobics	20.00
FRE	111	Fundamentals of French	15.00	IDN	101	Elementary Indonesian I	15.00
FRE	201	Intermediate French I	15.00	IDN	102	Elementary Indonesian II	15.00
FRE	202	Intermediate French II	15.00	IDN	201	Intermediate Indonesian I	15.00
FRE	207	French for International Professions II	15.00	IDN	202	Intermediate Indonesian II	15.00
GER	101	Elementary German	15.00	IEE	591	Seminar: Manufacturing Strategy	50.00
GER	102	Elementary German	15.00	IEE	591	Seminar: Effects of Economics/New Products Market	50.00
GER	111	Fundamentals of German	15.00	IEE	591	Seminar: Strategic Product Development	50.00
GER	201	Intermediate German	15.00	IEE	591	Seminar: New Product Strategic	50.00
GER	202	Intermediate German	15.00	ITA	101	Elementary Italian	15.00
GLG	102	Introduction to Geology II (Historical)	20.00	ITA	102	Elementary Italian	15.00
GLG	103	Introduction to Geology I—Laboratory	5.00	ITA	201	Intermediate Italian	15.00
GLG	294	Geology of the Planets	10.00	ITA	202	Intermediate Italian	15.00
GLG	305	Geology of the Earth, Moon, and Planets	10.00	JPN	101	Elementary Japanese	15.00
GLG	310	Structural Geology	5.00	JPN	102	Elementary Japanese	15.00
GLG	336	Invertebrate Paleontology	10.00	JPN	107	Japanese for International Professions I	15.00
GLG	405	Geology of the Moon	10.00	JPN	201	Intermediate Japanese	15.00
GLG	406	Geology of Mars	10.00	JPN	202	Intermediate Japanese	15.00
GLG	420	Volcanology	35.00	JPN	207	Japanese for International Professions II	15.00
GLG	424	Petrology	5.00	JUS	484	Internship	20.00
GLG	435	Sedimentology	15.00	JUS	584	Internship	20.00
GLG	436	Principles of Stratigraphy	20.00	MIC	206	Microbiology Laboratory	25.00
GLG	441	Ore Deposits	20.00	MIC	302	Advanced Bacteriology Laboratory	25.00
GLG	455	Advanced Field Geology	35.00	MIC	421	Experimental Immunology	20.00
GLG	456	Cordilleran Regional Geology	10.00	MIC	470	Bacterial Diversity and Systematics	25.00

Special Class Fees and Deposits for ASU Main and ASU East (continued)

Special Fees (continued)

MUP 111	Studio Instruction	\$60.00	SPA 107	Spanish for International Professions I	\$15.00
MUP 121	Studio Instruction	40.00	SPA 111	Fundamentals of Spanish	15.00
MUP 127	Studio Instruction	60.00	SPA 201	Intermediate Spanish	15.00
MUP 311	Studio Instruction	60.00	SPA 202	Intermediate Spanish	15.00
MUP 321	Studio Instruction	40.00	SPA 207	Spanish for International Professions II	15.00
MUP 327	Studio Instruction	60.00	SPE 478	Student Teaching in Special Education	25.00
MUP 511	Studio Instruction	60.00	SPE 496	Field Experience	10.00
MUP 521	Studio Instruction	40.00	SPE 498	PS: Field Experience	10.00
MUP 527	Studio Instruction	60.00	SWE 101	Elementary Swedish	15.00
MUP 727	Studio Instruction	60.00	SWE 102	Elementary Swedish	15.00
NOR 101	Elementary Norwegian	15.00	SWE 201	Intermediate Swedish	15.00
NOR 102	Elementary Norwegian	15.00	SWE 202	Intermediate Swedish	15.00
NOR 201	Intermediate Norwegian	15.00	THA 101	Elementary Thai I	15.00
NOR 202	Intermediate Norwegian	15.00	THA 102	Elementary Thai II	15.00
NUR 211	Nurse-Client Relationships	15.00	THA 201	Intermediate Thai I	15.00
NUR 214	Health Assessment in Nursing Practice	15.00	THA 202	Intermediate Thai II	15.00
NUR 217	Basic Clinical Skills	15.00	THP 113	Techniques of Theatrical Makeup	5.00
NUR 314	Health Assessment for Registered Nurses	15.00	THP 213	Introduction to Technical Theatre	40.00
NUR 330	Care of Acute and Chronically Ill Adults	15.00	THP 312	Puppetry with Children	10.00
NUR 427	Community Health Nursing	9.00	THP 340	Scene Design	5.00
NUR 428	Management of Client in Health Care Settings	30.00	THP 345	Lighting Design	15.00
NUR 429	Community Health Nursing: Clinical	15.00	THP 440	Advanced Scene Design	5.00
NUR 430	Home Health Care	15.00	THP 441	Scene Painting	20.00
NUR 560	Advanced Health Assessment (spring 1998)	45.00	THP 444	Drafting for the Stage	5.00
NUR 580	Adult Health Nursing Assessment/ Promotion Practicum (fall 1998)	45.00	THP 445	Advanced Lighting Design	5.00
PLB 108	Concepts in Plant Biology	10.00	THP 506	Scenography	5.00
PLB 260	Plants in Cities: Introduction to Urban Horticulture	20.00	THP 512	Puppetry Workshop	10.00
PLB 300	Comparative Plant Diversity	15.00	UET 415	Electronic Manufacturing Engineering Principles	10.00
PLB 308	Plant Physiology	30.00	WST 294	Women and Social Action	20.00
PLB 310	The Flora of Arizona	20.00			
PLB 362	Landscape Plants I	10.00			
PLB 370	Landscape Practices (spring 1998)	25.00			
POR 101	Elementary Portuguese	15.00			
POR 201	Intermediate Portuguese	15.00			
REC 463	Senior Internship	20.00			
REC 494	ST: Tourism and Public Lands	15.00			
RUS 101	Elementary Russian	15.00			
RUS 102	Elementary Russian	15.00			
RUS 201	Intermediate Russian	15.00			
RUS 202	Intermediate Russian	15.00			
RUS 211	Basic Russian Conversation	15.00			
RUS 212	Basic Russian Conversation	15.00			
SED 478	Student Teaching in Secondary Schools	25.00			
SED 496	Field Experience	10.00			
SED 578	Student Teaching in the Secondary Schools	25.00			
SED 598	ST: Using Math Manipulatives/Middle Schools	5.00			
SPA 101	Elementary Spanish	15.00			
SPA 102	Elementary Spanish	15.00			

Deposits

ADE 321	Architectural Studio I	\$25.00
ADE 322	Architectural Studio II	25.00
ADE 421	Architectural Studio III	25.00
ADE 422	Architectural Studio IV	25.00
ADE 510	Foundation Architectural Studio	25.00
ADE 511	Core Architectural Studio I	25.00
ADE 512	Core Architectural Studio II	25.00
ADE 521	Advanced Architectural Studio I	25.00
ADE 522	Advanced Architectural Studio II	25.00
ADE 621	Advanced Architectural Studio III	25.00
ADE 622	Advanced Architectural Studio IV	25.00
CHM 101	Introductory Chemistry ²	10.00
CHM 107	Chemistry and Society ²	10.00
CHM 113	General Chemistry ²	10.00
CHM 114	General Chemistry for Engineers ²	10.00
CHM 115	General Chemistry with Qualitative Analysis ²	10.00
CHM 116	General Chemistry ²	10.00
CHM 117	General Chemistry for Majors I ²	20.00

¹ Chemistry classes may also carry a deposit. See "Deposits."

² Chemistry classes may also carry a nonrefundable special class fee. See "Special Fees."

Special Class Fees and Deposits for ASU Main and ASU East (continued)

Deposits (continued)

CHM 118	General Chemistry for Majors II ²	\$20.00	INT 364	Interior Design Studio I	\$25.00
CHM 235	Elementary Organic Chemistry Laboratory ²	20.00	INT 365	Interior Design Studio II	25.00
CHM 319	Organic Chemistry Laboratory for Majors I ²	20.00	INT 464	Interior Design Studio III	25.00
CHM 320	Organic Chemistry Laboratory for Majors II ²	20.00	INT 465	Interior Design Studio IV	25.00
CHM 326	Analytical Chemistry Laboratory ²	20.00	INT 466	Interior Design Studio V	25.00
CHM 335	General Organic Chemistry Laboratory ²	20.00	INT 467	Interior Design Studio VI	25.00
CHM 336	General Organic Chemistry Laboratory ²	20.00	PLA 361	Landscape Architecture III	25.00
CHM 343	Physical Chemistry Laboratory ²	25.00	PLA 362	Landscape Architecture IV	25.00
CHM 367	Elementary Biochemistry Laboratory ²	20.00	PLA 461	Landscape Architecture V	25.00
CHM 422	Instrumental Analysis Laboratory ²	25.00	PLA 462	Landscape Architecture VI	25.00
CHM 424	Separation Science ²	25.00	PUP 361	Urban Planning III	25.00
CHM 431	Qualitative Organic Analysis ²	20.00	PUP 362	Urban Planning IV	25.00
CHM 444	General Physical Chemistry Laboratory ²	25.00	PUP 461	Urban Planning V	25.00
CHM 452	Inorganic Chemistry Laboratory ²	20.00	PUP 462	Urban Planning VI	25.00
CHM 464	Biophysical Chemistry Laboratory	20.00	PUP 572	Planning Studio I: Data Inventory and Analysis	25.00
CHM 467	General Biochemistry Laboratory ²	20.00	PUP 574	Planning Studio II: Options and Implementation	25.00
CHM 525	Spectrochemical Methods of Analysis ²	25.00			
CHM 526	X-ray Methods of Analysis ²	25.00			
CHM 527	Electrical Methods of Chemical Analysis ²	25.00			
DSC 593	Applied Projects	25.00			
DSC 599	Thesis	25.00			
IND 360	Industrial Design III	25.00			
IND 361	Industrial Design IV	25.00			
IND 460	Design Project I	25.00			
IND 461	Design Project II	25.00			

Class Fees Paid in Class or at Location Listed

AET 300	Aircraft Design I	\$0-40.00
AMT 100	Flight Safety I ³	
AMT 200	Flight Safety II ³	
AMT 300	Flight Safety III ³	
AMT 387	Multiengine Pilot Ground School	17.00/hr
EPE 105	Physical Education Activity: Scuba	35.00
EPE 305	Physical Education Activity: Advanced Scuba	35.00

¹ Chemistry classes may also carry a deposit. See "Deposits."

² Chemistry classes may also carry a nonrefundable special class fee. See "Special Fees."

³ Fees are variable and paid directly to contractor for rental of aircraft.

Classification of Courses

See pages 7–8 for the “Course Prefix Index.”

COURSE INFORMATION

Information about all lower- and upper-division courses offered at ASU Main and ASU East appears in the *General Catalog*, published every spring. Classes scheduled for the current or upcoming fall or spring semester are listed in the *Schedule of Classes*, published before the beginning of registration. Classes scheduled for the summer sessions are listed in the *Summer Sessions Bulletin*, published every spring. The *Schedule of Classes* and *Summer Sessions Bulletin* are also available online at www.asu.edu/registrar/schedule. Information about all courses that apply toward graduate programs appears in the *Graduate Catalog*, published annually. Information about lower- and upper-division courses offered at ASU West appears in the *ASU West Catalog*, published annually.

COURSE NUMBERING SYSTEM

100–299 (Lower-Division) Courses. Lower-division courses are designed primarily for freshmen and sophomores. Certain classes are closed to freshmen who lack the designated prerequisites or whose majors are outside the unit offering the course. This information is available in the *General Catalog*, in the *Schedule of Classes*, or from the student’s academic advisor.

300–499 (Upper-Division) Courses. Upper-division courses are designed primarily for juniors, seniors, and other advanced students. Prerequisites and other restrictions should be noted before registration. Courses at the 400 level apply to graduate degree requirements for individual programs of graduate study when approved by the Graduate College. See “Reserving of Course Credit by Undergraduates” on page 71.

500–799 (Graduate-Level) Courses. Graduate-level courses are designed for graduate students. However, an upper-division undergraduate student may enroll in these courses with the approval of the student’s advisor, the course instructor, the department chair, and the dean of the college in which the course is offered. If the course does not meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by a nondegree graduate student. See “Reserving of

Course Credit by Undergraduates” on page 71.

Continuing Registration. Courses numbered 595, 695, and 795, Continuing Registration, carry one semester hour of credit; however, the student receives neither credit nor grade for the course.

Omnibus Courses. The omnibus numbers are used for courses offered on an experimental or tutorial basis or for courses in which the content is new or periodically changes. Academic units use their own prefixes before omnibus course numbers. The general nature of the work required for a particular omnibus course is consistent from unit to unit, but subject matter varies. Omnibus courses are often offered for a variable number of semester hours. See the appropriate academic unit in the *General Catalog* or major in the *Graduate Catalog* for the omnibus course listing under a subject area.

OMNIBUS UNDERGRADUATE COURSE DESCRIPTIONS

191 First-Year Seminar. (1–3)
Small course emphasizing student-faculty discussion/interaction. Strongly recommended for first-year students. Must have taken 25 or fewer semester hours. Consulting an academic advisor before enrolling is recommended.

194, 294, 394, 494 Special Topics. (1–4)
Covers topics of immediate or special interest to a faculty member and students.

484 Internship. (1–12)
Structured practical experience following a contract or plan, supervised by faculty and practitioners.

498 Pro-Seminar. (1–7)
Small-group study and research for advanced students within their majors. Major status in the department or instructor approval is required.

499 Independent Study. (1–3)
Provides an opportunity for original study or investigation in the major or field of specialization on an individual and more autonomous basis. Neither a substitute for a catalog course nor a means of taking a catalog course on an individual basis. Requires application well in advance of regular registration with the student’s advisor, the advisor’s signature, and approval by both the instructor with whom the student will work and the chair of the department offering the course. This course may be taken only by outstanding senior students who have completed at least one semester in residence and who have a cumulative GPA of 3.00 or higher in the major or field of specialization. A special class fee may be required.

First-Year Seminar. The First-Year Seminar series is specifically designed to meet the needs of the first-year stu-

dent. Faculty volunteer to direct the seminars and choose course topics according to their own interests and areas of specialization. Class size is restricted so that, early in their college careers, students may interact directly with some of the best faculty the university has to offer.

Honors Courses. The courses listed as 298 and 492 Honors Directed Study, 493 Honors Thesis, 497 Honors Colloquium, and all courses with the HON prefix are reserved for students in the University Honors College. These courses range in credit from one to six semester hours. Consulting with an honors advisor before enrolling is recommended.

OMNIBUS GRADUATE COURSE DESCRIPTIONS

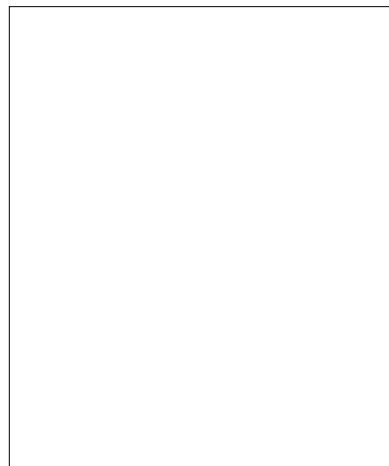
500, 600, 700 Research Methods. (1–12) Course on research methods in a specific discipline.

580, 680, 780 Practicum. (1–12) Structured practical experience in a professional program, supervised by a practitioner and/or faculty member with whom the student works closely.

583, 683, 783 Field Work. (1–12) Structured, supervised field experience in a field science or other discipline requiring experience in field techniques.

584, 684, 784 Internship. (1–12) Structured practical experience following a contract or plan, supervised by faculty and practitioners.

590, 690, 790 Reading and Conference. (1–12) Independent study in which a student meets regularly with a faculty member to discuss assignments. Course may include such assignments as intensive reading in a specialized area, writing synthesis of literature on a specified topic, writing literature review of a topic.



Old Main, the oldest building on campus. Tim Trumble photo

591, 691, 791 Seminar. (1–12) A small class emphasizing discussion, presentations by students, and written research papers.

592, 692 Research. (1–12) Independent study in which a student, under supervision of a faculty member, conducts research that is expected to lead to a specific project such as a thesis or dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

593, 693, 793 Applied Project. (1–12) Preparation of a supervised applied project that is a graduation requirement in some professional majors.

594 Conference and Workshop. (1–12) Topical instruction, usually in compressed format, leading to academic credit. Often offered off campus to groups of professionals.

595, 695, 795 Continuing Registration. (1) Used in situations where registration is necessary but where credit is not needed. Replaces arbitrary enrollment in reading and conference, research, thesis, dissertation, etc. Used by students when taking comprehensive examinations, defending thesis or dissertation, or fulfilling the continuous enrollment requirement in doctoral programs. Credit is not awarded, and no grade is assigned.

598 Special Topics. (1–4) Topical courses not offered in regular course rotation—e.g., new courses not in the catalog, courses by visiting faculty, courses on timely topics, highly specialized courses responding to unique student demand.

599 Thesis. (1–12) Supervised research focused on preparation of thesis, including literature review, research, data collection and analysis, and writing.

792 Research. (1–15) Independent study in which a student, under supervision of a faculty member, conducts research that is expected to lead to a specific project such as a dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

799 Dissertation. (1–15) Supervised research focused on preparation of dissertation, including literature review, research, data collection and analysis, and writing.

The preceding courses are described in announcements of the Graduate College and are also available in the respective departments. Under special circumstances, arrangements may be made at the dean’s request, through the approval of the senior vice president and provost, to increase the standard semester hours of credit.

LAW 597, 697, and 797. The numbers 597, 697, and 797 have been reserved for the Visiting Student Program in the College of Law.

Prerequisites and Corequisites. Some requirements, known as prerequisites, must be met *before* registering for

a course. Other requirements, called corequisites, must be met *while* taking a course. A student registering for a course should be able to show that prerequisites have been met and that corequisites will be met as stated in the catalog or *Schedule of Classes* or must otherwise satisfy the instructor that equivalent preparation has been completed.

International Program Courses. Courses with the prefix IPO numbered 495 and 595 are reserved for International Programs study abroad and exchange programs. For most programs, participating students register for 18 semester hours. Following completion of an international program, undergraduate students receive credit for the study completed, with a minimum of 12 semester hours and a maximum of 18 semester hours, graduates with a minimum of six semester hours and a maximum of 12 semester hours.

IPO courses numbered 494 and 598 may be taken for one semester hour. Students register for these courses under the title “Study Abroad.” At the conclusion of the program and the transfer of overseas courses to the students’ ASU records, a grade of “Y” is entered for the course.

For some special international programs, students register and receive credit for fewer semester hours.

Key to Course Listing Codes

Code	Definition
M	ASU Main and ASU East campus code*
W	ASU West campus code*
GLG	Example of a departmental prefix designation
410	Example of a course number
(3)	Example of course semester hours
F	Course offered fall only
S	Course offered spring only
SS	Course offered summer session only
F, S	Course offered both semesters
F 1998	Course offered every other year on semester indicated
A	Course offered once a year
N	Course not regularly offered

* Campus codes are not used in the catalogs but appear in the fall and spring *Schedule of Classes* and the *Summer Sessions Bulletin*.

Undergraduate Enrollment

Arizona State University shares with other colleges and universities a tradition of service and academic excellence that is hundreds of years old. Its purpose is the exchange of knowledge and the pursuit of wisdom. What makes this university special is its commitment to providing a setting where faculty and students are challenged to exchange ideas and information within an atmosphere of intellectual honesty.

The university offers its students unique opportunities to enjoy both a rich cultural heritage and a diverse student population. Anyone giving evidence of suitable preparation, by way of acceptable academic credentials, is welcome to the university without regard to race, religious creed, or national origin.

Under the constitution and the laws of the State of Arizona, jurisdiction over ASU has been vested in the Arizona Board of Regents. The regents, in turn, grant broad legal authority to the president, the administration, and the faculty to regulate student life within reasonable limits.

Remaining in good standing in the university community is a privilege rather than a right. A student, by enrolling, voluntarily assumes certain obligations of conduct and performance. These expectations in conduct include avoiding irresponsible use of alcohol and the use, possession, distribution, or possession with intent of distribution of illegal drugs. The university enforces its conduct rules through prescribed procedures outlined in the *Student Code of Conduct*. The university also cooperates fully with law enforcement agencies to enforce all laws relating to alcohol and illegal substances.

The university has a strong interest in its students' conduct. Students are expected, as part of their obligations of enrollment, to become familiar with the *Student Code of Conduct*, available at Student Life (SSV B228). Violations of the *Student Code of Conduct*, whether committed by individuals or groups, are subject to university discipline, as are violations of university regulations with regard to academic dishonesty. The university reserves the right to take necessary and appropriate action to protect the safety and welfare of the campus community. Such action may include taking disciplinary measures under the *Student Code of Conduct* against students whose behavior

off campus involves the sale or distribution of illegal drugs, physical assault, or violence that may present a clear and present danger to the safety of the university or to members of the university community.

STUDENT SERVICES AT ASU

Arizona State University is a richly diverse academic setting with more than 49,000 students. The ASU student may be a traditional 18- to 24-year-old, a recent high school graduate, a community college transfer, someone returning to college to pursue a degree, or a professional studying for an advanced degree or career change. The ASU student may live in residence halls, with sororities or fraternities on campus, or in one of the many communities in the metropolitan Phoenix area. Each of the 50 states and more than 100 countries have students enrolled at ASU.

The university is organized into several distinct administrative areas. Student Affairs, one of these areas, is responsible for the delivery of a variety of services and developmental programs in support of students' university needs and educational pursuits. These programs and services are based upon human development research that advocates that a person develop culturally, emotionally, intellectually, morally, physically, psychologically, socially, and spiritually.

Special attention is given not only to the recruitment of a high-achieving, culturally diverse student body, but to the creation of an energetic campus environment that both catalyzes mature development and advances the academic endeavors of students.

Enrollment services to students begin with recruitment, admissions, student financial assistance, on-campus housing, and registration programs. Student Affairs encourages students to explore the facilities, services, and human resources available. ASU Main agencies guiding students in their educational experience include Career Services, Counseling and Consultation, Educational Development, the Memorial Union, Recreational Sports, Residential Life, Student Development, Student Health, Student Life, and Student Publications. Each of these areas provides specialized learning opportunities that contribute to an environment that fosters both personal and academic growth.

Undergraduate Admission

Arizona State University welcomes application for admission from anyone seeking to benefit from the university's broad spectrum of educational programs and services.

For information and application materials, prospective students may call 602/965-7788 or write

UNDERGRADUATE ADMISSIONS
ARIZONA STATE UNIVERSITY
PO Box 870112
TEMPE AZ 85287-0112

With reasonable advance notice, Undergraduate Admissions arranges for a tour of ASU Main, a university information session, and, if desired, a meeting with an admissions counselor.

Requests for specific information relating to academic programs or student services should be addressed to the appropriate department, division, school, or college.

Admission Procedures for New Freshman and Transfer Applicants

Individuals interested in admission to an undergraduate program at ASU need to have the following items on file at Undergraduate Admissions:

1. application for admission, including residency information;
2. official transcript(s) mailed directly from the institution(s);
3. American College Test (ACT), Scholastic Aptitude Test (SAT), or Test of English as a Foreign Language (TOEFL) scores, as needed; and
4. a \$40.00 nonrefundable application fee, required of all applicants applying as nonresidents or residing outside Arizona.

Applicants are urged to apply and to have their materials sent as soon as possible to enable university officials to make an early decision concerning the applicant's admission and to permit the student to take part in preregistration and orientation. After all necessary items are received, a minimum of four weeks should be allowed for an admission decision to be made.

Early Notification Date. Applicants whose files are complete (all necessary documentation has been received) by

November 1 receive notification by December 1. Applicants whose files are complete by December 1 receive notification by January 15.

Application. Prospective students must complete and sign the Application for Undergraduate Admission. A \$40.00 nonrefundable application fee is required of all applicants applying as nonresidents or residing outside Arizona.

Students who do not register must submit a new application (and application fee for nonresident applicants) if they wish to apply for a subsequent semester. All documents are destroyed one year after the semester for which the student has applied if the student is not registered in a degree program.

Any misrepresentation or falsification on the admission application, including failure to report any college or university attendance, is cause for cancellation of enrollment and any credits earned.

Residency Classification Information. Like other state-supported colleges and universities, ASU distinguishes between resident and nonresident students with regard to tuition. Residents of Arizona are required to provide residency information, which is part of the admission application. Any student who does not provide residency information is classified as a nonresident for tuition purposes. For more information, call the Residency Classification Section at 602/965-7712.

Transcripts. Transcripts must be requested by the applicant. Official transcripts of academic records from high school and a separate transcript from each institution of higher education the student has attended must be *mailed directly to Undergraduate Admissions by the records office of the issuing institution(s)*. *Transcripts sent or carried by hand by the applicants themselves or transmitted by facsimile (fax) machine are not accepted.* High school transcripts must show GPA, rank in class, and date of graduation. Applicants under the age of 22 must also have official high school records submitted. An English translation of all foreign language transcripts is required.

Entrance Examinations. All new freshman applicants *must* take either the American College Test (ACT) or Scholastic Aptitude Test (SAT) on a

national test date in their junior or senior year of high school. Transfer applicants who are under the age of 22 must submit ACT or SAT scores, which are used to complete competency requirements and for course placement.

A report of the test scores should be sent to Undergraduate Admissions directly from

AMERICAN COLLEGE TESTING
PROGRAM
PO Box 168
IOWA CITY IA 52240

or the

COLLEGE BOARD ADMISSIONS
TESTING PROGRAM
Box 592-R
PRINCETON NJ 08540

Undergraduate Admissions may investigate any test score that is inconsistent with a student's academic record or previous scores.

An applicant whose native language is not English is usually required to take the Test of English as a Foreign Language (TOEFL). See "International Student Admissions," on page 64.

Certificate of Admission. After being admitted, students receive a Letter of Admission, a Measles Immunization Verification form, and publications that contain information about orientation programs.

Upon receipt, a student should check their admission information for accuracy and report any errors and changes to Undergraduate Admissions at 602/965-5641.

Immunization Requirements. Every newly admitted student born after December 31, 1956, must provide proof of measles immunity to Student Health. A tuberculin skin test is strongly recommended for students who work in health care or food services or for international students who come from a high-risk environment. *Students are not permitted to register until proof of immunity to measles (rubeola) is on file with Student Health.*

For more information, call Student Health at 602/965-1358. Students may fax proof of measles immunity to Student Health at 602/965-2269.

The following proof of measles (rubeola) immunity is considered adequate:

1. record of measles (rubeola) immunization received after January 1, 1980;
2. record of blood test showing measles (rubeola) immunity; or
3. proof of diagnosed measles (rubeola) case.

Orientation

University orientation programs for new students and their parents are provided at numerous times during the year, including the beginning of each semester. Each orientation program includes academic advisement, campus tours, special events, and an introduction to university resources and proce-

dures. Parent programs are also included. Newly admitted students are sent information preceding each orientation program. Students are strongly encouraged to attend orientation activities.

Undergraduate Admission Standards

The Arizona Board of Regents establishes undergraduate admission standards for the university in general. *Particular colleges, schools, or departments within the university may establish stricter standards, which are given in the respective sections of the catalog and should be noted by students planning to enroll in any of these programs.*

Admission Requirements

Graduation from Secondary School.

To be eligible for admission to ASU, an applicant must have graduated from a recognized high school with satisfactory scholarship defined as meeting both the general aptitude and basic competency requirements shown in the "General Aptitude Requirements for Freshmen" and "General Aptitude Requirements for College Transfers" tables and the "Basic Competency Requirements" table, page 61.

Applicants with a maximum of one deficiency in no more than two competency areas may be admitted with conditions subject to removing the deficiencies within one calendar year of

General Aptitude Requirements for Freshmen

Residency Classification	Class Rank		Composite Score		GPA (4.00 = A)
			ACT ¹	SAT ²	
Arizona residents ³	top quarter	or	22	or 1040	or 3.00 competency GPA ⁴
Nonresidents ⁵	top quarter	or	24	or 1110	or 3.00 competency GPA

¹ The ACT scoring system has been modified. As a result, these scores are effective for tests taken in and after October of 1989. Equivalent scores for tests taken before October 1989 are 21 for Arizona residents and 23 for nonresidents.

² The SAT scoring system has been modified. As a result, these recentered scores are effective for tests taken on or after April 1, 1995. Equivalent scores for tests taken before April 1995 are 930 for Arizona residents and 1010 for nonresidents.

³ All resident freshmen who carry a competency GPA from 2.50 to 2.99 or who rank in the top 26–50% of the graduating high school class are admitted with conditions.

⁴ A GPA calculated on courses that are used to fulfill competency requirements.

⁵ All nonresident freshmen who believe they have had a strong high school background and who rank in the top 26–50% of their graduating classes or who carry a competency GPA from 2.50 to 2.99 may apply and are considered on a case-by-case basis. Based on the review, the applicants may be admitted with conditions, deferred until additional course work is completed, or denied.

General Aptitude Requirements for College Transfers¹

Residency Classification	Transferable Semester Hours	GPA (4.00 = A)	Materials Required
Arizona residents	1–23	2.00 college GPA plus general aptitude requirements for freshman plus competency requirements	Application, college and high school transcripts, and ACT or SAT scores
	24 or more	2.00 college GPA plus competency requirements	Application, college and high school transcripts, and ACT or SAT scores
Nonresidents ²	1–23	2.50 college GPA plus general aptitude requirements for freshman plus competency requirements	Application, college and high school transcripts, and ACT or SAT scores
	24 or more	2.50 college GPA plus competency requirements	Application, college and high school transcripts, and ACT or SAT scores

¹ Students 22 years of age or older at the time of enrollment do not need to meet competency requirements and therefore need not submit high school transcripts or test scores.

² All nonresident transfers who have earned a 2.00–2.49 cumulative GPA are encouraged to apply and are considered on a case-by-case basis. Based on the review, the applicants may be admitted with conditions, deferred until additional course work is completed, or denied.

Basic Competency Requirements

High School Courses		Test Scores		College Courses
English				
Four years high school: English composition/ literature-based	<i>or</i>	Minimum test score: ACT English – 21 ¹ or SAT I Verbal – 530 (450) ²	<i>or</i>	One transferable three-semester-hour college-level course in English composition
Mathematics				
Four years high school: One year Algebra I One year Geometry I One year Algebra II One year advanced mathematics	<i>or</i>	Minimum test score: ACT Math – 20 ¹ or SAT I Math – 520 (500) ²	<i>or</i>	One transferable three-semester hour course in mathematics for which Algebra II is a prerequisite
Laboratory Science				
Three years high school, one each from three of the following: biology chemistry earth science physics integrated sciences An advanced level course may be substituted for one subject area	<i>or</i>	Two years high school lab science (biology, chemistry, earth science, physics) plus minimum SAT II: subject test score on one of the following: Chemistry Achievement – 600 (575) ² Biology Achievement – 590 (550) ² Physics Achievement – 620 (590) ² ACT Science Reasoning – 20 The test score may not be from any subject from which high school credit was earned.	<i>or</i>	Three transferable four-semester-hour college-level lab science courses in different subject areas An advanced level course may be substituted for one subject area
Social Science				
Complete both A and B.				
A One year high school American history	<i>or</i>	Minimum SAT II: subject test score on American History and Social Studies Achievement – 560 (510) ²	<i>or</i>	One transferable three-semester-hour college-level American history course
B One year high school social science (e.g., European history, world history, sociology, geography, government, anthropology)	<i>or</i>	Minimum SAT II: subject score on World History Achievement – 580 (545) ²	<i>or</i>	One transferable three-semester-hour college-level social science course
Foreign Language				
Two years of the same foreign language	<i>or</i>	NA	<i>or</i>	One year of transferable college study in the same foreign language
Fine Arts				
One unit of fine arts or a combination of two semesters of fine arts	<i>or</i>	NA	<i>or</i>	One transferable three credit fine arts course

¹ The ACT scoring system has been modified. As a result, these scores are effective for tests taken in and after October of 1989. Equivalent scores for tests taken before October 1989 are 19 for English and 18 for math.

² The SAT scoring system has been modified. As a result, these recentered scores are effective for tests taken on or after April 1, 1995. Equivalent scores for tests taken before April 1995 are in parentheses.

university enrollment. See page 77 for an explanation of procedures to meet these competencies.

Competencies may be met by combinations of high school and college courses or test scores. A minimum 2.00 average (4.00 = A) must be earned in the courses taken in each of the six competency areas. Students 22 years of age or older at the time of enrollment need only meet the general aptitude requirements. An applicant whose most recent education is outside the United States and whose school does not issue a traditional U.S. high school transcript may be exempt from fulfilling the competency requirements. See the “Basic Competency Requirements” table on page 61.

If the applicant is unable to meet these specific admission requirements, it is possible to file a letter of appeal with the University Undergraduate Admissions Board:

UNIVERSITY UNDERGRADUATE
ADMISSIONS BOARD
ARIZONA STATE UNIVERSITY
PO Box 870112
TEMPE AZ 85287-0112

The decision of the board is final. The applicant must be able to meet at least one of the following criteria to be considered for appeal:

1. an upward grade trend during the high school career or an upward grade trend during the senior year;
2. positive recommendations from secondary school administrators, faculty, or counselors based on considerations such as academic potential, work experience, and leadership ability;
3. an average score of 50 or greater on the General Education Development (GED); or
4. completion of at least 12 semester hours of college freshman-level academic studies (at a community college or at a university or both) with a GPA of 2.50 or higher on a 4.00 = A scale in courses in English, social science, mathematics, physical or natural science, foreign languages, fine arts, or the humanities.

The School of Engineering recommends calculus. The laboratory sciences chosen should include at least one unit in physics and one year of

chemistry. One year of biology is strongly recommended.

The College of Nursing requires one year each of high school physics and chemistry. Two years of high school chemistry are recommended.

Admission before Graduation from High School. Admission may be granted to high school seniors who submit a six-semester or seven-semester transcript that shows academic quality and rank in class in keeping with admission standards and who complete the steps in the undergraduate admission procedures. Admission is official when a verification of the high school graduation showing the final GPA, the rank in class, and the date of graduation has been received in the mail by Undergraduate Admissions directly from the high school. In addition, students who are admitted with more than two deficiencies must submit, at least 45 days in advance of the semester, official records to verify the completion of competencies such that *no more than* two deficiencies remain. Students with more than two deficiencies who have not been admitted 45 days in advance of the semester may not be eligible for admission. An admission may be canceled if the final verification shows that the applicant has not met the university requirements for admission or that more than two deficiencies remain.

Admission of Nondegree Applicants—Undergraduate. Any high school graduate is invited to enroll for six or fewer semester hours per semester of undergraduate course work as a nondegree student. Students currently enrolled in high school and persons under the age of 18 may be admitted as nondegree students by submitting official ACT or SAT scores that meet the general aptitude requirements of the university. Persons admitted as nondegree students for a specific year and term must remain nondegree until the next semester.

Anyone interested in admission as a nondegree undergraduate student at ASU must submit to Undergraduate Admissions: (1) a Nondegree Undergraduate Application for Admission (including residency information) and (2) a \$40.00 nonrefundable application fee (for applicants applying as nonresidents or residing outside Arizona). Applicants who are not high school gradu-

ates or who are younger than age 18 must also submit ACT or SAT scores.

No more than 15 hours of completed nondegree work may be applied to a degree program. A nondegree student who decides to work toward a bachelor's degree must *apply for admission to a degree program* with Undergraduate Admissions and meet the admission requirements.

Once registered in a regular degree program, a student is not permitted to register again in nondegree status. Nondegree students are not eligible to receive most types of financial aid, nor are they eligible to receive certain benefits, such as veteran benefits.

Transfer Applicants

All transfer applicants under the age of 22 must submit official high school records, including an ACT or SAT score, and meet basic competency requirements. Students who will be 22 years old by the time the semester begins are exempt from the competency requirements.

Arizona Applicants. An Arizona applicant for transfer admission must have a cumulative GPA of 2.00 (4.00 = A) or higher in all work undertaken at previous institutions of higher learning. A minimum of 24 college or university transferable semester hours must have been earned to be considered a transfer applicant.

Arizona transfer applicants must have the respective minimum GPAs to be admitted to the professional programs in the following areas: Computer Science—2.50; Construction—2.25; Economics—2.50; Engineering—2.50; and Technology—2.25. Other academic units may have different GPA requirements to enroll in junior- or senior-level courses.

Nonresident Applicants. A non-Arizona applicant for transfer admission must have a cumulative GPA of 2.50 or higher on a 4.00 = A scale in all work undertaken at previous institutions of higher learning. Applicants who have at least a 2.00 on a 4.00 = A scale and who believe that they have a strong academic record are considered on a case-by-case basis.

Regardless of residency, all applicants for the majors of Computer Science and Economics in the College of Liberal Arts and Sciences must have transfer GPAs of 2.50 or higher.

Transfer Credit

Credit is awarded for traditional course work successfully completed at institutions of higher learning as indicated by ASU and the Arizona Board of Regents. *Whether the specific credits can be applied toward a degree depends on the requirements of the department, division, school, or college in which the student is enrolled.* There are several qualifications:

1. Transfer credit is not given for courses in which the lowest passing grade (“D”) or a failing grade was received.
2. While some courses successfully completed but evaluated on nontraditional grading systems (e.g., pass/fail) are acceptable for transfer, colleges in the university may not accept such credits to fulfill graduation requirements.
3. Grades and honor points earned at other colleges and universities are considered for admission but are not included in computing the student’s cumulative GPA at ASU.

Certain types of credits cannot be transferred to ASU, including the following types:

1. credits awarded by postsecondary institutions in the United States that lack candidate status or accreditation by a regional accrediting association;
2. credits awarded by postsecondary institutions for life experience;
3. credits awarded by postsecondary institutions for courses taken at noncollegiate institutions (e.g., governmental agencies, corporations, industrial firms);
4. credits awarded by postsecondary institutions for noncredit courses, workshops, and seminars offered by other postsecondary institutions as part of continuing education programs; and
5. credit for active service or courses that were taken through the military.

Acceptable academic credits earned at other institutions that are based on a different unit of credit than the one prescribed by the Arizona Board of Regents are subject to conversion before being transferred to ASU. Once a transfer course equivalency is determined, it stands unless the student

changes majors and the course is required by the new major.

Veterans Exception. By Arizona statute, no failing grades received by a veteran at an Arizona university or community college before military service may be considered when determining admissibility. This exception applies only to veterans who

1. are honorably discharged;
2. have served in the armed forces of the United States for a minimum of two years; and
3. have previously enrolled at a university or community college in Arizona.

Military service records must be submitted, including form DD 214.

Community Colleges. A maximum of 64 semester hours are accepted as lower-division credit when transferred from community, junior, or two-year colleges.

Community college students who plan to transfer to ASU at the end of their first or second years are strongly advised to plan their community college courses to meet the requirements of the curricula they select.

Students Attending Arizona Community Colleges. To determine the equivalency of courses offered by Arizona community colleges and courses offered at ASU, a student should refer to the *Arizona Higher Education Course Equivalency Guide* in consultation with an academic advisor. Provided college attendance has been continuous, students are permitted to follow the degree requirements specified in the ASU catalog in effect at the time they began community college work. See pages 80–81, “Guidelines for Determination of Catalog Year.”

Transfer General Education Core Curriculum

With the statement of values as common ground, the Arizona public community colleges and universities have agreed upon a common structure for a general education core curriculum. This core curriculum provides students attending any Arizona public postsecondary institution with the opportunity to build a core general education program which is transferable to any other state institution without loss of credit. This common agreement is called the

Transfer General Education Core Curriculum (TGECC).

The TGECC is composed of a minimum of 41 semester hours of lower-division general education course work in which a student may prepare for transfer. The TGECC is transferable from one Arizona community college to another Arizona community college. Students transferring from an Arizona community college to one of the state universities have the option of completing the lower-division general education requirements at the university to which they transfer or completing the TGECC. Courses beyond the TGECC which are completed at an Arizona community college will be accepted in transfer by each university according to course articulation information provided in the *Arizona Higher Education Course Equivalency Guide*.

Completion of the TGECC will fulfill lower-division general education requirements at all state universities. Students utilizing this option will still be required to fulfill lower-division program requirements and prerequisites within their college and major/minor area of study. In order to most efficiently complete a degree program, students should select courses to meet the TGECC requirements that will also fulfill program requirements in the college and major they intend to pursue upon transfer. Majors in the professional fields (i.e., architecture, engineering, business, fine/creative arts, or health professions) and sciences have significant prerequisites and/or program requirements that must be completed before a student may be admitted to upper-division course work. Community college students who are undecided about which of the universities they plan to attend or what program of study they intend to pursue are advised to explore educational options while they complete the TGECC. In all cases, students have the responsibility for selecting general education course work that is relevant to the requirements of their intended major and degree.

Transfer students must meet established institutional admission standards, as well as admission criteria for specific majors and programs at the state universities. Students who complete both the TGECC and an Associate of Arts degree will be assigned junior-class standing by the state universities.

Junior-class standing is based on the number of units a student has earned and does not necessarily indicate the remaining number of units needed to complete degree requirements. Course prerequisites, major requirements, and upper-division requirements will continue to be specified by each university. Appropriate sequencing of courses and timely completion of course prerequisites are essential to ensure efficient progress toward a baccalaureate degree. Students who have identified the university they plan to attend and/or a major area of study are advised to fulfill requirements and prerequisites identified by these programs through transfer guides and/or curriculum check sheets provided by the state universities. The TGECC does not replace or disregard articulation agreements developed to enhance the transfer process between specific institutions.

The TGECC is reviewed and monitored each academic year by the subject area articulation task forces and the General Education Articulation Task Force (GEATF). The statewide GEATF is composed of representatives from each Arizona community college and state university. The GEATF is responsible for monitoring the TGECC and reviewing related appeals. The GEATF is responsible to the Academic Program Articulation Steering Committee (APASC).

Admission before Receipt of Final Transcript

Students enrolled in other colleges and universities are considered for admission on the basis of meeting all admission requirements, except for a final transcript of work in progress. This final transcript must be sent to Undergraduate Admissions directly from the issuing institution immediately after the work in progress has been completed. Transcripts carried by hand are not accepted. *Admission is official only after the final transcript has been received showing that the applicant has met the university admission requirements.* In the event the applicant does not qualify or has falsified application documents, admission and registration are canceled, and any registration fees paid are returned.

Appeal Procedure. Transfer students who feel they have been unjustly denied credit for courses they have taken may appeal to the standards committee of the colleges in which they have enrolled. This procedure does not apply to community college transfer of credit greater than the 64-hour maximum; see “Community Colleges.” The decision of this committee is final.

An applicant for transfer admission whose academic record fails to meet ASU admission standards is denied admission. Such an applicant, however, may write a letter of appeal accompanied by three letters of recommendation to the University Undergraduate Admissions Board for reconsideration of his or her application:

UNIVERSITY UNDERGRADUATE
ADMISSIONS BOARD
ARIZONA STATE UNIVERSITY
PO Box 870112
TEMPE AZ 85287-0112

The decision of this board is final.

International Student Admissions

To comply with Immigration and Naturalization Services regulations, students who plan to attend ASU on an F-1 or J-1 visa must

1. have a minimum GPA of 3.00 (4.00 = A) from secondary school course work if a freshman applicant, or have a minimum GPA of 2.50 (4.00 = A) from college or university course work, if a transfer applicant;
2. meet basic competency requirements if attended four years of high school in the U.S.;
3. submit a financial statement not more than six months old from a financial institution assuring adequate resources to support themselves while in residence at the university;
4. have all required admissions materials and credentials reach Undergraduate Admissions by May 1 if applying for the fall semester or October 1 if applying for the spring semester (an English translation of all foreign language documents is required);
5. pay a nonrefundable application fee of \$40.00 in U.S. funds; and

6. meet all appropriate immigration standards and requirements.

Credit from a Foreign Institution.

Transfer credits or advanced standing is granted for academic course work completed at foreign tertiary level institutions that are either recognized by the home government/Ministry of Education as a degree-awarding institution or attached to a regionally accredited U.S. college or university as a Study Abroad Program. There will be no advanced credits for the international affiliation programs overseas unless they comply with this general policy.

TOEFL

Applicants whose native language is not English (identified by the U.S. Department of State Bureau of Public Affairs) must provide evidence of English language proficiency as indicated by acceptable scores on the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 500 is required for general admission to the university, and a minimum score of 550 is required for the professional programs in the School of Engineering and the Del E. Webb School of Construction. The following three exceptions apply:

1. Applicants who have completed their junior and senior years in a U.S. high school may provide an SAT Verbal score of 580 or an ACT English subscore of 23 in place of a TOEFL score for the professional programs in the School of Engineering and the Del E. Webb School of Construction. Scores of 530 on the SAT Verbal or 21 on the English subscore place these applicants in the preprofessional programs.
2. Applicants who have completed a minimum of 48 semester hours of transfer credits at a U.S. college or university (including completion of two semesters of first-year composition, earning a minimum 2.50 cumulative GPA), may be admitted into the preprofessional programs without the TOEFL. Entrance into the professional programs in the School of Engineering and the Del E. Webb School of Construction requires a TOEFL score of 550, an SAT verbal score of 580, or an ACT English subscore of 23.

3. Applicants who have received a bachelor’s degree from a college or university in the United States are exempt from the TOEFL. If these applicants meet the admission standards for the professional programs, exclusive of language tests, they are admitted to the professional program.

Upon admission to the university, such students are issued a Certificate of Eligibility (Form I–20 or IAP–66), which enables them to apply for the appropriate visa.

All F–1 or J–1 visa students must have insurance coverage against illness and accident before being permitted to register. Insurance must be maintained throughout the student’s enrollment in the university and may be obtained at the time of registration.

Upon arrival on campus, students must report to the international student advisor in Student Life.

American English and Culture Program

The American English and Culture Program (AECPP) features an intensive course of study designed for adult international students who desire to become proficient in English as a second language for academic, professional, or personal reasons. Inquiries about the curriculum, fee schedule, and other topics should be addressed to

AMERICAN ENGLISH AND CULTURE PROGRAM, DEPARTMENT 4
ARIZONA STATE UNIVERSITY
PO Box 873106
TEMPE AZ 85287–3106

Acceptance into the American English and Culture Program is separate from admission to the university. For more information, see page 243.

Admission of Applicants with Disabilities

Students should contact Disability Resources for Students (DRS) immediately upon admission to the university to receive information regarding eligibility requirements and deadlines that will ensure accommodations for the beginning of the semester.

Call or write
DISABILITY RESOURCES FOR STUDENTS
ARIZONA STATE UNIVERSITY
PO Box 873202
TEMPE AZ 85287–3202
602/965–1234 (VOICE/TTY)

Advanced Placement Credit

Examination	Score	Semester Hours	Equivalency
Art—History	5 or 4	6	ARS 101, 102
	3	3	ARS 101 or 102
Art—Studio—Drawing	5	6	ART 111, 112
	4	3	ART 111
Art—Studio—General	5	6	ART 112, DEC*
	4	3	ART 112
Biology	5 or 4	8	BIO 181, 182
	3	4	BIO 181
Chemistry	5 or 4	9	CHM 113, 115
	3	4	CHM 113
Computer Science A	5 or 4	3	CSE 100
Computer Science AB	5 or 4	6	CSE 100, 200
Economics—Introductory Macroeconomics	5 or 4	3	ECN 111
Economics—Introductory Microeconomics	5 or 4	3	ECN 112
English—Language and Composition	5 or 4	6	ENG 101, 114 eligible for ENG 102H
English—Literature and Composition	5 or 4	6	ENG 101, 204 eligible for ENG 102H
French—Language	5	14	FRE 201, 202, 311, 312
	4	11	FRE 201, 202, 311
	3	8	FRE 201, 202
French—Literature	5	18	FRE 111, 201, 202, 321, 322
	4	12	FRE 111, 201, 202
	3	8	FRE 201, 202
German—Language	5	14	GER 201, 202, 311, 312
	4	11	GER 201, 202, 311
	3	8	GER 201, 202
German—Literature	5	15	GER 111, 201, 202, 314
	4	12	GER 111, 201, 202
	3	8	GER 201, 202
History—American or European	5 or 4	6	HIS 103 and 104 or HIS 101 and 102
	3		Department evaluates examination and recommends credit.
Latin—Language	5	16	LAT 101, 102, 201, 202
	4	12	LAT 101, 102, 201
	3	8	LAT 101, 102
Mathematics—Calculus AB	5, 4, or 3	4	MAT 270
Mathematics—Calculus BC	5 or 4	8	MAT 270 and 271; additional credit may be granted upon departmental approval.
	3	4	MAT 270
Music	5 or 4	3	MTC 125

* If the portfolio emphasizes 3D, the student can request to have it evaluated for ART 115 credit.

The following accommodations can take up to three months for production and/or coordination: adapted instructional material development, alternative print formats (e.g., large print, braille, and computer based files), lab equipment adaptation, reader service, and sign language and oral interpreting services. Students who miss preregistration cannot be guaranteed these accommodations and may have to use alternate accommodations.

Special Programs for Advanced Placement and Credit

A maximum of 60 hours of credit are awarded for any or all programs, including ASU comprehensive and proficiency examinations. In these categories, only credit earned by comprehensive examination counts toward the resident credit requirement for graduation.

Advanced Placement. Students who have taken an advanced placement (AP) course of the College Entrance Examination Board (CEEB) in their secondary school *and* who have taken an AP Examination of the CEEB may receive university credit. No credit is given for any examination with a score of 2 or 1.

There is no limit to the number of AP credits that can be used to meet the General Studies requirement, including the requirements in natural sciences (S1 and S2), and literacy and critical inquiry (L1 and L2).

When the scores are received by the university directly from the CEEB, credit is awarded as shown in the “Advanced Placement Credit” table on pages 65–66.

College-Level Examination Program (CLEP). Students who have taken a College-Level Examination of the College Entrance Examination Board may receive university credit. The table of CLEP credit applies to all students enrolling in the university for the first time in August 1975 and any student enrolling thereafter. CLEP examination credit is *not* given where (1) it duplicates credit previously earned by the student at the university or accepted by the university for work done elsewhere

Advanced Placement Credit (cont.)

Examination	Score	Semester Hours	Equivalency
Physics B	5 or 4 3	6 3	PHY 111, 112 PHY 111
Physics C—Electricity and Magnetism	5 or 4	4	PHY 112, 114; or, upon departmental approval, credit may instead be granted for PHY 131, 132.
Physics C—Mechanics	5 or 4	4	PHY 111, 113; or, upon departmental approval, credit may instead be granted for PHY 121, 122.
Political Science			
American Government and Politics	5 or 4	3	POS 110
Comparative Government and Politics	5 or 4	3	POS 150
Psychology	5 or 4	3 3	PGS 101 Department evaluates examination and recommends credit.
Spanish—Language	5 4 3	14 11 8	SPA 201, 202, 311, 312 SPA 201, 202, 311 SPA 201, 202
Spanish—Literature	5 4 3	15 12 8	SPA 111, 201, 202, 325 SPA 111, 201, 202 SPA 201, 202
Statistics	5 or 4	3	STP 226

CLEP Credit

General Examinations	Semester Hours	Equivalency
English Composition	None	With essay qualifies for ENG 105
Humanities	6	Elective credit
Mathematics	3	MAT 106
Natural Sciences	8	Elective credit
Social Sciences and History	6	Elective credit
Subject Examinations	Semester Hours	Equivalency
American Government	3	POS 110
American History Early Colonization to 1877	3	HIS 103
1865 to the Present	3	HIS 104
American Literature	6	ENG 241, 242
Analysis and Interpretation of Literature	3	Elective credit

CLEP Credit (cont.)		
Subject Examinations	Semester Hours	Equivalency
Calculus with Elementary Functions	4	MAT 270
College Algebra (1993) (replaces College Algebra [1979])	3	MAT 117 (Students must score 46 or higher to receive credit.)
College Algebra and Trigonometry	3	MAT 170
College French	8	FRE 101, 102
College German	8	GER 101, 102
College Spanish	8	SPA 101, 102
English Literature	3	Elective credit
Freshman College Composition (replaces College Composition and Freshman English)	None	With satisfactory essay qualifies for ENG 105.
General Biology	8	BIO 181, 182
General Chemistry	8	CHM 113, 115
Human Growth and Development	None	No credit
Information Systems and Computer Applications	3	Elective credit
Introduction to Educational Psychology	None	No credit
Introductory Accounting	6	Elective credit
Introductory Business Law	3	Elective credit
Introductory Psychology	3	PGS 101
Introductory Sociology	3	SOC 101
Principles of Macroeconomics (replaces Introductory Macroeconomics)	3	ECN 111 (Students must score a 75 or higher to receive credit.) College of Business students may not use this for ECN 111 requirement.
Principles of Management	None	No credit
Principles of Marketing	None	No credit
Principles of Microeconomics (replaces Introductory Microeconomics)	3	ECN 112 (Students must score a 75 or higher to receive credit.) College of Business students may not use this for ECN 112 requirement.
Trigonometry	None	No credit
Western Civilization (9) Ancient Near East to 1648	6	HIS 100, 101
1648 to the Present	3	HIS 102

or (2) it is more elementary than a course in which the student has already received credit. All examinations are given monthly by University Testing Services.

There is no limit to the number of CLEP credits that can be used to fulfill the General Studies requirement. The General Studies requirement in natural sciences (S1 and S2) and literacy and critical inquiry (L1 and L2) are not satisfied by CLEP (See the General Studies Courses table on pages 87–108).

General Examinations. To obtain credit or placement, students must receive a standard score of 500 or higher for the General Examinations, except for English Composition with Essay, on which students must receive a standard score of 610/1978 scale or 500/1986 scale. *Students who have completed 60 semester hours of credit are not eligible to receive any credit for the CLEP General Examinations.*

Subject Examinations. A standard score of 50 or higher must be received to obtain credit for any subject examination. The completion of 60 semester hours does not preclude eligibility for additional credit for subject examinations.

All equivalency is subject to future review and possible catalog change.

For more information, call University Testing Services at 602/965-7146 or stop by EDB 302.

International Baccalaureate Diploma/Certificate. Students who present an International Baccalaureate Diploma/Certificate may qualify for university credit, depending on the level of the examination and the grade received. Arizona State University grants credit for higher-level courses only. A grade of 5 qualifies the student to receive credit for up to two introductory courses while a grade of 4 qualifies a student to receive credit for one introductory course. No credit is awarded for English as a Second Language (English B). Credit is awarded according to the table of “International Baccalaureate Diploma/Certificate Credit,” page 69.

Comprehensive Examinations. A comprehensive examination is intended to permit a student to establish academic credit in a field in which the student has gained experience or competence equivalent to an established university course. Applications are

given only for courses listed in the current catalog and only for courses in which a comprehensive examination can serve as a satisfactory measure of accomplishment.

A number of restrictions apply. The student must be enrolled at ASU with *no more than 100 semester hours of credit* earned. The examinations must be taken during the first two semesters in residence in a degree program at the university. *No more than 60 semester hours of credit may be established* by comprehensive examinations (including AP and CLEP credit) and independent learning courses.

Comprehensive examinations may not be taken in any course in which the student has been given admission credit or transfer credit from any educational institution. Credit may not be received for an examination in an elementary level of a field in which the student has earned more advanced credit nor for a prerequisite for a course already completed.

The decision on the suitability of course material for a comprehensive examination, the development of a comprehensive examination, and the administration of an examination are strictly departmental functions. An application is for one course only. The student completes an application form with the number, title, and number of semester hours for the course. When completed, the application must be approved by the student's advisor and the chair of the department responsible for offering the course.

The student must then pay the stated fee for such examinations at Cashiering Services. The receipt must be taken to the departmental office.

The examination is prepared by the instructor who normally conducts the course, and it is comprehensive in nature and scope. The instructor and other experts designated by the chair grade the examination, using letter grades "A," "B," "C," "D," or "E." If the grade is "C" or higher, a mark of "Y" is entered on the student's permanent record; otherwise, no entry is made. Credit by examination is indicated as such on the record. The student is notified by mail of the result of the examination. In cases of failure ("D" or "E"), the student is *not* given an opportunity to repeat the examination.

A student pursuing a second baccalaureate degree may not receive credit by comprehensive examination, but, with prior approval of the college, the student may use the examination to waive a course requirement if a grade of "C" or higher is earned.

Proficiency Examinations. Proficiency examinations and auditions are given

1. to waive a course requirement;
2. to validate certain transfer credits in professional programs; and
3. to determine a student's ability in a field where competence is an important consideration.

Detailed information may be obtained from the dean's office of the college in which the student is registered.

UNIVERSITY TESTING REQUIREMENTS

All new, transfer, or readmitted undergraduate students who plan to enroll for seven or more semester hours must meet one of the following testing requirements. *Students who fail to meet at least one of these requirements will not be allowed to register for any course the following semester.*

1. Take the ACT English or SAT verbal examination and have scores submitted to ASU.
2. Receive a score of 4 or 5 for the advanced placement examination in English offered by the College Entrance Examination Board and have scores submitted to ASU.
3. Take the CLEP general examination in English, earning a score that qualifies for placement in ENG 105, and have scores submitted to ASU.
4. Have previously taken ENG 101, 102, 105, 107, or 108 at ASU and received a grade of "D" or higher. If the course was taken before 1980, contact the Recording Section, SSV B114, before registering for classes.
5. Transfer a course equivalent to ENG 101, 102, 105, 107, or 108 with a grade of "C" or higher. An official transcript showing the grade must be received at ASU at least six weeks before registration. If a student transfers an equivalent composition course from a public

community college or university in Arizona, the equivalency is automatically posted, and the student need not take further action. A student transferring a composition course from any other college or university must have the course evaluated for equivalency. See "First-Year Composition Requirement," page 79, for more information.

Placement Examinations

English. New students and continuing, re-entry, transfer, and nondegree students who have not taken any composition courses are placed in First-Year Composition courses according to their scores on the ACT English or SAT Verbal tests. Students who score 18 (16)¹ or below on the ACT English test or 460 (380)² or below on the SAT Verbal test must enroll in WAC 101, a basic writing course (see page 330). Students who score between 19 (17)¹ and 28 (24)¹ on the ACT English test or between 470 (390)² and 650 (580)² on the SAT Verbal test are eligible to enroll in ENG 101. Students who score 29 (25)¹ or higher on the ACT English test or 680 (590)² or higher on the SAT Verbal test may take ENG 105 in place of ENG 101 and 102. Students who are accepted in the University Honors College are eligible to enroll in ENG 105 after being advised. Students may also qualify for ENG 105 by achieving appropriate scores on the CLEP General Examination in English Composition with Essay or the CLEP Subject Examination in College Composition with Essay.

Foreign Language. For information regarding foreign language placement testing, see page 352, "Foreign Language Requirement and Placement," and pages 66–69, "Special Programs for Advanced Placement and Credit."

Mathematics. Placement examinations before registering in mathematics

¹ The ACT scoring system has been modified. As a result, these scores are effective for tests taken in and after October 1989. Equivalent scores for tests taken before October 1989 are in parentheses.

² The SAT scoring system has been modified. As a result, these scores are effective for tests taken in and after April 1995. Equivalent scores for tests taken before April 1995 are in parentheses.

courses are not required at ASU. Students planning to register in mathematics courses should consult the Self-Advising flowchart available at university advising offices and the Department of Mathematics offices in PSA 208 and 216. The flowchart places emphasis on a student's prior preparation and performance in mathematics. In most lower-division mathematics courses, an intensive review by the students is followed by a test during the first week of classes. Students not doing well on these tests are encouraged to enroll immediately in a less demanding mathematics course. Students needing additional evaluation are encouraged to take the Algebra Placement Exam or the Calculus Placement Exam, administered by appointment at University Testing Services (UTS), EDB 302. Call UTS at 602/965-7146 for an appointment.

Academic Advising

Effective academic advising of students is an essential aspect of the educational experience at ASU. The university is committed to providing

quality advising to continuing, first-time, and transfer students. To achieve the highest quality advising, students, faculty, and staff must work to form a partnership. To ensure timely and accurate advising to their majors, each college has advisors to assist students in developing programs of study, assessing educational goals, and understanding rules, procedures, and curriculum requirements. In some colleges, these advisors are faculty members. In others, they are full-time, professional advisors. In most instances, students have academic and career advising available from both faculty members and full-time advisors. Students are encouraged to take advantage of the skill and knowledge of the advising professionals available to them. Most new students and many continuing students have mandatory advising as a condition of registration.

An additional unit, Cross-college Advising Services ([CAS] UASB 129, 602/965-4464), is a central advising, referral, and information facility whose staff is available to assist students in their academic careers at ASU. Emphasis is placed on advising services to

first-time, prospective, transfer, and visiting students and students in transition, such as those changing majors and those without majors. In addition to guidance in the exploration or selection of a major, CAS provides general academic information and referrals to all areas of student academic support.

Students are strongly encouraged to seek academic advising at the earliest possible time and regularly throughout their academic careers, whether or not advising is mandatory in their particular programs. Advisors may be contacted at the locations and times shown in the "Academic Advising" table. See page 549 for a list of building abbreviations and names.

Readmission to the University

Undergraduate students who have previously attended ASU but have not been enrolled at ASU for one semester or more are required to apply for readmission for the semester in which re-enrollment is intended. Nonresident applicants must submit a nonrefundable \$40.00 application fee. If, meanwhile, the student has attended another accredited college or university, it is necessary for the student to have on file an official transcript of all academic work taken. Failure to report such attendance is considered misrepresentation and falsification of university records. In addition, it is considered cause for Records Hold action and withholding of further registration privileges.

An applicant for readmission to a degree program must meet the requirements for good standing (see page 77) and the requirements of the college to which the application is being made. An applicant who has been denied readmission may appeal to the University Undergraduate Admissions Board. Nondegree applicants for readmission must have a minimum GPA of 2.00. If not, the applicant must apply to ASU through Undergraduate Admissions.

Conditional Readmission. A student completing academic work in progress at another institution may be granted conditional readmission. This conditional status remains effective until an official transcript is received. The student is subject to Records Hold action, and additional registration privileges are withheld if this condition for readmission is not cleared by midsemester.

International Baccalaureate Diploma/Certificate Credit

Examination	Score	Semester	
		Hours	Equivalency
Art/Design	7, 6, or 5	6	ART 111, 112
		4	ART 112
Biology	7, 6, or 5	8	BIO 181, 182
		4	BIO 181
Chemistry	7, 6, or 5	9	CHM 113, 115
		4	CHM 113
Economics	7, 6, or 5	6	ECN 111, 112
		4	ECN 111
English A	7, 6, or 5	6	ENG 101, 110
		4	ENG 110
English B	No credit		None
Foreign Language A or B*	4	4	Foreign language 101
Foreign Language A or B*	5	8	Foreign language 101, 102
History—American	7, 6, or 5	6	HIS 103, 104
		4	HIS 103
History—European	7, 6, or 5	6	HIS 101, 102
		4	HIS 101
Mathematics	7, 6, 5, or 4	4	MAT 270
Physics	7, 6, or 5	8	PHY 111, 112, 113, 114
		4	PHY 111, 113

* No credit is awarded if the language is the student's native language.

Academic Renewal

Academic renewal is a university policy administered for the purpose of recalculating the ASU cumulative GPA of undergraduate students who have been readmitted to a degree program after an absence of at least five continuous calendar years including summer sessions and who have completed in good standing a minimum of 12 college-approved additional hours in residence within three semesters after re-entry. Students may have the former academic record before the five-year absence (including transfer credits) accepted in the same manner as if the credits were transfer credits. That is,

earned hours are carried forward for up to 60 hours of credit in which a grade of "C" or higher was earned. The cumulative GPA is based only on credits earned subsequent to the student's re-entry. All graduation residency, academic recognition residency, and GPA requirements must be fulfilled after academic renewal.

A request for academic renewal follows this procedure:

1. Students interested in academic renewal must request the Application for Academic Renewal from the Readmission Section of the Office of the Registrar or the dean of the college offering the major.
2. The Application for Academic Renewal may be submitted immediately upon readmission but not later than the start of the third semester after readmission.
3. The Application for Academic Renewal is submitted by the student to the dean of the college offering the major.
4. The dean specifies in advance a minimum of 12 semester hours.
5. When the approved credits are completed with a cumulative GPA of 2.50 or higher, and no grade lower than "C" in each course, the dean forwards the Application for Academic Renewal to the Office of the Registrar for processing.

Academic Advising¹

College or School	Location	Telephone	Days	Hours
College of Architecture and Environmental Design	ARCH 141	602/965-3584	Mon.-Fri.	8:00 A.M.-12:00 NOON, 1:00 P.M.-5:00 P.M.
College of Business	BA 123	602/965-4227	Wed. Other weekdays	9:00 A.M.-6:30 P.M. 9:00 A.M.-4:30 P.M.
College of Education	EDB 7	602/965-3877	Mon.-Fri.	9:00 A.M.-5:00 P.M.
College of Engineering and Applied Sciences	EC G100	602/965-3421	Mon.-Fri.	8:00 A.M.-12:00 NOON, 1:00 P.M.-5:00 P.M. Appointments are recommended.
College of Fine Arts	GHALL 127	602/965-4495	Mon.-Fri.	8:00 A.M.-12:00 NOON, 1:00 P.M.-5:00 P.M.
College of Law	LAW 101	602/965-1474	Mon.-Fri.	8:00 A.M.-5:00 P.M. Call for additional hours.
College of Liberal Arts and Sciences	SS 111	602/965-6506	Mon.-Fri.	8:00 A.M.-5:00 P.M.
College of Nursing	NUR 108	602/965-2987	Mon.-Fri.	8:00 A.M.-5:00 P.M.
College of Public Programs	WILSN 203	602/965-1034	Mon.-Fri.	8:00 A.M.-5:00 P.M.
Graduate College	WILSN lobby	602/965-3521	Mon.-Fri.	8:00 A.M.-5:00 P.M. Walk-ins are welcome; appointments are recommended.
School of Social Work	WHALL 135	602/965-6081	Mon., Fri. Tues.-Thurs.	9:00 A.M.-3:00 P.M. 9:00 A.M.-5:30 P.M. Appointments are recommended.
Cross-college Advising Services	UASB 129	602/965-4464	Mon., Wed. Tues., Thurs. Fri.	8:00 A.M.-6:30 P.M. ² 8:00 A.M.-5:00 P.M. 7:00 A.M.-5:00 P.M.
University Honors College	MCL 112	602/965-2359	Mon.-Fri.	8:00 A.M.-5:00 P.M. Appointments are recommended.

¹ Students seeking academic advising at ASU East should see page 436 for more information.

² Walk-ins are welcome.

Only students working toward their first undergraduate degree are eligible to apply for academic renewal, which may be effected only once during a student's academic career. Academic renewal is transferable among colleges. All students with ASU GPAs below 2.00 are eligible to petition for academic renewal. Individual colleges may elect to entertain petitions for academic renewal from students with ASU GPAs above 2.00. College standards committees have final authorization on academic renewal petitions. Eligibility for graduation is based on the ASU cumulative GPA after academic renewal. However, a student's complete record—before and after academic renewal—remains on the transcript and may be taken into consideration when a student applies for undergraduate professional or graduate programs.

Registration

All persons attending a class at ASU must be registered for that class. A student is considered to be registered when all registration fees have been paid in full.

Eligibility. Only eligible students may register for courses at ASU. An eligible student is either continuing from the previous semester or has been admitted or readmitted to the university. See "Undergraduate Admission," pages 60–64, and "Readmission to the University," page 69.

Proof of Identification. To receive university services, photo identification must be presented. Each admitted or readmitted student who completes the registration process for a regular semester needs to obtain a student identification card. This photo identification card is valid for the duration of the student's enrollment at ASU.

Photo IDs are issued throughout the semester at the Sun Card office located in the Memorial Union. See the *Schedule of Classes*. Refer to "Sun Card/ID Card," page 45.

Registration Fees. Registration fees are due and must be paid in full at the time specified each semester in the *Schedule of Classes*. If any payment tendered is unauthorized, incomplete, or received after the due date, registration fees are considered not paid.

Schedule of Classes. The *Schedule of Classes*, published for the fall and

spring semesters, and the *Summer Sessions Bulletin* are distributed without charge. These publications are also available online at www.asu.edu/registrar/schedule. They list course offerings, dates, times, places, and procedures for registration, along with other important information relating to the term.

Course Loads. A minimum full-time course load for an undergraduate student is 12 semester hours. The maximum course load for which a student may register is 18 semester hours (with the exception of a 19-hour maximum for students enrolled in the Colleges of Engineering and Applied Sciences or Architecture and Environmental Design). A student wishing to register for more than the maximum must petition the standards committee of the college in which the student is enrolled and must obtain an approved override before registration. See "Summer Session Semester Loads," for summer course load information.

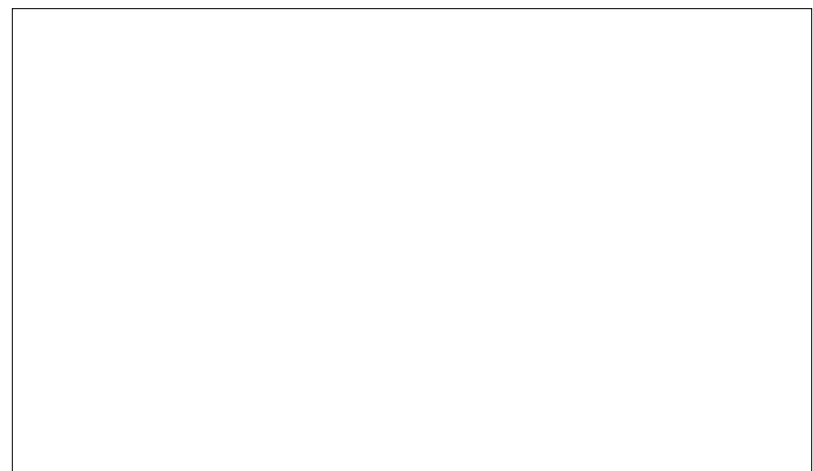
Reserving of Course Credit by Undergraduates. Seniors at ASU within 12 semester hours of graduation may enroll in a 400-level or graduate course and reserve the credit for possible use in a future graduate program. The course cannot be used to meet a baccalaureate graduation requirement. Before registration in the course, the student must submit a Graduate College Petition form requesting credit reservation. The form must be signed by the student's advisor, the head of the academic unit offering the class, and the dean of the Graduate College.

Permission to reserve a course does not guarantee admission to a graduate degree program or that the course may be used toward graduate degree requirements. A maximum of nine semester hours may be reserved, and only courses with an "A" or "B" grade are applicable. Reserved credit earned before admission to a graduate degree program is classified as nondegree credit. The maximum course load for a student enrolled in a reserved course is 15 semester hours during a regular semester and six hours during a summer session.

Summer Session Semester Hour Load. The summer session semester hour load limit is seven semester hours for each five-week session and nine semester hours for the eight-week session. The student may not exceed a total of 14 semester hours for any combination of sessions.

Concurrent Enrollment. Provided that the other university regulations concerning enrollment, graduation requirements, and transfer of credits are not violated, a student may enroll in classes at other institutions or in independent learning courses while enrolled at ASU. However, the student is urged to seek advising before concurrent enrollment to assure orderly progress toward a degree. If total credits exceed the maximum course load, prior permission must be granted by the college standards committee. See "Course Loads," this page.

Attendance. The instructor has full authority to decide whether class attendance is required.



The next step following registration is a trip to the bookstore.

Tim Trumble photo

Enrollment Verification Guidelines.

The registrar is responsible for verifying enrollment according to the general guidelines in the “Enrollment Verification Guidelines” table. Independent learning courses are not considered for enrollment verification purposes.

Cooperative Programs

Cooperative Education. Cooperative education at ASU is any educational program that requires *alternating classroom and work experience* in government or industry. The work experience exists for its educational value.

Full-time Status of Co-op Students.

A co-op student, during a work semester, is identified as both co-op and full time by the university. In order to qualify, the student must have prescribed hours and GPA requirements.

Rights and Privileges of Co-op Students. During their work semesters, co-op students have the rights, privileges, and protections—with regard to university matters—accorded to full-time students, except financial aid. They maintain catalog continuity and have student access to university facilities and events.

Financial Aid for Co-op Students.

Co-op students are not identified to lenders (including ASU) as being in loan repayment status. They have an “in school” full-time enrollment status. Co-op students do not receive any financial aid disbursement during their co-op semesters, *nor are such awards transferred to another semester.* The student is responsible for notifying Stu-

dent Financial Assistance as soon as plans for a co-op term are made but no later than 10 days before the co-op term begins. The department or school is responsible for notifying Student Financial Assistance of students approved for co-op terms.

Traveling Scholar Program. The Traveling Scholar Program is a cooperative program between the state universities designed to enable students to take advantage of programs or special resources that are not available at their own institutions. Any undergraduate student with a GPA of at least 2.50 or graduate student with a GPA of at least 3.00 enrolled at ASU, Northern Arizona University, or University of Arizona may be designated a Traveling Scholar by prior mutual agreement of the appropriate academic authorities at both the sponsoring and hosting institutions. Contact the Registrar’s Records Information Section for more information and the application form.

Grading System

Definition of a Unit of Credit. The Arizona Board of Regents has defined (May 26, 1979) a unit of credit for the institutions under its jurisdiction. A minimum of 45 hours of work by each student is required for each unit of credit. An hour of work represents a minimum of 50 minutes of class time—often called a “contact hour”—or 60 minutes of independent study work. For lecture-discussion courses, this requirement equates to at least 15 contact hours and a minimum of 30 hours of

work outside the classroom for each unit of credit. Even though the values of 15 and 30 may vary for different modes of instruction, the minimum total of 45 hours of work for each unit of credit is a constant. Since the unit of credit as defined by the Arizona Board of Regents is the cornerstone of academic degree programs at ASU, degrees granted by other institutions that are recognized by ASU should be based on a similar unit of credit.

Grades and Marks. All grades and marks appear on the grade report, permanent record, and/or unofficial transcript.

They are indicated by the letters shown in the “Grades” table on page 73.

Grading Options. Ordinarily a grade of “A,” “B,” “C,” “D,” or “E” is given upon completion of a course, unless a grading option of “audit” or “pass/fail” is indicated at the time of registration. *Grading options cannot be changed after the close of the drop/add period.*

Incomplete. A mark of “I” (incomplete) is given by the instructor only when a student who is otherwise doing acceptable work is unable to complete a course because of illness or other conditions beyond the student’s control. The mark of “I” should be granted only when the student can complete the unfinished work with the same instructor. However, an incomplete (“I”) may be completed with an instructor designated by the department chair if the original instructor later becomes incapacitated or is otherwise not on campus. The

Enrollment Verification Guidelines

	Full-Time	Half-Time	Less Than Half-Time
Regular semester			
Undergraduate	12 or more hours	6–11 hours	5 or fewer hours
Graduate	9 or more hours	5–8 hours	4 or fewer hours
Graduate assistant*	6 or more hours		
Five-week summer session			
Undergraduate	4 or more hours	2 hours	1 hour
Graduate	3 or more hours	2 hours	1 hour
Graduate assistant*	2 or more hours	1 hour	
Eight-week summer session			
Undergraduate	6 or more hours	3–5 hours	2 or fewer hours
Graduate	5 or more hours	3–4 hours	2 or fewer hours

* For enrollment verification purposes, graduate assistant is a generic term that includes graduate assistant, teaching assistant, research assistant, graduate associate, teaching associate, and research associate.

student is required to arrange with the instructor for the completion of the course requirements. The arrangement is recorded on the Request for Grade of Incomplete form. The student has one calendar year from the date the mark of "I" is recorded to complete the course. If the student completes the course within the calendar year, the instructor must submit a Request for Grade of Incomplete/Authorization for Change of Grade form to the Office of the Registrar, whether the student passed or failed the course. Marks of "I" are changed to a grade of "E" for purposes of evaluating graduation requirements for undergraduate students. Marks of "I" received in the fall 1983 semester or thereafter for undergraduate courses that have been on a student's record for more than one calendar year are automatically changed to a grade of "E." An undergraduate student does not re-register or pay fees for a course for which an incomplete "I" has been received in order to complete the course.

Students who receive a mark of "I" in courses at the 500 level or above have one calendar year to complete the course for a grade. After one calendar year, the mark of "I" becomes a permanent part of the transcript. To repeat the course for credit, a student must re-register and pay fees. The grade for the repeated course appears on the transcript but does not replace the permanent "I."

Satisfactory. A mark of "Y" (satisfactory) may be used at the option of individual colleges and schools within the university and is appropriate for intern-

ships, projects, readings and conferences, research, seminars, theses, and workshops. The "Y" is included in earned hours but is not computed in the GPA.

Credit Enrollment. The semester hour is the unit on which credit is computed. It represents one 50-minute class exercise per week per semester. To obtain credit, a student must be properly registered and must pay fees for the course.

Audit Enrollment. A student may choose to audit a course, in which case the student attends regularly scheduled class sessions, but no credit is earned. The student should obtain the instructor's approval before registering and paying the fees for the course. Selected courses may not be audited. Veteran students using education benefits should see "Veterans Services," page 37.

The mark of "X" is recorded for completion of an audited course, unless the instructor determines that the student's participation or attendance has been inadequate, in which case the mark of "W" (unrestricted withdrawal) may be recorded. This grading option may not be changed after the close of drop/add. The "X" is not included in earned hours and is not computed in the GPA.

Pass/Fail Enrollment. A mark of "P" (pass) or "E" (fail) may be assigned for this grading option. This grading method may be used at the option of individual colleges and schools within the university. Consult the college

dean's office for detailed information and restrictions before registration. "P" is included in earned hours but is not computed in the GPA.

Remedial Enrollment. A mark of "RC" (remedial credit) or "RN" (remedial no credit) may be assigned for this grading option. The course appears on an unofficial ASU transcript but does not appear on the grade report or official ASU transcript and is not included in earned hours. Remedial hours are included in verification of enrollment for purposes of loan deferment and eligibility.

Instructor-Initiated Drop. An instructor may drop a student for nonattendance during the second week of classes in fall or spring semesters or the first two days of each summer session. Instructor-initiated drops for nonattendance are signed by the dean or dean's designee. The college notifies students by mail. The student must contact the instructor before the end of the first week of classes if absences during that period cannot be avoided.

Drop/Add. Students registering for courses for a semester or summer session may drop or add courses through the first week of classes in a semester or the first two days of a summer session. See the *Schedule of Classes* or *Summer Sessions Bulletin* for dates of drop/add periods. During this period, a student may drop one or more but not all scheduled courses without penalty. Courses that are dropped do not appear on the student's transcript and fees paid are fully refunded, depending on the student's remaining hours. A student who wishes to withdraw from all courses during the drop/add period must process an unrestricted withdrawal.

Unrestricted Course Withdrawal. During the first four weeks of a semester or the first six days of a summer session, a student may withdraw from any course with a mark of "W." See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the unrestricted withdrawal period.

Restricted Withdrawal. From the fifth week to the end of the 10th week of a semester and from the seventh day to the end of the third week of a summer session, students may withdraw with a mark of "W" from only courses

Grades

Grade	Definition	Value	Notes
A	Excellent	4.00	
B	Good	3.00	
C	Average	2.00	
D	Passing	1.00	
E	Failure	0.00	
I	Incomplete		
NR	No report		
P	Pass		
RC	Remedial credit		Appears only on unofficial copy of ASU transcript.
RN	Remedial no credit		Appears only on unofficial copy of ASU transcript.
W	Withdrawal		
X	Audit		
Y	Satisfactory		

in which the instructor certifies that they are passing at the time of the withdrawal. See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the restricted withdrawal period.

The number of restricted withdrawals with the mark of “W” is limited. One restricted withdrawal is assessed for each course withdrawn from, unless the student is withdrawing from all courses. A complete withdrawal results in the assessment of one restricted withdrawal against a student’s limit. The number of withdrawals is a total of two for students during freshman, sophomore, junior, or senior standing; and a total of two for students during second undergraduate degree standing.

Students who have reached their restricted withdrawal limit are not allowed to process any additional restricted course withdrawals. However, students are allowed to process a restricted complete withdrawal even when they have reached the restricted withdrawal limit. The preceding limits do not prevent students from processing a complete withdrawal from the university with marks of “W” and/or “E.” Complete withdrawal counts as one withdrawal for purposes of applying the above limits. The preceding does not apply to audit enrollment or zero-hour labs and recitations.

Procedure for Restricted Withdrawal

1. Obtain a withdrawal form from any registrar site.
2. Obtain a signature and verification of grade from instructor(s).
3. Have the form processed at any registrar site.

Instructor-Initiated Withdrawal. An instructor may withdraw a student from a course with a mark of “W” or a grade of “E” only in cases of disruptive classroom behavior. A student may appeal an instructor-initiated withdrawal to the standards committee of the college in which the course is offered. The decision of the committee is final. Restricted withdrawal limits do not apply to withdrawals initiated by an instructor.

Withdrawal from the University. To withdraw from *all* classes after having paid registration fees, a student must

submit a request in person, withdraw using InTouch, or submit a signed request to the Office of the Registrar. The InTouch complete withdrawal option is only available through the first week of classes for a semester. During the unrestricted complete withdrawal period, a student may withdraw from all courses with marks of “W.” During the restricted complete withdrawal period, a student may withdraw with marks of “W” only from courses that the instructors certify the student was passing at the time of withdrawal. See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the complete withdrawal periods. No one is permitted to withdraw from the university or to conduct any registration transaction in the last two weeks of the semester. The date of the complete withdrawal is always the date the withdrawal form or letter is received in the Office of the Registrar.

Medical/Compassionate Withdrawal.

Normally, a medical/compassionate withdrawal request is made in cases where serious illness or injury (medical) or other significant personal situation (compassionate) prevents a student from continuing his or her classes and incompletes when other arrangements with the instructor are not possible. Usually, consideration is for complete withdrawal. All applications for withdrawal require thorough and credible documentation; application for less than a complete withdrawal must be especially well documented to justify the selective nature of the medical/compassionate withdrawal request.

Medical Withdrawal. When a student must withdraw from one or more classes for personal medical reasons, that student may request a medical withdrawal. This policy covers both physical health and mental health difficulties. A medical withdrawal aids the student in two ways:

1. it is considered an unrestricted withdrawal, regardless of when it occurs; and
2. according to the policies of the Student Fee Payment Office, the student may be refunded a greater portion of tuition and/or fees paid for the semester than the published university refund schedule would normally allow.

Compassionate Withdrawal. When a student must withdraw from one or more classes for significant personal reasons, not related to the student’s personal physical or mental health (for example, care of a seriously ill child or spouse, or a death in the student’s immediate family), that student may request a compassionate withdrawal. A compassionate withdrawal aids the student in the two ways listed above under “Medical Withdrawal.”

Each college has a dean’s representative (medical/compassionate withdrawal designee) to review medical/compassionate withdrawal requests. A student requesting a medical/compassionate withdrawal is referred to the dean’s designee of the college of the major. A nondegree student is referred to the dean’s designee of the college with which he or she is primarily affiliated. The dean’s designee determines the appropriateness of the medical/compassionate withdrawal request and whether an administrative hold is indicated. Removal of the hold must be authorized by the designee before the student can register for a future semester or be readmitted to the university.

Although the medical/compassionate withdrawal procedure may be used at any time during or after the close of the specified semester, the student is encouraged to submit the application as early as possible.

During the unrestricted withdrawal period (generally the first four weeks of a semester or the first six days of a summer session), a student who follows the regular withdrawal procedure will automatically be granted a “W” in each of his or her classes, regardless of the reasons for withdrawing and whether or not he or she is passing the classes. However, even during the unrestricted withdrawal period, a student must process a formal medical/compassionate withdrawal to be eligible for consideration of a larger refund of tuition and/or fees than would be granted under regular unrestricted withdrawal procedures.

For both partial and complete withdrawals, during both the unrestricted withdrawal period and the restricted withdrawal period, a student who follows the medical/compassionate withdrawal procedure will be granted a “W” in each of his or her classes upon approval of the medical/compassionate

withdrawal, regardless of whether or not he or she is passing. The medical/compassionate withdrawal procedure will result in a special note line on the unofficial transcript.

Even after the close of the semester, the dean's designee in the college of the student's major may approve a medical/compassionate withdrawal for each class for which a "W" is to be granted, regardless of which college offered the course(s). Refunds are not given beyond six months past the close of the semester.

Only one Request for Documented Medical/Compassionate Withdrawal form needs to be filed with the college of the major, even if classes in more than one college are involved. The form should clearly specify each class for which the student is to receive a grade of "W." Signatures from the instructor(s) and/or department chair(s) for each class are not required; the dean's designee's signature is sufficient.

Grade Points. For the purpose of computing the grade point average (GPA), grade points are assigned to each of the grades for each semester hour as follows: "A," four points; "B," three points; "C," two points; "D," one point; "E," zero points. GPAs are rounded to the nearest 100th of a grade point.

Grade Point Average. Grade points earned for a course are multiplied by the number of semester hours to produce honor points. For example, receiving an "A," which is assigned four grade points, in a three-semester-hour course would produce 12 honor points. The grade point average (GPA) is obtained by dividing the total number of honor points earned by the total number of semester hours graded "A," "B," "C," "D," or "E." Other grades do not carry grade points. *Semester GPA* is based on *semester* net hours. *Cumulative GPA* is based on *total* net hours.

Change of Grade. Ordinarily the instructor of a course has the sole and final responsibility for any grade reported. Once the grade has been reported to the registrar, it may be changed upon the signed authorization of the faculty member who issued the original grade. Approval for the

change is also required by the department chair and the dean of the college concerned. This policy also applies to the grade of "F" (incomplete).

University Policy for Student Appeal Procedures on Grades

Informal. The steps outlined below, beginning with step A, must be followed by any student seeking to appeal a grade. Student grade appeals must be processed in the regular semester immediately following the issuance of the grade in dispute (by commencement for fall or spring), regardless of whether the student is enrolled at the university. It is university policy that students filing grievances and those who are witnesses are protected from retaliation. Students who believe they are victims of retaliation should immediately contact the dean of the college in which the course is offered.

- A. The aggrieved student must first undergo the informal procedure of conferring with the instructor, stating the evidence, if any, and reasons for questioning that the grade received was not given in good faith. The instructor is obliged to review the matter, explain the grading procedure used, and show how the grade in question was determined. If the instructor is a graduate assistant and this interview does not resolve the difficulty, the student may then go to the faculty member in charge of the course (regular faculty member or director of the course sequence) with the problem.
- B. If the grading dispute is not resolved in step A, the student may appeal to the department chair or other appropriate chair of the area within the department (if any). The department chair may confer with the instructor to handle the problem. Step B applies only in departmentalized colleges.
- C. If these discussions are not adequate to settle the matter to the complainant's satisfaction, the student may then confer with the dean of the college concerned (or the dean-designate), who will review the case. If unresolved, the dean or designate may refer the case to the college academic grievance hearing

committee to review the case formally. In most instances, however, the grievance procedure does not go beyond this level.

Formal. The following procedure takes place after steps A, B, and C (or A and C) have been completed.

- D. Each college has on file in the office of the dean (and in each department of the college) the procedures and composition of the undergraduate or graduate academic grievance hearing committee for student grievances. Each college committee shall operate under grievance procedures as stated which satisfy due process requirements. The committee shall always meet with the student and the instructor in an attempt to resolve the differences. At the conclusion of the hearing, the committee shall send its recommendations to the dean.
- E. Final action in each case will be taken by the dean after full consideration of the committee's recommendation. Grade changes, if any are recommended, may be made by the dean. The dean shall inform the student, instructor, department chair (if any), the registrar, and the grievance committee of any action taken.

Repeating Courses. An undergraduate course taken at ASU may be repeated for credit if the grade of "D," "E," or "W" or a mark of "X" is received. Undergraduate courses in which grades of "D" or "E" are received may be repeated only once. After an undergraduate student repeats 100- and 200-level courses, the student's transcript shows both grades, but the student's cumulative GPA reflects only the higher grade. After an undergraduate student repeats 300- or 400-level courses, the student's cumulative GPA and the transcript reflect both grades.

After completing the course, the student must file a Deletion Form with the Office of the Registrar. To be eligible for the deletion of "D" or "E" grades, the course must be repeated at ASU. Students who have graduated are not eligible to delete the grade for a course taken before the award of the ASU bachelor's degree.

This policy does not apply to seminar and independent study courses with different content each semester. This policy affects only undergraduate students and undergraduate courses.

Demonstration of Mastery. An undergraduate student who receives a “D” in a course in which a “C” or higher is required may use the grade from an equivalent course taken elsewhere to demonstrate mastery at the “C” or higher level. However, the course may neither be transferred to ASU (since credit has already been given for the course) nor computed in the student’s GPA.

Midterm Report. Instructors are required to evaluate students at midterm for academic progress. A student who has been evaluated for a “D” or “E” at midsemester receives a midterm report. The midterm “D” and “E” grades are not recorded on the student’s permanent record. Midterm reports are mailed to the student’s local address of record.

Final Grades. Grades may be viewed online at www.asu.edu/registrar or accessed through InTouch at 602/350-1500.

Records Hold. The Office of the Registrar enforces a financial records hold

or administrative hold on the records of a student when an outstanding financial obligation or disciplinary action has been reported.

When a hold is placed on a record, the following results may occur:

1. No official or unofficial transcript is issued.
2. Registration privileges are suspended.
3. Other student services may be revoked.

The hold remains effective until removed by the initiating office. It is the student’s responsibility to clear the conditions causing the hold.

Transcripts. The Office of the Registrar releases official transcripts *only upon the written request of the student*. The request must include the following information:

1. the student’s name and former name(s);
2. the student ID number;
3. the date of birth; and
4. the dates of attendance.

The request for official transcript form is available online at www.asu.edu/registrar/forms.

The Office of the Registrar does not issue a transcript if the student has a financial records hold. The student must supply a specific address if the transcript is to be mailed. The fee for an official transcript for a student not enrolled is \$5.00 for the first copy. Additional copies ordered at the same time are \$1.00 each. The fee is \$1.00 per copy for a student enrolled for a current or future semester.

Unofficial transcripts may be requested in person at the Office of the Registrar, any registrar site, or by mail or fax 602/965-2295 if a signed release is enclosed. There is no charge for an unofficial transcript.

All in-person transcript requests require presentation of photo identification. Requests are not accepted from third parties without a written release from the student. For information on parental access to records, see “Access to Records,” page 78.

Basic Competencies

Area	ASU Courses That May Be Used to Meet Basic Competencies
American history	Any one course: HIS 103, 104
English	Any one course: ENG 101, 105, 107; WAC 101, 107
Fine arts	Any undergraduate three-semester-hour course offered in the College of Fine Arts.
Foreign language	Student must complete through the 102 course level of any foreign language course.
Laboratory science*	
Chemistry	Any one course: CHM 101, 113, 117
Earth sciences	Any numbered selection: <ol style="list-style-type: none"> 1. GLG 101 and 103 2. GPH 111
Life sciences	Any numbered selection: <ol style="list-style-type: none"> 1. BIO 100, 113, 120, 181, 182, 201 2. PLB 108
Physics	Any numbered selection: <ol style="list-style-type: none"> 1. AST 111 and 113 2. AST 112 and 114 3. PHS 110 4. PHY 101 5. PHY 105 6. PHY 111 and 113 7. PHY 112 and 114 8. PHY 121 and 122 9. PHY 131 and 132
Mathematics	Any one course: MAT 106, 114, 117, 119, 170, 210, 260, 270, 290
Social science	Any one course: ASB 102; ECN 111, 112; GCU 102, 121, 141; HIS 100, 101, 102; PGS 101; POS 101, 110, 120, 150, 160; SOC 101

* The laboratory science requirement is designed to demonstrate competency in two separate laboratory science areas. Therefore, for example, if one lab science competency has already been met in life sciences either through high school course work, the ATP biology achievement test, or college course work, the second lab science course must be selected from chemistry, earth sciences, or physics.

Retention and Academic Standards

Class Standing. Hours earned determine class standing.

Student	Hours Earned
Freshman	24 or fewer hours earned
Sophomore	25–55 hours earned
Junior	56–86 hours earned
Senior	87 or more hours earned
Graduate	Bachelor's degree from accredited institution

Academic Good Standing. Academic good standing for degree-seeking students for the purpose of retention is defined as follows:

Total Earned Hours	Minimum Cumulative GPA
24 or fewer	1.60
25–55	1.75
56 or more	2.00

A student who does not maintain the minimum GPA standard is placed on academic probation or is disqualified. A student on academic probation is in conditional good standing and is permitted to enroll. A student who has been disqualified is not in academic good standing and is not permitted to enroll for fall or spring semesters.

To transfer from one college to another within the university or to be eligible for readmission, a student must have a GPA of 2.00 or higher. The GPA determining good standing is computed on courses taken only at ASU.

For purposes of retention or transfer, an individual college may set higher GPA standards; otherwise, the university standards prevail. See the college sections of this catalog or contact the college deans' offices for statements regarding college retention standards.

Meeting Basic Competencies. New students are required to have completed a specific number of courses in the areas of American history, English, laboratory science, mathematics, and social science. Students who are exempt from these requirements include transfer students with 36 or more transferable semester hours, students admitted by GED, and students who are 22 years of

age or older by the first day of the semester. An admitted student who needs to meet competencies in one or more of these areas must satisfy the requirement within one year of the beginning of the student's first semester at ASU. Subject competencies in each area may be met by earning a grade of "D" or higher at ASU in an appropriate course(s) as listed in the "Basic Competencies" table on page 76.

Appealing Basic Competencies. A student who has not met all basic competencies at the end of one calendar year after the student's initial date of enrollment is not permitted to continue at ASU. Each student is notified that he or she may not register or, if already registered, that the registration has been canceled.

A student wishing to appeal the dismissal should submit a petition through his or her college. The colleges have three options in reviewing these appeals:

1. extending the student's end semester to allow one additional semester to complete the required course work;
2. allowing the student to substitute a course not currently approved to fulfill a competency area when an error has been made in advising or for other just causes; or
3. denying the petition.

College actions are forwarded to the Office of the Registrar for processing.

Dean's List. Undergraduate students who earn 12 or more graded semester hours ("A," "B," "C," "D," or "E") during a semester in residence at ASU with a GPA of 3.50 or higher are eligible for the Dean's List. A notation regarding Dean's List achievement appears *only* on the final grade report available online at www.asu.edu/registrar.

Satisfactory Academic Progress. The university is required to publish and enforce standards of satisfactory academic progress for certain students (e.g., student athletes, students receiving financial aid, and students receiving veterans benefits).

Certification of satisfactory progress for student athletes is verified by the academic advisor and the dean's designee for certifying satisfactory progress.

Certification of satisfactory progress for students receiving financial aid or veterans benefits is verified by Student Financial Assistance or the Veterans Services Section respectively. Students should contact their advisors or the appropriate office for additional information on satisfactory progress requirements.

Student Academic Complaints. If a student is dissatisfied with the instruction received in a class or with the interaction with the instructor of the class, the student may pursue the following avenues in the order listed:

1. The student may discuss the complaint with the instructor of the class.
2. If the issue is not resolved at this level, the student may contact the chair of the department in which the course is offered.
3. If further discussion or appeal is needed, the student may contact the dean of the college in which the course is offered.

Probation. A student's college assumes responsibility for enforcing academic standards and may place any student on probation who has failed to maintain good standing as previously defined. For purposes of probation and retention, an individual college may set higher GPA standards. A student on academic probation is required to observe any rules or limitations the college may impose as a condition for retention.

Disqualification. A student who is placed on probation at the end of a semester is subject to disqualification by the college at the end of the following semester if the conditions imposed for retention are not met.

Disqualification is exercised at the discretion of the college and becomes effective on the first day of the semester following college action. A *disqualified student is notified by the dean of the college or the Office of the Registrar and is not allowed to register in a fall or spring semester at the university until reinstated.* A student who has been disqualified may appeal to the college standards committee. A student who is disqualified may not attend as a nondegree student.

Reinstatement. If a student with a GPA of 2.00 or greater has been disqualified by one college and seeks to transfer to another college at ASU, the student may apply at the Readmissions Section (SSV B114) or directly to the college to which the student wishes and is qualified to transfer.

To be reinstated into an ASU college other than the disqualifying college, the student must submit an application for reinstatement to the University Undergraduate Admissions Board through the Readmissions Section of the Office of the Registrar.

To be reinstated into the same college from which the student was disqualified, the student must submit an application for reinstatement to the disqualifying college. When reinstatement includes readmission, application must be made to the Readmissions Section of the Office of the Registrar.

Reinstatement Appeals. A student wishing to appeal the decision of the standards committee of a college may submit an appeal to the University Undergraduate Admissions Board. The decision of the board is final.

Academic Integrity. The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university or other sanctions as specified in the University Student Academic Integrity Policy. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities. The University Student Academic Integrity Policy is available from the Office of the Senior Vice President and Provost and from the deans of the individual colleges.

Suspension or Expulsion for Academic Dishonesty. All decisions relating to expulsion or suspension that are concerned with academic dishonesty are the sole prerogative of the dean of the school or college in which the student has been admitted. These decisions of suspension or expulsion can be appealed in accordance with established university procedures. Application for reinstatement may be made to any of the academic units within the university after the specified period of suspension. Merely having remained in

a suspended status for a period of time does not, in itself, constitute a basis for reinstatement.

Student Records

Family Educational Rights and Privacy Act of 1974

The Family Educational Rights and Privacy Act of 1974, also known as the Buckley Amendment, sets forth the requirements governing the protection of the privacy of the educational records of students who are or have been in attendance at ASU.

Definitions

Eligible Student. For the purpose of this act, an *eligible student* is defined as any individual formally admitted to and enrolled at ASU or the parents of a *dependent* eligible student. Dependency is defined by Section 152 of the Internal Revenue Code of 1954.

Record. The term *record* includes any information or data recorded in any medium, including, but not limited to, handwriting, print, tapes, film, microfilm, microfiche, and electronic means.

Types of Information

Educational Record. The term *educational record* refers to those records directly related to a student and maintained by an educational institution. Two types of educational records are subject to the provisions of this act: (1) directory information and (2) personally identifiable information. The term does not include those records specifically excluded by Section 99.3 of the privacy act.

Directory Information. The term *directory information* includes the following student information: name, local and permanent addresses, local telephone number, date and place of birth, citizenship, residency status, academic level, major field of study, college of enrollment, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student.

Personally Identifiable Information. The term *personally identifiable information* includes the name of a student's

parent or other family member(s), a personal identifier such as the student's Social Security number, a list of personal characteristics, or other information that would make the student's identity easily traceable and any information, including directory information, that the student has indicated not to be released.

Access to Records

An eligible student or a parent of a dependent eligible student may inspect and review the student's educational records. Some form of photo identification must be displayed before access to educational records is allowed.

Directory information may be released to anyone without consent of the student unless the student has indicated otherwise. Students may request that this information not be released by completing a form in the Office of the Registrar. A request to withhold this information excludes the student from being listed in the annual directory only if the request is submitted to the Office of the Registrar before the end of the third week of the fall semester.

All other educational records that contain personally identifiable information may not be released without the written consent of the student. A parent of a dependent student may challenge denial of such access by producing the most current copy of Internal Revenue Form 1040. If that form lists the student in question as a dependent, the parent is required to sign an affidavit that affirms that the student is his or her dependent. The affidavit is retained by the Office of the Registrar. Upon receipt of the affidavit, the university makes student records available to the parent for the rest of that calendar year as specified under the Buckley Amendment.

Students may grant access to parents or agencies by completing a form in the Office of the Registrar.

Location of Policy and Records

The custodian of Educational Records at ASU is the Office of the Registrar. Copies of this policy are available in the following offices: Reserve sections of Hayden Library and the Noble Science and Engineering Library, the Office of the Registrar, Undergraduate and Graduate Admissions, and Student Life. The Office of the Registrar also maintains a directory that lists all education records maintained on students by ASU.

University Graduation Requirements

UNIVERSITY REQUIREMENTS

All students enrolled in a baccalaureate degree program must fulfill the following university requirements to graduate.

Credit Requirements

A minimum of 120 semester hours is required for graduation with a baccalaureate degree. A minimum of 45 semester hours in upper-division courses is required for graduation. Some programs may require more than 45 upper-division semester hours for graduation; refer to college graduation requirements for the specific number required.

Not more than 60 semester hours in independent learning courses and/or earned by comprehensive examination (including AP, CLEP, and IB exams) are accepted for credit toward the baccalaureate degree.

Grade Point Requirement

A minimum cumulative grade point average (GPA) of 2.00 for all courses taken at ASU is required to graduate with a baccalaureate degree.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 semester hours of approved course work in General Studies, as described on pages 84–87. General Studies courses are listed on pages 87–108, in the course descriptions, in the *Schedules of Classes*, and in the *Summer Sessions Bulletin*.

Students transferring from Arizona community colleges with the Transfer General Education Core Curriculum (TGECC) have met all lower-division General Studies requirements.

First-Year Composition Requirement

Completion of both ENG 101 and 102 or ENG 105 with a grade of “C” or higher is required for graduation from ASU in any baccalaureate program (see pages 81–82). International students from non-English-speaking countries may meet the First-Year Composition requirement by completing ENG 107 and 108 with a grade of “C” or higher.

New or Transfer Students. Before new students or transfer students can register for the first time at ASU, they must determine what courses to take to

complete the university First-Year Composition requirement; the students must then enroll immediately in composition courses and continue to do so every term until composition requirements are met. *College offices may grant waivers to the immediate and continual enrollment requirement when there are scheduling conflicts detrimental to the student’s academic progress.* Transfer students from other Arizona colleges or universities can determine the acceptability of their composition courses by referring to the most recent Arizona Commission for Postsecondary Education *Course Equivalency Guide* in consultation with an academic advisor. Composition courses transferred from out-of-state institutions must be evaluated and approved by advisors specifically designated for this purpose by the dean of each college.

The transfer student must file an application in the student’s college for Equivalency of First-Year Composition Requirements, along with a transcript and catalog descriptions of the composition courses to be transferred. The application, available in each college, should be filed immediately upon transfer of course work to ASU so that the student is able to enroll in an additional composition course, if required to do so.

For more information, the student should go to the appropriate college or school listed in the “Academic Advising” table on page 70. Refer to “Building Abbreviations,” page 549, for more information.

Resident Credit Requirement

Resident credit refers to a course that is offered in a regular semester, winter session, intersession, or summer session. Credit earned through comprehensive examinations is also included when calculating ASU resident hours. Credit earned through independent learning, advanced placement, the College-Level Examination Program, or an International Baccalaureate Diploma/Certificate (as described on page 67) are excluded when calculating ASU resident hours.

Campus Resident Credit Requirement. Every candidate for the baccalaureate degree is required to earn a minimum of 30 semester hours in resident credit courses at the ASU campus from which the student will graduate.

Guidelines for Determination of Catalog Year

The *General Catalog* is published annually. Department, division, school, college, and university requirements may change and are upgraded often. In determining graduation requirements, an undergraduate student may use only one edition of the *General Catalog* but may elect to follow any subsequent catalog. Students maintaining continuous enrollment at any public Arizona community college or university may graduate according to the requirements of the catalog in effect at the time of initial enrollment or according to the requirements of any single catalog in effect during subsequent terms of continuous enrollment. Students may maintain continuous enrollment whether attending a single public community college or university in Arizona or transferring among public institutions in Arizona while pursuing their degrees.

Students transferring among Arizona public higher education institutions must meet the admission, residency, and all curricular and academic requirements of the degree-granting institution.

1. A semester in which a student earns course credit is counted toward *continuous* enrollment. Non-credit courses, audited courses, failed courses, or courses from which the student withdraws do not count toward the determination of *continuous* enrollment for catalog

Continuous Enrollment—Example A

Student's Activity	Semester/Year	Status
Admitted and earned course credit at an Arizona community college	Fall 1998	Active
Continued at an Arizona community college	Spring 1999 Fall 1999	Active
Transferred to an Arizona university	Spring 2000	Student enrolled under 1998–99 or any subsequent catalog

Continuous Enrollment—Example B

Student's Activity	Semester/Year	Status
Admitted and earned course credit at an Arizona community college	Fall 1996	Active
Enrolled but earned all "Ws," or "Es"	Spring 1997	Inactive
Enrolled in audit courses only	Fall 1997	Inactive
Nonattendance	Spring 1998	Inactive
Transferred to an Arizona university	Fall 1998	Student enrolled under 1998–99 or any subsequent catalog

Continuous Enrollment—Example C

Student's Activity	Semester/Year	Status
Admitted and earned course credit at an Arizona community college	Fall 1996	Active
Nonattendance	Spring 1997 Fall 1997 Spring 1998	Inactive
Readmitted and earned course credit at an Arizona community college	Fall 1998	Active
Transferred to an Arizona university	Spring 1999	Student enrolled under 1998–99 or any subsequent catalog

Continuous Enrollment—Example D

Student's Activity	Semester/Year	Status
Admitted and earned course credit at an Arizona community college	Fall 1996	Active
Nonattendance	Spring 1997	Inactive
Readmitted and earned course credit at an Arizona community college	Summer 1997	Active
Nonattendance	Fall 1997 Spring 1998	Inactive
Transferred to an Arizona university	Fall 1998	Student enrolled under 1996–98 or any subsequent catalog

Continuous Enrollment—Example E

Student's Activity	Semester/Year	Status
Admitted and earned course credit at an Arizona community college	Summer 1996	Active
Continued at an Arizona community college	Fall 1996 Spring 1997	Active
Nonattendance	Fall 1997	Inactive
Readmitted and earned course credit at an Arizona community college	Spring 1998	Active
Transferred to an Arizona university	Summer 1998	Student enrolled under 1996–98 or any subsequent catalog

purposes. See the “Continuous Enrollment—Example A” and “Continuous Enrollment—Example B” tables.

- Students who do not meet the minimum enrollment standard stipulated in number 1 during three consecutive semesters (fall/spring/fall or spring/fall/spring) and the intervening summer term* at any public Arizona community college or university are no longer considered continuously enrolled. These students must meet requirements of the public Arizona community college or university catalog in effect at the time they are readmitted or of any single catalog in effect during subsequent terms of *continuous* enrollment after readmission. See the “Continuous Enrollment—Example C” and “Continuous Enrollment—Example D” tables.
- Students admitted or readmitted to a public Arizona community college or university during a summer term must follow the requirements of the catalog in effect the following fall semester or of any single catalog in effect during subsequent terms of *continuous* enrollment. See the “Continuous Enrollment—Example E” table.
- In areas of study in which the subject matter changes rapidly, material in courses taken long before graduation may become obsolete or irrelevant. Course work that is

more than eight years old is applicable to completion of degree requirements at the discretion of the student's major department. Departments may accept such course work, reject it, or request that the student revalidate its substance. The eight-year limit on course work applies except when program accreditation agencies limit the life of course work to fewer than eight years. Departments may also require students to satisfy current major requirements rather than major requirements in earlier catalogs, when completing earlier requirements is no longer possible or educationally sound.

- Enrollment by Arizona community college students in nontransferable courses still constitutes enrollment for purposes of determining whether the student has been continuously enrolled. For example, if a student takes two semesters of cooperative education classes, which are not transferable to the university but constitute *continuous* enrollment at the community college, the university should consider it *continuous* enrollment.
- Exceptions made by an institution apply only to the institution that made the exception. For example, if the community college departments accepted credit that was more than eight years old, the university department to which the student transfers has the right and the obligation to reevaluate any credit more than eight years old.

Inquiries about these guidelines may be directed to the student's academic advisor.

* Students are not obligated to enroll and earn course credit during summer terms, but summer enrollment may be used to maintain continuous enrollment status.

Declaration of Graduation

Students following the curriculum requirements of the 1996–98 or later catalog editions may be eligible to file a Declaration of Graduation using the Degree Audit Reporting System (DARS).

DARS is an automated process that matches courses a student has completed with the requirements of a particular academic degree program, resulting in a report that shows the student which requirements are satisfied and which requirements remain to be fulfilled, thus providing a guide for efficient selection of courses toward graduation. For example, a Biology major would request a Degree Audit Report that would show how his or her completed ASU and transfer course work would apply to the biology degree program.

A student must review his or her degree audit with the academic advisor and submit a Declaration of Graduation within the semester he or she earns the 87th semester hour. Students who have not met the above requirement are prevented from further registration.

Students following the curriculum requirements of the 1994–96 or earlier catalog editions, plus selected students following later catalogs, will follow the Program of Study requirement instead of the Declaration of Graduation. Inquiries about whether to follow the Declaration of Graduation procedure or the Program of Study procedure may be directed to the academic advisor.

Program of Study Requirements

A student following the curriculum requirements of the 1994–96 or earlier catalog editions, plus selected students following later editions, must file an Undergraduate Program of Study for graduation within the semester the student earns his or her 87th semester hour. The Program of Study guides the student in accomplishing successful completion of degree requirements in a timely manner. Students who have not met the above requirement are prevented from further registration.

Program of Study forms and procedural information are available from the Graduation Section at SSV B113A, at any registrar site, or online at www.asu.edu/registrar/forms.

Application for Graduation Requirements

The following steps are required to complete the graduation process:

1. Register for the final semester.
2. Pay the graduation fee at Cashiering Services. Note the deadline date listed in the "University Calendar," pages 12–14.
3. Submit the fee receipt to the Graduation Section, SSV B113A, and apply for graduation. The Degree Audit Report or Program of Study is reviewed at this time and the graduation date and eligibility to graduate are verified.
4. Complete all course work listed on the Degree Audit Report or Program of Study by graduation date.

For more information about application for graduation requirements at ASU West, contact ASU West Admissions and Records, UCB 120.

Students must comply with the above requirements to graduate.

The Application for Graduation along with the Degree Audit Report or Program of Study is reviewed to verify graduation eligibility.

Petition for Variance from Degree

Any student wishing to have a college or university degree requirement variance must petition the standards committee of the college in which the student is enrolled. In addition, variance from university degree requirements must be approved by the Main Campus Standards Committee.

All petitions must originate with the student's advisor. Refer to the college sections of this catalog for college and department requirements.

Main Campus Standards Committee.

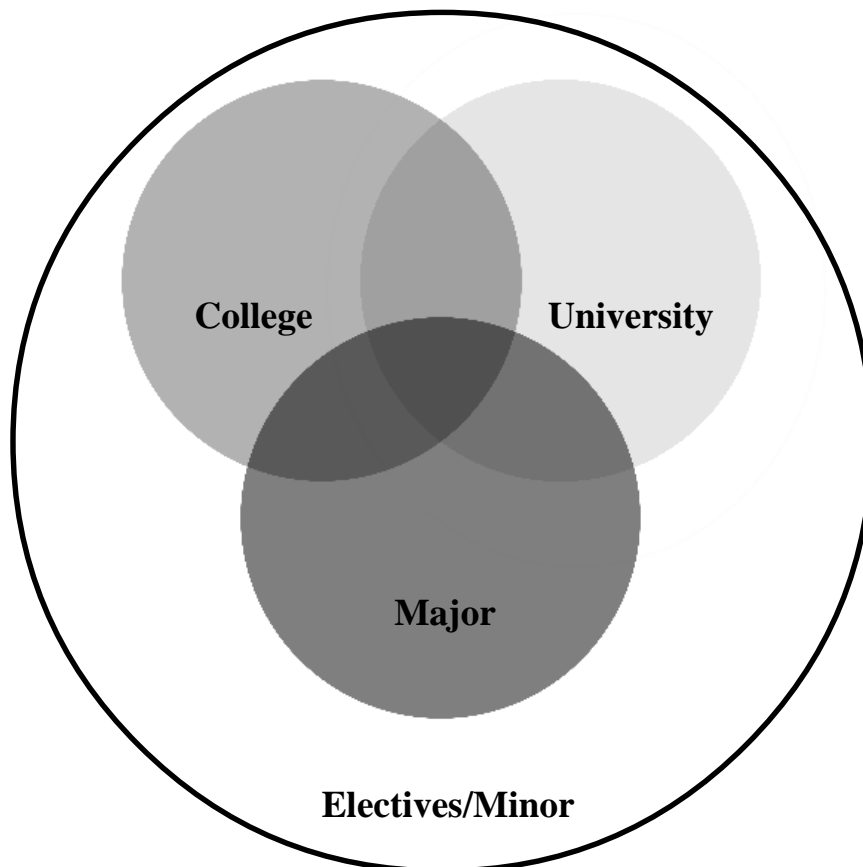
This committee advises the Office of the Senior Vice President and Provost regarding undergraduate student petitions that concern university-wide academic requirements. These requirements include but are not limited to

requirements on the amount of transfer credit, graduation requirements, limits on credit by examination, and requirements for a second baccalaureate degree (see page 83). To petition for a variance from such university requirements, the normal department, division, school, and college forms and procedures are used. Only petitions that have been denied at the college level are forwarded to the Main Campus Standards Committee.

OTHER REQUIREMENTS

The separate units of the university, such as colleges, schools, and departments, have specific requirements for graduation that must be satisfied for a baccalaureate degree. For those requirements, see the appropriate *General Catalog* section. Students are encouraged to consult with an academic advisor in planning a program to ensure that it meets the various requirements. A well-planned program may enable a student to concurrently satisfy a portion

Graduation Requirements Venn Diagram



of the General Studies requirement together with a portion of a college or major requirement.

OVERVIEW OF GRADUATION REQUIREMENTS

At ASU, students take classes that fulfill four types of requirements. As illustrated in the “Graduation Requirements Venn Diagram” on page 82, some courses can fulfill two or more types of requirements, but other courses fulfill only one requirement. The total semester hours needed to graduate are represented by the largest circle. The university minimum is 120 semester hours. Some majors, however, require more than 120 semester hours.

Although the three shaded circles are equal in size and the white circle is larger than all three, the total number of semester hours for each type of requirement may vary.

University Requirements. The light gray circle represents university requirements. The General Studies requirement and the First-Year Composition requirement are among the university requirements, described below. For General Studies, a minimum of 35 semester hours in five core and three awareness areas is required. For more information, see pages 84–108.

College Requirements. The medium gray circle represents college requirements. Some colleges and schools have additional requirements, especially the College of Liberal Arts and Sciences. It is important that you understand the requirements of your college.

Major. The dark gray circle represents the requirements of the major. The semester hours required for a major may be as low as 30 hours or as high as 63 hours.

Electives/Minor. The white circle represents electives and the requirements of a minor. A minor typically adds an additional 18 to 25 semester hours. Though every student must eventually declare a major, a minor is not required. For more information on minors, see page 110. Some courses, while providing semester hours toward graduation, fall outside the shaded circles and are not required in your program for graduation. These courses are electives. Some majors leave no room for electives within the minimum 120 semester hours required to graduate.

General Graduation Information

Graduation with Academic Recognition. An undergraduate student must have completed at least 60 semester hours of resident credit at ASU to qualify for graduation with academic recognition for a baccalaureate degree.

Cumulative GPA	Academic Recognition
3.40–3.59	<i>cum laude</i>
3.60–3.79	<i>magna cum laude</i>
3.80–4.00	<i>summa cum laude</i>

The cumulative GPA for these designations is based on only ASU resident course work. For example, ASU independent learning course grades are not calculated in the honors GPA. All designations of graduation with academic recognition are indicated on the diploma and the ASU transcript. Graduation with academic recognition applies only to undergraduate degrees.

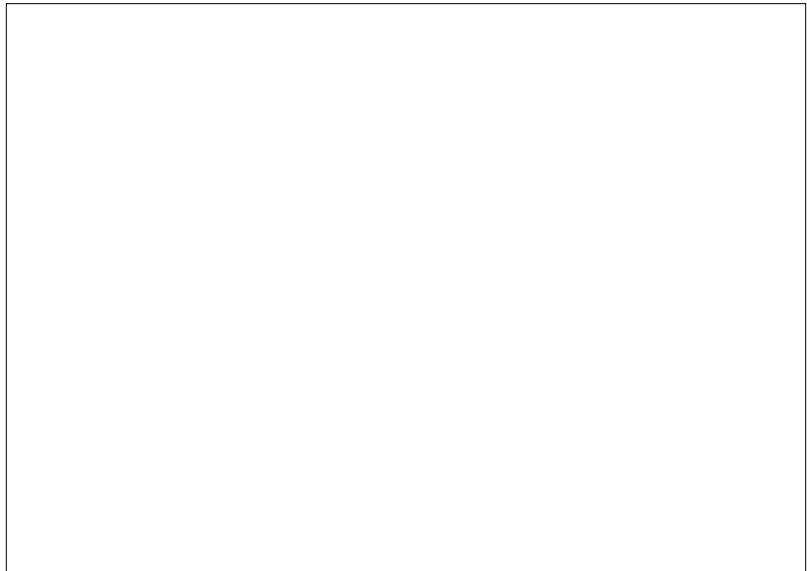
A student who has a baccalaureate degree from ASU and is pursuing a second baccalaureate degree at ASU (with a minimum of 30 hours of resident credit) is granted academic recognition on the second degree based on the semester hours earned subsequent to the posting of the first degree. If fewer than 60 semester hours are completed at ASU subsequent to completion of the first ASU degree, the level

of academic recognition can be no higher than that obtained on the first degree. If 60 or more semester hours are completed at ASU after completion of the first ASU degree, the level of academic recognition is based on the GPA earned for the second ASU degree. Inquiries about graduation with academic recognition may be directed to the Graduation Section, 602/965–3256.

Second Baccalaureate Degree. The student seeking a second baccalaureate degree must meet admission criteria for that degree. After conferral of the first degree, a minimum of 30 semester hours in resident credit must be successfully completed at the ASU campus from which the second baccalaureate degree will be awarded. The student must meet all degree and university requirements of the second degree.

Concurrent Degrees. More than one baccalaureate degree may be pursued concurrently if prior approval is given by the standards committee(s) of the college(s) offering the degrees. Students may receive concurrent degrees if they meet the minimum requirements for both degrees.

Graduate Degrees. See the “Graduate College” and “College of Law” sections for graduate degrees offered and statements of requirements for graduate degrees. A *Graduate Catalog* may be obtained from the Graduate College.



The celebration begins for Cristina Francese, School of Social Work graduate, as bachelor's degrees are conferred during spring commencement. Tim Trumble photo

General Studies

All undergraduate students must fulfill the General Studies requirement.

General Studies is based on four principles. The first is the distinction between skill and knowledge—the instrumental skills by means of which knowledge is acquired and communicated and the knowledge itself in the sense of fact, information, or conclusions. Second is the distinction between skill in the use of language and skill in the use of figures—literacy and numeracy. Third is the conventional division of knowledge into the humanities, the social sciences, and the natural sciences. And fourth is the concept of the university graduate as a person who is not only prepared for advanced study or a particular profession, but also is amply prepared to lead a constructive and satisfying personal, social, and civic or political life. This principle implies a commonality of knowledge (that is, knowledge shared with others), skill in learning and in communicating with others, and a diversity of learning that frees the person to enjoy the diversity of human potentiality. In addition to the four principles, the program recognizes the value of sustained experience in the acquisition of a skill or the mastery of a body of knowledge, the increasing importance of literacy and numeracy skills because of the rapid growth of modern knowledge, the utility of historical perspective, and the internationalization of modern life.

The General Studies Program consists of *five core areas* and *three awareness areas*. The core areas are as follows:

1. literacy and critical inquiry (L1 and L2);
2. numeracy (N1, N2, N3);
3. humanities and fine arts (HU);
4. social and behavioral sciences (SB); and
5. natural sciences (S1 and S2).

These areas provide training in basic academic skills and assure that students are introduced to the traditional branches of knowledge.

The *three awareness areas* are as follows:

1. cultural diversity in the United States (C);
2. global awareness (G); and
3. historical awareness (H).

These areas contribute to the development of an international perspective, foster an understanding of current human events by study of the past, and promote appreciation of cultural diversity within the contemporary United States.

The courses approved by the ASU Main General Studies Council (for ASU Main and ASU East) for meeting the General Studies requirement are noted in the *General Catalog* following this section, in the course descriptions, and in the *Schedule of Classes* each academic term. The courses approved by the ASU West General Studies Council can be found in the *ASU West Catalog* and in the *Schedule of Classes*.

General Studies Requirement

All students enrolled in a baccalaureate degree program must successfully complete a minimum of 35 semester hours of approved General Studies courses. The required distribution of General Studies courses among the core areas and awareness areas is described below. It is important to note that 35 semester hours must be taken in the five core areas. Students also must take courses that satisfy each of the three awareness areas. Note, however, that the awareness area requirement does not mean that the student must exceed 35 hours. Many courses concurrently satisfy a core requirement and an awareness area requirement.

The following conditions apply in taking courses to satisfy the General Studies requirement:

1. a course may satisfy a core and an awareness area requirement concurrently;
2. a course may not be used to concurrently satisfy requirements in two core areas, even if it is approved for more than one core area; and
3. a course may be used to concurrently satisfy requirements in two awareness areas, if it is approved for those areas.

There is no limit to the number of advanced placement (AP) or CLEP credits that can be used to meet the General Studies requirement (see pages 66–67). However, the natural sciences (S1 and S2) and literacy and critical inquiry (L1 and L2) portions of the Gen-

eral Studies requirement are not satisfied by CLEP.

First-Year Composition is a university requirement of all students that is separate from and in addition to General Studies.

Transfer Credit

Students transferring from Arizona community colleges with the Transfer General Education Core Curriculum (TGECC) have met all lower-division portions of the General Studies requirement. Students transferring from other approved institutions of higher education ordinarily are given General Studies credit, hour for hour, for work done in those institutions insofar as it is equivalent in content to General Studies courses at this university.

College and School Requirements

Colleges and schools may require their students to take specific courses to satisfy the General Studies requirement. In some instances, the number of semester hours exceeds the minimum 35 semester hours because of the required college or school courses.

Also, colleges and schools can define requirements that go beyond the General Studies requirement and require additional courses. Those colleges and schools can designate specific General Studies-approved courses that students must take to satisfy college or school requirements.

Students are encouraged to consult with an academic advisor in planning a program to ensure that it meets the various requirements. A well-planned program may enable a student to concurrently satisfy requirements at the university, college or school, and department levels.

CORE AREAS

Literacy and Critical Inquiry (L1 and L2)

Literacy is here defined broadly as communicative competence in written and oral discourse; critical inquiry is defined as the gathering, interpretation, and evaluation of evidence. Building on the proficiency attained in traditional freshman composition courses, the literacy and critical inquiry requirements help students sustain and extend their ability to reason critically and communicate clearly through language. Thus, the literacy and critical inquiry requirement stipulates a sequence of

two courses beyond First-Year Composition.

Requirement. Six semester hours are required. One L1 course is required, typically at the sophomore level, in which students learn how to gather, interpret, and evaluate evidence and to express their findings in writing or speech. This course includes a series of formal, graded, and written or spoken assignments. The L1 course is preferably taken after completion of the First-Year Composition requirement. Completion of one semester of First-Year Composition is required.

One L2 upper-division course is required with advanced subject-matter and rigorous critical-writing assignments. The course should be taken in the student's major discipline and may also count toward the major.

Numeracy (N1, N2, and N3)

The numeracy requirement is intended to ensure that students have skill in basic mathematics, can use mathematical analysis in their chosen fields, and can understand how computers can make mathematical analysis more powerful and efficient. Numeracy thus has three components. First, the acquisition of essential skill in basic mathematics requires the student to complete a course in college algebra or to demonstrate a higher level of skill by completing a course for which college algebra is a prerequisite. The second component, the real-world application of mathematical reasoning, requires the student to take a course in the use of quantitative analysis to solve problems of substance. Many students may use courses in statistics to satisfy this requirement. The third component of numeracy requires use of the computer to assist in serious analytical work. Computers are widely used to study the implications of social decisions or to model physical systems, and computer modeling courses are available in many major programs.

Requirement. Six semester hours are required. *One course must be selected from the mathematics category; a second course must be selected from either of the remaining two categories listed below.* However, if competence is demonstrated in college algebra by passing an exemption examination, six semester hours are still required, and one course in the mathematics category

that has College Algebra as a prerequisite may be selected, or all six semester hours may be taken in one or both of the two remaining categories.

1. *Mathematics.* A course in college mathematics (i.e., MAT 114), college algebra (i.e., MAT 117), precalculus (i.e., MAT 170), or any other mathematics course for which college algebra is a prerequisite fits this category.
2. *Statistics and Quantitative Reasoning.* Courses that emphasize the use of statistics or other mathematical methods in the interpretation of data and in describing and understanding quantitative relationships fit this category. The course selected can be taken in the student's major discipline and can count toward the major's semester-hour requirements.
3. *Computer Applications.* Courses that involve the use of computer programming languages or software in the development of skills in analytical thinking fit this category. The course selected can be taken in the student's major discipline and can count toward the major's semester-hour requirements.

Humanities and Fine Arts (HU)

The humanities are concerned with questions of human existence and the universality of human life, questions of meaning and the nature of thinking and knowing, and questions of moral, aesthetic, and other human values. The humanities investigate these questions in both the present and the past and make use of philosophy, foreign languages, linguistics and communication studies, religious studies, literature, and fine arts. The fine arts constitute the artist's creative deliberation about reality, meaning, knowledge, and values. The humanities and fine arts core area enables students to broaden and deepen their consideration of basic human values and their interpretation of the experiences of human beings.

Requirement. See "Combined Requirement" on page 86.

Social and Behavioral Sciences (SB)

The social and behavioral sciences provide scientific methods of inquiry and empirical knowledge about human behavior, both within society and individually. The forms of study may be

cultural, economic, geographic, historical, linguistic, political, psychological, or social. The courses in this area address the challenge of understanding the diverse natures of individuals and cultural groups who live together in a world of diminishing economic, linguistic, military, political, and social distance.

Combined Requirement. *A total of 15 semester hours must be completed in the following two core areas: (1) social and behavioral sciences and (2) humanities and fine arts. Four conditions must be satisfied:*

1. A minimum of six semester hours must be taken in one core area and nine hours in the other core area.
2. At least one course within the 15 semester hours must be at the upper-division level.
3. Two courses from the same department in either core area are required.
4. Courses from at least two departments in either core area must be taken.

Natural Sciences (S1 and S2)

Courses in the natural sciences core area help the student to develop an appreciation of the scope and limitations of scientific capability to contribute to the quality of society. Knowledge of methods of scientific inquiry and mastery of basic scientific principles and concepts, in particular those that relate to matter and energy in living and non-living systems, are stressed. Firsthand exposure to scientific phenomena in the laboratory is important in developing and understanding the concepts, principles, and vocabulary of science. At least one of the two laboratory courses required in the natural sciences core area must include an introduction to the fundamental behavior of matter and energy in physical or biological systems.

Requirement. Eight semester hours are required. *One laboratory course in the natural sciences* that includes a *substantial* introduction to the fundamental behavior of matter and energy in physical or biological systems is required.

A second laboratory course in the natural sciences selected, for example, from anthropology, astronomy, biology, chemistry, experimental psychology, geology, microbiology, physical anthropology, physical geography, physics, or plant biology is required.

AWARENESS AREAS

Students must complete courses that satisfy each of the three awareness areas. Courses that are listed for a core and an awareness area may satisfy both requirements concurrently, as may courses that are listed for more than one awareness area.

Cultural Diversity in the United States (C)

The contemporary “culture” of the United States involves the complex interplay of many different cultures that exist side by side in various states of harmony and conflict. The U.S. history involves the experiences not only of different groups of European immigrants and their descendants, but also of diverse groups of American Indians, Hispanic Americans, African Americans, and Asian Americans—all of whom played significant roles in the development of contemporary culture and together shape the future of the United States. At the same time, the recognition that gender, class, and religious differences cut across all distinctions of race and ethnicity offers an even richer variety of perspectives from which to view oneself. Awareness of cultural diversity and its multiple sources can illuminate the collective past, present, and future and can help to achieve greater mutual understanding and respect.

The objective of the cultural diversity requirement is to promote awareness and appreciation of cultural diversity within the contemporary United States. This is accomplished through the study of the cultural, social, or scientific contributions of women and minority groups, examination of their experiences in the United States, or exploration of successful or unsuccessful interactions between and among cultural groups.

Global Awareness (G)

Human organizations and relationships have evolved from being family and village centered to the modern global interdependence that is apparent in many disciplines—for example, contemporary art, business, engineering, music, and the natural and social sciences. Many serious local and national problems are world issues and require solutions that exhibit mutuality and reciprocity. These problems occur in a wide variety of activities, such as food

supply, ecology, health care delivery, language planning, information exchange, economic and social developments, law, technology transfer, and even philosophy and the arts. The global awareness area recognizes the need for an understanding of the values, elements, and social processes of cultures other than the culture of the United States. The global awareness area includes courses that recognize the nature of other contemporary cultures and the relationship of the American cultural system to generic human goals and welfare.

Courses that meet the requirement in global awareness are of one or more of the following types:

1. area studies that are concerned with an examination of culture-specific elements of a region of the world;
2. the study of a non-English language;
3. studies of international relationships, particularly those in which cultural change is facilitated by such factors as social and economic development, education, and the transfer of technology; and
4. studies of cultural interrelationships of global scope such as the global interdependence produced by problems of world ecology.

Historical Awareness (H)

The historical awareness area aims to develop a knowledge of the past that can be useful in shaping the present and future. Because historical forces and traditions have created modern life and lie just beneath its surface, historical awareness is an aid in the analysis of present-day problems. Also, because the historical past is a source of social and national identity, historical study can produce intercultural understanding by tracing cultural differences to their origins in the past. Even the remote past may have instructive analogies for the present.

The historical awareness area consists of courses that are historical in method and content. In this area, the term “history” designates a sequence of past events or a narrative whose intent or effect is to represent such a sequence. The requirement presumes that these are human events and that history includes all that has been felt, thought, imagined, said, and done by human beings. History is present in the lan-

guages, art, music, literature, philosophy, religion, and the natural sciences, as well as in the social science traditionally called history.

GENERAL STUDIES COURSES

The following ASU Main and ASU East General Studies courses satisfy the requirements of the five core areas and three awareness areas. General Studies courses are regularly reviewed. Since courses are occasionally added to and deleted from the list, students should always consult the *Schedule of Classes* each semester to see which courses currently meet the General Studies requirement.

A student receives the General Studies credit a course carries in the semester in which the course is taken, with one exception: *a course listed on an approved program of study but subsequently deleted from the General Studies list retains the General Studies credit it carried when the program of study was approved.*

Under each core and awareness area, courses are presented alphabetically by

course prefix. The course prefix is followed by course number and course title. The number in parentheses following the course title indicates the semester hours of credit. The letter following the semester hours of credit indicates when the course will be offered. See “Key to Course Listing Codes” on page 57.

The table, “Key to General Studies Credit Abbreviations,” identifies which requirement(s) the course meets. This key is also used in the *Schedule of Classes*. General Studies courses are also identified following course descriptions.

The campus codes “M” (for ASU Main) and “W” (for ASU West) identify the campus that maintains academic control over the course (i.e., course content, registration restrictions, General Studies designations, and other curricular matters). ASU East courses are listed under the “M” campus code. The campus code is not used in the catalogs but appears in the *Schedule of Classes*, on transcripts, and other enrollment and registration records.

Key to General Studies Credit Abbreviations

Code	Description
L1	Literacy and critical inquiry core courses (intermediate level)
L2	Literacy and critical inquiry core courses (upper division)
N1	Numeracy core courses (mathematics)
N2	Numeracy core courses (statistics and quantitative reasoning)
N3	Numeracy core courses (computer applications)
HU	Humanities and fine arts core courses
SB	Social and behavioral sciences core courses
S1	Natural sciences core courses (introductory)
S2	Natural sciences core courses (additional courses)
C	Cultural diversity in the United States courses
G	Global awareness courses
H	Historical awareness courses
/	or
,	and

General Studies Courses

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
—	493 Honors Thesis. (3–6) F, S, SS (See description on page 101. Only three semester hours may fulfill L2 requirement.)		L2										
ACC	330 Accounting Information Systems. (4) F, S, SS	L1											
	430 Taxes and Business Decisions. (4) F, S, SS		L2										
AES	301 Air Force Leadership and Management I. (3) F		L2										
	303 Air Force Leadership and Management II. (3) S		L2										
	401 Preparation for Active Duty I. (3) F		L2										
AGB	250 World Food Dynamics. (3) S											G	
	258 International Agribusiness. (3) F											G	
	444 Agribusiness Analysis. (3) S		L2										
	450 International Agricultural Development. (3) S											G	
	453 World Agricultural Resources. (3) SS											G	
AMT	308 Air Transportation. (3) F											G	
ANP	236 Introduction to Computer Modeling. (3) F, S (Cross-listed as DSC/PUP 236.)					N3							
APH	100 Introduction to Environmental Design. (3) F, S, SS (Cross-listed as DSC/PUP 100.)						HU					G	H
	200 Introduction to Architecture. (3) F						HU					G	
	300 World Architecture I/Western Cultures. (3) F						HU					G	H
	301 World Architecture II/Eastern Cultures. (3) S											G	
	304 American Architecture. (3) N						HU						
	305 Contemporary Architecture. (3) N						HU						
	313 History of Western Architecture I. (3) F		L2				HU						
	314 History of Western Architecture II. (3) S		L2				HU						

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	485	Women in the Visual Arts. (3) S	L2										
ART	444	Computer Art I. (3) F, S				N3							
	446	Computer Art II. (3) A				N3							
ASB	102	Introduction to Cultural and Social Anthropology. (3) F, S						SB				G	
	202	Ethnic Relations in the United States. (3) F, S									C		H
	211	Women in Other Cultures. (3) N										G	
	222	Buried Cities and Lost Tribes: Our Human Heritage. (3) S					HU						
	231	Archaeological Field Methods. (4) S								S2			
	240	Introduction to Southeast Asia. (3) F (Cross-listed as GCU/HIS/POS/REL 240.)										G	
	242	Asian American Experiences: An Anthropological Perspective. (3) F	L1								C		
	250	Anthropology Topics. (3) S	L1										
	302	Ethnographic Field Study in Mexico. (3) SS	L1					SB				G	
	311	Principles of Social Anthropology. (3) S						SB					
	321	Indians of the Southwest. (3) S	L2					SB			C		H
	322	Indians of Mesoamerica. (3) S						SB				G	
	323	Indians of Latin America. (3) F						SB				G	
	324	Peoples of the Pacific. (3) N										G	
	325	Peoples of Southeast Asia. (3) F										G	
	326	Human Impacts on Ancient Environments. (3) S						SB					H
	330	Principles of Archaeology. (3) F, S						SB					
	333	New World Prehistory. (3) F	L2					SB					
	335	Prehistory of the Southwest. (3) F, S						SB			C		H
	337	Pre-Hispanic Civilization of Middle America. (3) S											H
	351	Psychological Anthropology. (3) S						SB					
	353	Death and Dying in Cross-Cultural Perspective. (4) F					HU	SB				G	
	355	Shamanism, Healing, and Consciousness. (3) S					HU	SB					
	361	Old World Prehistory I. (3) F											H
	362	Old World Prehistory II. (3) S											H
	383	Linguistic Theory: Phonetics and Phonology. (4) F						SB					
	400	Cultural Factors in International Business. (3) S (Cross-listed as IBS 400.)										G	
	412	History of Anthropology. (3) F	L2					SB					
	416	Economic Anthropology. (3) F	L2					SB					
	462	Medical Anthropology: Culture and Health. (3) F 1998									C		
	471	Introduction to Museums. (3) F	L2										
	480	Introduction to Linguistics. (3) F						SB					
	481	Language and Culture. (3) S						SB					
	483	Sociolinguistics and the Ethnography of Communication. (3) N						SB					
ASE	485	Engineering Statistics. (3) F, S, SS				N2							
ASM	101	Human Origins and the Development of Culture. (3) F, S						SB					
	301	Peopling of the World. (3) S						SB					
	342	Human Biological Variation. (4) S								S2			
	344	Fossil Hominids. (3) N											H
	348	Social Issues in Human Genetics. (3) S						SB					
	452	Dental Anthropology. (4) F								S2			
	455	Primate Behavior Laboratory. (3) N	L2										
AST	111	Introduction to Solar Systems Astronomy. (3) F (Both AST 111 and 113 must be taken to secure S1 or S2 credit.)								S1 . S2			

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
112	Introduction to Stars, Galaxies, and Cosmology. (3) S (Both AST 112 and 114 must be taken to secure S1 or S2 credit.)								S1	S2			
113	Astronomy Laboratory I. (1) F (Both AST 111 and 113 or AST 113 and 321 must be taken to secure S1 or S2 credit.)								S1	S2			
114	Astronomy Laboratory II. (1) S (Both AST 112 and 114 or AST 114 and 322 must be taken to secure S1 or S2 credit.)								S1	S2			
321	Introduction to Planetary and Stellar Astrophysics. (3) F (Both AST 113 and 321 must be taken to secure S1 or S2 credit.)								S1	S2			
322	Introduction to Galactic and Extragalactic Astrophysics. (3) S (Both AST 114 and 322 must be taken to secure S1 or S2 credit.)								S1	S2			
BIO	100 The Living World. (4) F, S, SS								S1	S2			
	120 Human Physiology. (4) F, S									S2			
	181 General Biology. (4) F, S, SS								S1	S2			
	182 General Biology. (4) F, S, SS									S2			
	193 The Nature of Biological Science. (4) F								S1	S2			
	201 Human Anatomy and Physiology I. (4) F, S, SS									S2			
	241 Human Genetics. (4) F									S2			
	302 Cancer and Heart Disease. (3) F		L2										
	303 Radiation and Life. (3) S		L2										
	304 Radiation Medicine and Biology. (3) F		L2										
	316 History of Biology: Conflicts and Controversies. (3) N (Cross-listed as HPS 330.)												H
	318 History of Medicine. (3) N (Cross-listed as HPS 331.)												H
	319 Environmental Science (Nonmajor). (3) F (Cross-listed as PLB 320.)											G	
	321 Introductory Ecology Laboratory. (3) S		L2										
	406 Computer Applications in Biology. (3) F (Cross-listed as PLB 432.)					N3							
	410 Techniques in Wildlife Conservation Biology. (3) F		L2										
	415 Biometry. (4) F					N2							
	416 Professional Values in Science. (2-3) A (Cross-listed as HPS 410.)		L2										
	426 Limnology. (4) S		L2										
	428 Biogeography. (3) F		L2										
	435 Research Techniques in Animal Behavior. (3) S 1999		L2										
	446 Principles of Human Genetics. (3) A		L2										
	470 Systematic Zoology. (4) S 1999		L2										
BIS	402 Senior Seminar. (3) F, S, SS		L2										
BME	201 Introduction to Bioengineering. (3) F (Cross-listed as STE 201.)		L1										
	202 Global Awareness Within Biomedical Engineering Design. (3) F		L1				HU						
	413 Biomedical Instrumentation. (3) F		L2										
	423 Biomedical Instrumentation Laboratory. (1) F		L2										
BUS	301 Fundamentals of Management Communication. (3) F, S, SS		L1										
	451 Business Research Methods. (3) N		L2										
CCS	101 Introduction to Chicana and Chicano Studies. (3) F										C		
	111 Introduction to Chicana and Chicano Culture. (3) S										C		
	300 Chicana and Chicano Culture and Society. (3) F										C		
CDE	232 Human Development. (3) F, S							SB					
	430 Infant/Toddler Development in the Family. (3) F							SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	230	Small Group Communication. (3) F, S, SS						SB					
	241	Introduction to Oral Interpretation. (3) F, S, SS	L1				HU						
	250	Introduction to Organizational Communication. (3) F, S, SS						SB					
	263	Elements of Intercultural Communication. (3) F, S, SS						SB			C	G	
	308	Empirical Research Methods in Communication. (3) F, S, SS	L2										
	316	Gender and Communication. (3) F, S						SB			C		
	319	Persuasion and Social Influence. (3) F, S, SS						SB					
	320	Communication and Consumerism. (3) A						SB					
	321	Rhetorical Theory and Research. (3) F, S	L2				HU						H
	323	Communication Approaches to Popular Culture. (3) F, S, SS									C		
	325	Advanced Public Speaking. (3) F, S	L1										
	344	Performance of Oral Traditions. (3) N					HU				C		
	357	Communication Technology and Information Diffusion. (3) F						SB					
	371	Language, Culture, and Communication. (3) F, S						SB			C	G	
	410	Interpersonal Communication Theory and Research. (3) F, S, SS						SB					
	411	Communication in the Family. (3) A						SB					
	421	Rhetoric of Social Issues. (3) F, S					HU						
	426	Political Communication. (3) F						SB					
	441	Performance Studies. (3) F, S, SS					HU						
	445	Narrative Performance. (3) N					HU						
	446	Interpretation of Literature Written by Women. (3) N					HU				C		
	450	Theory and Research in Organizational Communication. (3) F, S, SS						SB					
	463	Intercultural Communication Theory and Research. (3) F, S, SS						SB				G	
CON	101	Construction and Culture: A Built Environment. (3) F, S					HU					G	H
	389	Construction Cost Accounting and Control. (3) F, S				N3							
	472	Development Feasibility Reports. (3) F, S	L2										
	495	Construction Planning and Scheduling. (3) F, S				N3							
	496	Construction Contract Administration. (3) F, S	L2										
CSE	100	Principles of Programming. (3) F, S, SS				N3							
	180	Computer Literacy. (3) F, S, SS				N3							
	181	Applied Problem Solving with BASIC. (3) F, S, SS				N3							
	183	Applied Problem Solving with FORTRAN. (3) F				N3							
	200	Concepts of Computer Science. (3) F, S, SS				N3							
	210	Data Structures and Algorithms I. (3) F, S, SS				N3							
	423	Microcomputer System Hardware. (3) S	L2										
CSH	310	Chicana and Chicano Folklore. (3) A					HU				C		
	351	Contemporary Chicana and Chicano Arts. (3) A					HU				C		
	363	Chicana and Chicano Literature. (3) F (Cross-listed as ENG 363.)	L2				HU				C		
	485	Chicana Writers. (3) A	L2				HU				C		
CSS	331	Contemporary Issues in the Chicana and Chicano Community. (3) S									C		
	336	Issues in Immigration and Migration. (3) A									C		H
	340	Chicanas and Chicanos in the U.S. Economy. (3) S									C		
	432	Issues in Chicana and Chicano Gender. (3) A									C		
DAH	100	Introduction to Dance. (3) F, S					HU						
	201	Cross-Cultural Dance Perspectives. (3) F, S					HU					G	
	300	Focus on Dance. (3) F, S, SS					HU						
	301	Philosophy and Criticism of Dance. (3) F, S	L2				HU						
	401	Dance History I. (3) F					HU						
	402	Dance History II. (3) S					HU						

			L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
DSC	100	Introduction to Environmental Design. (3) F, S, SS (Cross-listed as APH/PUP 100.)						HU					G	H
	101	Design Awareness. (3) F, S, SS						HU					G	
	236	Introduction to Computer Modeling. (3) F, S, SS (Cross-listed as ANP/PUP 236.)					N3							
ECE	100	Introduction to Engineering Design. (4) F, S					N3							
	300	Intermediate Engineering Design. (3) F, S, SS		L1										
	380	Probability and Statistics for Engineering Problem Solving. (3) F, S					N2							
	400	Engineering Communications. (3) F, S, SS		L2										
ECN	111	Macroeconomic Principles. (3) F, S, SS							SB					
	112	Microeconomic Principles. (3) F, S							SB					
	304	Current Issues in Economics and Politics. (3) A		L1					SB					
	306	Survey of International Economics. (3) A (Cross-listed as IBS 306.)							SB					
	313	Intermediate Macroeconomic Theory. (3) F, S							SB					
	314	Intermediate Microeconomic Theory. (3) F, S							SB					
	331	Comparative Economic Systems. (3) N							SB				G	
	360	Economic Development. (3) N							SB				G	
	365	Economics of Russia and Eastern Europe. (3) A							SB				G	
	404	History of Economic Thought. (3) N							SB					
	421	Earnings and Employment. (3) A		L2					SB					
	436	International Trade Theory. (3) A							SB				G	
	438	International Monetary Economics. (3) A							SB				G	
	441	Public Finance. (3) A		L2					SB					
	450	Law and Economics. (3) A		L2										
	480	Introduction to Econometrics. (3) A					N2							
EDP	303	Human Development. (3) F, S		L2										
	310	Educational Psychology. (1–6) F, S, SS							SB					
	454	Statistical Data Analysis in Education. (3) F, S, SS					N2							
EEE	490	Senior Design Laboratory. (3) F, S		L2										
EMC	321	Computer Literacy. (3) F, S, SS					N3							
	323	Computer Applications. (3) F, S					N3							
ENG	200	Critical Reading and Writing about Literature. (3) F, S		L1				HU						
	201	World Literature. (3) F						HU						H
	202	World Literature. (3) S						HU						H
	204	Introduction to Contemporary Literature. (3) A						HU						
	212	English Prose Style. (3) N		L1										
	215	Strategies of Academic Writing. (3) F, S		L1										
	216	Persuasive Writing on Public Issues. (3) F, S		L1										
	217	Personal and Exploratory Writing. (3) F, S		L1										
	218	Writing about Literature. (3) F, S		L1										
	221	Survey of English Literature. (3) F, S						HU						H
	222	Survey of English Literature. (3) F, S						HU						H
	241	American Literature. (3) F, S						HU						
	242	American Literature. (3) F, S						HU						
	301	Writing for the Professions. (3) F, S		L1										
	303	Classical Backgrounds of English Literature. (3) N						HU						
	307	Utopian Literature. (3) N		L2				HU						H
	312	English in Its Social Setting. (3) F, S						HU	SB					
	321	Introduction to Shakespeare. (3) F, S		L2				HU						
	331	American Drama. (3) A		L2										
	332	Major American Novels. (3) A		L2										
	333	American Ethnic Literature. (3) A		L2								C		
	352	Short Story. (3) F, S						HU						

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
ETC	100	Languages of Technology. (4) F, S				N3							
	200	Impact of Communications Technology on Society. (3) F, S			L1								
	400	Technical Communications. (3) F, S, SS			L2								
FAS	330	Personal Growth in Human Relationships. (3) F, S						SB					
	331	Marriage and Family Relationships. (3) F, S						SB					
	361	Introduction to Family/Child Research Methods. (3) S			L1								
	435	Advanced Marriage and Family Relationships. (3) F						SB					
FIN	461	Financial Cases and Modeling. (3) A			L2								
FLA	150	Introduction to East Asian Culture. (3) S					HU					G	
	323	Survey of Literature of the Soviet Era in Translation. (3) F, S			L2		HU					G	
	400	Linguistics. (3) S						SB					
	420	Foreign Literature in Translation. (3) F, S					HU					G	
	421	Japanese Literature in Translation. (3) F, S			L2		HU					G	
FON	344	Nutrition Services Management. (3) S			L1								
	448	Community Nutrition. (3) F			L2								
FRE	201	Intermediate French I. (4) F, S, SS										G	
	202	Intermediate French II. (4) F, S, SS										G	
	205	Readings in French Literature. (3) F, S, SS										G	
	207	French for International Professions II. (8) S										G	
	311	French Conversation. (3) F, S										G	
	312	French Composition. (3) F, S										G	
	319	Business Correspondence and Communication. (3) S										G	
	321	French Literature. (3) F, S			L2		HU						H
	322	French Literature. (3) F, S			L2		HU						
	411	Advanced Spoken French. (3) F, S										G	
	412	Advanced Written French. (3) F, S										G	
	415	French Civilization I. (3) F					HU						
	416	French Civilization II. (3) S					HU					G	
	441	French Literature of the 17th Century. (3) N					HU						
	442	French Literature of the 17th Century. (3) N					HU						H
	445	French Literature of the 18th Century. (3) N			L2		HU						
	452	French Novel of the 19th Century. (3) N					HU						
	453	Theater of the 19th Century. (3) N			L2		HU						
	461	Preatomic Literature. (3) F					HU						
	462	Postatomic Literature. (3) S					HU						
	471	The Literature of Francophone Africa and the Caribbean. (3) N			L2		HU						
GCU	102	Introduction to Human Geography. (3) F, S						SB					
	121	World Geography. (4) F, S						SB				G	
	141	Introduction to Economic Geography. (3) N						SB					
	240	Introduction to Southeast Asia. (3) F (Cross-listed as ASB/HIS/POS/REL 240.)										G	
	253	Introduction to Cultural and Historical Geography. (3) N						SB				G	
	322	Geography of U.S. and Canada. (3) A						SB					
	323	Geography of Latin America. (3) F						SB				G	
	325	Geography of Europe. (3) A						SB				G	
	326	Geography of Asia. (3) F						SB				G	
	327	Geography of Africa. (3) N						SB				G	
	328	Geography of Middle East and North Africa. (3) N						SB				G	
	332	Geography of Australia and Oceania. (3) A										G	
	344	Geography of Hispanic Americans. (3) S								C			
	350	The Geography of World Crises. (3) F, S						SB				G	
	351	Population Geography. (3) F						SB					
	352	Political Geography. (3) N						SB				G	
	357	Social Geography. (3) A						SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	359	Cities of the World I. (3) N										G	
	360	Cities of the World II. (3) N										G	
	361	Urban Geography. (3) F, S						SB					
	421	Geography of Arizona and Southwestern United States. (3) F, S									C		
	423	Geography of South America. (3) S						SB				G	
	424	Geography of Mexico and Middle America. (3) A						SB				G	
	425	Geography of Mexican-American Borderland. (3) S				L2						G	
	426	Geography of Russia and Surroundings. (3) N						SB				G	
	442	Geographical Analysis of Transportation. (3) S						SB					
	495	Quantitative Methods in Geography. (3) F				N2							
	496	Geographic Research Methods. (3) F, S				L2							
GER	201	Intermediate German. (4) F, S, SS										G	
	202	Intermediate German. (4) F, S, SS										G	
	311	German Conversation. (3) F										G	
	312	German Conversation. (3) S										G	
	313	German Composition. (3) S										G	
	319	Business Correspondence and Communication. (3) N										G	
	411	Advanced Grammar and Conversation. (3) F										G	
	412	Advanced Grammar and Composition. (3) S										G	
	415	German Civilization. (3) S					HU						H
	416	German Civilization. (3) F					HU						H
	421	German Literature. (3) F					HU						
	422	German Literature. (3) S				L2	HU						
	453	German Literary Masterpieces on Film. (3) F, S, SS					HU					G	H
GLG	101	Introduction to Geology I (Physical). (3) F, S, SS (Both GLG 101 and 103 must be taken to secure S1 or S2 credit.)							S1	S2			
	102	Introduction to Geology II (Historical). (3) S (Both GLG 102 and 104 must be taken to secure S2 credit.)								S2			
	103	Introduction to Geology I—Laboratory. (1) F, S, SS (Both GLG 101 and 103 must be taken to secure S1 or S2 credit.)							S1	S2			
	104	Introduction to Geology II—Laboratory. (1) S (Both GLG 102 and 104 must be taken to secure S2 credit.)								S2			
	105	Introduction to Planetary Science. (4) S								S2			
	110	Environmental Geology. (3) F (Both GLG 110 and 111 must be taken to secure S2 credit.)								S2		G	
	111	Environmental Geology Laboratory. (1) F (Both GLG 110 and 111 must be taken to secure S2 credit.)								S2			
	450	Geology Field Camp. (6) SS				L2							
GPH	111	Introduction to Physical Geography. (4) F, S							S1	S2			
	211	Landform Processes. (3) S				L1							
	212	Introduction to Meteorology I. (3) F (Both GPH 212 and 214 must be taken to secure S2 credit.)								S2			
	214	Introduction to Meteorology Laboratory I. (1) F (Both GPH 212 and 214 must be taken to secure S2 credit.)								S2			
	418	Landforms of the Western United States. (3) A				L2							
GRA	318	History of Graphic Design. (3) F					HU						
	345	Design Rhetoric. (3) F, S				L2							
GRK	301	Ancient Greek Literature. (3) F					HU						
	302	Ancient Greek Literature. (3) S					HU						

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
HIS	100	Western Civilization. (3) F, S						SB					H
	101	Western Civilization. (3) F, S						SB					H
	102	Western Civilization. (3) F, S						SB				G	H
	103	The United States. (3) F, S						SB					H
	104	The United States. (3) F, S						SB					H
	107	Introduction to Japan. (3) A						SB				G	H
	111	Global History Since 1500. (3) F, S										G	H
	230	American Social History. (3) A				L1							H
	240	Introduction to Southeast Asia. (3) F (Cross-listed as ASB/GCU/POS/REL 240.)										G	
	270	Judaism in American History. (3) N						SB					H
	273	American Military History. (3) N						SB					H
	300	Historical Inquiry. (3) F, S				L1		SB					H
	303	American Cultural History. (3) F, S						SB					H
	304	American Cultural History. (3) F, S						SB					H
	305	Asian Civilizations. (3) A						SB				G	H
	306	Asian Civilizations. (3) F, S						SB				G	H
	308	Modern Southeast Asia. (3) S						SB				G	H
	312	Interpreting China's Classics. (3) F (Cross-listed as HUM 312.)				L2	HU						H
	320	Ancient Greece. (3) F						SB					H
	321	Rome. (3) S						SB					H
	322	The Middle Ages. (3) A						SB					H
	323	The Middle Ages. (3) A						SB					H
	324	Renaissance. (3) F				L2		SB					H
	325	Reformation. (3) S				L2		SB					H
	326	Early Modern Europe. (3) A						SB					H
	327	Early Modern Europe. (3) N						SB					H
	329	19th-Century Europe. (3) A						SB					H
	330	19th-Century Europe. (3) A						SB					H
	331	20th-Century Europe. (3) N						SB				G	H
	332	20th-Century Europe. (3) N						SB				G	H
	333	Women and Society in Europe. (3) N				L2	HU	SB					H
	335	Family, Class, and Society in Modern Europe. (3) N				L2		SB					H
	351	England. (3) A						SB					H
	352	England. (3) N						SB					H
	357	19th-Century West. (3) F						SB					H
	358	The West in the 20th Century. (3) S						SB					H
	360	American Indian History to 1900. (3) F						SB			C		H
	361	American Indian History Since 1900. (3) S						SB			C		H
	363	African American History I. (3) A						SB			C		H
	364	African American History II. (3) A						SB			C		H
	365	Islamic Civilization. (3) N					HU						H
	366	The Modern Middle East. (3) N						SB				G	H
	369	Exploration and Empire. (3) S				L2							H
	370	Women in U.S. History, 1600–1880. (3) F						SB			C		H
	371	Women in U.S. History, 1880–1980. (3) S						SB			C		H
	380	History of the Mexican American. (3) A						SB					H
	382	Historical Statistics. (3) N				N2							
	383	Latin America. (3) A						SB					H
	384	Latin America. (3) A						SB					H
	401	American Colonial History. (3) A						SB					H
	404	The Early Republic, 1789–1850. (3) A				L2		SB					H
	406	Civil War and Reconstruction. (3) A				L2		SB					H
	407	The Emergence of Modern America. (3) A						SB					H
	409	Recent American History. (3) A						SB					H

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	331 History of Medicine. (3) A (Cross-listed as BIO 318.)												H
	410 Professional Values in Science. (2-3) A (Cross-listed as BIO 416.)		L2										
HUM	110 Contemporary Issues in Humanities. (3) F, S						HU						
	200 Encountering the Humanities. (3) S						HU						
	301 Humanities in the Western World. (4) F		L1				HU						H
	302 Humanities in the Western World. (4) S		L1				HU						H
	310 Japanese Cities and Cultures to 1800. (3) S (Cross-listed as REL 355.)		L1				HU						H
	312 Interpreting China's Classics. (3) F (Cross-listed as HIS 312.)		L2				HU						H
	320 Hispanic Cultures: Europe and the Americas. (3) F		L1				HU						H
	340 Contemporary American Film and Popular Culture. (3) F						HU						
	420 Interpreting Latin America. (3) S						HU					G	H
	440 Los Angeles and Cultural Theory. (3) S		L1				HU				C		
	450 Technology and Culture. (3) S		L1				HU						
	460 Postmodern Culture and Interpretation. (3) F		L2										
	462 Psychoanalysis and Culture. (3) F		L2				HU	SB					
	465 Narrative in the Human Sciences. (3) F		L2				HU						
	498 Pro-Seminar in the Humanities. (3) A		L2				HU						
IBS	300 Principles of International Business. (3) A												G
	306 Survey of International Economics. (3) A (Cross-listed as ECN 306.)							SB					
	400 Cultural Factors in International Business. (3) S (Cross-listed as ASB 400.)												G
IDN	201 Intermediate Indonesian I. (5) F												G
	202 Intermediate Indonesian II. (5) S												G
IEE	205 Microcomputer Applications in Industrial Engineering. (3) F, S					N3							
	305 Information Systems Engineering. (3) F					N3							
	374 Quality Control. (3) F				N2								
	463 Computer-Aided Manufacturing and Control. (3) F, S					N3							
	475 Introduction to Simulation. (3) F, S					N3							
	476 Operations Research Techniques/Applications. (4) F, S				N2								
IND	316 20th-Century Design I. (3) F						HU						H
	317 20th-Century Design II. (3) S						HU						H
	470 Professional Practice for Industrial Design. (3) F		L2										
INT	223 Interior Design Issues and Theories. (3) F						HU						
	310 History of Interior Design I. (3) F						HU						H
	311 History of Interior Design II. (3) S						HU						H
	412 History of Decorative Arts in Interiors. (3) F						HU						
	442 Specifications and Documents for Interiors. (3) F		L2										
ITA	201 Intermediate Italian. (4) F, S												G
	202 Intermediate Italian. (4) F, S												G
	311 Italian Composition and Conversation. (3) F, S												G
	312 Italian Composition and Conversation. (3) F, S												G
	314 Advanced Italian. (3) N												G
	325 Introduction to Italian Literature. (3) F						HU						
	415 Italian Civilization. (3) N		L2				HU						G
	430 Italian Literature of the Middle Ages. (3) N						HU						
	441 Dante: <i>Divina Commedia</i> . (3) N		L2				HU						
	443 Italian Literature of the Renaissance. (3) N						HU						H
	446 Italian Literature of the 18th and 19th Centuries. (3) N						HU						
	449 20th-Century Italian Literature. (3) N						HU						G

			L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
JPN	201	Intermediate Japanese. (5) F											G	
	202	Intermediate Japanese. (5) S											G	
	207	Japanese for International Professions II. (10) S											G	
	311	Japanese Conversation and Composition. (3) F											G	
	312	Japanese Conversation and Composition. (3) S											G	
	313	Advanced Japanese. (3) F											G	
	314	Advanced Japanese. (3) S											G	
	321	Japanese Literature. (3) N		L2				HU					G	
JRN	201	Journalism Newswriting. (3) F, S, SS		L1										
	301	Reporting. (3) F, S		L2										
JUS	100	The Justice System. (3) F, S, SS							SB					
	180	Introduction to American Indian Justice Studies. (3) F 1999										C		
	200	Topics in Concepts and Issues of Justice. (3) F, S, SS							SB					
	280	American Indian Law and Society. (3) F, S, SS										C		
	302	Basic Statistical Analysis in Justice Studies. (3) F, S, SS				N2								
	321	Wealth Distribution and Poverty. (3) F										C		
	360	Law and Social Control. (3) F, S, SS							SB					
	380	Contemporary Issues of American Indian Nations. (3) F, S, SS										C		
	404	Imperatives of Prof. (3) F, S, SS		L2										
	415	Gender and International Development. (3) F, S, SS		L2									G	
	450	Alternatives to Incarceration. (3) F, S, SS		L2										
	463	Discretionary Justice. (3) F, S, SS							SB					
	469	Political Deviance and the Law. (3) F, S, SS		L2					SB			C		
	470	Alternative Dispute Resolution. (3) F, S, SS		L2										
	474	Legislation of Morality. (3) F, S, SS		L2										
	477	Youth and Justice. (3) F, S, SS		L2					SB					
	480	Law, Policy, and American Indians. (3) F, S, SS										C		
LAT	201	Intermediate Latin. (4) F						HU						
	202	Intermediate Latin. (4) S						HU						
LIA	390	The Use of Research Libraries. (3) F, S		L1										
MAE	468	Aerospace Systems Design. (3) F, S		L2										
	490	Projects in Design and Development. (3) F, S		L2										
MAT	114	College Mathematics. (3) F, S, SS			N1									
	117	College Algebra. (3) F, S, SS			N1									
	119	Finite Mathematics. (3) F, S, SS			N1									
	170	Precalculus. (3) F, S, SS			N1									
	210	Brief Calculus. (3) F, S, SS			N1									
	260	Technical Calculus I. (3) F, S, SS			N1									
	270	Calculus with Analytic Geometry I. (4) F, S, SS			N1									
	290	Calculus I. (5) N			N1									
	300	Mathematical Structures. (3) F, S		L2										
	419	Linear Programming. (3) S				N2								
	421	Applied Computational Methods. (3) F, S				N3								
	423	Numerical Analysis I. (3) F, S				N3								
	425	Numerical Analysis II. (3) F, S				N3								
	427	Computer Arithmetic. (3) S				N3								
	451	Mathematical Modeling. (3) S				N2								
MCE	446	Understanding the Culturally Diverse Child. (3) A										C		
MCO	120	Media and Society. (3) F, S							SB					
	402	Communications Law. (3) F, S, SS		L2										
	418	History of Communications. (3) F, S							SB					H
	430	International Communication. (3) F, S											G	
	450	Visual Communication. (3) F, S, SS						HU						
	456	Political Communication. (3) F, S							SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	460										C		
MET	416					N3							
MGT	463		L2										
MHL	201					N3							
	344						HU					G	
	352												H
	438												H
	439		L2										H
	441		L2										
	447		L2										
	466		L2				HU				C		
MIC	205									S2			
	206									S2			
	302		L2										
	401		L2										
MIS	410							SB					
	412							SB					
	414							SB					
	416							SB					
MKT	460		L2										
MUE	381		L2										
MUS	340						HU						H
	347						HU						
	353						HU						
	354						HU						
	355						HU						H
	356						HU						
NUR	211		L1										
	306		L1										
	403		L2										
PGS	101							SB					
	222							SB					
	270							SB					
	304		L1										
	306							SB					
	315							SB					
	341							SB					
	344		L2										
	350							SB					
	351		L2					SB					
	365							SB					
	414		L2					SB					
	427		L2					SB					
	441		L2					SB					
	443		L2					SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	444 Adolescent Psychology and Psychopathology. (3) N		L2										
	445 Child Language and Drawing. (3) F							SB					
	446 Social Development. (3) N		L2										
	450 Social Perception and Cognition. (3) N		L2										
	451 Stereotyping, Prejudice, and Discrimination. (3) N		L2										
	452 Applied Social Psychology. (3) F		L2										
	461 Interpersonal Influence. (3) N							SB					
	463 Advanced Psychology of Adjustment. (3) F		L2										
	465 Psychology of Stress and Coping. (3) F		L2										
	466 Abnormal Psychology. (3) F, S, SS							SB					
	467 Psychology of Magical Beliefs. (3) N		L2										
PHI	101 Introduction to Philosophy. (3) F, S, SS						HU						
	103 Principles of Sound Reasoning. (3) F, S, SS		L1				HU						
	301 History of Ancient Philosophy. (3) F						HU						H
	302 History of Modern Philosophy. (3) S						HU						H
	304 Existentialism. (3) N						HU						
	305 Ethical Theory. (3) A						HU						
	306 Applied Ethics. (3) F, S, SS						HU						
	307 Philosophy of Law. (3) A						HU						
	308 Philosophy of Art. (3) A						HU						
	309 Social and Political Philosophy. (3) A						HU						
	310 Environmental Ethics. (3) A						HU						
	311 Philosophy in Literature. (3) A						HU						
	312 Theory of Knowledge. (3) A						HU						
	314 Philosophy of Science. (3) A						HU						
	315 Philosophy of Language. (3) A						HU						
	316 Metaphysics. (3) A						HU						
	317 Philosophy of Mind. (3) A						HU						
	318 Philosophy of Religion. (3) A						HU						
	319 Philosophy of Computing. (3) N					N3	HU						
	325 Philosophy of Social Science. (3) N						HU	SB					
	332 19th-Century Philosophy. (3) N						HU						
	335 History of Ethics. (3) A						HU						
	350 Philosophical Argument and Exposition. (3) S		L2										
	402 Empiricism. (3) N						HU						
	403 Contemporary Analytic Philosophy. (3) A						HU						
PHS	110 Fundamentals of Physical Science. (4) F, S								S1	S2			
	208 Patterns in Nature. (4) F, S (Cross-listed as STE 208.)								S1	S2			
PHY	101 Introduction to Physics. (4) F, S								S1	S2			
	111 General Physics. (3) F, S, SS (Both PHY 111 and 113 must be taken to secure S1 or S2 credit.)								S1	S2			
	112 General Physics. (3) F, S, SS (Both PHY 112 and 114 must be taken to secure S1 or S2 credit.)								S1	S2			
	113 General Physics Laboratory. (1) F, S, SS (Both PHY 111 and 113 must be taken to secure S1 or S2 credit.)								S1	S2			
	114 General Physics Laboratory. (1) F, S, SS (Both PHY 112 and 114 must be taken to secure S1 or S2 credit.)								S1	S2			
	121 University Physics I: Mechanics. (3) F, S, SS (Both PHY 121 and 122 must be taken to secure S1 or S2 credit.)								S1	S2			
	122 University Physics Laboratory I. (1) F, S, SS (Both PHY 121 and 122 must be taken to secure S1 or S2 credit.)								S1	S2			

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H	
	131	University Physics II: Electricity and Magnetism. (3) F, S, SS (Both PHY 131 and 132 must be taken to secure S1 or S2 credit.)								S1	S2			
	132	University Physics Laboratory II. (1) S, SS (Both PHY 131 and 132 must be taken to secure S1 or S2 credit.)								S1	S2			
	151	Physics II. (4) F								S1	S2			
	252	Physics III. (4) S								S1	S2			
	420	Research Paper. (1) F, S						L2						
PLA	310	History of Landscape Architecture. (3) F (Cross-listed as APH 411.)												H
	420	Theory of Urban Design. (3) F (Cross-listed as PUP 420.)						HU						
PLB	108	Concepts in Plant Biology. (4) F, S, SS								S1	S2			
	260	Plants in Cities: Introduction to Urban Horticulture. (4) S									S2			
	300	Comparative Plant Diversity. (4) F						L2			S2			
	320	Environmental Science (Nonmajor). (3) F (Cross-listed as BIO 319.)												G
	414	Plant Pathology. (3) F						L2						
	432	Computer Applications in Biology. (3) F (Cross-listed as BIO 406.)												N3
POR	201	Intermediate Portuguese. (5) S												G
	313	Portuguese Composition and Conversation. (3) F												G
	314	Portuguese Composition and Conversation. (3) S												G
	321	Luso-Brazilian Literature. (3) N						HU						
	472	Luso-Brazilian Civilization. (3) N						HU						G
POS	101	Political Ideologies. (3) F, S							SB					
	110	Government and Politics. (3) F, S							SB					
	150	Comparative Government. (3) F, S							SB					G
	160	Global Politics. (3) F, S							SB					G
	220	Political Issues and Public Policy. (3) A							SB					
	230	Current Issues in National Politics. (3) F, S						L1	SB					
	240	Introduction to Southeast Asia. (3) F (Cross-listed as ASB/GCU/HIS/REL 240.)												G
	260	Current Issues in International Politics. (3) F, S						L1	SB					G
	270	American Legal System. (3) F, S							SB					
	301	Empirical Political Inquiry. (3) F, S							SB					
	310	American National Government. (3) F, S							SB					
	313	The Congress. (3) A							SB					
	314	The American Presidency. (3) A							SB					
	315	The Supreme Court. (3) A							SB					
	316	State and Local Government. (3) A							SB					
	320	Public Administration. (3) A							SB					
	325	Public Policy Development. (3) A							SB					
	331	Public Opinion. (3) A							SB					
	332	American Political Parties. (3) A							SB					
	333	Interest Groups. (3) A							SB					
	336	Electoral Behavior. (3) A							SB					
	340	History of Political Philosophy I. (3) A						HU						H
	341	History of Political Philosophy II. (3) A						HU						H
	346	Problems of Democracy. (3) A						HU						
	350	Comparative Politics. (3) A							SB					G
	356	Western Europe. (3) A							SB					G
	357	South Asia Politics. (3) A							SB					G
	358	Southeast Asia. (3) A							SB					G

			L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
QBA	221	Statistical Analysis. (3) F, S					N2							
	321	Applied Quality Analysis I. (3) A		L2										
	391	Management Science. (3) N					N2							
	450	Operations and Process Analysis. (3) A		L2										
REC	120	Leisure and the Quality of Life. (3) F, S, SS							SB					
	160	Leisure and Society. (3) A							SB					
	305	Introduction to Travel and Tourism. (3) F, S											G	
	330	Programming of Recreation Services. (3) F, S		L2										
	380	Wilderness and Parks in America. (3) S							SB					H
	458	International Tourism. (3) F, S											G	
REL	100	Religions of the World. (3) F, S						HU					G	
	200	The Study of Religious Traditions. (3) A		L1				HU					G	
	201	Religion and the Modern World. (3) A		L1				HU						
	202	Religion and Popular Culture. (3) F, S						HU				C		
	203	Saints and Sinners: Explorations in Sacred Biography. (3) F, S						HU						H
	205	Living and Dying. (3) F, S						HU						
	210	Introduction to Judaism. (3) A		L1				HU						H
	225	African American Religion. (3) A						HU				C		
	240	Introduction to Southeast Asia. (3) F (Cross-listed as ASB/GCU/HIS/POS 240.)											G	
	270	Introduction to Christianity. (3) A						HU						
	305	Ritual, Symbol, and Myth. (3) A		L2				HU						
	310	Western Religious Traditions. (3) F						HU						H
	315	Hebrew Bible (Old Testament). (3) A		L2				HU						H
	317	Introduction to Rabbinic Judaism. (3) A						HU						H
	320	American Religious Traditions. (3) F, S						HU				C		H
	321	Religion in America. (3) F, S						HU				C		H
	322	Malcolm and Martin. (3) F, S						HU				C		
	323	Black Religion: A Biographical Approach. (3) F, S						HU				C		
	330	Native American Religious Traditions. (3) A						HU				C		
	331	History of Native American Religious Traditions. (3) N		L2					HU			C		H
	332	South American Indian Religions. (3) F, S						HU					G	
	344	Religion and Values in Japanese Life. (3) S						HU					G	
	345	Asian Religious Traditions. (3) F						HU					G	
	350	Hinduism. (3) A		L2				HU					G	H
	351	Buddhism. (3) A		L2				HU					G	
	355	Japanese Cities and Cultures to 1800. (3) S (Cross-listed as HUM 310.)		L1				HU						H
	365	Islamic Civilization, 700–1300. (3) F						HU						H
	366	Islamic Civilization, 1300 to Present. (3) F						HU					G	H
	371	New Testament. (3) A						HU						
	372	Formation of the Christian Tradition. (3) A						HU						H
	377	Religion in Russia. (3) F, S						HU						H
	379	Religion, Nationalism, and Ethnic Conflict. (3) F, S						HU					G	
	381	Religion and Moral Issues. (3) A		L2				HU						
	385	Contemporary Western Religious Thought. (3) A		L2				HU						
	390	Women and Religion. (3) A						HU					G	
	410	Judaism in Modern Times. (3) N						HU						H
	415	The Jewish Mystical Tradition. (3) A						HU						
	420	Religion in American Life and Thought. (3) A		L2				HU						
	426	American Preachers and Preaching: The Sermon in America. (3) N		L2				HU						
	427	American Religious Thought. (3) N						HU						H
	444	Religion in Japan. (3) F						HU					G	H
	460	Studies in Islamic Religion. (3) A						HU					G	

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	470 Religion in the Middle Ages. (3) A						HU						H
	471 Reformation and Modern Christianity. (3) A						HU						H
	486 Modern Critics of Religion. (3) A						HU						
RUS	201 Intermediate Russian. (4) F, SS											G	
	202 Intermediate Russian. (4) S, SS											G	
	211 Basic Russian Conversation. (3) F											G	
	212 Basic Russian Conversation. (3) S											G	
	311 Russian Composition and Conversation. (3) F											G	
	312 Russian Composition and Conversation. (3) S											G	
	321 Survey of Russian Literature. (3) A		L2				HU						H
	322 Survey of Russian Literature. (3) A		L2				HU						
	323 Survey of Literature of the Soviet Era. (3) A		L2				HU					G	
	411 Advanced Composition and Conversation I. (3) F											G	
	412 Advanced Composition and Conversation II. (3) S											G	
	420 Russian Poetry. (3) N		L2				HU						
	421 Pushkin. (3) N		L2				HU						
	423 Dostoyevsky. (3) N		L2				HU						
	424 Tolstoy. (3) N		L2				HU						
	425 Chekhov. (3) N		L2				HU						
	426 Literatures of the Nationalities of the Former Soviet Union. (3) N		L2				HU					G	
	430 Russian Short Story. (3) N		L2				HU						
	441 Survey of Russian Culture. (3) N		L2				HU					G	H
SCM	455 Purchasing Research and Negotiation. (3) F, S		L2										
SHS	367 Language Science. (3) F							SB					
	465 Speech and Language Acquisition. (3) S, SS							SB					
SOC	101 Introductory Sociology. (3) F, S, SS							SB					
	301 Principles of Sociology. (3) F, S, SS							SB					
	312 Sociology of Adolescence. (3) F, S							SB					
	315 Courtship and Marriage. (3) F, S, SS							SB					
	318 Overview of Aging. (3) F							SB					
	321 Sociology of Work. (3) S							SB					
	331 Environmental Sociology. (3) F							SB					
	332 Urban Sociology. (3) F, S							SB				G	
	333 Population. (3) F, S, SS							SB				G	
	340 Sociology of Deviant Behavior. (3) F, S, SS							SB					
	341 Modern Social Problems. (3) F, S, SS							SB					
	352 Social Change. (3) F, S							SB				G	H
	360 Sociological Psychology. (3) F, S							SB					
	361 Variant Sexuality. (3) F							SB					
	365 The Sociology of Mass Communication. (3) F, S							SB					
	391 Sociological Research. (3) F, S, SS							SB					
	395 Social Statistics I. (3) F, S, SS				N2								
	415 The Family. (3) F, S, SS							SB					
	416 Marriage Problems in Contemporary Society. (3) S		L2					SB					
	417 Family Violence. (3) F, S							SB					
	418 Aging and the Life Course. (3) F, S							SB					
	420 Sociology of Religion. (3) S		L2					SB					
	422 Sociology of Complex Organizations. (3) F		L2					SB					
	423 Social Class and Stratification. (3) S		L2					SB					
	427 Sociology of Health and Illness. (3) F		L2					SB					
	429 Sociology of Law. (3) S							SB					
	433 Demographic Methods. (3) S							SB					
	446 Sociology of Crime. (3) F							SB					
	451 Comparative Sociology. (3) F							SB				G	

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	455	Collective Behavior. (3) S						SB					
	456	Political Sociology. (3) S						SB				G	
	464	Women's Roles. (3) S	L2					SB			C		
	470	Racial and Ethnic Minorities. (3) F, S, SS						SB					
	474	Afro-American in Modern Society. (3) F, S, SS	L2					SB			C		
	483	History of Social Thought. (3) S, SS	L2					SB					
	485	Sociology of Knowledge. (3) F	L2					SB					
	486	Contemporary Theory. (3) S						SB					
SPA	201	Intermediate Spanish. (4) F, S, SS										G	
	202	Intermediate Spanish. (4) F, S, SS										G	
	203	Intermediate Spanish for Bilinguals. (4) F										G	
	204	Intermediate Spanish for Bilinguals. (4) S										G	
	207	Spanish for International Professions II. (8) S										G	
	313	Spanish Conversation and Composition. (3) F, S, SS										G	
	314	Spanish Conversation and Composition. (3) F, S, SS										G	
	319	Business Correspondence and Communication. (3) N										G	
	325	Introduction to Hispanic Literature. (3) F, S					HU						
	412	Advanced Conversation and Composition. (3) F, S										G	
	413	Advanced Spanish Grammar. (3) F										G	
	420	Applied Spanish Linguistics. (3) S	L2										
	421	Spanish in the Southwest. (3) F	L2					SB			C		
	425	Spanish Literature. (3) F, S					HU						
	426	Spanish Literature. (3) F, S					HU						
	427	Spanish American Literature. (3) F, S	L2										
	428	Spanish American Literature. (3) F, S	L2									G	
	464	Mexican American Literature. (3) F					HU						
	471	Civilization of the Spanish Southwest. (3) S					HU						
	472	Spanish American Civilization. (3) F					HU					G	H
	473	Spanish Civilization. (3) S					HU	SB				G	
SPE	311	Orientation to Education of Exceptional Children. (3) F, S, SS						SB					
SPF	301	Culture and Schooling. (3) F, S	L2										
STE	201	Introduction to Bioengineering. (3) F (Cross-listed as BME 201.)	L1										
	208	Patterns in Nature. (4) F, S (Cross-listed as PHS 208.)							S1	S2			
STP	226	Elements of Statistics. (3) F, S, SS			N2								
	326	Intermediate Probability. (3) F, S			N2								
	420	Introductory Applied Statistics. (3) F, S, SS			N2								
	429	Experimental Statistics. (3) S				N3							
SWU	271	Introduction to Social Work. (3) F, S											H
	301	Human Behavior in the Social Environment I. (3) F, S	L2					SB					
	321	Statistics for Social Workers. (3) F, S			N2								
	340	Human Behavior in the Social Environment II. (3) F, S						SB					
	474	Ethnic/Cultural Variables in Social Work. (3) F, S									C		
TCM	201	Radio-Television Writing. (3), F, S, SS	L1										
	315	Broadcast News Reporting. (3) F, S	L2										
THA	201	Intermediate Thai I. (5) F										G	
	202	Intermediate Thai II. (5) S										G	
THE	100	Introduction to Theatre. (3) F, S, SS					HU						
	220	Principles of Dramatic Analysis. (3) F, S	L1										
	300	Film: The Creative Process. (3) F, S, SS					HU						
	320	History of the Theatre I. (3) F					HU						H
	321	History of the Theatre II. (3) S					HU						H

Minors, Certificates, and Interdisciplinary Studies

Interdisciplinary studies are available to students through an interdisciplinary degree, the Bachelor of Interdisciplinary Studies (see page 112), or through an extensive choice of minors or certificates which may be taken in conjunction with other majors. Since interdisciplinary studies provide skills which support employment in a rapidly changing work place, students are encouraged to consider these options. Consult the academic advisor in your major about the impact of enrolling in a minor or certificate program.

Minors

A minor is an approved, coherent concentration of academic study in a single discipline, involving substantially fewer hours of credit than the corresponding major. Several ASU colleges offer undergraduate minors in addition to majors. For more information about specific minors offered at ASU, refer to the individual college and department descriptions in this catalog.

Students in most majors may pursue one or more minors and, upon successful completion of the prescribed course work, have that accomplishment officially recognized on the ASU transcript at graduation if (1) the college/department of the minor officially certifies, through established verification procedures, that all requirements for the minor have been met, and (2) the college (and, in certain colleges, the department) of the student's major allows the official recognition of the minor.

A student wishing to pursue a specific minor should consult an academic advisor in the unit offering that minor to ensure that an appropriate set of courses is taken.

Note: Certain major and minor combinations may be deemed inappropriate either by the college or department of the major or minor. Inappropriate combinations include (but would not be limited to) ones in which an excessive number of courses in the minor are simultaneously being used to fulfill requirements of the student's major.

Minors	Pages
College of Architecture and Environmental Design	
Environmental Resources	133
Urban Planning	133–134
College of Business	
Business (for nonbusiness majors)	143
College of Fine Arts	
Art History	250
Dance	261
Music*	
Theatre	278
College of Liberal Arts and Sciences	
Anthropology	311
Asian Languages (Chinese/Japanese)	350
Astronomy	373
Biology	316
Chemistry and Biochemistry	321
Chicana and Chicano Studies	324
Economics for Students	
Planning a Career in Law	325–326
English	326
Exercise Science/ Physical Education	331
Family Resources and Human Development	334
French	350
General Economics	325
Geology	341
German	350
History	343
Humanities	347
Italian	350
Mathematics	362
Microbiology	367
Philosophy	371
Physics	373
Plant Biology	378
Political Science	381
Psychology	384
Religious Studies	387
Russian	350
Sociology	390
Spanish	350
Women's Studies	395
College of Public Programs	
Communication	410
Justice Studies	417
Mass Communication	415
Recreation Management	423
Tourism	423
Interdisciplinary Programs	
Gerontology	110

* For information, contact an advisor in the School of Music.

Certificates

Students may pursue some certificate programs along with a major and other certificate programs independently. For more information, refer to the pages indicated in the table below. See page 535 for ASU West certificates.

Certificates	Pages
American Humanics, Certificate in Youth Agency Administration	422–423
American Indian Justice Studies	418
Asian Studies	307–308
East Asian Studies	307–308
Gerontology	110, 241, 284
Hazardous Materials and Waste Management	448
Health Physics	308
International Business Studies	159
Jewish Studies	308
Latin American Studies	308
Medieval and Renaissance Studies	308
Medieval Studies ¹	
Museum Studies ^{1, 2}	
Nonprofit Management	241
Post-Master's Family Nurse Practitioner	241
Quality Analysis	147
Renaissance Studies ¹	
Russian and East European Studies	309
Scholarly Publishing ¹	
Small Business and Entrepreneurship	147
Southeast Asian Studies	309
Translation	351
Transportation Systems ¹	
Women's Studies	309

¹ For more information, see the *Graduate Catalog*.

² Contact the Department of Anthropology.

Concurrent and Dual Degrees

Graduate students have the opportunity to pursue more than one degree at the same time as part of an organized program. Refer to the “Concurrent and Dual Degrees Offered at ASU Main” table on page 111. For more information, see the *Graduate Catalog*.

Interdisciplinary Studies

Asian Studies. See pages 307–308 for information about the Certificate in Asian Studies.

Energy Studies. An expanding instructional and research involvement in energy matters exists through the following three curricular paths:

1. general studies, which emphasize energy as an elective beyond the scope of a chosen major (for more information, contact M.J. Pasqualetti, 602/965–4548);
2. specific studies in the College of Architecture and Environmental Design, for those pursuing the Master of Architecture degree and the Master of Science degree in Building Design; and
3. specific studies in the College of Engineering and Applied Sciences, usually for those seeking a degree in a branch of engineering.

Environmental Studies. The Center for Environmental Studies encourages and coordinates interdisciplinary environment-related activities in the natural and social sciences within the university. The center sponsors special courses, conferences, and workshops on environmental topics. Drawing from faculty and students throughout the university, the center participates in research and community programs relating to environmental problem areas. It does not formally offer courses or a degree program. For more information, see page 36 or call 602/965–2975.

Film Studies. The Film Studies Program exists not only to provide information and experience, but also to serve as a means of creative expression for the student and as a useful subject and tool in teaching. The program is not designed to produce professional filmmakers. However, it may provide practical preparation for students desiring further film study in other institutions.

Inquiries about this program should be directed to the Film Studies coordinator, Jay Boyer, at 602/965–7644.

Gerontology. The Gerontology Program brings together faculty from several disciplines to teach courses related

to adult development and aging, to collaborate on gerontological research, and to participate in projects of service to older adults.

A certificate at the postbaccalaureate level and an undergraduate minor are available in Gerontology. The certificate consists of 24 semester hours—12 hours of required and 12 hours of elective course work. The minor consists of 18 semester hours—six hours of required and 12 hours of elective course work. Courses related to aging are taught throughout the university by faculty who are active contributors to research, theory, and public policy and practice. In addition, gerontology provides students with opportunities to gain practical experience in working with elderly people. A practicum, held at the Veterans Administration Hospital, is available to students who have completed some gerontology course work. Gerontology also helps students find rewarding internships in community programs for older adults. For more information, refer to the current *Student Handbook in Gerontology* or call 602/965–3225.

Islamic Studies. The art, history, geography, and religion of the Islamic world are the subjects of several courses offered by departments in the College of Fine Arts and the College of Liberal Arts and Sciences. For information, call Dr. Mark Woodward, Department of Religious Studies, at 602/965–7145.



Palm trees framed and reflected in the windows of the Student Services Building.
Priscilla Benbrook photo

Linguistics. Linguistics concentrations are offered in master's degree programs in the Departments of Anthropology, English, and Languages and Literatures through the Graduate College. Numerous linguistics courses are offered in these and other departments. For information, call Dr. Dawn Bates of the University Committee on Linguistics, at 602/965-3168.

Medieval and Renaissance Studies. An undergraduate Certificate in Medieval and Renaissance Studies is offered by the Arizona Center for Medieval and Renaissance Studies. See page 308 for more information. See the *Graduate Catalog* for information about the Certificate in Medieval Studies and the Certificate in Renaissance Studies, and page 33 for information about the center.

Southeast Asian Studies. See page 309 for information about the Certificate in Southeast Asian Studies.

Transportation Systems. See the *Graduate Catalog* for information on the Certificate in Transportation Systems.

Women's Studies. See page 309 for information about the Certificate in Women's Studies.

MILITARY OFFICER TRAINING

U.S. Air Force and U.S. Army ROTC units are active on the ASU campus. See "Department of Aerospace Studies" and "Department of Military Science," pages 310-311 and 368-370, for more information.

Defense Activity for Non-Traditional Education Support (DANTES). ASU is a participating institution with DANTES and is listed in the DANTES Directory of Independent Study. DANTES is an executive agency of the Department of Defense that provides educational support for the voluntary education programs of all services. The primary missions of DANTES are (1) to provide nationally recognized examination and certification programs as part of the voluntary education programs of military services and (2) to facilitate the availability of high-quality independent institutions for service men and women.

Concurrent and Dual Degrees Offered at ASU Main

Concurrent or Dual Degrees	Administered by
Juris Doctor/Master of Health Services Administration	College of Law/School of Health Administration and Policy
Juris Doctor/Master of Science in Economics*	College of Law/Department of Economics
Juris Doctor/Doctor of Philosophy in Justice Studies	College of Law/Committee on Law and Social Sciences
Master of Business Administration/Juris Doctor	College of Business/College of Law
Master of Business Administration/Master of Accountancy	College of Business
Master of Business Administration/Master of Architecture	College of Business/School of Architecture
Master of Business Administration/Master of Health Services Administration	College of Business
Master of Business Administration/Master of International Management	College of Business/American Graduate School of International Management (Thunderbird) or Groupe Ecole Supérieure de Commerce Toulouse, France, or Universidad Carlos III de Madrid, Spain
Master of Business Administration/Master of Science in Economics	College of Business
Master of Business Administration/Master of Science in Information Management	College of Business
Master of Business Administration/Master of Taxation	College of Business
Master of Science in Engineering (Industrial Engineering)/Master of International Management of Technology	Department of Industrial and Management Engineering/American Graduate School of International Management (Thunderbird)
Master of Science in Justice Studies/Master of Arts in Anthropology	School of Justice Studies/Department of Anthropology
Master of Science in Nursing/Master of Health Services Administration	College of Nursing/School of Health Administration and Policy

* Applications for this program are not being accepted at this time.

WESTERN INTERSTATE COMMISSION FOR HIGHER EDUCATION (WICHE)

For Arizona residents who wish to attend professional schools of dentistry, veterinary medicine, occupational therapy, optometry, and osteopathy in one of the other western states, Arizona has joined with the other western states to create the Western Interstate Commission for Higher Education. Through WICHE, qualified Arizona residents may attend schools in other western states at essentially the same expense to the students as to residents of the state in which the school is located. Students must have maintained at least average grades in their preprofessional work and must have been legal residents of Arizona for at least the last five years. Recipients are required to return to Arizona to practice or to repay a portion of the funds expended in their behalf.

For applications and more information contact Dr. Brice W. Corder, College of Liberal Arts and Sciences, 602/965-2365.

Bachelor of Interdisciplinary Studies

Division of Undergraduate
Academic Services
602/965-4464

INTERDISCIPLINARY STUDIES— B.I.S.

The Bachelor of Interdisciplinary Studies (B.I.S.) is a university-wide program intended for the student who has academic interests that might not be satisfied with existing majors. Building on two academic areas of interest (emphasis areas) and an interdisciplinary core, students in the B.I.S. are expected to take an active role in creating their educational plan and defining their vocational goals. The B.I.S. emphasizes versatility and problem solving, skills desired in a changing workplace environment. Self-assessment and appraisal of opportunities to support academic and career goals are key elements in the core courses. The empha-

sis areas are based on approved academic minors and certificate programs and should represent academic interests which the student wishes to integrate into a meaningful program.

Students interested in pursuing the B.I.S. degree should contact Cross-college Advising Services (CAS) in UASB 131, 965-4464, to attend an informational session conducted by an academic advisor.

The combination of emphasis areas gives students greater flexibility in creating a unique program to accomplish individualized academic goals. Combinations created by current students illustrate a range of possibilities:

American humanics certificate program and theatre
business and communication
business and environmental resources
communication and sociology
dance and exercise science
economics and Spanish
environmental resources and geology
justice studies and political science
psychology and women's studies
religious studies and anthropology

Basic Requirements

The B.I.S. requires 120 semester hours. The major is composed of a 12-hour core (see "Core Courses") and a minimum of 36 semester hours in two emphasis areas (18 hours each). Throughout the core sequence, the student will assemble a portfolio including self assessment on progression toward career goals, and an evaluation of key education and personal activities that may apply.

Core Courses

BIS	301	Foundations of Interdisciplinary Studies	3
BIS	302	Interdisciplinary Studies	3
BIS	401	Interdisciplinary Practicum	3
BIS	402	Senior Seminar	3
Total			12

Other Requirements

In addition to the basic requirements, students must also complete all university requirements, including English Composition and General Studies. Early advising is recommended to facilitate selecting courses that may apply to both the University General Studies requirements and the emphasis areas.

Declaring the B.I.S. major. Academic advising from Cross-college Advising Services is required before being approved to declare the B.I.S. In addition, the following requirements must be completed by the end of the semester of the request:

1. 45 semester hours of college credit;
2. cumulative G.P.A. of 2.00;
3. selection of two areas of emphasis, with a minimum of two courses (minimum grade of "C") completed or in progress in each emphasis area. Approval of each department is required; and
4. statement of purpose for seeking a B.I.S. degree.

All incoming students and continuing students with a minimum GPA of 2.00 who do not meet the above requirements will be placed in a pre-BIS major until the requirements have been met.

Approved Emphasis Areas

Each emphasis area requires 18 semester hours, of which 12 hours must be at the upper division. They are based on existing minors or certificate programs (see colleges for specific minors or certificate programs). Emphases based on minors with fewer than 18 hours will have additional semester hours required. Complete information on each emphasis is available in CAS, UASB 131.

College of Architecture and Environmental Design

Environmental resources*
Urban planning*

College of Business

Business
International business studies
Small business and entrepreneurship

College of Fine Arts

Dance
Music
Theatre

College of Liberal Arts and Sciences

Anthropology
Asian languages (Chinese/Japanese)
Asian studies
Astronomy
Biology
Chemistry and biochemistry
Chicana and Chicano studies
East Asian studies
Economics (for students planning a career in law)

* Contact the department or school.

English
 Exercise science/physical education
 Family resources and human development
 French
 General economics
 Geology
 German
 History
 Interdisciplinary humanities
 Italian
 Jewish studies
 Latin American studies
 Mathematics
 Microbiology
 Philosophy
 Physics
 Plant biology
 Political science
 Psychology
 Religious studies
 Russian
 Russian and East European studies
 Sociology
 Spanish
 Translation
 Women's studies

College of Public Programs

American humanics/youth agency administration
 American Indian justice studies
 Communication
 Justice studies*
 Mass communication
 Recreation management*
 Tourism*

Interdisciplinary Programs

Gerontology

BACHELOR OF INTERDISCIPLINARY STUDIES (BIS)

BIS 301 Foundations of Interdisciplinary Studies. (3) F, S, SS

Analysis of 21st-century workplace, introduction of critical thinking skills, interdisciplinary methods. Includes autobiographical self-study and education plan. Lecture, seminar, discussion.

BIS 302 Interdisciplinary Studies. (3) F, S, SS

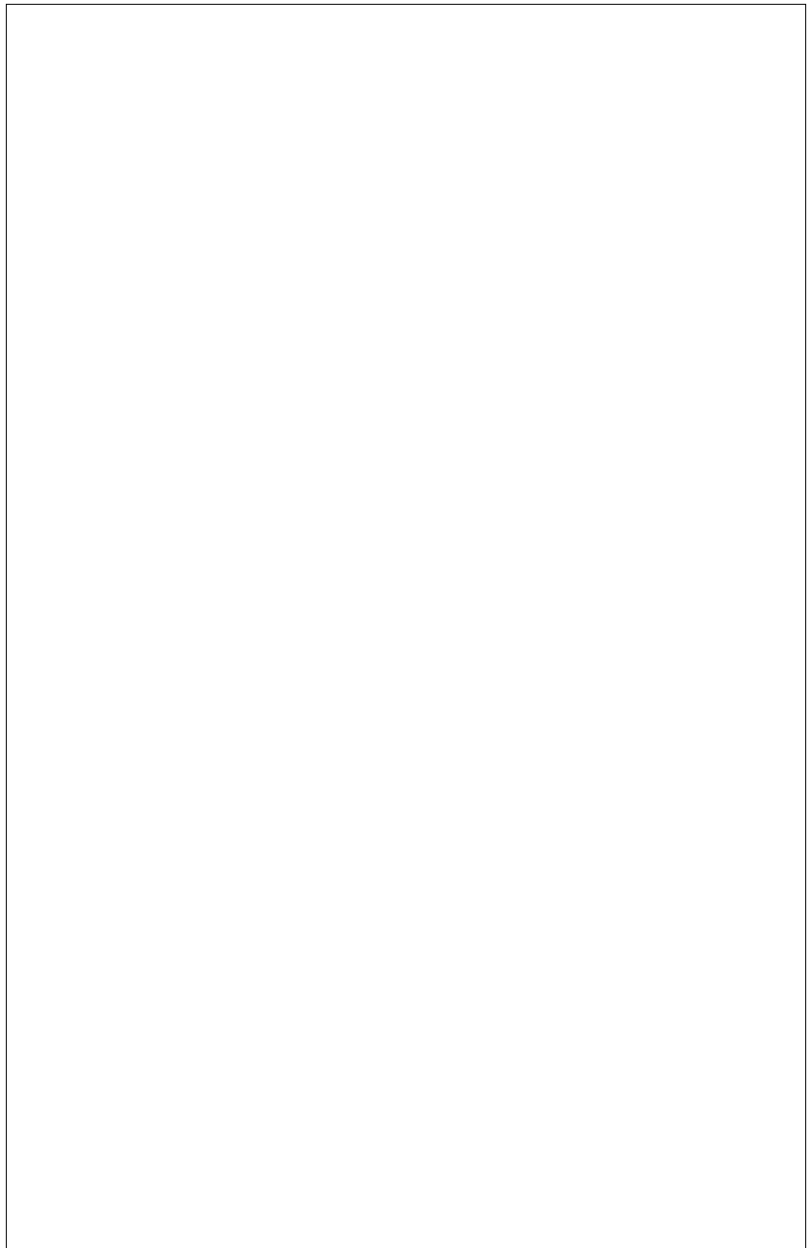
Development of general learning skills and interdisciplinary thinking. Lecture, seminar, discussion.

BIS 401 Interdisciplinary Practicum. (3) F, S, SS

Further development of general learning skills and interdisciplinary thinking. Lecture, seminar, discussion.

BIS 402 Senior Seminar. (3) F, S, SS

Students select capstone activity (independent research, senior thesis, internship, community service, etc.). Lecture, seminar, discussion. *General Studies: L2.*



Old Main is home to the university's ROTC programs.

Tim Trumble photo

* Contact the department or school.

College of Architecture and Environmental Design

John Meunier, M.Arch.
Dean

PURPOSE

The practice of architecture and environmental design is the culturally responsible shaping of our environment—from the scale of the cities in which we live to the buildings and interiors we inhabit and the artifacts and products we use. What we design must be durable, useful, beautiful, appropriate to its context, and not a waste of resources, energy, or materials. Designing our environment is an art, a technology, and a social science that has a history as long as human culture. The goals of the faculty include offering students an education that becomes the basis for life-long growth and improvement as professionals, advancing the discipline in both theory and practice, and improving the quality of the environment by making the expertise and knowledge of the faculty available to other professionals and to the public.

ORGANIZATION

Academic Organization. The college is composed of three academic units:

- School of Architecture
- School of Design
- School of Planning and
Landscape Architecture

Administration of the college is the responsibility of the dean, who in turn is responsible to the president of the university through the senior vice president and provost.

College Facilities. All the college's programs are housed in a single complex. Facilities include the Architecture and Environmental Design Library; computer laboratories; design studios; the Gallery of Design; lecture and seminar rooms; the Media Center; offices for faculty, the administration, and student organizations; the shop; the slide collection; Materials Resource Center; and technology laboratories. The bridge between the original building and the expansion places the college's review and display space at the heart of the complex.

Architecture and Environmental Design Library. As a branch of the University Libraries, the Architecture and Environmental Design Library provides easy access to more than 30,000 books, periodicals, and reference materials for students, faculty, and the professional community. The library's special collections include archives of Blaine

Drake, Victor Olgyay, Calvin Straub, Will Bruder, and others, as well as research materials on Paolo Soleri and Frank Lloyd Wright. The Alternative Energy Collection and the Materials Resource Center provide additional sources for research.

Gallery of Design. The Gallery of Design is one of eight university galleries and museums. It provides space for traveling exhibitions and exhibitions of student and faculty work.

Special Facilities. College programs are supplemented by several special laboratories, including the computer-aided design and graphics lab; the high-bay research lab; the lighting lab; the solar research lab; the solar roofdeck work area; an extensive shop equipped to handle wood, plastic, and metal; the Herberger Center for Design Excellence; and the Joint Urban Design Program, which also has a studio at the ASU Downtown Center. The Media Center includes traditional graphics and audiovisual equipment as well as portable gear. The slide collection, with more than 100,000 images, is available for instructional use, and the college maintains an array of materials testing equipment.

ADMISSION

Lower-Division Programs. A new or transfer student who has been admitted to the university and has selected a college major is admitted to the lower-division program of his or her choice. A separate application procedure is required for entry to upper-division programs and graduate programs. Acceptance into lower-division programs does not guarantee acceptance to upper-division programs. Acceptance into lower-division programs requires a TOEFL score of 500 or higher for international students whose native language is not English.

Transfer Credits. While the university accepts credits transferred from other accredited institutions, transfer credits are not applied to specific degree programs until reviewed and accepted by the appropriate academic units. Transfer course work must be equivalent in both content and level of offering. In addition, a review of samples of work (portfolio format) from previous studio classes is required. Change of major transfers into

the College of Architecture and Environmental Design, or one of its program areas, requires a minimum 2.50 cumulative GPA.

Upper-Division Programs. Admission to upper-division programs is competitive. Consult requirements of each major for details. Students applying to more than one program must make a separate application to each and must submit separate portfolios. Students not enrolled at ASU when they apply to upper-division programs must also make a separate application to the university. Students not admitted to the upper division are not dismissed from the university and may reapply or may transfer to other programs. Students who plan to reapply should contact a college academic advisor. Transfers into upper-division programs are considered only if vacancies occur, and such transfers are limited to students with equivalent course work who are competitive with continuing students. Acceptance into some upper-division programs requires a TOEFL score of 500 or higher for international students whose native language is not English.

ADVISING

While the college and its academic units provide academic advising, *it is ultimately the responsibility of each student to fulfill academic and program requirements.* Advising and record keeping for lower-division programs are the responsibility of a college academic advisor (located in ARCH 141). Records for upper-division program students are kept in the appropriate academic units, and advising is by the faculty and the head of the academic unit. General career advising is available from all faculty members. Administration of program requirements is the responsibility of the head of the academic unit and the dean.

Appeals Procedures. Academic appeals and requests for variances are typically made first to the student's advisor and then, if necessary, to the head of the appropriate academic unit, the Governance and Grievance Committee, and, finally, the dean. A student who feels unjustly treated in academic or other matters relating to his or her career as a student may contact a college academic advisor or may take the grievance to the college ombudsperson.

DEGREES

Undergraduate. The college offers curricula for four- or five-year degree programs: the Bachelor of Science in Design (B.S.D.) degree with majors in Architectural Studies, Graphic Design, Housing and Urban Development, Industrial Design, and Interior Design; the B.S. degree in Environmental Resources; the Bachelor of Science in Landscape Architecture degree; and the Bachelor of Science in Planning degree. Applications for the B.S.D. degree in Design Science are not being accepted at this time.

Each undergraduate program is divided into a lower-division and an upper-division program. Completion of a lower-division program does not guarantee advancement to an upper-division program.

MINORS

The faculty in the School of Planning and Landscape Architecture offer minors in Environmental Resources and Urban Planning. See pages 133–134 for more information.

GRADUATE PROGRAMS

The faculty in the College of Architecture and Environmental Design offer the National Architectural Accrediting Board (NAAB)-accredited professional degree Master of Architecture (M.Arch.); Planning Accreditation Board (PAB)-accredited professional degree Master of Environmental Planning (M.E.P.); M.S. degree in Building Design; Master of Science in Design (M.S.D.); M.S. degree in Environmental Resources; and Ph.D. degree in Environmental Design and Planning. For more information on graduate programs in the College of Architecture and Environmental Design, see the *Graduate Catalog*.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students seeking a bachelor's degree must meet all university graduation requirements. See pages 79–83.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 semester hours of approved course

work in General Studies, as described on pages 84–87. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. General Studies courses are listed on pages 87–108 in the *General Catalog* following the section on General Studies, in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

COLLEGE DEGREE REQUIREMENTS

College of Architecture and Environmental Design degree requirements supplement the General Studies requirement. Each curriculum offered by the college includes sufficient approved course work to fulfill the General Studies requirement.

MAJOR REQUIREMENTS

Students seeking the Bachelor of Science in Design degree must satisfactorily complete a curriculum of 120 or 150 semester hours, depending on the major. The Bachelor of Science in Planning degree requires 120 semester hours. The Bachelor of Science in Landscape Architecture degree requires 120 semester hours. The B.S. degree in Environmental Resources requires 120 semester hours.

Students majoring in Interior Design must take 150 semester hours. All other majors require 120 hours.

Special Honors at Graduation. At the time of graduation, students with academic distinction are awarded the respective designation *cum laude*, *magna cum laude*, or *summa cum laude*. Also see university requirements for graduation with academic recognition, page 83.

ACADEMIC STANDARDS

Lower-Division Retention Standards. A student in one of the college's lower-division programs is placed on probation when he or she fails to maintain a cumulative GPA of 2.00. Students on probation must observe rules or limitations the college imposes on their probation as a condition of retention. If, after one semester on probation, the overall GPA is not at least a 2.00 and the conditions of probation have not been met, the student is disqualified for

**College of Architecture and Environmental Design
Degrees, Majors, and Concentrations**

Major	Degree	Administered by
Baccalaureate Degrees		
Architectural Studies	B.S.D.	School of Architecture
Design Science ¹	B.S.D.	School of Design
Environmental Resources Concentration: natural resource management	B.S.	School of Planning and Landscape Architecture
Graphic Design	B.S.D.	School of Design
Housing and Urban Development	B.S.D.	School of Planning and Landscape Architecture
Industrial Design	B.S.D.	School of Design
Interior Design ²	B.S.D.	School of Design
Landscape Architecture	B.S.L.A.	School of Planning and Landscape Architecture
Urban Planning	B.S.P.	School of Planning and Landscape Architecture
Graduate Degrees		
Architecture	M.Arch.	School of Architecture
Building Design Concentrations: computer-aided design, energy performance and climate-responsive architecture, facilities development and management	M.S.	School of Architecture
Environmental Design in Planning Concentrations: design; history, theory, and criticism; planning	Ph.D.	College of Architecture and Environmental Design
Environmental Planning Concentration: urban planning	M.E.P.	School of Planning and Landscape Architecture
Environmental Resources	M.S.	School of Planning and Landscape Architecture
Design Concentrations: graphic design, industrial design, interior design	M.S.D.	School of Design

¹ Applications for this program are not being accepted at this time.

² This major requires more than 120 semester hours to complete.

a minimum of two full academic semesters. Appeals may be made to the college Governance and Grievance Committee. Also see university retention standards, pages 77–78.

Upper-Division Retention Standards.

Students in upper-division programs are placed on probation when they fail to meet *any* of the following requirements:

1. failure, incomplete, or withdrawal from any required course;
2. a semester GPA below 3.00;
3. a grade of “D” or “E” in a design studio or a design laboratory; or
4. violation of the college *Code of Student Responsibilities* or any admission agreement.

Students on probation must observe rules or limitations that the college or academic unit places on their probation as a condition of continuation. Students may be removed from a program (but not necessarily the university) if

1. the requirements imposed are not met or the probationary semester GPA is below 3.00 after one semester on probation;
2. failures or withdrawals in required courses are not resolved at the next offering of the course;
3. failures or withdrawals from required sequential courses are not resolved; or
4. incompletes in required sequential courses are not completed before the first day of class of the next semester.

A student removed from a program is not guaranteed reinstatement in the program even if probation requirements or requirements placed on readmission are fulfilled. Appeals may be made first to the appropriate academic unit and, if necessary, to the college Governance and Grievance Committee. Also see university retention standards, pages 77–78.

Incompletes. It is the student’s responsibility to contact the instructor regarding the process of requesting and fulfilling an incomplete. Tardiness in contacting the instructor may result in a failing grade. Students must obtain an official “Request for Grade of Incomplete” form from their academic units. The completed form must include a justification, a listing of requirements that have not been fulfilled, and a proposed

schedule of completion. The instructor reviews the request, proposes modifications if necessary, and submits a copy of the request to the appropriate program head (for upper-division students) or a college academic advisor (for lower-division students). An incomplete in an upper-division course that is a prerequisite for sequential courses automatically places the student on probation and denies enrollment in subsequent courses. Also see university requirements on incompletes, pages 72–73.

Withdrawals. University withdrawal regulations apply to lower-division courses. In addition, because the college's upper-division curricula are modular and sequential and because space in the programs is limited, a student is expected to progress through the curriculum with his or her class. Withdrawal from a required upper-division course automatically places a student on probation. Withdrawal from a required upper-division course in a required sequence automatically removes the student from the program beginning the subsequent semester. Also see university requirements on withdrawals, pages 73–75.

Credit/No Credit. The only courses accepted toward graduation with a grade of pass/fail or credit/no credit are internships and field studies.

Foreign Study. The College of Architecture and Environmental Design maintains active communications with several foreign institutions offering professional course work similar to the programs of the college. This opportunity is available for students who wish to pursue professional studies at a foreign institution in lieu of resident course work for up to one academic year. Any interested student is encouraged to inform the head of his or her academic unit at the earliest possible date of any intentions for foreign study.

Exchange programs currently exist with the Stuttgart University, Germany; Wageningen Agricultural University, the Netherlands; the University of Valladolid, Spain; the University of British Columbia, Canada; and the Autonomous University of Guadalajara, Mexico. Foreign study programs in France, Italy, and Spain and summer off-campus courses are offered by the School of Architecture. The School of Planning and Landscape Architecture

offers a summer landscape planning course in Europe.

Students are also encouraged to consider foreign travel for either a semester or an entire academic year. A leave of absence must be requested for foreign study and foreign travel. Each academic unit reserves the right to evaluate the content and the student's competency in each of the courses completed at foreign institutions.

Internships. Upper-division students in the college are required to complete an internship program during the summer, normally between the third and fourth years of study. In the Environmental Resources degree program the internship is offered as an elective and is not required.

Attendance. Attendance is expected at all classes, laboratories, and seminars and is a criterion for evaluating performance. Absences and missing work due to absences may result in failure of a course or academic probation. A student may not be excused from attending a class except for medical reasons or other serious personal conditions beyond his or her control. Requests for special consideration must be submitted in writing to the instructor. If accepted, a student may be allowed to take a late or special examination or to submit missing work. Tardiness in contacting the instructor is cause for denying acceptance. See university policy regarding religious holidays, page 23.

Employment. It is difficult for students in professional programs to carry part-time employment while in school. Acceptance to any of the college's

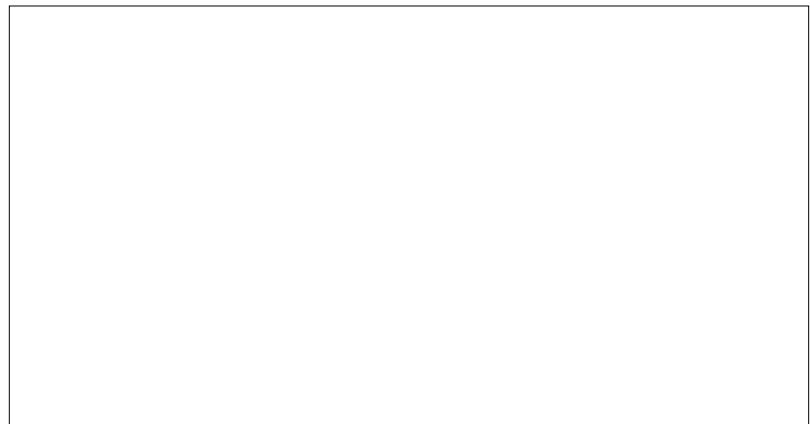
upper-division programs presumes a commitment of a minimum of eight hours a day for professional studies. Prior work experience is not a requirement for admission to upper-division programs.

Retention of Student Work. The college reserves the right to retain any or all projects or work submitted to meet course requirements for the college's future instructional, publication, and exhibition use.

Student Leave of Absence. Upper-division students who withdraw from classes or do not continue sequentially in enrollment must request both a leave of absence and readmission in writing from the head of the appropriate academic unit. Leaves of absence are for one-year increments and may be approved for personal reasons, travel, work, or additional study in other disciplines. A student on leave must make the written request for readmission before May 1 for the fall semester of the year of return or before November 1 for the spring semester so that a space may be reserved. Failure to request a leave of absence may result in removal from the program.

STUDENT RESPONSIBILITY

The purpose of this code is to promulgate standards of conduct for students of the College of Architecture and Environmental Design and to establish procedures for reviewing violations. Students are expected to support and maintain the highest professional standards with regard to their individual conduct and their personal and



Max Underwood, associate professor of Architecture, was recently named a National Distinguished Professor by the Association of Collegiate Schools of Architecture.

Jeff Havir photo

common environments in the college. Copies of the *Code of Student Responsibilities* are available from the Office of the Dean and a college academic advisor.

SPECIAL PROGRAMS

The college and its academic units regularly sponsor lecture series, symposia, and exhibits. In addition, faculty and students attend regional and national meetings of educators and professionals. Academic units sponsor student awards programs and regularly invite professionals and critics to reviews of student projects. The college also participates with the University Honors College, offering courses accepted in that college.

GENERAL INFORMATION

Accreditation. Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a minimum of five years of study, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. These professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year preprofessional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program or for employment options in architecturally related areas. See pages 18–19 for information on the accreditation of programs in the College of Architecture and Environmental Design.

Dean's List. Undergraduate students who earn 12 or more graded semester hours ("A," "B," "C," "D," or "E") during a semester in residence at ASU with a GPA of 3.50 or higher are eligible for the Dean's List. A notation of achieving the distinction of being listed on the Dean's List appears on the final grade report for that semester.

College of Architecture and Environmental Design Alumni Association. The College of Architecture and Envi-

ronmental Design Alumni Association encourages graduates to contribute to the college by acting as liaisons among the college community, students, and practicing professionals. The college also calls on the members of the Architecture Guild of Arizona State, the Arizona Design Institute, the Council for Design Excellence, and the Planning Advisory Committee for advice and to promote the goals of the college.

Council for Design Excellence. The Council for Design Excellence has been created to consolidate a partnership between the College of Architecture and Environmental Design and key community leaders who share a vital interest in the development of high quality in the built environment of the Phoenix metropolitan area. By joining together professionals, business and civic leaders, students, and faculty in a common pursuit of design excellence, the council seeks to make a profound difference in the quality of life.

Affiliations. See pages 18–21 for information on affiliations maintained by the college.

Student Professional Associations. The purpose of the student associations is to assist students with the transition into professional life and to acquaint them with the profession relating to their program of study. These include the following associations:

- American Institute of Architecture Students
- College of Architecture and Environmental Design Pre-Studies Organization
- Student Association of the College of Architecture and Environmental Design
- Student Association of Interior Designers (ASID, IALD, IFDA, IFMA, IIDA)
- Student Chapter/American Planning Association
- Student Chapter/American Society of Landscape Architects
- Student Chapter/Industrial Designers Society of America
- Student Chapter/Society of Environmental Graphic Designers
- Student Chapter/Society for Range Management
- Student Chapter/Soil and Water Conservation Society
- Student Chapter/Wildlife Society
- Women in Architecture

School of Architecture

Ron McCoy
Director
 (AED 162D) 602/965-3536
www.asu.edu/caed/Architecture

REGENTS' PROFESSOR COOK

PROFESSORS
 BOYLE, EL DIASTY,
 McCOY, McSHEFFREY,
 MEUNIER, PETERSON,
 SCHEATZLE, UNDERHILL

RESEARCH PROFESSOR JONES

ASSOCIATE PROFESSORS
 HARTMAN, KUPPER, LOOPE,
 McINTOSH, OZEL, SHEYDAYI,
 UNDERWOOD, ZYGAS

ASSISTANT PROFESSORS
 BERTELSEN, SOROKA,
 SPELLMAN, VAN DUZER

PURPOSE

The architecture program at ASU offers an integrated curriculum of professional courses and focuses on the design laboratory. The program reflects an awareness of the complex factors affecting the quality of the built environment. The program seeks through scholarship, teaching, research, design, and community service to develop the discipline and the knowledge necessary to address the important environmental and design issues faced by society.

In addition to developing knowledge and skills in architectural design, building technology, and professional practice, students are encouraged to select electives from a broad range of approved courses both within the college and across the university. These electives may be selected to devise a minor, to further professional study, or in some other fashion to enrich the student's academic experience.

ORGANIZATION

The School of Architecture's program is organized by the faculty under the direction and administration of the director and standing committees of the faculty.

DEGREES

The faculty in the School of Architecture offer the Bachelor of Science in Design degree with a major in Architectural Studies.

The program in architecture culminates with the professional degree Master of Architecture, which is accredited by the National Architectural Accrediting Board (NAAB). Completion of the program is intended to take six years.

Admission to the professional program in architecture is competitive and begins after completion of lower-division requirements (see "Admission" below and "Degree Requirements," page 120). The professional program includes two years of upper-division study leading to the Bachelor of Science in Design and two years of graduate study leading to the Master of Architecture (see "Upper-Division Professional Program" on this page).

In cooperation with the University Honors College, the school offers a special honors curriculum for students with University Honors College standing. Consult the advising officers in the school for information.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected Architectural Studies are admitted to the lower-division architecture program without separate application to the School of Architecture. Completion of lower-division requirements does not ensure acceptance to the upper-division professional program.

Transfer credits for the lower-division program are reviewed by the college faculty. To be admissible to this curriculum, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. Consult a college academic advisor for an appointment.

Entering lower-division students who are not prepared to enroll in some of the required courses are required to complete additional university course work. These additional prerequisite courses do not apply to the Bachelor of Science in Design degree requirements.

Upper-Division Professional Program. Admission to the upper-division professional program is competitive and limited by available resources. Admission is awarded to those applicants demonstrating the highest promise for professional success, including evidence of ability and the prospect for significant public service.

Transfer students who have completed the equivalent required lower-division course work may apply to the upper-division program. Prior attendance at ASU is not required for application to the upper-division program. Applicants who already hold a bachelor's degree in another field should apply to the 3+ year Master of Architecture degree program. See the *Graduate Catalog* for more information.

To be eligible for admission to the upper-division program, the following is required:

1. admission to ASU (note that application and admission to ASU are separate from application and admission to the upper-division program);
2. completion of lower-division requirements (a minimum of 62 semester hours) or equivalents as approved by a college academic advisor and the faculty of the school;
3. a minimum university cumulative GPA of 3.00 as well as a 3.00 GPA based only on the required lower-division courses or equivalents; and
4. submission of a portfolio (for detailed information about this requirement, see "Portfolio Format Requirements" on page 120).

In an unusual circumstance, when the admission standard deficiency is slight, written evidence of extenuating circumstances is convincing, and promise for success is evident, a student may be granted admission to the upper division on a *provisional* basis.

Students not admitted to the upper-division program are not dismissed from the school and may reapply or may transfer to other programs. Students who intend to reapply should meet with a college academic advisor.

Applications for transfer into the upper-division professional program are considered only if vacancies occur.

Transfer applicants must demonstrate that equivalent course work has been completed, and applicants must be academically competitive with continuing students.

Students who successfully complete the upper-division requirements receive the Bachelor of Science in Design degree with a major in Architectural Studies. This is not a professional degree. To complete the professional architecture program, students must attain the NAAB-accredited Master of Architecture degree. Students who receive the B.S.D. are eligible to apply for the graduate program and should consult the *Graduate Catalog* for proper application procedures. This application process is competitive and based on a thorough review of a student's undergraduate preparation and performance.

Students with the four-year Bachelor of Science in Design degree (with a major in Architectural Studies or an equivalent degree from another school that offers an accredited professional degree in architecture) should apply directly to the graduate program.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to a college academic advisor for the application form well in advance of the application deadline. For more information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from a college academic advisor. The following dates and procedures are for students applying to 1998–99 upper-division programs.

Upper-Division Application Deadlines. *April 15, 1998.* Portfolio and application documents are due in the school office by 5:00 P.M.

June 5, 1998. If the spring 1998 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 5. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Undergraduate Admissions office. Application is not complete until the university receives official transcripts for transfer course work.

For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1998. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation. An accepted student is expected to begin his or her upper-division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Portfolio Format Requirements.

Each applicant is responsible for obtaining the following documents and including them in the portfolio. Application materials are submitted at one time in a presentation binder (portfolio) with plastic sleeves (8.5" x 11" format only). The student's name must be affixed to the outside. Items must appear in the following order:

Page 1. The application form should be completely filled out with the first page visible. Application forms are available from the college academic advising office.

Page 2. The second page of the application should be visible.

Page 3. Application Essay. Student's name should be written in the upper right-hand corner.

Page 4. All college transcripts for both ASU and transfer work should be included through the fall 1997 semester. Copies are acceptable. An academic advisor forwards 1998 ASU transcripts. (Applicants wishing to transfer spring semester 1998 work are responsible for submitting these transcripts by June 12 so that they may be added to their portfolios. The student is also responsible for getting an official transfer transcript sent directly to the Office of the Registrar.)

Page 5. A certificate of admission is necessary only for those students who have been newly admitted for fall 1998 and who are applying directly into an upper-division program. The certificate is not required for students currently attending ASU.

Following Pages (Usually 10–20 Sheets). Students should present work sufficient to demonstrate the depth and breadth of their creative activity. This work should include (but is not limited to) examples of two- and three-dimensional design and graphics. Each project should be clearly identified (course, length of project, etc.), with a concise accompanying description of the assignment.

Students are encouraged to include additional materials, written or pictorial, that provide additional evidence of skills and abilities and of the aptitude and commitment to the major. When any work submitted is not completely original, the source must be given. When work is of a team nature, the applicant's role should be clearly indicated. Original examples or slides must not be submitted. All examples must be photographs or other reproduction graphic media.

Return of Portfolios. Application documents (pages 1–5) remain the property of the College of Architecture and Environmental Design. However, the remaining portfolio is returned after the admissions review, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after July 1, 1998. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school.

ADVISING

Advising for the lower-division curriculum is through the college academic advising office. Advising for upper-division students is by assigned faculty advisors and administrative personnel from the School of Architecture.

DEGREE REQUIREMENTS

The Bachelor of Science in Design degree with a major in Architectural Studies requires a minimum of 120 hours of course work. Most lower-division students pursue option A; however, those who intend eventually to seek an advanced degree in either engineering or building science are encouraged to fulfill the requirements outlined in option B.

GENERAL STUDIES REQUIREMENT

The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

The accredited professional degree Master of Architecture requires an additional 56 hours of approved graduate-level course work. For more information, consult the *Graduate Catalog*.

Architectural Studies—B.S.D. Lower-Division Requirements

Option A¹

First Year

Fall	
APH 100	Introduction to Environmental Design <i>HU, G, H</i> 3
ENG 101	First-Year Composition 3
PHI 103	Principles of Sound Reasoning <i>LI/HU</i> 3
	or ECN 112 Microeconomic Principles <i>SB</i> (3) or approved philosophy elective
SB elective	..... 3
Approved electives	..... 3
Total	..... 15

Spring

ADE 120	Design Fundamentals I ² 3
ENG 102	First-Year Composition 3
MAT 210	Brief Calculus <i>NI</i> 3
Approved elective	..... 6
Total	..... 15

Second Year

Fall	
ADE 221	Design Fundamentals II ² 3
APH 200	Introduction to Architecture <i>HU, G</i> 3
PHY 111	General Physics <i>SI/S2</i> ³ 3
PHY 113	General Physics Laboratory <i>SI/S2</i> ³ 1
Approved electives	..... 6
Total	..... 16

Spring

ADE 222	Design Fundamentals III ² 3
ANP 236	Introduction to Computer Modeling <i>N3</i> 3

PHY 112	General Physics <i>S1/S2</i> ⁴	3
PHY 114	General Physics Laboratory <i>S1/S2</i> ⁴	1
SB elective		3
Approved elective		3
Total		16
Option A lower-division total		62

- ¹ Transfer credits are reviewed by the college and evaluated for admissibility to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.
- ² Portfolio review is required for transfer studio work. See a college academic advisor for an appointment.
- ³ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.
- ⁴ Both PHY 112 and 114 must be taken to secure S1 or S2 credit.

**Architectural Studies—B.S.D.
Upper-Division
Professional Program Requirements
Option A
Third Year**

Fall		
ADE 321	Architectural Studio I	4
APH 313	History of Western Architecture I <i>L2/HU*</i>	3
ATE 353	Architectural Construction	3
AVC 301	Architectural Communication I	2
Approved elective/or L2		3
Total		15
Spring		
ADE 322	Architectural Studio II	5
ANP 331	Analysis and Programming	3
APH 314	History of Western Architecture II <i>L2/HU*</i>	3
ATE 361	Building Structures I	3
Total		14
Summer		
ARP 484	Clinical Internship	1
Total		1

Fourth Year		
Fall		
ADE 421	Architectural Studio III	5
ATE 451	Building Systems I	3
ATE 462	Building Structures II	3
Professional elective		3
Total		14
Spring		
ADE 422	Architectural Studio IV	5
ATE 452	Building Systems II	3
Architectural history elective		3

Professional elective	3
Total	14
Option A upper-division total	58
B.S.D. option A minimum total	120

* These courses may be completed before admission to the upper division. If already completed, a student may substitute an approved elective.

**Architectural Studies—B.S.D.
Lower-Division Requirements
Option B¹**

First Year		
Fall		
APH 100	Introduction to Environmental Design <i>HU, H</i>	3
ECE 100	Introduction to Engineering Design	4
ECN 112	Microeconomic Principles <i>SB</i> or ECN 111 Macroeconomic Principles <i>SB</i> (3)	3
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I <i>NI</i>	4
Total		17
Spring		
ADE 120	Design Fundamentals I ²	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics <i>S1/S2</i>	3
PHY 122	University Physics Laboratory I <i>S1/S2</i>	1
Total		14

Second Year		
Fall		
ADE 221	Design Fundamentals II ²	3
APH 200	Introduction to Architecture <i>HU, G</i>	3
ECE 210	Engineering Mechanics I: Statics	3
MAT 272	Calculus with Analytic Geometry III	4
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ²	3
PHY 132	University Physics: Laboratory II <i>S1/S2</i> ²	1
Total		17
Spring		
ADE 222	Design Fundamentals III ²	3
ANP 236	Introduction to Computer Modeling <i>N3</i>	3
ECE 300	Intermediate Engineering Design <i>L1</i>	3

ECE 312	Engineering Mechanics II: Dynamics	3
MAT 274	Elementary Differential Equations	3
Total		15
Option B lower-division total		63

¹ Transfer credits are reviewed by the college and evaluated for admissibility to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.

² Portfolio review is required for transfer studio work. Contact the School of Architecture for an appointment.

**Architectural Studies—B.S.D.
Upper-Division
Professional Program Requirements
Option B
Third Year**

Fall		
ADE 321	Architectural Studio I	4
APH 313	History of Western Architecture I <i>L2/HU</i> ¹	3
ATE 353	Architectural Construction	3
AVC 301	Architectural Communication	2
Total		12
Spring		
ADE 322	Architectural Studio II	5
ANP 331	Analysis and Programming	3
APH 314	History of Western Architecture II <i>L2/HU</i> ¹	3
ECE 313	Introduction to Deformable Solids	3
Total		14

Summer		
ARP 484	Clinical Internship ²	2
Total		2

Fourth Year		
Fall		
ADE 421	Architectural Studio III	5
ATE 451	Building Systems I	3
ECE 351	Engineering Materials	3
Approved SB Elective		3
Total		14
Spring		
ADE 422	Architectural Studio IV	5
ATE 452	Building Systems II	3
CEE 321	Structural Analysis and Design	4

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
Total		15
Option B upper-division total		57
B.S.D. option B minimum total		120

¹ These courses may be completed before admission to the upper division. If already completed, a student may request to substitute an approved elective.

² Internship is done over the summer between the third and fourth year.

Master of Architecture Graduate Division Professional Program Requirements

Fifth Year

Fall

ADE 521	Advanced Architectural Studio I	5
ATE 553	Building Systems III	3
ATE 563	Building Structures III	3
Professional elective		3
Total		14

Spring

AAD 551	Architectural Management I	3
ADE 522	Advanced Architectural Studio II	5
APH 681	Architectural Theory	3
Professional elective		3
Total		14

Sixth Year

Fall

AAD 552	Architectural Management II	3
ADE 621	Advanced Architectural Studio III	5
ANP 681	Project Development	3
Professional elective		3
Total		14

Spring

AAD 681	Professional Seminar: Capstone	3
ADE 622	Advanced Architectural Studio IV	5
Approved elective		3
Professional elective		3
Total		14
Graduate division total		56

COURSES

Subject matter within the school is categorized in the following instructional areas on this page.

Architectural Administration and Management. AAD courses focus on the organizational and management as-

pects of architectural practice, including management coordination, administrative procedures, ethics, legal constraints, and the economics of practice.

Architectural Design and Technology Studios. ADE courses require the synthesis of knowledge and understanding gained from other course work and develop an understanding of design theory and design skill through a series of comprehensive design projects. Students apply analytical methods, compare alternative solutions, and develop sophisticated technical and conceptual results.

Environmental Analysis and Programming. ANP courses develop the ability to analyze and program environmental and human factors as preconditions for architectural design using existing and emerging methods of evaluation and analysis.

Architectural Philosophy and History. APH courses develop an understanding of architecture as both a determinant and a consequence of culture, technology, needs, and behavior in the past and present. Studies are concerned with the theory as well as the rationale behind methods and results of design and construction. Case studies are both domestic and international.

Architecture Professional Studies. ARP courses provide students with off-campus opportunities, educational experience in group and individual studies relative to specific student interests, and faculty expertise, including summer internships and field trips.

Architectural Technology. ATE courses develop knowledge of the technical determinants, resources, and processes of architecture. These studies focus on the science and technology of design and construction, including materials, building systems, acoustics, lighting, structural systems, environmental control systems, computer applications to design and technology, and both passive and active solar systems. Emphasis is on measurable and quantifiable aspects.

Architectural Communication. AVC courses develop the student's understanding of communication theory as it applies to architectural design and practice as well as skills in drawing, graphics, photography, presentation design, and the design process.

The courses required in the upper-division and graduate levels of the professional program are not open to non-majors and students not admitted to the upper-division program.

GRADUATE PROGRAMS

The faculty of the school of Architecture offer a Master of Architecture and a M.S. degree in Building Design. Also, a dual career program—Master of Architecture/Master of Business Administration, has been established in cooperation with the College of Business. For more information, see the *Graduate Catalog*.

ARCHITECTURAL ADMINISTRATION AND MANAGEMENT (AAD)

AAD 551 Architectural Management I. (3) S Organizational, human performance, and market influences on architecture firms and projects. Readings, case studies, and analysis of managerial problems and solutions. Lecture, discussion. Prerequisite: graduate-level standing. Corequisite: ADE 522.

AAD 552 Architectural Management II. (3) F Design delivery, coordination of construction documents, cost estimating, bidding and negotiations, construction observation, and post-construction services. Case studies. Lecture, discussion. Prerequisite: AAD 551. Corequisite: ADE 621.

AAD 553 Advanced Architectural Management. (3) A Current issues in the business and practice of architecture. Financial management, project management, and design delivery strategies. Includes case studies. Lecture, discussion. Prerequisite: AAD 551 or instructor approval.

AAD 554 Advanced Construction Contract Administration. (3) N Advanced topics and problems in construction contract administration. Prerequisite: AAD 552 or instructor approval.

AAD 555 Architect as Developer. (3) A Development building, real estate, construction funding, land acquisition, and the sources for capital. Prerequisite: instructor approval.

AAD 558 Advanced Specifications and Cost Analysis. (3) N Coordination of working drawings, construction specifications, and cost estimates. Emphasis on methods, office procedures, contract conditions, bonds, and bidding procedures. Prerequisite: instructor approval.

AAD 560 Contemporary Architectural Practice. (3) A Advanced issues and directions in design delivery, firm and project management, global markets and expanding cultural responsibilities. Includes case studies. Seminar. Prerequisite: instructor approval.

AAD 681 Professional Seminar: Capstone. (3) S Examination of ethical, political, social, economic, ecological, and cultural issues confronting the practice of architecture. Readings and case studies. Seminar. Prerequisite: AAD 552. Corequisite: ADE 622.

ARCHITECTURAL DESIGN AND TECHNOLOGY STUDIOS (ADE)

ADE 120 Design Fundamentals I. (3) F, S, SS

Development of visual literacy. Introduction to drawing and graphic representation as methods of seeing and problem solving. Studio. Prerequisite: major in College of Architecture and Environmental Design.

ADE 221 Design Fundamentals II. (3) F

Exercises in basic design, stressing creative problem-solving methods, principles of composition, and aesthetic evaluation. Development of vocabulary for environmental design. Lecture, studio. Pre- or corequisite: ADE 120.

ADE 222 Design Fundamentals III. (3) S

Application of design fundamentals with an emphasis on architectural issues. Lecture, studio. Prerequisite: APH 200. Prerequisite with a grade of "C" or higher: ADE 221.

ADE 321 Architectural Studio I. (4) F

Introductory building design problems. Emphasis on design process, communication methods, aesthetics, construction, and technology. Lecture, studio, field trips. Prerequisite: admission to upper division. Corequisites: ATE 353; AVC 301.

ADE 322 Architectural Studio II. (5) S

Site and building design problems. Emphasis on programmatic and environmental determinants and building in natural and urban contexts. Lecture, studio, field trips. Prerequisite: ADE 321. Corequisite: ANP 331.

ADE 421 Architectural Studio III. (5) F

Topical design problems of intermediate complexity, including interdisciplinary problems. Lecture, studio, field trips. Prerequisites: ADE 322 and ARP 484 for Architectural Studies majors; permission of the school director for other majors in the college.

ADE 422 Architectural Studio IV. (5) S

Topical design problems of intermediate complexity, including interdisciplinary problems. Lecture, studio, field trips. Prerequisite: ADE 322 for Architectural Studies majors; permission of the school director for other majors in the college.

ADE 510 Foundation Architectural Studio. (6) SS

Fundamentals of architectural design, methodology, visualization, and representation. Lecture, studio, field trips. Prerequisite: admission to graduate program.

ADE 511 Core Architectural Studio I. (6) F

Application of design fundamentals in architectural problems, including construction, technology, programmatic and environmental determinants. Lecture, studio, field trips. Prerequisites: ADE 510; APH 200, 509. Corequisite: ATE 353.

ADE 512 Core Architectural Studio II. (6) S

Application of architectural design fundamentals to increasingly complex problems, including specific sites and activities. Lecture, studio, field trips. Prerequisite: ADE 511.

ADE 521 Advanced Architectural Studio I. (5) F

Design problems emphasizing theory, aesthetics, and tectonics as influences on architectural form. Lecture, studio, field trips. Prerequisite: admission to graduate program.

ADE 522 Advanced Architectural Studio II. (5) S

Design problems emphasizing the comprehensive integration of building systems and technologies as influences on architectural form. Lecture, studio, field trips. Corequisites: AAD 551; ADE 521.

ADE 621 Advanced Architectural Studio III. (5) F

Design problems emphasizing the urban context, planning issues, and urban design theory as influences on architectural form. Lecture, studio, field trips. Corequisites: AAD 552; ADE 522; instructor approval.

ADE 622 Advanced Architectural Studio IV. (5) S

Individual, student-initiated project reflecting a culminating synthesis of architectural ideas. Studio. Prerequisites: ADE 621; ANP 681. Corequisite: AAD 681.

ADE 661 Bioclimatic Design Studio. (6) A

Sustainable architectural and site synthesis at a variety of scales emphasizing bioclimatic criteria and the use of passive and low-energy systems. Prerequisite: professional degree or instructor approval. Corequisite: ATE 558.

ENVIRONMENTAL ANALYSIS AND PROGRAMMING (ANP)

ANP 236 Introduction to Computer Modeling. (3) F, S

Fundamentals of computer operation, geographic information systems, geometric modeling of three-dimensional forms and rendering of light, mathematical modeling of processes using spreadsheets. Lab. Cross-listed as DSC/PUP 236. Prerequisite: major in the College of Architecture and Environmental Design. *General Studies: N3.*

ANP 331 Analysis and Programming. (3) S

Analysis of natural and human environmental determinants as the basis of the programming and design of the built environment. Lecture, studio. Corequisite: ADE 322.

ANP 431 Architectural Programming Methods. (3) N

Theory and methods of architectural programming including determinants of architecture, information gathering techniques, program preparation, and methods of evaluation. Prerequisite: professional-level standing.

ANP 475 Computer Programming in Architecture. (3) F, S

Computer programming for architectural problems and applications. Lecture, lab. Prerequisite: CSE 183 or equivalent.

ANP 477 Computer Applications to Design Problems. (3) F

Examination of generic microcomputer software in solving architectural design problems. Emphasis on the logic of problem formulation. Lecture, lab. Prerequisite: instructor approval.

ANP 530 Computer Graphics in Architecture. (3) A

Fundamentals of computer graphics programming in architecture, including graphics hardware, device independent packages, 2- and 3-dimensional transformations, and data structures. 2 hours lecture, 3 hours lab. Prerequisite: ANP 475 or instructor approval.

ANP 561 Architectural Information Processing Systems. (3) A

Applications of information processing systems to architectural problems. Analysis of computing tools with respect to assumptions and theories. Lecture, lab. Prerequisites: graduate standing; instructor approval.

ANP 562 Information Systems for Facilities Management. (3) N

Introduction to database design and implementation. Assessment of facility management problems from information system points of view. Seminar, lab. Prerequisites: ANP 477 or (561); graduate standing.

ANP 576 Community Housing. (3) N

History, practices, trends, and forms of housing; includes growth of public programs, national and local programs, zoning law, housing distribution, planning principles and policies, design review, standards, and private development practice.

ANP 577 Housing Environments. (3) A

Contemporary housing environments, housing types, and life styles as determined by user preference, density, development and property standards, cost, community and privacy, security, identity, movement, and the need for open space.

ANP 581 Urban Structure and Design. (3) F

The nature and dynamics of urbanization and its relationship to architecture and urban design, including growth, decay, socialization, planning processes, and visual perception. Case studies. Prerequisite: professional-level standing.

ANP 681 Project Development. (3) F 1998

Definition and elaboration of major ideas for implementation in ADE 622 Advanced Architectural Studio IV in relation to contemporary theory and practice. Seminar. Prerequisite: ADE 522.

ARCHITECTURAL PHILOSOPHY AND HISTORY (APH)

APH 100 Introduction to Environmental Design. (3) F, S, SS

Survey of environmental design: includes historic examples and the theoretical, social, technical, and environmental forces that shape them. Cross-listed as DSC/PUP 100. *General Studies: HU, G, H.*

APH 200 Introduction to Architecture. (3) F

Survey of issues and polemics affecting current architectural theory and practice. Lecture, discussion. *General Studies: HU, G.*

APH 300 World Architecture I/Western Cultures. (3) F

Historical and contemporary built environments of Western civilizations: Mediterranean, Europe, and the Americas as manifestations of cultural history and responses to environmental determinants. Prerequisite: nonmajor. *General Studies: HU, G, H.*

APH 301 World Architecture II/Eastern Cultures. (3) S

Historical and contemporary built environments of Eastern civilizations: Mid-East, Central Asia, Far East, and South Pacific as manifestations of cultural history and responses to environmental determinants. *General Studies: G.*

APH 304 American Architecture. (3) N Architecture in the United States from earliest colonial times to present. Prerequisite: nonmajor. *General Studies: HU.*

APH 305 Contemporary Architecture. (3) N Europe and America from the foundations of the modern movement to the present. Prerequisite: nonmajor. *General Studies: HU.*

APH 313 History of Western Architecture I. (3) F Representative buildings and sites with emphasis on their physical and social settings from antiquity through the Middle Ages. Prerequisite: junior standing or instructor approval. *General Studies: L2/HU.*

APH 314 History of Western Architecture II. (3) S Representative examples of architecture and urban design with emphasis on their social and historical contexts; from the Middle Ages to the present. Prerequisite: junior standing or instructor approval. *General Studies: L2/HU.*

APH 411 History of Landscape Architecture. (3) F The physical record of human attitudes toward the land. Selected examples of ancient through contemporary landscape planning and design. Cross-listed as PLA 310. *General Studies: H.*

APH 414 History of the City. (3) F The city from its ancient origins to the present day with emphasis on European and American cities during the last five centuries. Cross-listed as PUP 412.

APH 441 Ancient Architecture. (3) N Architecture of the ancient Mediterranean world with selective emphasis on major historical complexes and monumental sites. Prerequisite: APH 313. *General Studies: HU.*

APH 442 Preservation Planning. (3) F Principles and practices in planning for preservation, conservation and neighborhood redevelopment. Emphasis on evaluation of historic resources. Off-campus field practicum required. Prerequisite: instructor approval.

APH 443 Renaissance Architecture. (3) N Selected examples of Renaissance architecture and urbanism with emphasis on their historical and cultural settings. Prerequisite: APH 314. *General Studies: HU.*

APH 444 Baroque Architecture. (3) N Selected examples of Baroque architecture and urbanism with emphasis on relationships between architecture and other arts. Prerequisite: APH 314. *General Studies: HU.*

APH 446 20th-Century Architecture I. (3) F Architecture in Europe and America from the foundations of the modern movement to the culmination of the international style. Prerequisite: major in college. *General Studies: HU.*

APH 447 20th-Century Architecture II. (3) S Developments in architecture since the international style. Prerequisite: APH 446. *General Studies: HU.*

APH 509 Foundation Seminar. (3) SS Historical, technical, theoretical, environmental, and professional issues in architecture. Lecture, seminar, field trips. Prerequisite: ADE 510.

APH 511 Energy Environment Theory. (3) F Solar and other energy sources in designed and natural environments; architectural, urban, and regional implications of strategies using other renewable resources.

APH 681 Architectural Theory. (3) S An examination of architectural theory. Emphasis on application of theory to practice. Seminar. Prerequisite: instructor approval.

APH 682 Architectural Criticism. (3) F An examination of architectural criticism, emphasizing specific methods of criticism and their application for aesthetic judgment. Seminar. Prerequisite: instructor approval.

APH 683 Critical Regionalism. (3) N Critical inquiry in cultural grounding the definition of place in architectural theory and practice. Lecture, field studies. Prerequisite: APH 446 or 447.

ARCHITECTURE PROFESSIONAL STUDIES (ARP)

ARP 451 Architecture Field Studies. (1–6) F, S, SS Organized field study of architecture in specified national and international locations. Credit/no credit. May be repeated with approval of director.

ARP 484 Clinical Internship. (1–12) SS Full-time internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit. Prerequisite: instructor approval.

ARP 684 Professional Internship. (2–6) S Field experience in an architectural firm specializing in an area directly related to the student's advanced study. Integration of theory and state-of-the-art practices. Credit/no credit. Prerequisite: instructor approval.

ARCHITECTURAL TECHNOLOGY (ATE)

ATE 353 Architectural Construction. (3) F Materials and methods of construction. Aesthetic, code, and cost considerations. Lecture, lab. Corequisite: ADE 321.

ATE 361 Building Structures I. (3) S Introduction to load distribution on structures. Static analysis of determinant beams, trusses, arches, and rigid frames. Computer applications. Lecture, lab. Prerequisite: admission to upper division.

ATE 451 Building Systems I. (3) F Principles of solar radiation, heat and moisture transfer, and environmental control systems as form influences. Energy conscious design. Lecture, lab. Prerequisite: admission to upper division.

ATE 452 Building Systems II. (3) S Architectural design implications of heating, ventilation, and air conditioning systems. Principles of lighting, daylighting, and acoustics, and their applications. Lecture, lab. Prerequisite: ATE 451.

ATE 453 Advanced Architectural Construction. (3) N Study of construction materials assembly and architectural detailing. Lecture, lab. Prerequisite: ATE 353.

ATE 462 Building Structures II. (3) F Strength of materials. Stresses in beams and columns. Thermal effects on structures. Analysis, design, and detailing of wood structural systems. Lecture, lab. Prerequisite: ATE 361.

ATE 501 Introduction to Solar Energy. (3) N Introduction to theoretical and practical aspects of use of solar radiation and nocturnal cooling for control of building environments.

ATE 521 Building Environmental Science. (3) F Scientific principles relating to comfort and environmental control. Heat and moisture transfer. Solar/natural energies for heating, cooling, and lighting. Lecture, lab. Prerequisite: MAT 290 or equivalent.

ATE 522 Desert Habitation Technology. (3) N Analysis of habitation approaches in nontechnological and technological societies arising from the nature of desert areas.

ATE 530 Daylighting Design. (3) S Daylight analysis, availability, design sky measurements, modeling and simulation. Integration with passive heating, cooling, building design, and energy considerations. Lecture, lab.

ATE 533 Building Performance Simulation and Visualization. (3) S Simulating, analyzing, and evaluating building energy, lighting, and acoustic systems using computer software packages. Lecture, lab.

ATE 534 Earth Sheltering. (3) S Fundamentals of earth-atmosphere interaction, thermal and moisture effects, soil appraisal, underground passive techniques, comfort and energy efficiency. Lecture, lab.

ATE 550 Passive Cooling in Buildings. (3) N Theory, analysis, and application of passive and low energy cooling systems for thermal comfort in buildings. Prerequisite: ATE 521.

ATE 551 Passive Heating in Buildings. (3) N Theory, analysis, and application of passive and low energy heating systems for thermal comfort in buildings. Prerequisite: ATE 521.

ATE 552 Energy Parameters in Buildings. (3) N Advanced modeling. Transient and multidimensional analysis of thermal and daylight performance using variable weather data. Prerequisite: ATE 551 or instructor approval.

ATE 553 Building Systems III. (3) F Design and integration of building systems, including mechanical, electrical, plumbing, security, communications, fire protection, and transportation. Prerequisite: admission to upper division or instructor approval.

ATE 554 Building Energy Efficiency. (3) S Impact of building design on energy performance. Climate responsiveness, operations dynamics, and subsystems integration in thermal comfort and efficiency. Prerequisite: ATE 452.

ATE 557 Construction Documents I. (3) S Production of architectural working drawings; legal status, organization, layout, site survey plans, sections, elevations, details, schedules, and coordination. Lecture, lab. Prerequisite: admission to upper division.

ATE 558 Bioclimatic Parameters. (3) S Theory, analysis, and application of energy-related parameters of site, climate, human comfort, and building program for design synthesis.

ATE 560 Building Energy Analysis. (3) F
Computer simulation of building thermal behavior. Software review. Detailed study of selected simulation models using case study projects. Lab. Prerequisites: ANP 475 (or 477); ATE 582.

ATE 561 Energy Analysis Techniques. (3) F
Mathematical models of building envelope and comfort conditioning systems as bases for optimization techniques. Prerequisite: ATE 560.

ATE 562 Experimental Evaluation. (3) A
Instrumentation, measurement and computational techniques for analysis of building components, and assessment of thermal and luminous performance. Prerequisite: ATE 521.

ATE 563 Building Structures III. (3) F
Analysis, design, and detailing of steel buildings and frames. Lateral analysis of small rigid and braced frame systems. Lecture, lab. Prerequisite: ATE 462 or equivalent.

ATE 564 Advanced Structures: Concrete. (3) A
Analysis, design, and detailing of concrete systems, considering continuity, multistory frames and shear walls, and lateral analysis. Computer application. Prerequisite: ATE 563 or instructor approval.

ATE 565 Advanced Structures: High Rise. (3) A
Developments in high-rise construction. Effects of wind and seismic forces. Preliminary analysis, design, and detailing considering code requirements. Lecture, lab. Prerequisite: ATE 563 or instructor approval.

ATE 582 Environmental Control Systems. (3) A
Heating, ventilation, and air-conditioning systems. Loads, psychrometrics, refrigeration cycle, air/water distribution, controls, energy performance standards, and utility rates. 2 hours lecture, 3 hours lab, field trips. Prerequisite: ATE 451 or 521.

ARCHITECTURAL COMMUNICATION (AVC)

AVC 141 Design Graphics. (2) N
Orthographic, paraline, axonometric, and perspective projection, shades and shadows, and basic descriptive geometry for designers. 1 hour lecture, 4 hours studio. Prerequisite: major in the College of Architecture and Environmental Design.

AVC 161 Advanced Freehand Perspective Drawing. (2) N
Introduction to color media, and analytical and design drawing exercises. 4 hours studio. Prerequisite: major in the College of Architecture and Environmental Design.

AVC 301 Architectural Communication. (2) F
Communication skills for architecture studios. Emphasis on graphics, drawing conventions, media, computer-aided design, design of presentations, and oral presentations. Lecture, studio. Corequisite: ADE 321.

AVC 410 Architectural Presentation Techniques. (3) F, S
Special techniques of graphic communications as preliminary presentation tools for the design professional. Prerequisite: AVC 301 or instructor approval.

AVC 411 Architectural Watercolor Presentation Techniques. (2) N
Introduction of architectural presentation techniques using watercolor as a primary media. Emphasis on color, composition, and technique. Prerequisite: AVC 301 or instructor approval.

AVC 444 Architectural Photography. (2–3) N
Use of photography as a means of architectural study, evaluation, and record. Introduction to 35 mm camera and darkroom techniques. Lecture, lab. Prerequisite: instructor approval.

School of Design

Robert L. Wolf
Director
(AED 154B) 602/965-4135
Fax 602/965-9717
www.asu.edu/caed/Design

PROFESSORS

KROELINGER, REZNIKOFF, WOLF

ASSOCIATE PROFESSORS

BERNARDI, BRANDT, CUTLER,
DETRIE, DORSA, JOHNSON,
McDERMOTT, NIELSEN, PATEL,
RATNER, SANFT, WITT

ASSISTANT PROFESSORS

HARMON-VAUGHAN,
NICKERSON, RANDALL

Information about the School of Design may also be obtained via the Web address provided or by sending electronic mail to robert.lee.wolf@asu.edu.

PURPOSE

The School of Design educates designers for a professional world that needs informed and developed talent. The curricula emphasize preparation in building bridges between the academic world and the professions. The faculty believe that designers have a responsibility to the public and the communities they serve. The student learns not only the history and theory of the professions and their practical application, but an understanding of systems, functions, scientific, and technical data related to public welfare, safety, and human factors. Students integrate aesthetic values into the products and spaces they design and consider the aspirations of the world in which they live. The goal is to

create the best design curricula possible and to develop technically accomplished and conceptually sophisticated graduates who continue to evolve as practicing professionals. With the help of an international network and a faculty of active design professionals, the aim is to educate creative individuals who will achieve a comprehensive understanding of both products and interiors as related to the different cultures in which they exist.

ORGANIZATION

Programs in the School of Design are organized by the faculty of the school under the direction and administration of the director.

DEGREES

The faculty in the School of Design offer the Bachelor of Science in Design degree with three majors: Graphic Design, Industrial Design, and Interior Design. Applications are not being accepted to the major in Design Science.

Graphic Design. The Graphic Design program educates and develops students for both the graphic design profession and graduate work. The goal of the faculty is to offer the best graphic design education, allowing the graduating student every option available. Studio classroom projects are planned to strengthen and refine students' proficiency in the language, process, and technical aspects of the profession. Projects are intended to help students think critically as individuals and in group situations. Students opting for the profession can expect to work in the areas of ad design, brand identity, broadcast graphics, corporate identity, environmental graphics, informational graphics, in-house corporate design, museum informational design, publication design, Web site design, and others. Students pursuing graduate studies can expect to be equally well prepared with critical and analytical thinking skills coupled with a diversified portfolio. The program is dedicated to a comprehensive education in graphic design as it relates to the changing communication standards of today and the future.

Industrial Design. The program in Industrial Design prepares creative individuals to shape the objects used by people daily. The industrial design profession serves the needs of both manufacturers and consumers by developing products that are attractive, useful, safe, convenient, and comfortable to use. The designer's special talents and skills include an aesthetic sense, knowledge of materials and processes, and an understanding of the physical and psychological needs of the user. Designers often serve as a catalyst among management, marketing, and engineering staffs.

Through studio projects, students learn to visualize ideas and communicate them to others and to refine skills in freehand sketching, computer-aided design, and model making. Assignments balance conceptual aspects with practical techniques. Typical projects include electronics, toys, furniture, sports equipment, and packaging. Stress is placed on the role of the designer in a team effort. Third-year students perform internships in a large corporation or in a consulting design agency.

Interior Design. The program in Interior Design is accredited by the national accrediting agency, the Foundation for Interior Design Education Research. The five-year curriculum emphasizes design process, technical skill development, problem solving, and the management skills needed to work in collaboration with the allied design professions. The goal is to create high-quality environments for human use.

Significant changes in the interior design profession over the last two decades are reflected in the program. The school is committed to integrating computer technology into each level of the curriculum. In doing so, the program offers an excellent environment for experimenting with and testing innovative applications of computer-aided design and simulation to interior design.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected Graphic Design, Industrial Design or Interior Design as a major are admitted to the appropriate lower-division program. Transfer credits for the lower-division program are reviewed by the college and evaluated as admis-

sible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. Consult a college academic advisor for an appointment.

Entering lower-division students who are not ready to take some courses in the curriculum (for example, algebra and trigonometry or a second course in computer programming) are required to take additional courses, which do not apply to the Bachelor of Science in Design degree. If these courses are needed, it may take an additional year to complete the lower-division program.

Completion of lower-division requirements does not ensure acceptance to an upper-division professional program.

Upper-Division Program. When students have completed the lower-division curriculum requirements, they may apply for acceptance to upper-division programs in Graphic Design, Industrial Design, or Interior Design. In addition to the portfolio review, the faculty in charge of the Interior Design program conduct a four-hour required design charette to measure minimum competency and understanding of the design process. The limited spaces available each year are awarded to applicants with the highest promise for professional success. The faculty of the School of Design retain the right to admit any meritorious student who may be deficient in a published school criterion. Such admission requires an extraordinary review of the applicant by the school's admissions committee. Should the faculty choose to admit such an applicant, the student is placed automatically on a provisional admission status with stipulations as to what is required to be removed from probation. See "Application to Upper-Division Programs" on this page.

Students not admitted to upper-division programs are not dismissed from the university and may reapply or may transfer to other programs. Students who intend to reapply should meet with a college academic advisor.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to a college academic advisor for the applica-

tion form well in advance of the application deadline. For more information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from a college academic advisor. The following dates and procedures are for students applying to 1998-99 upper-division programs.

Upper-Division Application Deadlines. *April 15, 1998.* Portfolio and application documents are due in the school office by 5:00 P.M. In addition to the portfolio submittal, the Interior Design faculty conduct a half-day *required* design charette to measure minimum competency and understanding of the design process. The date is announced when the portfolio is submitted. Students who do not complete the charette are not considered for upper-division admission. Additionally, Graphic Design requires an aptitude test in addition to a portfolio submittal. Application packets can be obtained from the Academic Advising office one month before the due date.

June 5, 1998. If the spring 1998 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 5. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Undergraduate Admissions office. Application is not complete until the university receives official transcripts for transfer course work. For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1998. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation. An accepted student is expected to begin his or her upper-division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Industrial and Interior Design Portfolio Format Requirements. Each applicant is responsible for obtaining the

following documents and including them in the portfolio. Application materials are submitted at one time in a presentation binder (portfolio) with plastic sleeves (8.5" x 11" format only). The student's name must be affixed to the outside. Items must appear in the following order:

Page 1. The application form should be completely filled out with the first page visible. Application forms are available from the college academic advising office.

Page 2. The second page of the application should be visible.

Page 3. Application Essay.

Page 4. All college transcripts for both ASU and transfer work should be included through the fall 1997 semester. Copies are acceptable. An academic advisor forwards 1998 ASU transcripts. (Applicants wishing to transfer spring semester 1998 work are responsible for submitting these transcripts by June 6 so that they may be added to their portfolios. The student is also responsible for getting an official transfer transcript sent directly to the Office of the Registrar.)

Page 5. A certificate of admission is necessary only for those students who have been newly admitted for fall 1998 and who are applying directly into an upper-division program. The certificate is not required for students currently attending ASU.

Following Pages (Usually 10–20 Sheets). Students should present work sufficient to demonstrate the depth and breadth of their creative activity. This work should include (but is not limited to) examples of two- and three-dimensional design and graphics. Each project should be clearly identified (course, length of project, etc.), with a concise accompanying description of the assignment.

Students are encouraged to include additional materials, written or pictorial, that provide additional evidence of skills and abilities and of the aptitude and commitment to the major. When any work submitted is not completely original, the source must be given. When work is of a team nature, the applicant's role should be clearly indicated. Original examples or slides must not be submitted. All examples

must be photographs or other reproduction graphic media.

Individual applicants are responsible for obtaining the Graphic Design Applications Packet by contacting the College of Architecture and Environmental Design Academic Advising Office (ARCH 141). Application materials are submitted in a portfolio organized by the individual applicant. The student's name must be affixed to the outside, with completed materials appearing in the following order:

1. application to the Graphic Design upper-division program;
2. "Commonly Asked Questions" form; and
3. the Graphic Design Aptitude Test. The packet contains complete instructions for completing the standard test which is to be addressed by each applicant. This test requires the completion of five problems which will be reviewed by the faculty and become the portfolio of materials considered for admission to the upper-division program.

Return of Portfolios. Application documents (pages 1–5) remain the property of the College of Architecture and Environmental Design. However, the remaining portfolio is returned after the admissions review, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after July 1, 1998. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school.

ADVISING

Advising for the lower- and upper-division curricula is through a college academic advisor (ARCH 141).

DEGREE REQUIREMENTS

The Bachelor of Science in Design degree requires a minimum of 120 semester hours for a major in Graphic Design and Industrial Design and a minimum of 150 semester hours for a

major in Interior Design. The program includes required field trips. Students are responsible for these additional costs. Foreign study opportunities are available for honors students. An internship is a required part of the program.

Graphic Design

The curriculum in Graphic Design is divided into a lower-division (first year) and an upper-division program (second, third, and fourth):

Lower-division program	30
Upper-division program	90

The lower-division curriculum balances a foundation in academic subjects such as English, numeracy, and computer technology, with departmental foundation courses which include history and theory, as well as studio courses in drawing and design fundamentals as they relate to conceptual design. Students apply for entry into the professional program after fulfilling the first year School of Design core foundation courses. The upper-division curriculum includes studio work in graphic design and its relationship to problem solving at multiple scales. Projects are intended to educate students to think critically as individuals and as team participants in small and large corporate facilities. A formal eight-week summer internship is included in the professional program which is coordinated by the faculty. Students intern in a variety of settings, including in-house corporate design, publication design, ad design agencies, and others.

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirements and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements for this professional degree, students must meet all university graduation and college degree requirements. See pages 79–83.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Graphic Design—B.S.D. Lower-Division Requirements¹

First Year

Fall

DSC 101	Design Awareness <i>HU, G</i>	3
DSC 121	Design Principles I	3
ENG 101	First-Year Composition	3
	or ENG 105 Advanced First-Year Compo- sition (3) if qualified	
N1 elective	.....	3
N3 elective	.....	3
Total	.....	15

Spring

DSC 120	Design Drawing	3
DSC 122	Design Principles II	3
ENG 102	First-Year Composition	3
Approved elective ²	.....	3
SB elective	.....	3
Total	.....	15
Lower-division total	.....	30

¹ Transfer credits for the lower-division program must be equivalent in both content and level of offering. Samples of studio work to be accepted for credit must be provided for evaluation through appointment with the Graphic Design coordinator in AED 154.

² A list of courses that fulfill approved electives is available from the college academic advisor.

Graphic Design—B.S.D. Upper-Division Requirements

Second Year

Fall

GRA 283	Letterform I	3
GRA 284	Visual Communication I	3
DSC 494	ST: Finding Purpose: Survival in Design	3
L1 elective	.....	3
SB elective	.....	3
Total	.....	15

Spring

GRA 286	Visual Communication II ¹	3
GRA 287	Letterform II	3
Design elective	.....	3
HU, H elective	.....	3
S1, S2 elective with laboratory I	.....	4
Total	.....	16

Third Year

Fall

GRA 318	History of Graphic Design <i>HU</i>	3
GRA 383	Typography I ¹	3
GRA 386	Visual Communication III ¹	3
Approved electives ²	.....	6
Total	.....	15

Spring

DSC 483	Preinternship Seminar ¹	1
GRA 345	Design Rhetoric <i>L2</i>	3
GRA 385	Typography II	3
GRA 387	Visual Communication IV ¹	3
Approved elective ²	.....	3
Upper-division design elective	.....	3
Total	.....	16

Summer

DSC 484	Internship ¹	3
Total	.....	3

Fourth Year

Fall

GRA 481	Visual Communication V ¹	3
GRA 494	ST: Graphic Design	3
Upper-division design elective	.....	3
S1, S2 elective with laboratory II	.....	4
Total	.....	13

Spring

GRA 482	Visual Communication VI ¹	3
GRA 494	ST: Graphic Design	3
Approved electives ²	.....	6
Total	.....	12
Upper-division total	.....	90
B.S.D. minimum total	.....	120

¹ Most studio courses and some lecture courses are sequential. They must be taken in and may be offered only during the semester noted.

² A list of courses that fulfill approved electives is available from the college academic advisor.

Industrial Design

The curriculum in Industrial Design is divided into a lower-division and an upper-division program:

Lower-division program	.....	61
Upper-division program	.....	59
Total	.....	120

The lower-division curriculum balances a foundation in academic subjects such as English, algebra and trigonometry, computers, and physics with departmental courses that include history as well as studio courses in drawing, design fundamentals, human factors, and materials and processes.

The upper-division curriculum includes studio and laboratory work in industrial design, graphics, material design, and professional practice. Students also take a number of approved program electives. A supervised summer internship is part of the curriculum.

Upper-division studios emphasize projects that promote an interdisciplinary approach to solving problems and that develop the student's intellectual

understanding of the philosophy and direction of methods and theories related to industrial design. Problems proceed from small consumer products with simple task functions to larger and more complex problems and systems. Studio projects also emphasize the design processes: problem resolution through concept ideation, dialogue with specialists in related areas, and product development, presentation, and marketing.

Graduates of the program accept entry-level positions in industry and firms doing product and packaging design. Designers may focus on consumer products, transportation, electronics, medical devices, health products, recreational products, or materials application. Students may also choose to continue their education with graduate studies to enrich their design skills, to specialize, or to prepare for college-level teaching.

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

Industrial Design—B.S.D. Lower-Division Requirements¹

First Year

Fall

DSC 101	Design Awareness <i>HU, G</i>	3
DSC 121	Design Principles I	3
DSC 236	Introduction to Computer Modeling <i>N3</i>	3
ENG 101	First-Year Composition	3
	or ENG 105 Advanced First-Year Composition (3) if qualified	
MAT 117	College Algebra <i>N1</i>	3
Total	.....	15

Spring

DSC 120	Design Drawing	3
DSC 122	Design Principles II	3
ECN 112	Microeconomic Principles ²	3
ENG 102	First-Year Composition	3

MAT 170	Precalculus <i>NI</i>	3
Total	.....	15

Second Year

Fall		
DSC 344	Human Factors in Design	3
IND 227	Visual Methods for Problem Solving	3
IND 242	Materials and Design	3
IND 260	Industrial Design I	3
IND 316	20th-Century Design I <i>HU, H</i>	3
Total	.....	15

Spring

IND 228	Imaging and Visualization	3
IND 243	Process and Design	3
IND 261	Industrial Design II	3
PGS 101	Introduction to Psychology <i>SB</i> ²	3
PHY 111	General Physics <i>S1/S2</i> ³	3
PHY 113	General Physics Laboratory <i>S1/S2</i> ³	1
Total	.....	16
Lower-division total	.....	61

- ¹ Transfer credits for the lower-division program must be equivalent in both content and level of offering. Samples of studio work must be provided for evaluation. See a college academic advisor for an appointment.
- ² TGECC satisfied.
- ³ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

Industrial Design—B.S.D. Upper-Division Requirements

Third Year

Fall		
COM 225	Public Speaking or approved program elective <i>L1</i>	3
IND 327	Presentation Graphics	3
IND 354	Principles of Product Design	3
IND 360	Industrial Design III	5
MKT 394	Principles of Marketing	3
Total	.....	17

Spring

GRA 328	Graphic Design	3
IND 361	Industrial Design IV	5
S1, S2	elective with approved laboratory ...	4
Total	.....	12

Summer

DSC 484	Internship	2
Total	.....	2

Fourth Year

Fall

ENG 301	Writing for the Professions <i>L1</i>	3
IND 460	Design Project I	5
IND 470	Professional Practice for Industrial Design <i>L2</i>	3
Approved HU, SB	elective	3
Total	.....	14

Spring

IND 461	Design Project II	5
IND 474	Design Seminar	3
Approved elective*	.....	3
Elective	.....	3
Total	.....	14
Upper-division total	.....	59
B.S.D. minimum total	.....	120

* A list of courses that fulfill approved program and technology electives is available from the college academic advisor.

Interior Design

The curriculum in Interior Design is divided into a lower-division (first and second year) and an upper-division program (third, fourth, and fifth years):

Lower-division program	.....	56
Upper-division program	.....	94
Total	.....	150

The lower-division curriculum balances a foundation in academic subjects such as English, algebra and trigonometry, computer technology, and physics with departmental courses that include history and theory, as well as studio courses in drawing, design fundamentals, and conceptual design.

The upper-division curriculum includes studio work in interior design, furniture design, construction methods/structures, codes as related to materials and finishes, human factors, environmental control systems, as well as lecture courses in the history of interior design, decorative arts, and textiles. An eight-week supervised summer internship is part of the curriculum. The fifth year is an interdisciplinary year in which students address real-life environmental problems. This final year is a capstone experience which utilizes all previous learning within and outside the professional program. The student's final design project is completed in consultation with a member of the local professional community.

Graduates from the program accept entry-level professional positions in a variety of settings, including interior design firms, departments of space planning, architectural firms, public institutions, and industry. Students may also choose to continue their education through graduate studies, which offer greater enrichment in studio disciplines and which contribute to the possibility for postsecondary-level academic appointments, giving the recipients highly sought-after academic credentials.

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

Interior Design—B.S.D. Lower-Division Requirements¹

First Year

Fall

DSC 101	Design Awareness <i>HU, G</i>	3
DSC 121	Design Principles I	3
DSC 236	Introduction to Computer Modeling <i>N3</i>	3
ENG 101	First-Year Composition	3
	or ENG 105 Advanced First-Year Composition (3) if qualified	
MAT 117	College Algebra <i>NI</i>	3
Total	.....	15

Spring

COM 230	Small Group Communication, or approved SB elective	3
DSC 120	Design Drawing	3
DSC 122	Design Principles II	3
ENG 102	First-Year Composition or HU elective if ENG 105 is taken	3
MAT 170	Precalculus	3
Total	.....	15

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Second Year

Fall

INT	220	Media for Design Development ²	3
INT	223	Interior Design Issues and Theories <i>HU</i>	3
INT	231	Concepts for Interior Design ²	3
PHY	111	General Physics <i>S1/S2</i> ²	3
PHY	113	General Physics Laboratory <i>S1/S2</i> ²	1
Total			13

Spring

ARS	102	Art of the Western World II <i>HU</i>	3
COM	225	Public Speaking or Approved L1 elective	3
INT	235	User Needs and Behavior in Interior Design	3
S1 or S2 elective with laboratory			4
Total			13
Lower-division total			56

¹ Transfer credits for the lower-division program must be equivalent in both content and level of offering. Samples of studio work must be provided for evaluation. See a college academic advisor for an appointment.

² Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

Interior Design—B.S.D. Upper-Division Requirements

Third Year

Fall

DSC	344	Human Factors in Design	3
INT	310	History of Interior Design I <i>HU, H</i>	3
INT	340	Interior Codes: Public Welfare and Safety	3
INT	364	Interior Design Studio I	5
INT	366	Construction Methods in Interior Design	3
Total			17

Spring

DSC	483	Seminar	1
INT	311	History of Interior Design II <i>HU, H</i>	3
INT	341	Interior Materials and Finishes	3
INT	365	Interior Design Studio II	5
INT	455	Environmental Control Systems	3
Total			15

Summer

DSC	484	Internship	3
Total			3

Fourth Year

Fall

ENG	301	Writing for the Professions <i>L1</i>	3
INT	412	History of Decorative Arts in Interiors <i>HU</i>	3
INT	442	Specifications and Documents for Interiors <i>L2</i>	3
INT	457	Acoustics for Interior Design	3
INT	464	Interior Design Studio III	5
Total			17

Spring

INT	413	History of Textiles in Interior Design	3
INT	458	Lighting for Interior Design	3
INT	465	Interior Design Studio IV	5
SB	elective	.....	3
Total			14

Fifth Year*

Fall

INT	422	Facilities Planning and Management I	3
INT	446	Furniture Design and Production	3
INT	466	Interior Design Studio V	5
Approved degree project elective			3
Total			14

Spring

INT	423	Facilities Planning and Management II	3
INT	467	Interior Design Studio VI	5
INT	472	Professional Practice for Interior Design	3
Approved degree project elective			3
Total			14
Upper-division total			94
B.S.D. minimum total			150

* See "Fifth Year" below.

Fifth Year. During the fifth year, the student concentrates on research related to the development of a comprehensive project. This year is self-directed in nature and prepares the student for independent thinking and creative problem solving. The fifth-year experience promotes high expectations for producing professional work that represents the culmination of the major's academic experience. It should be noted that the fifth-year studio sequence is designed to draw majors from the upper-division programs of industrial design, graphic

design, and architecture, thus furthering a real-life interdisciplinary problem-solving experience.

DESIGN (DSC)

DSC 100 Introduction to Environmental Design. (3) F, S, SS

Survey of environmental design, including historic examples and the environmental, social, technical, and theoretical forces that shape them. Cross-listed as APH/PUP 100. *General Studies: HU, G, H.*

DSC 101 Design Awareness. (3) F, S, SS
Survey of cultural, global, and historical context for the design professions. *General Studies: HU, G.*

DSC 120 Design Drawing. (3) F, S, SS
Drawing as language to explore and communicate ideas. Development of drawing aptitude as language and process for design thinking. 1 hour lecture, 5 hours studio.

DSC 121 Design Principles I. (3) F, S, SS
Design as a language and process for creative thinking and realization. 1 hour lecture, 5 hours studio. Prerequisite: major in the College of Architecture and Environmental Design.

DSC 122 Design Principles II. (3) F, S, SS
Continued exploration of design as a language and process for creative thinking and realization. 1 hour lecture, 5 hours studio. Prerequisite: DSC 121.

DSC 236 Introduction to Computer Modeling. (3) F, S, SS
Fundamentals of computer operation, geographic information systems, geometric modeling of three-dimensional forms and rendering of light, mathematical modeling of processes using spreadsheets. Lab. Cross-listed as ANP/PUP 236. Prerequisite: major in the College of Architecture and Environmental Design. *General Studies: N3.*

DSC 344 Human Factors in Design. (3) F
Man-machine environment systems; human characteristics and behavior applied to design of products, systems, and their operating environment.

DSC 483 Preinternship Seminar. (1) S
Preparation of internship materials that produce and enhance a successful internship experience. Seminar. Prerequisite: 3rd-year major in the department.

DSC 484 Internship. (1–3) SS
Full-time summer internship under supervision of practitioners in the Phoenix area or other locales. Prerequisite: instructor approval.

DSC 520 Contemporary Design Issues. (3) F, S
Projected applications in design production, planning, and decision-making processes. Lecture, seminar. Prerequisites: INT 310 and 311 or equivalents.

DSC 524 Illumination and Acoustics. (3) N
Research and laboratory investigation of advanced illumination and acoustics issues of facility design. Emphasis on human factors and performance aspects. Prerequisites: INT 457 and 458 or equivalents.

DSC 525 Design Methodologies. (3) F Practical exercises and studies in problem-solving strategies; problem definition and supporting theory for the designer. Lectures, seminars, lab. Prerequisite: senior or graduate standing.

DSC 527 Modern Design Theory. (3) S Aesthetic, political, economic, and social theories that have shaped modern design; theory as the basis for design philosophies. Lectures, seminars. Prerequisite: DSC 525 or equivalent.

DSC 529 Design Criticism. (3) F Critical methods applied to design as material culture and human expression; evaluation of achievement versus intention. Lecture, seminar. Prerequisite: DSC 527 or equivalent.

DSC 544 Human Factors Systems and Documentation. (3) F Advanced topics associated with theory and methods of human factors in design. Individual projects stressing problem organization, evaluation, and documentation. Lectures, seminars, lab. Prerequisite: DSC 344 or equivalent.

DSC 552 Computer Simulation in Design. (3) F The use of computer graphics as a medium to develop and present images of the environment for analysis and perception. Lecture, lab. Prerequisite: senior or graduate standing.

DSC 553 Computer Imaging and Visual Perception. (3) S Issues and applications of computer simulation as a tool for describing and testing human interface with the environment. Lecture, lab. Prerequisite: senior or graduate standing.

DSC 558 Daylighting. (3) N Daylighting as a design determinant; concepts, techniques, methodology, experiments, and case studies. Lecture, studio. Prerequisite: senior or graduate standing.

DSC 580 Practicum: Methods of Teaching Design. (3) F Background and development of design education theories. Concepts of studio teaching methods. Comprehensive student project development and evaluation methods. Prerequisite: graduate standing.

GRAPHIC DESIGN (GRA)

GRA 283 Letterform I. (3) F Drawing of letterforms with focus on proportion and structure. Introduction to letterform nomenclature and classifications. 6 hours a week. Prerequisites: DSC 122; acceptance into Graphic Design program.

GRA 284 Visual Communication I. (3) F Theoretical and applied studies in shape, drawing, and color. 6 hours a week. Prerequisite: GRA 283.

GRA 286 Visual Communication II. (3) S Transition from theoretical to applied problems. Emphasis on refinement of visual skills. 6 hours a week. Prerequisites: GRA 284; acceptance into Graphic Design program. Corequisite: GRA 287.

GRA 287 Letterform II. (3) S Continuation of Letterform I with an emphasis on lowercase letters; basics of pen writing and font design. 6 hours per week. Prerequisites: GRA 284; acceptance into Graphic Design program. Corequisite: GRA 286.

GRA 318 History of Graphic Design. (3) F Survey of development in the graphic arts, innovative printing methods, aesthetic values, and social and cultural environments that shape them. *General Studies: HU.*

GRA 328 Graphic Design. (3) S Packaging applications and planning are investigated and applied to the development of an identity for a product line structured as a system. Lab. Prerequisite: IND 327.

GRA 345 Design Rhetoric. (3) F, S Development of critical thinking and expression of ideas in concise and persuasive written and spoken form. Prerequisites: ENG 101, 102. *General Studies: L2.*

GRA 382 Graphic Representation. (3) F Studio practice in drawing with an application toward graphic communication. 6 hours a week. May be repeated once for credit. Prerequisite: GRA 284.

GRA 383 Typography I. (3) F Theoretical exercises in spatial and textural qualities of type. Problems in tension, activation, and balance. Exercises in simple typographical applications. 6 hours a week. Prerequisites: GRA 286, 287. Corequisite: GRA 386.

GRA 385 Typography II. (3) S Problems in composition, choice, and combinations of type faces, formats, and their application to a variety of design projects. 6 hours a week. Prerequisite: GRA 383. Corequisite: GRA 387.

GRA 386 Visual Communication III. (3) F Problems in specific design applications such as poster, packaging, publications. Emphasis on development of concepts in visual communications. 6 hours a week. Prerequisites: GRA 286, 287. Corequisite: GRA 383.

GRA 387 Visual Communication IV. (3) S Client-oriented projects. Problems are multifaceted and the emphases are on continuity of design in more than one medium and format. 6 hours a week. Prerequisites: GRA 383, 386. Corequisite: GRA 385.

GRA 481 Visual Communication V. (3) F, S Studio problems with an emphasis on analysis, problem solving, and professional portfolio preparation. 6 hours a week. Prerequisites: GRA 385, 387.

GRA 482 Visual Communication VI. (3) S Individual and group projects with outside clients. All projects culminate in an exhibit. 6 hours a week. Prerequisite: GRA 481.

GRA 485 Graphic Design Workshop. (3) F, S, SS Preprofessional client/designer situations from concept to printed work. Studio workshop and internships for selected students. 6 hours a week. May be repeated once for credit. Prerequisite: instructor approval.

INDUSTRIAL DESIGN (IND)

IND 227 Visual Methods for Problem Solving. (3) F Introduction to conceptual design activity based on the mind-eye-media feedback loop. Graphic language used to represent conjecture, analysis, synthesis of objects, and their contexts. Seminar, studio. Prerequisite: DSC 122.

IND 228 Imaging and Visualization. (3) S Design activities stressing graphic language abstraction practiced for presentation. Structure of criticism, including description, interpretation, and evaluation are discussed. Seminar, studio. Prerequisite: IND 227.

IND 242 Materials and Design. (3) F Materials application in design. Introduction to characteristics and properties of metals and organic materials, including plastics and inorganic materials.

IND 243 Process and Design. (3) S Influences of industrial processing on design. Introduction to basic materials processing and postforming processes. Emphasis on appearance enhancement and design constraints of material processing. Prerequisite: IND 242.

IND 260 Industrial Design I. (3) F Introduction to the method and process of the industrial designer. Determinants necessary in small product design. 1 hour lecture, 2 hours studio. Prerequisite: DSC 122.

IND 261 Industrial Design II. (3) S Issues of physical form development related to product and design; form development properties of paper, fibers, wood, metal, and plastics. 1 hour lecture, 2 hours studio. Prerequisite: IND 260 or equivalent.

IND 316 20th-Century Design I. (3) F Modern European and American design from 1900 to 1940. Emphasis on transportation, product, furniture, exhibition, and graphic design. *General Studies: HU, H.*

IND 317 20th-Century Design II. (3) S Modern European, Asian, and American design since 1940. Emphasis on transportation, product, furniture, exhibition, and graphic design. *General Studies: HU, H.*

IND 327 Presentation Graphics. (3) F Methods for portfolio and professional product presentation using graphic media for information transfer are studied. Aesthetic judgment, organization, and craftsmanship are stressed. Seminar, studio. Prerequisite: IND 228.

IND 354 Principles of Product Design. (3) F Influences of physical and mechanical concepts in product design; mechanisms, kinematics, and fastening systems. Concepts of analysis for product design. Influences of concepts on aesthetics. Prerequisites: MAT 117; PHY 111.

IND 355 Plastics Design. (3) S Mold design for part requirements; molded holes; threads; inserts; fastening and joining; decorating; reinforced plastics. Prerequisite: IND 354.

IND 360 Industrial Design III. (5) F Methods of visual thinking, conceptualization, and ideation related to building skill levels in professional design presentation techniques. 10 hours studio. Prerequisite: department approval.

IND 361 Industrial Design IV. (5) S Emphasis on developing ideas into a complete functional product, including survey and application of aesthetics, human factors, materials, and manufacturing. 10 hours studio. Prerequisite: IND 360.

IND 460 Design Project I. (5) F

Complete analysis of the product unit as an element of mass production, featuring marketing, technology, human factors, and visual design. Emphasis on professional standards. 10 hours studio. Prerequisites: DSC 484; IND 361.

IND 461 Design Project II. (5) S

Product design, with emphasis in systems interaction. Culmination of design process and technique. Individual project direction is encouraged. 10 hours studio. Prerequisite: IND 361.

IND 470 Professional Practice for Industrial Design. (3) F

Business procedures, management techniques, accounting systems, ethics, and legal responsibilities of the design professions. May be repeated for credit. Prerequisite: senior standing. *General Studies: L2.*

IND 474 Design Seminar. (3) S

Manufacturer's liability, statutes, regulations, and common law rules; role of expert witnesses; insurance and product safety programs. Seminar. Prerequisite: senior standing.

INTERIOR DESIGN (INT)**INT 220 Media for Design Development.** (3) F

Graphic representation methods used to describe and analyze space; emphasis on quick presentation techniques. 6 hours studio. Prerequisite: DSC 121.

INT 223 Interior Design Issues and Theories. (3) F

Interiors issues, theories, and philosophies. Emphasis on unique social and cultural factors that shape 20th-century design concepts. *General Studies: HU.*

INT 231 Concepts for Interior Design. (3) F

Conceptual design development, including scale and proportion, light, texture, form, volume, and spatial hierarchy; passage and repose. 1 hour lecture, 4 hours lab. Prerequisite: DSC 122.

INT 235 User Needs and Behavior in Interior Design. (3) S

Applications of conceptual design to issues of programming and space planning, user needs, and behavior. 1 hour lecture, 4 hours lab. Prerequisite: INT 231.

INT 310 History of Interior Design I. (3) F

The design of interior spaces as an expression of cultural influences to 1835. *General Studies: HU, H.*

INT 311 History of Interior Design II. (3) S

Design of interiors as an expression of cultural influences from 1835 to the present. Prerequisite: INT 310 or instructor approval. *General Studies: HU, H.*

INT 340 Interior Codes: Public Welfare and Safety. (3) F

Codes and regulations as performance criteria for interior design. Corequisite: INT 366.

INT 341 Interior Materials and Finishes. (3) F

General analysis of quality control measures relating to interior design materials, finishes, and performance criteria. Prerequisites: INT 340, 366.

INT 364 Interior Design Studio I. (5) F

Studio problems in interior design related to behavioral response in personal and small group spaces. 10 hours studio. Prerequisite: department approval.

INT 365 Interior Design Studio II. (5) S

Studio problems in interior design, with emphasis on issues of public and private use of interior places of assembly. 10 hours studio. Prerequisite: INT 364.

INT 366 Construction Methods in Interior Design. (3) F

Design theory related to analysis, materials, and building techniques of horizontal and vertical construction in interior design. Lecture, field trips. Corequisite: INT 340.

INT 412 History of Decorative Arts in Interiors. (3) F

The design of decorative arts as an expression of cultural influences and as an extension of interior spaces. Prerequisite: INT 311 or instructor approval. *General Studies: HU.*

INT 413 History of Textiles in Interior Design. (3) S

Cultural and historical expression of textiles as related to interiors. May include field trips. Prerequisite: INT 412 or instructor approval.

INT 422 Facilities Planning and Management I. (3) F

The facility management process in large-scale organizations. Planning, long-range forecasting, and productivity. Project management methodologies using micro-based software programs. Prerequisite: senior standing.

INT 423 Facilities Planning and Management II. (3) S

The formation of facilities policies, procedures, and standards. The facilities database, space allocations, and management process. Evaluation of programming criteria. Prerequisites: INT 422; senior standing.

INT 442 Specifications and Documents for Interiors. (3) F

Contract specifications, documents, schedules, and bidding procedures for interior design. Prerequisites: INT 341, 365. *General Studies: L2.*

INT 446 Furniture Design and Production. (3) F

Design, construction, cost estimating, and installation in interior furniture and millwork. 1 hour lecture, 4 hours studio.

INT 455 Environmental Control Systems. (3) S

Survey of environmental control systems and their application in the design of building interiors. Lecture, field trips. Prerequisites: MAT 117, 118; PHY 111, 113; junior standing.

INT 457 Acoustics for Interior Design. (3) F

Physical properties of sound. Studies pertaining to sound-absorbing materials, constructions, and room acoustics. Prerequisites: MAT 170; PHY 111, 113.

INT 458 Lighting for Interior Design. (3) S

Light as an aspect of interior design. Evaluation of light sources for distribution, color, and cost.

INT 464 Interior Design Studio III. (5) F

Studio problems in interior design related to commercial spaces. 10 hours studio. Prerequisites: DSC 484; INT 365.

INT 465 Interior Design Studio IV. (5) S

Studio problems in interior design related to health and educational facilities. 10 hours studio. Prerequisite: INT 464.

INT 466 Interior Design Studio V. (5) F

Advanced interior design problem solving, design theory, and criticism. Thesis project development based upon the major's concentration. 10 hours studio. Prerequisite: department approval.

INT 467 Interior Design Studio VI. (5) S

Advanced series of specialized projects or continuation of thesis project based upon the major's concentration. 10 hours studio. Prerequisite: department approval.

INT 472 Professional Practice for Interior Design. (3) S

Business procedures, project control, fee structures, and professional product liabilities.

School of Planning and Landscape Architecture

Frederick Steiner

Director

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www.asu.edu/caed/Planning

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ASSISTANT PROFESSORS

CAMERON, CREWE, EWAN,
FISH-EWAN, GUHATHAKURTA,
McSHERRY, WASSERMAN

PURPOSE

The faculty in the School of Planning and Landscape Architecture offer a curriculum that provides an education for careers in environmental planning, environmental resource management, housing and urban development, landscape architecture, urban and regional development, and urban design. The goal of the faculty is to advance the profession of planning through scholarship, teaching, research, and community service.

Planners and landscape architects work on projects that range in scale from site and landscape development to the design of entire communities and the formulation of policies that shape urban and regional growth. Planning,

landscape architecture, and environmental resource management graduates work for both private firms and government agencies. Their work typically involves fields such as land-use planning, housing, natural resource management, urban transportation, development controls, and environmental impact assessment.

For graduates from environmental resources, employment opportunities in environmental resource management, range ecology, land reclamation, and soil conservation exist with both private firms and government agencies.

ORGANIZATION

The programs are organized by the faculty of the school under the direction and administration of the program coordinators and the school director.

DEGREES

The faculty in the School of Planning and Landscape Architecture offer the B.S. degree in Environmental Resources, Bachelor of Science in Planning degree in Urban Planning, Bachelor of Science in Landscape Architecture degree, and Bachelor of Science in Design degree in Housing and Urban Development.

Bachelor of Science in Planning (B.S.P.)

Following two years of preparatory work, students take two years of courses that include site planning, landscape architecture, urban design, comprehensive planning, socioeconomic and environmental analysis, computer and analytical methods, planning law, and public-policy formulation and administration. An internship is required between the third and fourth years. Many students continue to specialize in planning at the graduate level. Students in planning are exposed to the theories, methods, and interdisciplinary approaches of the profession of planning.

Bachelor of Science in Landscape Architecture (B.S.L.A.)

This degree prepares students to be professional landscape architects. Students explore the reasons for and the techniques involved in the analysis, planning, and design of the environment, both natural and built.

Bachelor of Science in Design (B.S.D.)

A B.S.D. degree with a major in Housing and Urban Development educates and trains professionals to lead in the production of high-quality affordable housing, in the development of creatively designed and soundly planned neighborhoods and communities, in the revitalization of communities, and in the exemplification of social inclusiveness and environmental sensitivity in responsible land development. HUD graduates may pursue careers in the private home development industry, in publicly sponsored housing and community redevelopment, with nonprofit housing agencies, or in post-graduate housing and urban development research and education. The B.S.D. with a major in Housing and Urban Development is offered in conjunction with the College of Extended Education.

Environmental Resources—B.S.

The concentration in natural resource management is available with options in wildlife habitat management and range ecology. In addition, particular attention is given to the study of ecosystem characteristics as they relate to the use of renewable resources.

MINORS

Environmental Resources

The minor in Environmental Resources is available to students interested in environmental courses but who wish to pursue other majors. A minimum of 16 semester hours are required for the minor. The courses are designed to appeal to and inform the nonenvironmental resources student and cover a broad range of topics.

All students must complete the required courses.

Required Courses

ERS 130	Soils and Environmental Quality <i>SI/S2</i>	4
ERS 246	Introduction to the Environmental Sciences <i>G</i>	3
ERS 480	Ecosystem Management and Planning	3
Total		10

Two additional courses must be selected from the optional course list.

Optional Courses

ERS 225/226	Soils/Soils Laboratory	4
ERS 333	Water Resources Management	3

ERS 360	Range Ecosystem Management	4
ERS 365	Watershed Management	3
ERS 370	Forest Ecosystem Dynamics	3
ERS 407	Range Plants and Habitats	4
ERS 410	Wildlife Habitat Relations	4
ERS 433	Riparian Ecosystem Management	3
ERS 460	Applied Systems Ecology	3
ERS 475	Wildlife and Range Animal Management	3

The minor is automatically open to students from the following majors: Architecture, Biology, Civil Engineering, Design, Geography, Landscape Architecture, Planning, Plant Biology, and Recreation. Students pursuing other majors will be considered on an individual basis. In order to pursue a minor in Environmental Resources, students must have a GPA of 3.00. Students must achieve a GPA of 3.00 in minor classes in order for them to count toward the minor.

Students in nonautomatically approved majors must submit a letter of application to the School of Planning and Landscape Architecture seeking approval to enter the minor program.

Urban Planning

The minor in Urban Planning is designed for students who are interested in the field but who wish to pursue other majors. The course selection is designed to provide an overview of the field and offer information with broad appeal.

All students must complete a minimum of 15 semester hours from the following courses:

PUP 301	Introduction to Urban Planning <i>LI*</i>	3
PUP 412	History of the City <i>H</i>	3
PUP 420	Theory of Urban Design <i>HU</i>	3
PUP 425	Urban Housing Analysis	3
PUP 432	Planning and Development Control Law	3
PUP 433	Zoning Ordinances, Subdivision Regulations, and Building Codes	3
PUP 442	Environmental Planning	3
PUP 444	Preservation Planning	3
PUP 475	Environmental Impact Assessment	3
PUP 510	Citizen Participation	3

* PUP 301 Introduction to Urban Planning is required. Landscape Architecture students must choose another class with an advisor's approval since PUP 301 is already required for the B.S.L.A.

The minor is automatically open to students from the following majors: Architecture, Civil Engineering, Environmental Resources, Geography, Housing and Urban Development, Landscape Architecture, and Real Estate. Students pursuing other majors will be considered on an individual basis. In order to pursue a minor in Urban Planning, students must have a GPA of 3.00. Students must achieve a GPA of 3.00 in minor classes in order for them to count toward the minor.

Students in nonautomatically approved majors must submit a letter of application to the School of Planning and Landscape Architecture seeking approval to enter the minor program.

GRADUATE PROGRAMS

The faculty in the School of Planning and Landscape Architecture offer specialization areas in landscape ecological planning, urban and regional development, and urban design under the Master of Environmental Planning (M.E.P.) degree; the M.S. degree in Environmental Resources; and a collegewide, interdisciplinary Ph.D. degree in Environmental Design and Planning with concentrations in design; history, theory, and criticism; and planning. For more information, see the *Graduate Catalog*.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected a program in the School of Planning and Landscape Architecture are admitted to the lower-division program. Transfer credits for the lower-division program are reviewed by the college and evaluated for admissibility to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. See a college academic advisor for an appointment.

Completion of lower-division requirements does not ensure acceptance to the upper-division professional program. Admission to the upper division is competitive and limited to the space available. Admission requires formal application and acceptance.

Upper-Division Program. Admission to the upper-division programs of the School of Planning and Landscape Architecture is limited to applicants who have completed the lower-division program requirements and who are determined by the admissions committee to have the best potential for academic success. Spaces in the program are limited by available facilities, faculty, and qualified applicants. A lower-division program GPA of 3.00 may be required. See "Application to Upper-Division Programs" below.

Students not admitted to upper-division programs are not dismissed from the university and may reapply later or may transfer to other programs. Students who plan to reapply should meet with a college academic advisor.

Applications for admission to the upper-division Housing and Urban Development program are made directly to the school director. Applications must include a proposed curriculum developed in conjunction with a faculty advisor and acceptable to the department faculty.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to a college academic advisor for the application form well in advance of the application deadline. For more information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from a college academic advisor. The following dates and procedures are for students applying to 1998–99 upper-division programs.

Upper-Division Application Deadlines. *April 15, 1998.* Portfolio and application documents are due in the school office by 5:00 P.M.

June 5, 1998. If the spring 1998 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 5. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Undergraduate Admissions office. Application is not complete until the university receives official transcripts for transfer course

work. For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1998. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation. An accepted student is expected to begin his or her upper-division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Portfolio Format Requirements.

Each applicant is responsible for obtaining the following documents and including them in a presentation binder (portfolio) with plastic sleeves (8.5" x 11" format only) and a label, with the student's name, affixed to the outside:

1. evidence of graphic and design work shown in 35mm slides or 3" x 5" or other appropriately sized photographs (20 maximum);
2. a statement of intent describing the applicant's specific background and interest in the major;
3. latest college-level transcript(s). No high school transcripts are required;
4. one example of written work (e.g., a class paper);
5. samples of individual work. Team work can be included, but the contribution of the candidate must be clarified;
6. students are strongly encouraged to submit evidence of other endeavors related to the major;
7. the applicant's GPA based on required courses and cumulative GPA will be evaluated;
8. students completing the Phoenix Community College (PCC) articulation program with the B.S.D.–HUD program should submit similar material from PCC.

Return of Portfolios. Application documents remain the property of the

School of Planning and Landscape Architecture. However, the remainder of the portfolio is returned after the admissions review, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after August 15, 1998. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school.

ADVISING

Advising for the lower-division curriculum is provided through a college academic advisor. Advising for the upper-division curriculum is provided by the school director and faculty advisors.

DEGREE REQUIREMENTS

The Bachelor of Science in Planning degree requires a total of 120 semester hours.

**Bachelor of Science in Planning,
Major in Urban Planning**

Lower-division courses	61
Upper-division courses core	57
Internship	2
Total	120

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

**Bachelor of Science in Planning,
Major in Urban Planning
Lower-Division Requirements¹**

First Year

Fall

ENG 101	First-Year Composition	3
	or ENG 105 Advanced First-Year Composition (3) if qualified	

MAT 117	College Algebra <i>N1</i>	3
	or approved more advanced <i>N1</i> elective	
PUP 100	Introduction to Environ- mental Design <i>HU, G, H</i>	3
PUP 194	Introduction to Graphics	3
	Approved <i>HU</i> or <i>SB</i> elective	3
Total	15	

Spring

ECN 112	Microeconomic Principles <i>SB</i>	3
ENG 102	First-Year Composition	3
	or <i>HU</i> elective if <i>ENG 105</i> is taken	
GPH 111	Introduction to Physical Geography <i>S1/S2</i>	4
	Approved <i>HU</i> or <i>SB</i> elective	3
	Approved <i>SB</i> elective	3
Total	16	

Second Year

Fall

ADE 221	Design Fundamentals <i>I</i> ²	3
BIO 319	Environmental Science <i>G</i>	3
PLA 201	Landscape Architecture and Society ²	3
PUP 261	Urban Planning I	4
PUP 301	Introduction to Urban Planning <i>L1</i>	3
Total	16	

Spring

BIO 100	The Living World <i>S1/S2</i>	4
PUP 264	Urban Planning II	4
	Approved <i>HU</i> elective	3
	Approved <i>N2</i> elective	3
Total	14	
Lower-division minimum total	61	

¹ Transfer credits are reviewed by the college and evaluated as admissible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.

² Portfolio review is required for transfer studio work. See a college academic advisor for an appointment.

**Bachelor of Science in Planning,
Major in Urban Planning
Upper-Division Professional
Program Requirements**

Third Year

Fall

PUP 322	Planning Methods Using Computers	3
PUP 361	Urban Planning III	5
PUP 412	History of the City <i>H</i>	3
PUP 424	Planning Methods	3
PUP 442	Environmental Planning	3
Minimum total	17	

Spring

GCU 361	Urban Geography <i>SB</i>	3
PUP 362	Urban Planning IV	5
PUP 420	Theory of Urban Design <i>HU</i>	3
SCM 405	Urban Transportation	3
Total	14	

Summer

PUP 484	Internship	2
PUP 485	International Field Studies in Planning and Landscape Architecture (optional)	1–12
Minimum total	2	

Fourth Year

Fall

PUP 425	Urban Housing Analysis	3
PUP 432	Planning and Development Control Law	3
PUP 461	Urban Planning V	5
PUP 494	Environmental Planning Economics	3
PUP 498	Senior Pro-Seminar	1
Total	15	

Spring

PUP 452	Ethics and Professional Practice <i>L2</i>	3
PUP 462	Urban Planning VI	5
PUP 475	Environmental Impact Assessment	3
Total	11	
Upper-division minimum total	59	
B.S.P. minimum total	120	

**Bachelor of Science in
Landscape Architecture**

Lower-division courses	61
Upper-division courses core	58
Internship	1
Total	120

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

**Bachelor of Science in
Landscape Architecture
Lower-Division Requirements¹**

First Year	
Fall	
ARS 101	Art of the Western World I <i>HU, H</i> 3 or approved HU or SB elective
ENG 101	First-Year Composition 3 or ENG 105 Advanced First-Year Composition (3) if qualified
HUD 161	Graphic Communication I 3
MAT 117	College Algebra <i>NI</i> 3 or approved more advanced N1 elective
PUP 100	Introduction to Environmental Design <i>HU, G, H</i> 3
Total 15	
Spring	
ARS 102	Art of the Western World II 3 or approved HU elective
ENG 102	First-Year Composition 3 or HU elective if ENG 105 is taken
GPH 111	Introduction to Physical Geography <i>SI/S2</i> 4 Approved HU or SB elective 3 Approved SB elective 3
Total 16	
Second Year	
Fall	
ADE 221	Design Fundamentals II ² 3
BIO 319	Environmental Science <i>G</i> 3
PLA 201	Landscape Architecture and Society ² 3
PLA 261	Landscape Architecture I 4
PUP 301	Introduction to Urban Planning <i>LI</i> 3
Total 16	
Spring	
BIO 100	The Living World <i>SI/S2</i> 4 or PLA 108 Concepts in Plant Biology <i>SI/S2</i>
HIS 101	Western Civilization <i>SB, H</i> 3 or HIS 102 Western Civilization <i>SB, G, H</i> or approved SB elective
PLA 264	Landscape Architecture II 4 Approved N2 elective 3
Total 14	
Lower-division minimum total 61	

¹ Transfer credits are reviewed by the college and evaluated as admissible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.

² Portfolio review is required for transfer studio work. See a college academic advisor for an appointment.

**Bachelor of Science in
Landscape Architecture
Upper-Division Professional
Program Requirements**

Third Year	
Fall	
PLA 310	History of Landscape Architecture <i>H</i> 3
PLA 361	Landscape Architecture III 5
PLA 442	Landscape Construction I 3
PUP 322	Planning Methods Using Computers 3
PUP 412	History of the City <i>H</i> 3
Total 17	
Spring	
PLA 362	Landscape Architecture IV 5
PLA 420	Theory of Urban Design <i>HU</i> 3
PLA 444	Landscape Construction II 3
PLB 362	Landscape Plants I 3 or PLA 494 Plant Materials (3) —
Minimum total 14	
Summer	
PLA 484	Internship 2 or approved elective*
PLA 485	International Field Studies in Planning and Landscape Architecture (optional) 1–12
Minimum total 2	
Fourth Year	
Fall	
PLA 363	Landscape Planting Design ... 3
PLA 461	Landscape Architecture V 5
PLA 498	Senior Professional Seminar 1
PUP 432	Planning and Development Control Law 3
Total 12	
Spring	
PLA 443	Landscape Architecture Theory and Criticism 3
PLA 462	Landscape Architecture VI 5
PUP 442	Environmental Planning 3 or PUP 546 Urban Design Policy (3)
PUP 452	Ethics and Professional Practice <i>L2</i> 3
Total 14	
Upper-division minimum total 59	
B.S.L.A. minimum total 120	

* Courses that fulfill approved electives should be selected in consultation with departmental advisors.

**Bachelor of Science in Design,
Major in Housing and
Urban Development**

Lower-division courses	63
Upper-division courses core	56
Internship	1
Total	120

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84–108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79–83.

**Bachelor of Science in Design,
Major in Housing and
Urban Development
Lower-Division Requirements**

First Year	
Fall	
ECN 111	Macroeconomics Principles <i>SB</i> 3
ENG 101	First-Year Composition 3
GPH 111	Introduction to Physical Geography <i>SI/S2</i> 4 or PHY 111 General Physics and 113 General Physics Laboratory <i>SI/S2</i> (4) ¹
HUD 161	Graphic Communication I 3
PUP 100	Introduction to Environmental Design <i>HU, G, H</i> 3
Total 16	
Spring	
CSE 180	Computer Literacy <i>N3</i> 3
ECN 112	Microeconomics Principles <i>SB</i> 3
ENG 102	First-Year Composition 3
HUD 201	Introduction to Housing and Urban Development 3
MAT 117	College Algebra <i>NI</i> 3 or MAT 170 Precalculus <i>NI</i> (3) or MAT 210 Brief Calculus <i>NI</i> (3)
Total 15	

Second Year

Fall	
ADE 221	Design Fundamentals II 3

APH 200	Introduction to Architecture <i>HU, G</i>	3
	or APH 313 History of Western Architecture I <i>L2/HU</i> (3) ²	
CON 252	Building Construction Methods, Materials, and Equipment	3
PLA 261	Landscape Architecture I	4
	or PUP 261 Urban Planning I (4)	
STP 226	Elements of Statistics <i>N2</i>	3
Total	.....	16

Spring

ACC 230	Uses of Accounting Information I	3
	or ACC 394 Survey of Accounting (3)	
APH 305	Contemporary Architecture <i>HU</i> ²	3
	or PLA 310 History of Landscape Architecture <i>H</i> (3) ²	
BIO 100	The Living World <i>S1/S2</i>	4
	or PHY 112 General Physics and 114 General Physics Laboratory <i>S1/S2</i> ³ (4)	
PUP 301	Introduction to Urban Planning <i>L1</i>	3
REA 394	Real Estate Fundamentals	3
Total	.....	16
Lower-division minimum total	.....	63

¹ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.
² For General Studies credit, APH 313 and PLA 310 are corequisites; APH 200 and APH 305 are corequisites.
³ Both PHY 112 and 114 must be taken to secure S1 or S2 credit.

Bachelor of Science in Design, Major in Housing and Urban Development Upper-Division Requirements

Third Year

Fall		
CON 383	Construction Estimating	3
HUD 301	Housing and Community Design and Development	3
	or CON 477 Residential Construction Business Practices (3)	
HUD 361	Housing and Urban Development Studio I: Residential Design and Development	2
HUD 363	Housing and Urban Development Seminar I: Residential Design and Development	3
MKT 394	Marketing and Selling	3
Total	.....	14

Spring*

CON 389	Construction Cost Accounting and Control <i>N3</i> ...	3
HUD 302	Housing Production Process	3
HUD 362	Housing and Urban Development Seminar II: Community Design and Development	2
HUD 364	Housing and Urban Development Seminar II: Community Design and Development	3
	Approved elective in computers	3
Total	.....	14

* CON 251 Microcomputer Applications for Construction is suggested.

Summer

HUD 484	Internship	1
PUP 485	International Field Studies in Planning and Landscape Architecture (optional)	1-12
Minimum total	.....	1

Fourth Year

Fall		
CON 495	Construction Planning and Scheduling <i>N3</i>	3
HUD 401	Assisted Housing	3
HUD 461	Housing and Urban Development Studio III: Comprehensive Housing Development Process	2
HUD 463	Housing and Urban Development Seminar III: Comprehensive Housing Development Process	3
PUP 433	Zoning Ordinances, Subdivision Regulations, and Building Codes	3
	or PUP 432 Planning and Development Control Law (3)	
Total	.....	14

Spring

HUD 402	Community Revitalization: Problems and Strategies	3
HUD 403	Advanced Topics in Housing and Urban Development	3
HUD 462	Housing and Urban Development Studio IV: Neighborhood Revitalization Process	2
HUD 464	Housing and Urban Development Seminar IV: Neighborhood Revitalization Process	3
PUP 452	Ethics and Professional Practice <i>L2</i>	3
Total	.....	14
Upper-division minimum total	.....	57
B.S.D.—HUD total	.....	120

Bachelor of Science in Environmental Resources

Lower-division courses	.....	61
Upper-division courses core	.....	32
Approved electives	.....	27
Total	.....	120

General Studies Requirement. The following curriculum includes sufficient approved course work to fulfill the General Studies requirement. See pages 84-108 for the General Studies requirement and a list of approved courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

Graduation Requirements. In addition to fulfilling college and major requirements, students must meet all university graduation and college degree requirements. See pages 79-83.

Bachelor of Science in Environmental Resources Lower-Division Requirements

First Year

Fall		
BIO 181	General Biology <i>S1/S2</i>	4
ENG 101	First-Year Composition	3
	or ENG 105 Advanced First-Year Composition (3)	
ERS 130	Soils and Environmental Quality <i>S1/S2</i>	4
	Computer course (see advisor)	3
Total	.....	14

Spring

BIO 182	General Biology <i>S2</i>	4
CHM 101	Introductory Chemistry <i>S1/S2</i>	4
ENG 102	First-Year Composition	3
	or HU elective if ENG 105 is taken	
HU elective	.....	3
Total	.....	14

Second Year

Fall		
BIO 320	Fundamentals of Ecology	3
ECN 111	Macroeconomic Principles <i>SB</i>	3
ERS 225	Soils	3
ERS 226	Soils Laboratory	1
ERS 350	Environmental Statistics <i>N2</i>	3
SB course	.....	3
Total	.....	16

Spring

CHM 231	Elementary Organic Chemistry <i>S1/S2</i>	3
CHM 235	Elementary Organic Chemistry Laboratory <i>S1/S2*</i>	1
ERS 246	Introduction to the Environmental Sciences <i>G</i>	3
MAT 210	Brief Calculus <i>N1</i>	3
PLB 310	The Flora of Arizona	4
HU elective	.....	3
Total	.....	17
Lower-division minimum total	.....	61

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

**Bachelor of Science in
Environmental Resources
Upper-Division Requirements**

Third Year**Fall**

ENG 301	Writing for the Professions <i>L1</i>	3
ERS 360	Range Ecosystem Management	4
ERS 407	Range Plants and Habitats	4
Approved electives (see advisor)	.....	3
Total	.....	14

Spring

ERS 333	Water Resources Management	3
	or ERS 365 Watershed Management (3)	
ERS 402	Vegetation Measurement	4
ERS 475	Wildlife and Range Animal Management	3
Approved electives (see advisor)	.....	6
Total	.....	16

Fourth Year**Fall**

ERS 410	Wildlife Habitat Relations	4
	or ERS 460 Applied Systems Ecology (3)	
ERS 490	Recent Advances in Environmental Resources	1
Approved electives	.....	6 or 7
HU or SB elective	.....	3
Minimum total	.....	14

Spring

ERS 480	Ecosystem Management and Planning	3
PUP 475	Environmental Impact Assessment	3
Approved electives	.....	6
Approved L2 elective	.....	3
Total	.....	15
Upper-division minimum total	.....	59
B.S.—ER total	.....	120

INQUIRIES

For further information on the lower-division or upper-division programs, contact a college academic advisor:

COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO Box 871605
TEMPE AZ 85287-1605

ENVIRONMENTAL DESIGN AND PLANNING (EPD)

See the *Graduate Catalog* for the EPD courses.

ENVIRONMENTAL RESOURCES (ERS)**ERS 130 Soils and Environmental Quality.**

(4) F, S
Introduction to soil resources, their physical and chemical properties, classification, energy dynamics, and the role they play in environmental quality. Lecture, lab. *General Studies: S1/S2.*

ERS 225 Soils. (3) F

Fundamental properties of soils and their relation to plant growth and the nutrition of man and animals. Relation of soils to environmental quality. Prerequisite: CHM 101 or 113 or equivalent.

ERS 226 Soils Laboratory. (1) F

Selected exercises to broaden the background and understanding of basic soil principles. Lab. Corequisite: ERS 225.

ERS 246 Introduction to the Environmental Sciences. (3) F, S

A global and ecological perspective on environmental conservation and management. *General Studies: G.*

ERS 333 Water Resources Management.

(3) S
Sources, their development, and conservation in arid regions for agricultural, natural resources, and urban uses. Prerequisite: CHM 101 or 113.

ERS 350 Environmental Statistics. (3) F

Statistical methods with applications in natural resource management and the environmental sciences. Use of computers and the Internet. Prerequisites: CSE 180; MAT 117. *General Studies: N2.*

ERS 353 Wildlife Nutrition. (3) F

Principles of nutrient metabolism in wildlife species, with emphasis on understanding the interaction of wildlife with their environment. Prerequisites: BIO 181 and 182 and CHM 101 and 230 or instructor approval.

ERS 360 Range Ecosystem Management.

(3) F
Ecosystem management principles applied to rangelands. Herbivory as an ecological process, evaluation of rangeland health, multiple use of rangelands. Lecture, recitation. Prerequisites: BIO 320 (or equivalent); ERS 246.

ERS 365 Watershed Management. (3) N
Hydrologic, physical, biological, and ecological principles applied to watershed management. Impact of ecosystem manipulations on water yield and quality. 1 weekend field trip. Prerequisites: ERS 225, 246.

ERS 370 Forest Ecosystem Dynamics. (3) S

Dynamics of forest ecosystem with applications from landscape ecology. Silvicultural principles, measurements, and multiple use of forests. Field trips required. Lecture, lab. Prerequisites: BIO 320; ERS 246, 350.

ERS 402 Vegetation Measurement. (4) S

Vegetation sampling and inventory as related to animal-habitat relations. Lecture, lab, 1 weekend field trip. Prerequisites: CSE 180 and ERS 350 and 360 and department major or instructor approval.

ERS 407 Range Plants and Habitats. (4) F

The distribution, ecological characteristics, identification of key plants, and values of habitats on western rangelands. Laboratory emphasis on grass identification. Lecture, lab. Prerequisite: PLB 310 or equivalent.

ERS 410 Wildlife Habitat Relations. (4) F

Interactions among animal populations and their habitat. Systems simulation of population dynamics as influenced by competition and management strategies. Lecture, lab, 1 weekend field trip. Prerequisite: ERS 360.

ERS 420 Ecological Restoration. (3) S

Techniques of ecological restoration applied for the improvement of arid and semiarid land and sensitive habitats. Weekend field trips. Prerequisite: ERS 360.

ERS 425 Soil Classification and Management. (3) N

Principles of soil genesis, morphology, and classification. Management and conservation practices will be presented. Prerequisite: ERS 225.

ERS 433 Riparian Ecosystem Management. (3) N

Examination of the functions and components that make up riparian ecosystems and the management of these ecosystems. Lecture, field trip. Prerequisite: ERS 225 or instructor approval.

ERS 446 Soil Fertility. (3) S

Ability of soils to retain and supply plant nutrients. Reactions of fertilizers in soils. Prerequisites: ERS 225, 226.

ERS 448 Soil Ecology. (3) N

Soils viewed in an ecosystem context, soil-plant relationships, nutrient budgets, and abiotic factors that influence soil processes. Prerequisites: BIO 320 and ERS 225 and 226 or instructor approval.

ERS 452 Soil, Water, and Irrigation. (3) N

Water measurement, conveyance, and conservation, with emphasis on crop production and soil-plant water relations. Prerequisite: ERS 225.

ERS 460 Applied Systems Ecology. (3) N

The systems approach applied to analysis and management of natural resource ecosystems. Use of simulation models. 2 hours lecture, 3 hours lab. Prerequisites: ERS 350 or equivalent; 1 course in ecology.

ERS 470 Land Reclamation. (3) N

Problems of reestablishing vegetation on disturbed sites. Special revegetation techniques, surface modifications, and government regulations. 1 weekend field trip. Prerequisites: ERS 407 and 420 and 446 and 448 or instructor approval.

ERS 475 Wildlife and Range Animal Management. (3) S

Principles and techniques for management of domestic and nondomestic animals using rangeland ecosystems. Emphasis on practical applications of management. Weekend field trips. Prerequisite: instructor approval.

ERS 477 Environmental Risk Assessment and Management. (3) S

Survey of methods related to identification, evaluation, comparison, and management of environmental risks. Prerequisite: senior standing.

ERS 480 Ecosystem Management and Planning. (3) S

Planning for management and conservation of wildland ecosystems. Ecological, economic, and social constraints on long-term sustainable resource development. Computer tools for resource planning. Lecture, 1 weekend field trip. Prerequisites: ERS 402 or equivalent; senior standing.

ERS 485 GIS in Natural Resources. (3) F
Principles of Geographic Information Systems (GIS) utilized in natural resource management. Use of computers for spatial analysis of natural resources. Lecture, lab. Prerequisite: CSE 180 or equivalent.

ERS 486 Remote Sensing in Environmental Resources. (4) S

Principles and application of remote sensing technologies in natural resource management. Integration of computerized data from aerial photography and Landsat imagery in resource management. Lecture, lab. Prerequisite: ERS 485 or equivalent.

ERS 490 Recent Advances in Environmental Resources. (1) N

Current literature and significant developments involving environmental resources. May be repeated for credit.

ERS 533 Riparian Ecology. (3) N

Review of recent literature, developments, and methods related to riparian ecology. Applications of soil and landscape ecology to riparian systems. Lecture, discussion, field trips.

ERS 540 Plant Responses to Environmental Stresses. (3) N

Reaction of plants to environmental stresses; aerial pollutants, fire, herbivores, mechanical treatments, pesticides, and soil amendments. 1 weekend field trip. Prerequisite: ERS 360 or instructor approval.

ERS 548 Plants, Soils, and Environmental Quality. (3) N

Effects of air quality on plants and soils, and their role in removing contaminants from the atmosphere. Prerequisite: ERS 225.

ERS 550 Vegetation Dynamics Studio. (4) F

Dynamics of vegetation emphasizing ecological succession, applications of landscape ecology and GIS, and analysis of vegetation data. Field trips, studio. Prerequisite: introductory statistics course.

ERS 551 Environmental Statistics Studio. (4) S

Advanced statistical procedures for environmental resources. Techniques for analyzing research data that do not meet assumptions. Studio. Prerequisite: ERS 350 or equivalent.

ERS 553 Advanced Animal Nutrition. (4) F

Metabolic and physiological interactions of nutrients in wild and domesticated animals consuming natural feeds. Lecture, lab.

ERS 560 Systems Ecology. (3) N

Quantitative description and mathematical modeling of ecosystem structure and function. Techniques for model construction and simulation. Lecture, lab. Prerequisites: ERS 350 or equivalent; computer programming; 6 hours in ecological studies.

HOUSING AND URBAN DEVELOPMENT (HUD)**HUD 161 Graphic Communication I. (3) F, S**

Development of drawing skills and understanding of the graphic communication systems used by planning, homebuilding, and landscape architecture professionals.

HUD 162 Graphic Communication II. (3) F, S

Development of sketching techniques and watercolor application used in concept development and final presentation. Prerequisite: HUD 161.

HUD 201 Introduction to Housing and Urban Development. (3) S

Perspectives and issues concerning HUD. Guest lectures by interdisciplinary faculty and private, public, and nonprofit practitioners.

HUD 301 Housing and Community Design and Development. (3) F

Single and multifamily housing, residential neighborhoods, and planned communities. Affordability in owner-occupied and rental housing. First-time, move-up, and adult markets.

HUD 302 Housing Production Process. (3) S

Development feasibility analysis, finance, contracts, land acquisition, community and permit presentation and negotiation, scheduling, cost control, marketing, and sales.

HUD 361 Housing and Urban Development Studio I: Residential Design and Development. (2) F

Affordable residential design, development, and production process. Studio. Pre- or corequisites: HUD 301, 363; upper-division HUD major.

HUD 362 Housing and Urban Development Studio II: Community Design and Development. (2) S

Neighborhood and new community design and development process. Studio. Pre- or corequisites: HUD 301, 361, 363, 364; upper-division HUD major.

HUD 363 Housing and Urban Development Seminar I: Residential Design and Development. (3) F

Affordable residential design, development, and production process. Seminar. Pre- or corequisites: HUD 301, 361; upper-division HUD major.

HUD 364 Housing and Urban Development Seminar II: Community Design and Development. (3) S

Neighborhood and new community design and development process. Seminar. Pre- or corequisites: HUD 301, 361, 362, 363; upper-division HUD major.

HUD 401 Assisted Housing. (3) F

Publicly-subsidized and nonprofit housing. Policy, implementation, and administration. FHA, Section 8, FmHA, projects and scatter site, and tax considerations.

HUD 402 Community Revitalization: Problems and Strategies. (3) S

Public policy and strategies for neighborhood revitalization and community renewal. Preservation and adaptive reuse, gentrification, neighborhood safety, and related socio-economic concerns.

HUD 403 Advanced Topics in Housing and Urban Development. (3) F, S

Varying topics, such as manufactured housing, homelessness, mortgage and finance in housing, housing abroad, marketing housing, and sustainable community development.

HUD 461 Housing and Urban Development Studio III: Comprehensive Housing Development Process. (2) F

Comprehensive development process simulation. Feasibility analysis, finance, design, community and permit presentation, construction, cost management, and marketing. Studio. Pre- or corequisites: HUD 302, 463; upper-division HUD major.

HUD 462 Housing and Urban Development Studio IV: Neighborhood Revitalization Process. (2) S

Housing rehabilitation, neighborhood revitalization, and urban infill. CDBG, empowerment-enterprise zoning, code enforcement, citizen participation, etc. Studio. Pre- or corequisites: HUD 401, 402, 464; upper-division HUD major.

HUD 463 Housing and Urban Development Seminar III: Comprehensive Housing Development Process. (3) F

Comprehensive development process simulation. Feasibility analysis, finance, design, community and permit presentation, construction and cost management, and marketing. Seminar. Pre- or corequisites: HUD 302, 461; upper-division HUD major.

HUD 464 Housing and Urban Development Seminar IV: Neighborhood Revitalization Process. (3) S

Housing rehabilitation, neighborhood revitalization, and urban infill. CDBG, empowerment-enterprise zoning, code enforcement, citizen participation, etc. Seminar. Pre- or corequisites: HUD 401, 402, 462; upper-division HUD major.

LANDSCAPE ARCHITECTURE (PLA)**PLA 201 Landscape Architecture and Society. (3) F, S**

The relevance of landscape architecture to the creation of humanized environments, with emphasis on natural factors.

PLA 261 Landscape Architecture I. (4) F

Reading the landscape: observing, experiencing, and graphically expressing the symbolic and aesthetic significance of natural landscapes. Studio. Cross-listed as PUP 261. Prerequisites: ADE 120; GPH 111.

PLA 264 Landscape Architecture II. (4) S
Landscape communication: communication techniques for urban planning and landscape architecture communication. Cross-listed as PUP 264. Prerequisites: ADE 120; PLA/PUP 261.

PLA 310 History of Landscape Architecture. (3) F
Physical record of human attitudes toward the land. Ancient through contemporary landscape planning and design. Cross-listed as APH 411. *General Studies: H.*

PLA 322 Planning Methods Using Computers. (3) F
Planning methods using database, word processors, spreadsheets, CAD, and mapping packages on microcomputers. Lecture, lab. Cross-listed as PUP 322.

PLA 359 Resort Planning and Recreation Design. (3) F
Interrelationships of social, economic, and physical aspects of total tourist resort design; emphasis on physical development of tourist centers and resort areas.

PLA 361 Landscape Architecture III. (5) F
Site planning: analysis of natural and cultural features; site systems and implications for plan making and design. Studio. Cross-listed as PUP 361. Prerequisite: department major or instructor approval.

PLA 362 Landscape Architecture IV. (5) S
Site design: site specific design of configured space by the creative development of form. Studio. Cross-listed as PUP 362. Prerequisite: department major or instructor approval.

PLA 363 Landscape Planting Design. (3) F
Functional and aesthetic use of plants in arid region landscape design. Design philosophies are explored through planting design problems. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

PLA 420 Theory of Urban Design. (3) F
Analysis of the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Cross-listed as PUP 420. Prerequisite: junior standing. *General Studies: HU.*

PLA 442 Landscape Construction I. (3) F
Landscape constructions focusing on landform transformations. Topics include landform analysis, grading, and earthwork. Studio. Prerequisite: admission to department's professional level or instructor approval.

PLA 443 Landscape Architecture Theory and Criticism. (3) S
Landscape architecture theories and projects are critically analyzed to evaluate validity of design and contribution to society. Prerequisites: PLA 310, 361, 420; PUP 412.

PLA 444 Landscape Construction II. (3) S
Characteristics of materials and methods used in landscape architectural construction. Studio. Prerequisite: PLA 442 or instructor approval.

PLA 461 Landscape Architecture V. (5) F
Landscape ecological planning: collection and application of ecological data relevant to planning and design at landscape scale. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

PLA 462 Landscape Architecture VI. (5) S
Urban design: analysis and design of the contemporary city emphasizing cultural and environmental influences of urban form. Prerequisite: department major or instructor approval.

PLA 484 Internship. (3) F, S, SS (SS1 only)
Full-time internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit. Prerequisite: department major or instructor approval.

PLA 485 International Field Studies in Planning and Landscape Architecture. (1–12) F, S, SS
Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with department approval. Study abroad. Cross-listed as PUP 485.

PLA 546 Urban Design Policy. (3) N
Advanced study of local, state, and federal urban design policy. Cross-listed as PUP 546. Prerequisite: PLA/PUP 420.

URBAN AND ENVIRONMENTAL PLANNING (PUP)

PUP 100 Introduction to Environmental Design. (3) F, S, SS
Survey of environmental design; includes historic examples and the theoretical social, technical, and environmental forces that shape them. Cross-listed as APH/DSC 100. *General Studies: HU, G, H.*

PUP 200 The Planned Environment. (3) F
Environmental, aesthetic, social, economic, political, and other factors influencing urban development. *General Studies: HU, H.*

PUP 236 Introduction to Computer Modeling. (3) F, S
Fundamentals of computer operation, geographic information systems, geometric modeling of three-dimensional forms and rendering of light, mathematical modeling of processes using spreadsheets. Lab. Cross-listed as ANP/DSC 236. Prerequisite: major in the College of Architecture and Environmental Design. *General Studies: N3.*

PUP 261 Urban Planning I. (4) F
Reading the landscape: observing, experiencing, and graphically expressing the symbolic and aesthetic significance of natural landscapes. Studio. Cross-listed as PLA 261. Prerequisites: ADE 120; GPH 111.

PUP 264 Urban Planning II. (4) S
Planning communication: communication techniques for urban planning and landscape architecture communication. Cross-listed as PLA 264. Prerequisites: ADE 120; PLA/PUP 261.

PUP 301 Introduction to Urban Planning. (3) F, S, SS
Theoretical and practical aspects of city planning. Interrelationships among physical planning, environment, government, and society. *General Studies: L1.*

PUP 322 Planning Methods Using Computers. (3) F
Planning methods using database, word processors, spreadsheets, CAD, and mapping packages on microcomputers. Lecture, lab. Cross-listed as PLA 322.

PUP 361 Urban Planning III. (5) F
Site planning: analysis of natural and cultural features; site systems and implications for plan making and design. Studio. Cross-listed as PLA 361. Prerequisite: department major or instructor approval.

PUP 362 Urban Planning IV. (5) S
Planning elements: one or more factors addressed, including land use, housing, environment, transportation, circulation, open space, economic development, urban design. Studio. Cross-listed as PLA 362. Prerequisite: department major or instructor approval.

PUP 412 History of the City. (3) F
The city from its ancient origins to the present day. Emphasis on European and American cities during the last five centuries. Cross-listed as APH 414. *General Studies: H.*

PUP 420 Theory of Urban Design. (3) S
Analysis of the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Cross-listed as PLA 420. Prerequisite: junior standing. *General Studies: HU.*

PUP 424 Planning Methods. (3) F
Tools useful for urban planning research; emphasis on research design and survey methods. Prerequisite: PUP 301 or instructor approval.

PUP 425 Urban Housing Analysis. (3) F
Nature, dimensions, and problems of urban housing, government policy environment, and underlying economics of the housing market.

PUP 430 Transportation Planning and the Environment. (3) S
Overview of transportation planning from the perspective of land use planning, economic development, environmental planning, and social needs. Lecture, discussion. Prerequisite: junior standing or instructor approval.

PUP 432 Planning and Development Control Law. (3) F
Case studies on police power, eminent domain, zoning, subdivision controls, exclusion, preservation, urban redevelopment, and aesthetic and design regulation.

PUP 433 Zoning Ordinances, Subdivision Regulations, and Building Codes. (3) F, S
Analysis of zoning ordinances, subdivision regulations, building codes, and other planning implementation techniques relative to local development.

PUP 442 Environmental Planning. (3) F
Environmental planning problems, including flood plains, water quality and quantity, solid and hazardous waste, air quality, landslides, and noise. Field trips. Prerequisite: PUP 301 or instructor approval.

PUP 444 Preservation Planning. (3) S
History, theory, and principles of historic preservation. Emphasis on legal framework and methods practiced. Lecture, off-campus field study. Prerequisite: instructor approval.

PUP 445 Women and Environments. (3) F Examines the role women play in shaping the built environment; ways built/natural forms affect women's lives. Focus on contemporary U.S. examples. Prerequisite: upper division or graduate status. *General Studies: C.*

PUP 452 Ethics and Professional Practice. (3) S Ethical problems and issues in planning, professional practice, and decision making. Prerequisite: department major or instructor approval. *General Studies: L2.*

PUP 461 Urban Planning V. (5) F Comprehensive planning: collection and analysis of economic, social, and environmental data relevant to urban planning; development of land-use plans. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

PUP 462 Urban Planning VI. (5) S Capstone studio: project focusing on synthesis aspects of plan making. Studio. Prerequisite: PUP 461 or instructor approval.

PUP 475 Environmental Impact Assessment. (3) S Criteria and methods for compliance with environmental laws; development of skills and techniques needed to prepare environmental impact statements/assessments.

PUP 484 Internship. (1–12) F, S, SS (SS1 only) Full-time internship under the supervision of practitioners in the Phoenix area or other locale. Credit/no credit. Prerequisite: department major or instructor approval.

PUP 485 International Field Studies in Planning and Landscape Architecture. (1–12) F, S, SS Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with department approval. Study abroad. Cross-listed as PLA 485.

PUP 510 Citizen Participation. (3) S Theory and practice of citizen participation in planning. Examines and critiques participation techniques and roles of planners. Prerequisite: instructor approval.

PUP 520 Planning Theories and Processes. (3) F Review of past and current theoretical developments related to social change perspectives, the role and ethics of planners. Prerequisite: instructor approval.

PUP 524 Planning Methods I: Planning Research Methods. (3) F Tools useful for urban planning research; emphasis on research design and survey methods. Prerequisite: PUP 301 or instructor approval.

PUP 525 Urban Housing Analysis. (3) F Nature, dimensions, and problems of urban housing, government policy environment, and underlying economics of the housing market.

PUP 531 Planning and Development Control Law. (3) S Case studies on police power, eminent domain, zoning, subdivision controls, exclusion, preservation, urban redevelopment, and aesthetic and design regulation.

PUP 532 Advanced Urban Planning Law. (3) S Advanced study on selected issues in planning law, such as urban design controls, exclusionary practices, compensable regulation, and tax policy. Prerequisite: PUP 432 or instructor approval.

PUP 544 Urban Land Use Planning. (3) F Theory and methods of urban land use planning, including the rational planning process, comprehensive, functional, and neighborhood plans. Prerequisite: PUP 301 or instructor approval.

PUP 546 Urban Design Policy. (3) N Advanced study of local, state, and federal urban design policy. Cross-listed as PLA 546. Prerequisite: PLA/PUP 420.

PUP 561 Urban Design Studio. (4) N Current urban form and urban landscape design problems within the Phoenix-centered region. Studio. Prerequisite: PLA/PUP 420 or instructor approval.

PUP 572 Planning Studio I: Data Inventory and Analysis. (4) F Comprehensive planning workshop dealing with real community problems. Focus on the data gathering and analysis steps of the planning process. Prerequisite: Master of Environmental Planning major or instructor approval.

PUP 574 Planning Studio II: Options and Implementation. (4) S Comprehensive planning workshop dealing with real community problems. Focus on the development of options, plan making, and plan implementation. Studio. Prerequisite: PUP 572 or instructor approval.

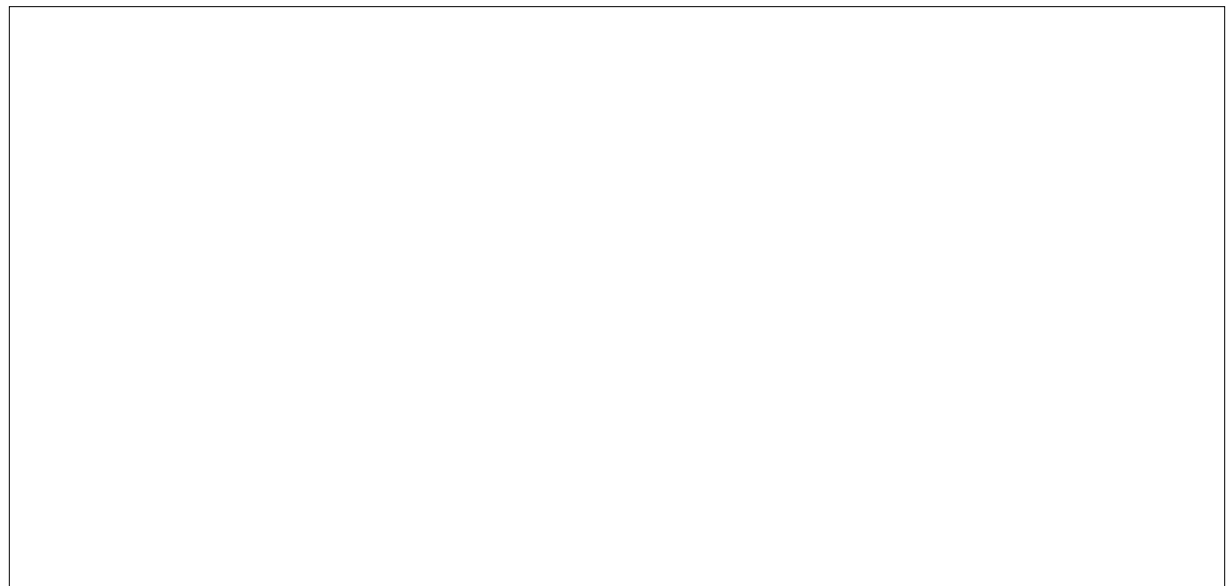
PUP 575 Environmental Impact Assessment. (3) S Criteria and methods for compliance with environmental laws; development of skills and techniques needed to prepare environmental impact statements/assessments.

PUP 584 Internship. (3) F, S, SS (SS1 only) Internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit.

PUP 622 Planning Methods II: Quantitative Planning Analysis. (3) S Methods and models used as the basic quantitative techniques of urban, regional, and environmental planning and policy analysis. Prerequisites: PUP 424; statistics; instructor approval.

PUP 642 Land Economics. (3) F Land use and locational impact of economic activity and the urban real property market. Prerequisite: instructor approval.

PUP 644 Public Sector Planning. (3) S Urban fiscal problems and public goods provision in state and local governments. Prerequisites: instructor approval; 1 course in microeconomics.



Araceli Morales constructs a model of a church in the College of Architecture and Environmental Design's wood shop.

Tim Trumble photo

College of Business

Larry E. Penley, Ph.D.
Dean

PURPOSE

The mission of the College of Business is to expand the knowledge of business and to educate men and women for managerial leadership through research activities and professional educational programs. These programs address issues of importance to future managers in a world characterized by demands for continuous improvements in quality; growing sophistication of information technology; globalized markets; racial, cultural, and gender diversity in the work force; and a demand for managers with practical, realistic skills.

Students have many opportunities to supplement their academic experiences. The college offers an honors program for academically talented students, an Academic Access Program to assist underrepresented students, an international component to provide a variety of international opportunities, an internship program which provides related practical experience, and 18 co-curricular organizations to increase student interaction and learning.

The college is a member of the American Assembly of Collegiate Schools of Business (AACSB), the official accrediting organization in the field of business. The undergraduate and graduate programs and the School of Accountancy and Information Management are accredited by this organization.

The college is host to a chapter of Beta Gamma Sigma, a national society that recognizes high academic achievement in AACSB-accredited schools. Selection to Beta Gamma Sigma is the highest scholastic honor a student in business can earn.

In addition to the regular degree curricula, other programs of study in the college are designed to meet special needs. Selected majors are available in the evening and continuing education courses are conducted for qualified persons who are regularly employed and who otherwise would be unable to enroll in college courses. Short courses and institutes on a noncredit basis are organized in cooperation with various business groups for the furtherance of in-service training of employed personnel.

The college works in partnership with the business community, and the board of the Dean's Council of 100

serves as a primary source of advice and counsel for the college. Through the various divisions of the L. William Seidman Institute, the college reaches out to the business community through research and executive education. For more information, visit the college's Web site at www.cob.asu.edu.

ORGANIZATION

The courses offered by the College of Business are organized into groups so that a related sequence may be established for the various subject fields. For administrative purposes, these fields are organized into the following academic units:

School of Accountancy and Information Management
Department of Business Administration
Department of Economics
Department of Finance
School of Health Administration and Policy
Department of Management
Department of Marketing

ADMISSION

The Prebusiness Program. Each student admitted to the College of Business is designated as a prebusiness student. The student follows the freshman and sophomore sequence of courses listed in the curriculum outline. Students are required to follow the recommendations of an academic advisor in completing the prescribed background and skill courses in preparation for the subsequent professional program. The skill courses follow.

ACC	230	Uses of Accounting Information I	3
ACC	240	Uses of Accounting Information II	3
CIS	200	Computer Applications and Information Technology N3	3
ECN	111	Macroeconomic Principles SB	3
ECN	112	Microeconomic Principles SB	3
ENG	101, 102	First-Year Composition	6
		or ENG 105	
		Advanced First-Year Composition (3)	3
MAT	119	Finite Mathematics N1	3
MAT	210	Brief Calculus N1	3
QBA	221	Statistical Analysis N2	3
Total			30

Accountancy and Computer Information Systems majors should refer to their specific requirements on pages 149–150 which list variations in the skill courses.

Completion of lower-division requirements does not ensure acceptance to the upper-division professional program. Prebusiness students are not allowed to register for 300- and 400-level business courses.

The Professional Program. The junior and senior years constitute the professional program of the undergraduate curriculum. Admission to the professional program is competitive and limited by available resources. Admission is awarded to those applicants demonstrating the highest promise for professional success.

To be considered for admission to the professional program, students must obtain an application to the professional program in the Undergraduate Programs Office in the College of Business. This application contains complete information concerning academic qualifications for admission to the professional program. Students interested in beginning the professional program in summer or fall must submit a professional program application in February or May. Students interested in beginning the professional program in January must submit a professional program application in September.

Nonbusiness Students. A nonbusiness student is permitted to register for selected 300- and 400-level business courses only if, (1) at the time of registration, the student has junior standing (56 semester hours completed) and (2) the student has a minimum cumulative GPA of 2.50 at ASU and a minimum GPA of 2.50 for all business courses completed at ASU. Students who have 56 semester hours completed but have never attended ASU are given a one-semester period to register and to establish a GPA at ASU. Students must meet all prerequisites and course requirements as listed in the catalog.

Nonbusiness majors are limited to a maximum of 15 semester hours of selected upper-division business courses (excluding economics [ECN] courses).

Bachelor of Interdisciplinary Studies.

A business emphasis is available to Interdisciplinary Studies students who successfully complete 18 semester hours of approved course work. Students may use any one of the existing business minors or certificates as a guide for the business emphasis. Students will select additional Business minor hours to meet the minimum 18-hour requirements. Students may use only one emphasis in business toward the Bachelor of Interdisciplinary Studies. For details, refer to the Bachelor of Interdisciplinary Studies degree on pages 112–113.

Minor. A Business minor is available to nonbusiness students. To complete the minor, students must obtain the requirements from the Undergraduate Programs Office in the College of Business and complete the specified business courses with a grade of “C” or higher. Courses used in a student’s major may not be used toward the Business minor. Students are advised to consult an advisor in the college of their majors to ensure the proper selection of courses for the minor. The upper-division courses for the minor are restricted to students with 56 semester hours who are in good standing. A specific program emphasizing small business is also available.

Nondegree Undergraduate and Graduate Students. A nondegree undergraduate or graduate student is permitted to enroll in selected 300- and 400-level business courses only during online registration and only if (1) the student has an ASU cumulative GPA of at least 2.50 and an ASU cumulative business GPA of at least 2.50 at the time of online registration or (2) the student has never attended ASU, in which case he or she is given a one-semester period to register during online registration and to establish a GPA at ASU. Students must meet all prerequisites and course requirements as listed in the catalog.

Nondegree undergraduate and graduate students are limited to a maximum of 15 semester hours of selected upper-division business courses (excluding economics courses).

ADVISING

The student should follow the sequence of courses in the “Curriculum Outline” and the recommendations of the academic advisor in completing the prescribed background and skill courses in preparation for the subsequent professional program.

**Curriculum Outline
Prebusiness Program**

First Year

First Semester

ECN 111	Macroeconomic Principles <i>SB</i>	3
	or ECN 112 Microeconomic Principles <i>SB</i> (3)	
ENG 101	First-Year Composition	3
MAT 119	Finite Mathematics <i>NI</i>	3
	General Studies	3
	PGS or SOC course	3
	Total	15

Second Semester

COM 100	Introduction to Human Communication <i>SB</i>	3
	or COM 230 Small Group Communication <i>SB</i> (3) or COM 259 Communication in Business and the Professions (3)	
ECN 112	Microeconomic Principles <i>SB</i>	3
	or ECN 111 Macroeconomic Principles <i>SB</i> (3)	
ENG 102	First-Year Composition	3
MAT 210	Brief Calculus <i>NI</i>	3
	Laboratory science <i>S1/S2</i>	4
	Total	16

Second Year

Third Semester

ACC 230	Uses of Accounting Information I	3
QBA 221	Statistical Analysis <i>N2</i>	3
	General Studies	3
	Laboratory science <i>S1/S2</i>	4
	PGS or SOC course	3
	Total	16

Fourth Semester

ACC 240	Uses of Accounting Information II	3
CIS 200	Computer Applications and Information Technology <i>N3</i>	3
	General Studies	9
	Total	15
	Prebusiness program total	62

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Accountancy and Computer Information Systems majors should refer to their specific course requirements on pages 149–150 which list course requirement variations.

Students are encouraged to have College Algebra (MAT 117) proficiency before registering in ECN 111 and 112. ECN 111 and 112 may be taken during the second and third semesters without any delay in the prebusiness program.

Professional Program. Students admitted to the professional program should select the necessary upper-division business courses to complete the major by consulting their departmental advising guide and faculty advisor. Professional program students must complete BUS 301 and COB 300 and 301 the first semester in the professional program.

Transfer Credit. Credit from other institutions is accepted subject to the following guidelines. Students planning to take their first two years of work at a community college or another four-year college should take only those courses in business and economics that are offered as freshman- or sophomore-level courses at any of the state-supported Arizona universities. These lower-division courses are numbered 100 through 299. *A maximum of 30 hours of business and economics courses from community colleges are accepted toward a bachelor's degree in business.*

Students may transfer a maximum of nine semester hours of approved upper-division business course work required for the business degree to ASU Main. Professional business courses taught in the junior or senior year in the state universities may not be completed at a two-year college for transfer credit in the business core or major. The introductory course in the legal, ethical, and regulatory issues in business is accepted as an exception to this policy, but only lower-division credit is granted. Such courses may be utilized in the free elective category *subject to the 30-hour limitation*. Courses taught as vocational or career classes at the community colleges that are not taught in the colleges of business at any one of the state universities are not accepted for credit toward a bachelor's degree. Courses taught in the upper-division business core at the state universities must be completed at the degree-granting institution unless transferred from

an accredited four-year school. Normally, upper-division transfer credits are accepted only from AACSB-accredited schools. To be accepted for credit as part of the professional program in business, all courses transferred from other institutions must carry prerequisites similar to those of the courses they are replacing at ASU.

A Transfer Partnership Degree is available to Maricopa community college students who wish to complete their first two years of course work at a Maricopa community college and transfer to the College of Business without loss of credit. Additional associate degrees are available to students who wish to complete their first two years of course work at an Arizona community college and transfer to the College of Business without loss of credit. Students should consult with an academic advisor in the Undergraduate Programs Office to plan curriculum requirements.

DEGREES

The faculty in the College of Business offer the B.S. degree in Accountancy, Computer Information Systems, Economics, Finance, Management, Marketing, Real Estate, and Supply Chain Management upon successful completion of a four-year curriculum of 120 semester hours. Students may select one of the majors shown in the "College of Business Degrees, Majors, and Concentrations" table, page 145. Each major is administered by the academic unit indicated.

GRADUATE PROGRAMS

The faculty in the College of Business offer the Master of Accountancy degree, a Master of Business Administration degree, the Master of Health Services Administration degree, the M.S. degree in Information Management, the M.S. degree in Economics, the Master of Taxation degree, the Ph.D. degree in Business Administration, and the Ph.D. degree in Economics.

Students have the opportunity to obtain dual degrees in two years with several master's degree programs in the College of Business. Some of those available are:

M.B.A./M.H.S.A.
M.B.A./M.S.I.M.
M.B.A./M.Acc.
M.B.A./M.S. in Economics
M.B.A./M.Tax.

Other concurrent degrees available are:

M.B.A./J.D.
M.B.A./Master of Architecture
M.B.A./M.I.M. with American Graduate School of International Management (Thunderbird), Glendale, AZ; ESC Toulouse, Toulouse, France; Universidad Carlos III, Madrid, Spain; and ITAM and ITESM-CEM, Mexico City, Mexico.

The evening M.B.A. program offers a Technology M.B.A. in addition to the full-time M.B.A. program.

The Executive M.B.A. program is available to those with significant work experience.

For more information about M.B.A. programs, refer to the *Graduate Catalog*.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement for a minimum of 35 hours of approved course work in General Studies, as described on pages 84–87. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

General Studies courses are listed on pages 87–108 in the *General Catalog* following the section on "General Studies," in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

First-Year Composition Requirement

Completion of both ENG 101 and 102 or ENG 105 with a grade of "C" or higher is required for graduation from ASU in any baccalaureate program. See page 79.

COLLEGE DEGREE REQUIREMENTS

College degree requirements supplement the General Studies requirement with additional course work from the list of approved courses. Business courses may not be used to fulfill college degree requirements except for ECN 111 and 112 and QBA 221.

College of Business Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Accountancy	B.S.	School of Accountancy and Information Management
Computer Information Systems	B.S.	School of Accountancy and Information Management
Economics	B.S.	Department of Economics
Finance	B.S.	Department of Finance
Management	B.S.	Department of Management
Marketing	B.S.	Department of Marketing
Real Estate	B.S.	Department of Business Administration
Supply Chain Management	B.S.	Department of Business Administration
Graduate Degrees		
Accountancy	M.Acc.	School of Accountancy and Information Management
Business Administration	M.B.A.	College of Business
Business Administration Concentrations: accountancy, finance, health services research, ¹ information management systems, management, marketing, supply chain management	Ph.D.	College of Business
Economics	M.S., Ph.D.	Department of Economics
Health Services Administration	M.H.S.A.	School of Health Administration and Policy
Information Management	M.S.	School of Accountancy and Information Management
Statistics	M.S. ²	Committee on Statistics
Taxation	M.Tax.	School of Accountancy and Information Management

¹ Not accepting applications.

² This program is administered by the Graduate College. See “Graduate College,” on pages 282–292.

A well-planned program of study may enable students to complete many General Studies and college degree requirements concurrently. Students are encouraged to consult with an academic advisor in planning a program to ensure that they comply with all necessary requirements.

Specific courses from the following areas must be taken to fulfill the college degree requirement.

Social and Behavioral Sciences. College of Business students must complete ECN 111 and 112, one course with a PGS prefix, one course with an SOC prefix, and may include these courses toward the General Studies requirements.

Science and Mathematics. College of Business students must complete MAT 119 and MAT 210 (or a more advanced

MAT course), QBA 221, and may include these courses toward the General Studies requirements.

Communication. All students in the College of Business except Accountancy majors must complete COM 100, 230, or 259. Accountancy majors must complete COM 100 (or 230) and 259.

Additional Courses. Additional courses, as needed to complete 60 hours, may be selected from the General Studies areas as noted on pages 87–108 or from the College of Business Policy Statement. Students are encouraged to consult with an academic advisor to ensure that they comply with all necessary requirements. Business courses may not be used to fulfill this requirement except for ECN 111 and 112 and QBA 221.

Additional Graduation Requirements

In addition to completion of courses outlined under “Major Requirements” on page 146, to be eligible for the B.S. degree in the College of Business, a student must

1. have completed at least 30 semester hours at ASU Main;
2. have attained a cumulative GPA of 2.00 or higher for all courses taken at this university, for all business courses taken at this university, and for all courses for the major taken at this university;
3. have earned a “C” or higher in each course in the business core and each course in the major;

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

4. have earned a minimum of 51 semester hours in traditional courses designed primarily for junior or senior students and completed in an accredited, four-year institution; and
5. have met all university degree requirements.

Exceptions. Any exception to these requirements must be approved by the Standards Committee of the College of Business.

Program of Study Requirement. A student in a professional program must complete a formal Undergraduate Program of Study during the semester in which the student completes 87 semester hours. The Program of Study guides the student in accomplishing successful completion of degree requirements in a timely manner. Students who have not met this requirement are prevented from further registration.

Pass/Fail

Business majors may not include among the credits required for graduation any courses taken at this university on a pass/fail basis. Pass/fail credits taken at another institution may be petitioned for use, but only if the student can demonstrate proof that the pass grade was equivalent to a “C” or higher.

MAJOR REQUIREMENTS

Students seeking a B.S. degree in the College of Business must satisfactorily complete a curriculum of 120 semester hours.

A major consists of a pattern of 18–24 semester hours in related courses falling primarily within a given subject field. Available majors are shown in the “College of Business Degrees, Majors, and Concentrations” table on page 145.

Major Proficiency Requirements. Students must receive grades of “C” or higher in upper-division courses for the major. If a student receives a grade below “C” in any course in the major, this course must be repeated. If a second grade below “C” is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

Business Core Requirements

To obtain an understanding of the fundamentals of business operation and to develop a broad business background, every student seeking a B.S. degree in the College of Business must complete the following courses:

Lower-Division Business Core

ACC 230	Uses of Accounting Information I	3
ACC 240	Uses of Accounting Information II	3
CIS 200	Computer Applications and Information Technology N3	3
Lower-division business core total		9

Upper-Division Business Core

BUS 301	Fundamentals of Management Communication L1 (first semester)	3
COB 300	Strategic Business Foundations L2 (first semester)	3
COB 301	Business Forum (first semester)	1
FIN 300	Fundamentals of Finance	3
LES 305	Legal, Ethical, and Regulatory Issues in Business	3
MGT 301	Management and Organization Behavior	3
MKT 300	Principles of Marketing	3
OPM 301	Operations and Logistics Management	3
International business course		3
Upper-division business core total		25
Business core total		34

Accountancy and Computer Information Systems majors should refer to their specific requirements on pages 149–150 which list variations in the business core courses.

Core Proficiency Requirement. Students must receive grades of “C” or higher in upper-division business core courses to graduate. If a student receives a grade below “C” in any of these courses, the course must be repeated. University policy states a course may be repeated only one time.

Elective Courses

Sufficient elective courses are to be selected by the student to complete the total of 120 semester hours required for graduation.

ACADEMIC STANDARDS

Probation. All students, freshman through senior, must maintain a mini-

mum GPA of 2.00 for all courses completed at ASU. If these standards are not maintained, the student is placed on probation.

Disqualification. A student who is on probation becomes disqualified if (1) the student obtains a semester GPA below 2.50 or receives a grade below “C” in one or more courses or if (2) the student has not returned to good standing by the end of two consecutive semesters.

Students who have been academically disqualified are not permitted to enroll in upper-division business courses during summer sessions.

Reinstatement and Readmission.

Students seeking reinstatement (after disqualification) or readmission (after an absence from the university) should contact the Undergraduate Programs Office regarding procedures and guidance for returning to good standing.

Academic Dishonesty. The faculty of the College of Business follow the guidelines in the Student Academic Integrity Policy on academic dishonesty. A copy of the policy may be obtained in the Undergraduate Programs Office.

Student Appeal Procedure on Grades. The faculty of the College of Business have adopted a policy on the student appeal procedure on grades. A copy of the policy may be obtained in the Undergraduate Programs Office.

SPECIAL PROGRAMS

Academic Access Program. The primary mission of the Academic Access Program (AAP) is to help the underrepresented student populations of the College of Business successfully navigate the college’s rigorous academic demands. To that end, the office manages a number of programs to assist students. Some of the programs are:

- Advising
- Advising ethnic student business organizations
- Mentoring
- Ongoing seminar and workshop series on study and work issues and strategies
- Referring students to other campus support offices
- Retention
- Teaching Academic Success courses COB 294 and 394
- Tutoring

Students can visit the office in BA 122, call 602/965-4066, or visit the college's Web site at www.cob.asu.edu/aap.

Asian Studies. Students in the College of Business may pursue a program with an emphasis in Asian studies as part of the B.S. degree requirements in business. At least 30 upper-division semester hours of the program must be in Asian studies content courses. Reading knowledge of an Asian language is required. The Asian studies content program must be approved by the Center for Asian Studies (see pages 307-308). Fulfillment of the requirements is recognized on the transcript as a bachelor's degree with a designation of the Asian studies discipline. It is possible to complete the certificate program in International Business Studies and the Asian studies emphasis concurrently.

Certificate in Small Business and Entrepreneurship. A curriculum in small business and entrepreneurship is available to business majors at ASU.

The certificate requires 15 semester hours of classes of which the following six semester hours must be included:

MGT 440	Entrepreneurship	3
MGT 494	ST: Business Plan Development	3

The remaining nine semester hours consist of three additional upper-division courses relevant to small business. A copy of the approved electives for business majors pursuing the Certificate in Small Business and Entrepreneurship is available in the Undergraduate Programs Office. To receive the certificate, students must complete the specified business courses with a grade of "C" or higher.

Certificate in International Business Studies. See page 159 for the requirements of this certificate.

Certificate in Quality Analysis. The program of study leading to the Certificate in Quality Analysis prepares students to perform technical analyses associated with quality measurement and improvement of manufacturing and service processes. Graduates with the ability to implement these analyses are in high demand in the marketplace. This program is not a substitute for the

listed areas of business specialization; rather, the courses required for the certificate add quantitative strength and implementation skills for quality tools to the student's chosen field of specialization.

Students are required to complete a bachelor's degree from any of the major fields of study at ASU and to complete a minimum of 15 semester hours of approved course work, including the following nine hours:

QBA 321	Applied Quality Analysis I L2	3
QBA 421	Applied Quality Analysis II	3
QBA 450	Operations and Process Analysis L2	3

To complete the certificate, the student selects at least six additional hours of course work related to quality analysis approved in advance by the advisor for the certificate program. The student must also complete the 15 hours of course work with a minimum GPA of 2.50.

Honors Program. College of Business students who have been admitted to the University Honors College and the professional program are eligible to participate in the Business Honors Program.

The Business Honors Program provides opportunities for academically talented undergraduate business students to interact with other leading students, faculty and business professionals inside and outside the classroom. The result is a challenging and enriched education experience that is valuable for professional career or graduate work.

To be admitted into the Business Honors Program students must meet the following criteria:

1. be enrolled in the University Honors College;
2. have a cumulative GPA of 3.40 or higher;
3. be admitted into the college's professional program; and
4. have sufficient time to complete the honors requirements.

Upon acceptance into the program, a valuable learning experience begins. The honors course work consists of HON 171 and 172 The Human Event

or HON 394 Selected Topics and an additional 18 semester hours of upper-division honors courses, including the following six semester hours:

COB 394	Honors Business Forum	1
COB 492	Honors Directed Study	1
COB 494	Honors Research	1
---	493 Honors Thesis	3

The Business Honors Program emphasizes activities beyond the normal classroom setting in order to broaden the educational experience. Such activities include special honors scholarships, student/faculty mixers, and professional seminars and panel discussions. Students are also encouraged to participate in the Mentoring Program, which allows students the opportunity to interact with local business professionals.

An academic advisor is assigned strictly to assist honors students in course selection, to monitor progress toward the honors recognition, and to be actively involved in career and educational guidance upon completion of the degree.

While the program focuses on students in the professional program, freshman and sophomore honors students are offered break-out sections in core classes, are invited to attend selected events, and can be assigned a junior or senior honors mentor.

For more information, call 602/965-8710 or stop by the Honors Program Office located in BAC 226. More information may be obtained by visiting the Honors College's home page at www.cob.asu.edu/HON. Interested students should also contact the University Honors College at 602/965-2359.

Internships. The college encourages students to complement their academic program with career-related work. This practical experience gives students a distinct advantage in the job market when seeking their first full-time professional positions. Additional benefits include industry contacts, a deeper understanding of career options, and monetary compensation that helps students finance their education.

Formal internships and co-ops offer professional work experience and experiential learning opportunities that enrich the student's academic preparation.

Students may do internships in the summer or part time during semesters. Co-op positions are full-time and require a one-semester or longer break in school attendance. The college provides guidelines to companies and encourages them to sponsor internship and co-op positions that benefit both the firm and the student. This is accomplished by building positions around projects and challenging responsibilities that enable students to apply learning acquired in advanced business classes.

ASU Career Services and the College of Business work cooperatively to help students identify and obtain career-related work. The process of obtaining internships and co-ops is a learning opportunity. Students use the same job-search skills and resources that are utilized to obtain permanent career positions. Informational materials, workshops, and required class activities help students learn job-search and career-exploration skills, and locate internship and co-op opportunities.

Students may earn academic credit for internship experience. Several academic units within the college offer internship courses. Work assignments for these courses must be approved in advance by a designated faculty member and all internship courses include an academic component.

For additional information, visit the Undergraduate Internship coordinator at BA 122, call 602/965-4066, or visit the College of Business Web site at www.cob.asu.edu.

Latin American Studies. Students in the College of Business may pursue a program with an emphasis in Latin American area studies. At least 30 upper-division semester hours of the program must be in Latin American content courses, including 15 semester hours of Latin American content courses in the College of Business listed on page 159 under International Business Studies (except ECN 365) and 15 semester hours of Latin American content courses in other disciplines. A reading knowledge of either Spanish or Portuguese is required; a reading knowledge of both is recommended. The Latin American content program must be approved by the Center for Latin American Studies (see page 308). Fulfillment of the requirements is recognized on the transcript as a bachelor's degree with a designation of the Latin American studies discipline. It is possible to complete the certificate program in International Business Studies and the Latin American emphasis concurrently.

Prelaw Studies. Prelaw students may pursue a program of study in the College of Business. Courses in accounting, economics, finance, insurance, labor relations, and statistics are recommended for any student planning to enter the legal profession.

The admission requirements of colleges of law differ considerably. The student should communicate with the dean of the law school the student hopes to attend and should plan a pro-

gram to meet the requirements of that school. Most law schools, including the ASU College of Law, require a baccalaureate degree for admission, although some permit admission upon completion of three years of college work.

Students who plan to complete a bachelor's degree before entering law school may follow any field of specialization in the College of Business. Within the College of Business are faculty members who are lawyers and who serve as advisors for students desiring a prelaw background.

RESEARCH CENTERS

L. William Seidman Research Institute

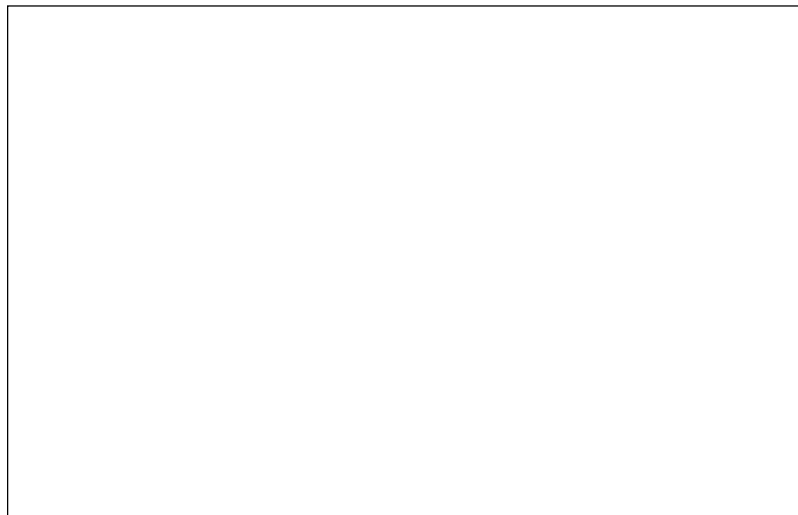
The College of Business has eight research centers operating under the umbrella of the L. William Seidman Research Institute. The following centers provide support for faculty research, give opportunities for advanced graduate students' involvement with faculty, and provide information and assistance to the business community on a wide variety of subjects:

- Arizona Real Estate Center
- Bank One Economic Outlook Center
- Center for Advanced Purchasing Studies
- Center for the Advancement of Small Business
- Center for Services Marketing and Management
- Center for the Study of Finance
- Joan and David Lincoln Center for Applied Ethics

The Seidman Research Institute's mission is to encourage and support applied business research by serving as a public access point to the College of Business, by transferring new knowledge to the public, by encouraging the development of education programs grounded in applied business research, and by conducting high-quality, applied business research.

The institute increases the level of funded research by adding support services to facilitate grant preparation and by facilitating the mission of research centers as liaisons between faculty and businesses. In addition, the institute provides desktop publishing services.

For more information, contact the director at the L. William Seidman Research Institute, BA 319, 602/965-5362. The institute's Web site is www.cob.asu.edu/seid.



Entering law students assemble in the College of Law's Great Hall for orientation.

Tim Trumble photo

COLLEGE OF BUSINESS (COB)

COB 300 Strategic Business Foundations.
(3) F, S, SS

A strategic, integrative foundation of key business issues covering all disciplines. Issues include diversity, ethics, globalization, interpersonal skills, and quality. Must be taken in the first semester of the professional program for business students. Lecture, lab. *General Studies: L2.*

COB 301 Business Forum. (1) F, S, SS
Provides professional program business students with information on careers, interviewing, job hunting, and resume skills. Must be taken in the first semester of the professional program for business students. Prerequisite: professional program business student.

**School of Accountancy
and Information
Management**

Philip M.J. Reckers
Director
(BA 223) 602/965-3631
www.cob.asu.edu/acct

PROFESSORS

BOATSMAN, BOYD, FLAHERTY,
JOHNSON, KAPLAN, PANY,
PHILIPPAKIS, RECKERS, RENEAU,
SCHULTZ, SHRIVER, R. SMITH,
STEINBART, TIDWELL, WYNDELTS

ASSOCIATE PROFESSORS

CHRISTIAN, GOLEN, GOUL, GUPTA,
KEIM, KIANG, KULKARNI, MOECKEL,
O'DELL, O'LEARY, PEI, REGIER,
ROY, ST. LOUIS, VINZE

ASSISTANT PROFESSORS

CHENOWETH, DAVID, HWANG,
MISHRA, K. SMITH, WHITECOTTON

SENIOR LECTURER

MACCRACKEN

LECTURERS

BOATSMAN, DOWLING, GEIGER,
HALL, TAYLOR

The School of Accountancy and Information Management houses separate undergraduate degree programs in Accountancy and Computer Information Systems. The school also offers a dual degree program in which students complete requirements for both degree programs (Accountancy and Computer Information Systems) simultaneously. For more information on courses, fac-

ulty, and programs, visit the school's Web site.

ADMISSIONS

The School of Accountancy and Information Management follows the College of Business policies and procedures for admission to its undergraduate professional programs in Accountancy, Computer Information Systems, and the dual degree program of Accountancy and Computer Information Systems.

To be considered for admission to the Accountancy major, a student must meet the College of Business admission requirements and have a grade of "B" or higher in both ACC 230 and 240 or their equivalents.

To be considered for admission to the Computer Information Systems major, a student must meet the College of Business admission requirements and have a grade of "C" or higher in CSE 100 or its equivalent.

Due to resource limitations, admission to all of the school's programs is very competitive. Approximately one third of all applicants who apply to the professional programs in Accountancy and Computer Information Systems may be admitted. Applicants are reviewed using a portfolio approach. Among the factors considered are: cumulative GPA, skill course GPA, transfer GPA and institution (if applicable), work experience, demonstrated community involvement and leadership skills, and responses to questions located in the professional program application. For current admission statistics for each program, please contact the Undergraduate Programs Office in the College of Business.

ACCOUNTANCY

The major in Accountancy includes the essential academic preparation for students

1. pursuing professional careers in public, corporate, and governmental accounting;
2. seeking positions in consulting; or
3. planning to operate their own businesses.

The major in Accountancy consists of the following courses:

ACC 330	Accounting Information Systems L1	4
ACC 340	External Reporting I	4
ACC 350	Internal Reporting	4
ACC 430	Taxes and Business Decisions L2	4
ACC 440	External Reporting II	4
ACC 450	Principles of Auditing	4
Total		24

As part of the requirements, all Accountancy majors must complete the following courses:

ACC 250	Introductory Accounting Lab	1
CIS 220	Programming Concepts for Accountancy Majors	3
CIS 335	Data and File Structures	3
CIS 420	Business Database Concepts	3
COM 100	Introduction to Human Communication SB	3
COM 259	Communication in Business and the Professions	3
ECN 306	Survey of International Economics SB*	3
ENG 301	Writing for the Professions L1	3
Total		22

* This course may be counted in the business core as an international business course.

COMPUTER INFORMATION SYSTEMS

The major in Computer Information Systems prepares students for professional careers involving the analysis, configuration, programming, and database aspects of the design and implementation of computerized business information systems. The course work prepares the student for a career in business computer information systems and for admission to graduate programs in computer information systems or management information systems.

The major in Computer Information Systems consists of the following courses:

ACC 330	Accounting Information Systems L1	4
CIS 335	Data and File Structures	3
CIS 410	Object-Oriented Modeling and Programming	3
CIS 420	Business Database Concepts	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84-108. For graduation requirements, see pages 79-83. For omnibus courses offered but not listed in this catalog, see pages 56-57.

CIS 430	Networks and Distributed Systems	3
CIS 440	Systems Design and Electronic Commerce	3
Total		19

All Computer Information Systems majors must complete CSE 100 Principles of Programming (N3) or a “C” or “C++” programming language course, which may be used as a college requirement, and CIS 235 Transaction and File Processing, which may be used in the business core in place of CIS 200.

MAJOR PROFICIENCY REQUIREMENTS

In addition to college and university requirements, Accountancy and Computer Information Systems majors must receive grades of “C” or higher in the required upper-division major and major support courses. If a student receives a grade below “C” in any required upper-division major course, this course must be repeated before any other upper-division major course can be taken. If a second grade below “C” is received in either an upper-division major course already taken or in a different upper-division major course, the student is no longer eligible to take additional upper-division major courses.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79–83 for university graduation requirements and pages 144–146 for college requirements.

ACCOUNTANCY (ACC)

- ACC 230 Uses of Accounting Information I.** (3) F, S, SS
Introduction to the uses of accounting information focusing on the evolution of the business cycle and how accounting information is used for internal and external purposes. Prerequisite: sophomore standing.
- ACC 240 Uses of Accounting Information II.** (3) F, S, SS
Introduction to the uses of accounting information focusing on the evolution of the business cycle and how accounting information is used for internal and external purposes. Prerequisites: ACC 230; sophomore standing.

ACC 250 Introductory Accounting Lab. (1) F, S, SS
Procedural details of accounting for the accumulation of information and generation of reports for internal and external users. Lab. Prerequisites: ACC 230; sophomore standing.

ACC 315 Financial Accounting and Reporting. (3) F, S
Accounting theory and practice related to uses of financial statements by external decision makers. Prerequisites: ACC 240, 250; non-Accountancy major.

ACC 316 Management Uses of Accounting. (3) F, S
Uses of accounting information for managerial decision-making, budgeting, and control. Prerequisites: ACC 240; non-Accountancy major.

ACC 330 Accounting Information Systems. (4) F, S, SS
Knowledge related to accounting information systems, emphasizing managerial decision-making and support, transaction processing, controls, computer technology, and systems development. 3 hours lecture, 3 hours lab. Prerequisites: CIS 200; professional program business student majoring in Accountancy. *General Studies: L1.*

ACC 340 External Reporting I. (4) F, S, SS
Financial accounting theory and practice related to external reporting. 3 hours lecture, 3 hours lab. Prerequisite: professional program business student majoring in Accountancy. Prerequisites: FIN 300; professional program business student majoring in Accountancy. Prerequisites with a grade of “C” or higher: ACC 250, 330.

ACC 350 Internal Reporting. (4) F, S, SS
Internal reporting systems for planning, control, and decision making. 3 hours lecture, 3 hours lab. Prerequisite: professional program business student majoring in Accountancy. Prerequisites: OPM 301; professional program business student majoring in Accountancy. Prerequisites with a grade of “C” or higher: ACC 250, 330.

ACC 430 Taxes and Business Decisions. (4) F, S, SS
Federal income taxation of sole proprietors, partnerships, corporations, fiduciaries, and individuals with an emphasis on tax consequences of business and investment decisions. 3 hours lecture, 3 hours lab. Prerequisites: LES 305; professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 340. *General Studies: L2.*

ACC 432 Problems in Managerial Accounting. (3) N
Cases and computer applications in decision-making, planning and control, and capital budgeting. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 350.

ACC 440 External Reporting II. (4) F, S, SS
Continuation of ACC 340 External Reporting I with emphasis on the recognition, research, and resolution of financial reporting issues. 3 hours lecture, 3 hours lab. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 340.

ACC 450 Principles of Auditing. (4) F, S
Standards and procedures in auditing. Planning, evidence gathering and accumulation, and reporting. Ethical and legal considerations. 3 hours lecture, 3 hours lab. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 440.

ACC 452 Advanced Taxation. (3) N
Advanced problems in business and fiduciary income tax, estate and gift tax, planning, and research. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 430.

ACC 467 Management Advisory Services. (3) N

Concepts and methods of providing advisory services with respect to accounting information systems and financial analysis. Administration of consulting practices. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 330.

ACC 475 Accounting in Public-Sector Organizations. (3) N
Principles of accounting and reporting, and budgeting and financial control systems applied in governmental units and other nonbusiness organizations. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 316 or 350.

ACC 483 Advanced Accounting. (3) N
Accounting theory related to business combinations, consolidated financial statements, foreign operations, partnerships, and nonbusiness organizations. Prerequisite: professional program business student majoring in Accountancy. Prerequisite with a grade of “C” or higher: ACC 440.

ACC 502 Financial Accounting. (3) A
Financial accounting concepts and procedures for external reporting. Prerequisite: M.B.A. degree program student.

ACC 503 Managerial Accounting. (3) A
Managerial accounting concepts and procedures for internal reporting. Prerequisite: M.B.A. degree program student.

ACC 511 Taxes and Business Strategy. (3) A
Economic implications of selected management decisions involving application of federal income tax laws. Recognition of tax hazards and tax savings. Prerequisite: ACC 502 or equivalent.

ACC 515 Professional Practice Seminar. (3) A
History, structure, environment, regulation, and emerging issues of the accounting profession.

ACC 521 Tax Research. (3) A
Tax research source materials and techniques. Application to business and investment decisions. Prerequisite: ACC 430.

ACC 533 EDP Auditing. (3) N
Analysis of EDP audit techniques and evaluation methods. Emphasis on current topics such as distributed processing and microcomputers. Prerequisite: ACC 450.

ACC 541 Strategic Cost Management and Uses of Information Technology. (3) A Strategic cost management emphasizing contemporary topics, including activity-based costing and strategic uses of information technology systems. Cooperative learning, lecture. Prerequisite: ACC 350 or 503.

ACC 567 Financial Models in Accounting Systems. (3) A Development and application of financial models by accountants. Analysis of decision support systems as financial modeling environments. Prerequisite: ACC 330.

ACC 571 Taxation of Corporations and Shareholders. (3) A Tax aspects of the formation, operation, reorganization, and liquidation of corporations and the impact on shareholders. Prerequisite: ACC 430.

ACC 573 Taxation of Partners and Partnerships. (3) A Tax aspects of the definition, formation, operation, liquidation, and termination of a partnership. Tax planning is emphasized. Prerequisite: ACC 430.

ACC 575 Estate and Gift Taxation. (3) A Tax treatment of wealth transfers at death and during life time, with emphasis on tax planning. Prerequisite: ACC 430.

ACC 577 Taxation of Real Estate Transactions. (3) A Income tax aspects of acquisition, operation, and disposal of real estate; syndications; installment sales; exchanges; dealer-investor issues; alternative financing; and planning. Prerequisite: ACC 521 or instructor approval.

ACC 582 Auditing Theory and Practice. (3) N Function and responsibility of the auditor in modern society. Advanced topics in auditing theory and methods. Contemporary issues in auditing. Prerequisite: ACC 450.

ACC 586 Shareholder Value Creation and Financial Statement Analysis. (3) N Develop skills necessary to exploit financial reporting information in a business environment and appreciation of reporting issues faced by management.

ACC 587 Computerized Accounting Systems. (3) A Design and evaluation of computer-based accounting information system. Development of computer-based financial models for planning and control. Prerequisite: ACC 330.

COMPUTER INFORMATION SYSTEMS (CIS)

CIS 200 Computer Applications and Information Technology. (3) F, S, SS Introduction to business information systems and the use of business application software. Prerequisite: MAT 117 or higher. *General Studies: N3.*

CIS 220 Programming Concepts for Accountancy Majors. (3) F, S, SS Introduction to business computer programming. Program languages such as C and C++ are used to familiarize students with proper programming style and practice. Prerequisite: prebusiness student.

CIS 235 Transaction and File Processing. (3) F, S Development of information systems using a file-oriented language such as COBOL. Introduction to business technology and system analysis. Prerequisites: CSE 100; MAT 119 or 210 or 270.

CIS 300 Computers in Business. (3) N Introduction to information systems in business. Use of computers for business problem solving. Prerequisites: CIS 200; professional program business student.

CIS 307 Systems Modeling. (3) N Procedures for investigating and analyzing decision systems. Use of special languages as tools of analysis and simulation. Prerequisites: CSE 100; MAT 119 or 210 or 270; professional program business student.

CIS 335 Data and File Structures. (3) F, S Use of languages such as C and C++ to implement the data structures, file structures, and interfaces used in business information systems. Prerequisites: CSE 100 and professional program business student majoring in Computer Information Systems or CIS 220 and professional program business student majoring in Accountancy.

CIS 410 Object-Oriented Modeling and Programming. (3) F, S Object-oriented modeling of business information systems. Abstract data types and object-oriented programming using a language such as C++. Prerequisites: CIS 335; professional program business student majoring in Computer Information Systems.

CIS 420 Business Database Concepts. (3) F, S Database theory, design, and application, including the entity-relationship model; the relational, hierarchical, and network database models; and query languages. Prerequisites: ACC 330; CIS 335; professional program business student majoring in Computer Information Systems or Accountancy.

CIS 430 Networks and Distributed Systems. (3) F, S Advanced topics such as communications protocols, distributed systems, and client-server systems; applications based on platforms such as networked UNIX. Prerequisites: CIS 335; professional program business student majoring in Computer Information Systems.

CIS 440 Systems Design and Electronic Commerce. (3) F, S Systems design for organizational and electronic commerce systems; use of project management and systems analysis and design tools. Prerequisites: CIS 410, 420; professional program business student majoring in Computer Information Systems.

CIS 502 Management Information and Decision Support Systems. (3) A Fundamentals of computer-based management information and decision support systems. Prerequisite: M.B.A. degree program student.

CIS 505 Object-Oriented Modeling and Programming. (3) A Object-oriented modeling of business information systems, abstract data types and object-oriented programming using a visual language. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 506 Business Database Systems. (3) A Hierarchical, network, relational, and other recent data models for database systems. Processing issues such as concurrency control, query optimization, and distributed processing. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 510 Systems Models and Simulation. (3) N Design of computer-based decision systems. Simulation as a research and decision-making tool. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 512 Decision Support Systems. (3) A Definition, description, construction, and evaluation of computer-based decision systems. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 515 Management Information Systems. (3) N Systems theory concepts applied to the collection, retention, and dissemination of information for management decision making. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 520 Systems Design and Evaluation. (3) N Methodologies of systems analysis and design. Issues include project management, interface, organizational requirements, constraints, documentation, implementation, control, and performance evaluation. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 525 Artificial Intelligence in Business. (3) N Development and application of artificial intelligence approaches to business problem solving. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 530 Information Systems Development. (3) A Object-oriented and interprocess communication and control concepts for information systems; applications based on languages such as C++ and platforms such as networked UNIX. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 535 Distributed Information Systems. (3) A Introduction to distributed systems and their impact on information systems in business. Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

CIS 591 Seminar on Selected CIS Topics. (3) A Topics such as the following are offered:
(a) Advanced Data and Knowledge Base Systems
(b) Advanced Java Programming
(c) Distributed Artificial Intelligence
(d) Integrated Modeling Environments
(e) Organizational Support Systems
Prerequisite: M.S. in Information Management or Master of Accountancy degree program student.

Department of Business Administration

John N. Pearson
Interim Chair
(BA 318) 602/965-3231
www.cob.asu.edu/ba

PROFESSORS

J. CARTER, P. CARTER,
GUNTERMANN, HENDRICK,
JENNINGS, METCALF, SMELTZER

ASSOCIATE PROFESSORS

ARANDA, BOHLMAN, BUTLER,
DAVIS, DUNDAS, ELLRAM,
LEONARD, LOCK, LYNCH,
MURRANKA, PEARSON, SIFERD

ASSISTANT PROFESSOR

MALTZ

SENIOR LECTURERS

FLYNN, GEISS

The faculty in the Department of Business Administration offer courses in four separate areas: legal and ethical studies, management communication, real estate, and supply chain management.

Legal and Ethical Studies

The legal and ethical studies faculty offer the undergraduate and the Master of Business Administration (M.B.A.) core requirements in legal and ethical studies. LES 306 and LES 307 together or their equivalents are not acceptable in lieu of LES 305. In addition, the faculty offer specialized courses in law and ethics relating to health care, insurance, real estate, and professional sports.

Management Communication

The management communication faculty serve the College of Business by teaching the B.S. core requirement BUS 301 Fundamentals of Management Communication. In addition, the faculty teach BUS 502 Managerial Communication, a core course in the M.B.A. degree, as well as other management communication courses.

Supply Chain Management

The major in Supply Chain Management includes the functions of planning, organizing, and controlling the flow of purchased materials into and out of the organization. Attention is

given to analyzing and selecting suppliers, price determination, value analysis, and investment recovery. Emphasis is also on the efficient use of transportation services by business management within a framework of logistics systems, government transportation policy relative to freight and passengers transportation, and the management of transportation shipper and carrier organizations. Graduates are employed by industrial firms, carriers, and governmental agencies.

The major in Supply Chain Management consists of the following courses:

SCM 345	Traffic and Logistics Management	3
SCM 355	Purchasing and Supplier Management	3
SCM 432	Materials Management	3
SCM 440	Productivity and Quality Management	3
SCM 455	Purchasing Research and Negotiation L2	3
SCM 479	Purchasing and Logistics Strategy	3
Total		18

Real Estate

The real estate faculty offer a unique one-year program designed for the students' last year of college. This innovative program emphasizes student involvement with real estate executives on projects in the Phoenix metropolitan area. Students are organized in teams to develop their analytical, communication, and team skills.

The program is organized around five aspects of real estate: brokerage/management, development, financing, investments, and market analysis. With the broad interdisciplinary perspective, emphasis on team work, and involvement in projects, students may pursue careers in land development, investment analysis, appraisal, property management, brokerage, and finance.

Successful completion of the program satisfies the requirements of the major based on the following courses:

LES 411	Real Estate Law	3
REA 300	Real Estate Analysis	3
REA 331	Real Estate Finance	3
REA 401	Real Estate Appraisal	3
REA 441	Real Estate Land Development	3
REA 456	Real Estate Investments	3
Total		18

Because of the emphasis on teamwork, interaction with business professionals, and completion of all require-

ments within a year, students may enter the program only in the fall semester.

MAJOR PROFICIENCY REQUIREMENTS

Students must receive grades of "C" or higher in upper-division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79–83 for university graduation requirements and pages 144–146 for college requirements.

BUSINESS ADMINISTRATION (BUS)

BUS 301 Fundamentals of Management Communication. (3) F, S, SS

Intrapersonal, interpersonal, and administrative communication within management contexts. Prerequisite: CIS 200. Prerequisite with a grade of "C" or higher: ENG 102. *General Studies: L1.*

BUS 431 Business Report Writing. (3) N Organization and preparation of reports incorporating electronic databases, word processing, and graphics. Prerequisite: BUS 301.

BUS 451 Business Research Methods. (3) N

Methods of collecting information pertinent to business problem solving, including design, collection, analysis, interpretation, and presentation of primary and secondary data. *General Studies: L2.*

BUS 502 Managerial Communication. (1–3) F, S

Analysis of various business problems, situations, and development of appropriate communication strategies. Prerequisite: MGT 502.

BUS 504 Professional Report Writing. (3) A Preparation and presentation of professional reports.

BUS 507 Business Research Methods. (3) N

Techniques for gathering information for business decision making. Selection, design, and completion of a business-oriented research project.

BUS 591 Seminar. (3) N

Selected managerial communication topics.

BUS 594 Study Conference or Workshop. (3) N

BUS 700 Research Methods. (3) N

LEGAL AND ETHICAL STUDIES (LES)**LES 305 Legal, Ethical, and Regulatory Issues in Business.** (3) F, S

Legal theories, ethical issues, and regulatory climate affecting business policies and decisions.

LES 306 Business Law. (3) A

Legal and ethical aspects of contracts, sales, commercial paper, secured transactions, documents of title, letters of credit, and bank deposits and collections.

LES 307 Business Law. (3) A

Legal and ethical aspects of agency, partnerships, corporations, bankruptcy, antitrust, securities, and other regulations of businesses.

LES 308 Business and Legal Issues in Professional Sports. (3) N

The economic structure of professional sports and application of contract, antitrust, arbitration, and labor laws in the industry.

LES 380 Consumer Perspective of Business Law. (3) F, S

Role of law as it affects society. Case studies are used to present principles that govern business and consumers. Lecture, television. Prerequisites: 2.00 GPA; junior standing.

LES 411 Real Estate Law. (3) A

Legal and ethical aspects of land ownerships, interests, transfer, finance development and regulations of the real estate industry.

LES 532 Negotiation Agreements. (3) F, S
Course develops negotiation competencies to build partnerships and create lasting agreements with internal/external customers, suppliers, work teams, and external constituencies. Lecture and substantial student interaction through team exercises.

LES 579 Legal and Ethical Issues for Business. (3) F, S

Study of legal and ethical components of business decisions; self-regulation and social responsibility as strategies. Prerequisites: ACC 503; FIN 502; MGT 502; MKT 502.

REAL ESTATE (REA)**REA 251 Real Estate Principles.** (3) N

Regulation, practices, legal aspects, and professional opportunities of the real estate industry. Cannot be applied to Real Estate major.

REA 300 Real Estate Analysis. (3) A

Application of economic theory and analytical techniques to real estate markets. Topics include law, finance, appraisal, market analysis, investments, development. Prerequisite: professional program business student.

REA 331 Real Estate Finance. (3) A

Legal, market, and institutional factors related to financing proposed and existing properties. Emphasis on current financing techniques and quantitative methods. Prerequisites: FIN 300; professional program business student.

REA 380 Real Estate Fundamentals. (3) F, S

Real estate for the student/consumer with an emphasis on the applied aspects of each area of real estate specialization. Prerequisites: 2.00 ASU GPA; business majors (non-real estate); junior standing.

REA 401 Real Estate Appraisal. (3) A

Factors affecting the value of real estate. Theory and practice of appraising and preparation of the appraisal report. Appraisal techniques. Prerequisites: REA 300; professional program business student.

REA 441 Real Estate Land Development. (3) A

Neighborhood and city growth. Municipal planning and zoning. Development of residential, commercial, industrial, and special purpose properties. Prerequisites: REA 300; professional program business student.

REA 456 Real Estate Investments. (3) A

Analysis of investment decisions for various property types. Cash flow and rate of return analysis. Prerequisites: FIN 300; professional program business student.

REA 461 Current Real Estate Topics. (3) N

Current real estate topics of interest are discussed and analyzed. Prerequisites: REA 300; professional program business student.

REA 591 Seminar in Selected Real Estate Topics. (3) N

Topics may be selected from the following:

- (a) Real Estate Development.
Development process covering feasibility, site selection, planning, design, financing, and construction. Relationship of land use controls and regulations to the private sector.
- (b) Real Estate Finance and Investments.
Basic techniques for analyzing the financial feasibility of real estate investments. Includes cash flow, yield and risk analysis; taxation, form of ownership, and management.
- (c) Real Estate Market Analysis.
Analytical techniques used in performing market research to assess the feasibility of proposed residential, retail, office, and other developments.
- (d) Real Estate Research.
Reviews current research in areas such as market studies, mortgage securement, valuation, development, investments, and government regulation.

SUPPLY CHAIN MANAGEMENT (SCM)**SCM 301 Purchasing/Materials and Logistics Management.** (3) N

Examines the purchasing, materials, and logistics management areas. Techniques for acquiring, storing, processing, and moving material inventory are presented. Prerequisite: professional program business student.

SCM 345 Traffic and Logistics Management. (3) F, S

Managing logistics activities with emphasis on integrating transportation needs with inventory, warehousing facility location, customer service, packaging, and materials handling. Prerequisites: OPM 301; professional program business student.

SCM 355 Purchasing and Supplier Management. (3) F, S

Management of the purchasing function, including organization, procedures, supplier selection, quality, inventory decisions, and price determination. Prerequisites: OPM 301; professional program business student.

SCM 405 Urban Transportation. (3) N

Economic, social, political, and business aspects of passenger transportation. Public policy and government aid to urban transportation development. Prerequisite: upper-division standing or instructor approval.

SCM 432 Materials Management. (3) F, S

Study of managing the productive flow of materials in organizations, including MRP/II, JIT, quality, facility planning, and job design. Prerequisites: OPM 301; professional program business student.

SCM 440 Productivity and Quality Management. (3) F, S

Productivity concepts at the national, organizational, and individual levels. Quality management and its relationship to productivity in all organizations. Prerequisite: professional program business student.

SCM 455 Purchasing Research and Negotiation. (3) F, S

Current philosophy, methods, and techniques used to conduct both strategic and operations purchasing research and negotiation. Includes negotiation simulations. Prerequisites: OPM 301; SCM 432; professional program business student. Prerequisite with a grade of "C" or higher: SCM 355. *General Studies: L2.*

SCM 460 Carrier Management. (3) N

Analysis of carrier economics, regulation, management, and rate-making practice; evaluation of public policy issues related to carrier transportation. Prerequisite: upper-division standing or instructor approval.

SCM 463 International Transportation and Logistics. (3) A

Logistics activities in international business with special emphasis on transportation, global sourcing, customs issues, and facility location in international environment. Prerequisite: SCM 345 or instructor approval.

SCM 479 Purchasing and Logistics Strategy. (3) F, S

Synthesis of purchasing, production, transportation to provide a systems perspective of materials management. Development of strategies. Prerequisites: SCM 345, 432; professional program business student. Prerequisite with a grade of "C" or higher: SCM 355.

SCM 532 Supply Chain Design and Development Strategies. (3) F

A strategic orientation toward the design and development of the supply chain for purchasing, materials, and logistics systems.

SCM 541 Supply Chain Management and Control. (3) S

Management and control of purchasing and logistics management systems. Total Quality Management to assess and assure customer satisfaction. Global strategies.

SCM 545 Supply Chain Continuous Improvement Strategies. (3) S

Leading edge strategies such as reengineering high-performance teams and expert systems for continuous improvement of the supply chain. Seminar.

SCM 591 Seminar. (3) N

Topics such as the following are offered:

- (a) Logistics and Transportation
- (b) Purchasing

SCM 791 Doctoral Seminar. (3) A

Topics may be selected from the following:

- (a) Logistics, Transportation, and Physical Distribution Management.
- (b) Purchasing and Materials Management.

Department of Economics

Arthur E. Blakemore
Chair

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www.cob.asu.edu/ecn/index.html

PROFESSORS

BLAKEMORE, BOYES, BRADA,
BURDICK, BURGESS, DeSERPA,
FAITH, GOODING, HAPPEL,
HOFFMAN, HOGAN, KAZMIER,
KINGSTON, LOW, MAYER,
McDOWELL, McPHERTERS, MELVIN,
MÉNDEZ, ORMISTON,
SCHLAGENHAUF, SCHLEE

ASSOCIATE PROFESSORS

AHN, MANELLI, REFFETT, REISER,
WILSON, WINKELMAN

ASSISTANT PROFESSORS

CHADE, DATTA, HENDRICKS

SENIOR LECTURER

ROBERTS

The study of economics affords an opportunity for the student to acquire a general knowledge of the methods by which goods and services are allocated and incomes are generated and why prices, employment, money, and financial markets behave as they do. Some knowledge of economics is crucial not only for those intending to participate in the business world, but for those intending to pursue graduate education in law or other business fields or to work in the world of journalism and communications.

Economists obtain positions at universities and in government, financial institutions, brokerage houses, private nonfinancial corporations, and international organizations such as the International Monetary Fund and the World Bank, and as financial journalists and as marketing and management specialists in domestic and international firms.

Economics majors are required to earn a minimum grade of "C" in MAT 210 Brief Calculus before taking upper-division courses in economics. While MAT 210 meets the minimum mathematics requirement to major in Eco-

nomics, all Economics majors who anticipate going on to graduate school in economics or in business or to law school are encouraged to take MAT 270 Calculus with Analytic Geometry I. Majors are encouraged to pursue further course work in mathematics. MAT 270 may be taken in lieu of MAT 210 in the science and mathematics area of the requirements described in the *Advising Handbook*.

The major in Economics consists of 18 semester hours of upper-division courses in economics. The following six hours must be included:

ECN 313	Intermediate Macroeconomic Theory <i>SB</i>	3
ECN 314	Intermediate Microeconomic Theory <i>SB</i>	3

ECN 313 and 314 should be taken before other upper-division courses in economics. Students must earn a minimum grade of "C" in ECN 313 and 314. Concurrent enrollment in ECN 313 and 314 is permitted. Concurrent enrollment in ECN 313 or 314 and other upper-division courses in economics is subject to the approval of the faculty advisor.

MAJOR PROFICIENCY REQUIREMENTS

Students must receive grades of "C" or higher in upper-division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in the major.

Other Economics Programs. For information on majoring in Economics in the College of Liberal Arts and Sciences, see pages 325–326.

For information on the minor in General Economics and on the minor in Economics for Students Planning a Career in Law, see pages 325–326.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79–83 for university graduation requirements and pages 144–146 for college requirements.

ECONOMICS (ECN)

ECN 111 Macroeconomic Principles.

 (3) F, S, SS

Basic macroeconomic analysis. Economic institutions and factors determining income levels, price levels, and employment levels. *General Studies: SB*.

ECN 112 Microeconomic Principles.

 (3) F, S

Basic microeconomic analysis. Theory of exchange and production, including the theory of the firm. *General Studies: SB*.

ECN 304 Current Issues in Economics and Politics.

 (3) A

Application of basic economic principles to contemporary issues such as crime, the environment, discrimination, health care, and the national debt. Not for Economics majors. Lecture, student projects, discussion. Prerequisites: ECN 111 or 112; 2.00 ASU GPA; junior standing. *General Studies: L1/SB*.

ECN 306 Survey of International Economics.

 (3) A

Survey of international trade issues, commercial policy, trade theory, customs unions, and international monetary topics. Not for Economics majors. Lecture, discussion. Cross-listed as IBS 306. Prerequisites: ECN 111 or 112; 2.00 ASU GPA; junior standing. *General Studies: SB*.

ECN 313 Intermediate Macroeconomic Theory.

 (3) F, S

Determinants of aggregate levels of employment, output, and income of an economy. Prerequisites: ECN 111, 112. Prerequisite with a grade of "C" or higher: MAT 210. *General Studies: SB*.

ECN 314 Intermediate Microeconomic Theory.

 (3) F, S

Role of the price system in organizing economic activity under varying degrees of competition. Prerequisites: ECN 111, 112. Prerequisite with a grade of "C" or higher: MAT 210. *General Studies: SB*.

ECN 315 Money and Banking.

 (3) SS

Functions of money. Monetary systems, credit functions, banking practices, and central banking policy. This course cannot be applied to the Economics major. Prerequisite: ECN 111.

ECN 331 Comparative Economic Systems.

 (3) N

Alternative institutions, past and present, for organizing the social division of labor. Property rights, information, and incentives in industrial societies. Prerequisite: ECN 111 or 112. *General Studies: SB, G*.

ECN 360 Economic Development.

 (3) N

Theories of economic growth and development. Role of capital formation, technological innovation, population, and resource development in economic growth. Prerequisite: ECN 111 or 112. *General Studies: SB, G*.

ECN 365 Economics of Russia and Eastern Europe.

 (3) A

Origins and analysis of contemporary institutions. Comparative development and differentiation in the 20th century. Prerequisite: ECN 111 or 112. *General Studies: SB, G*.

ECN 394 Special Topics.

 (3) N

Current topics of domestic or international interest. Analytical emphasis may be macro, micro, or both. See current *Schedule of Classes* for offerings. Not for Economics majors. Prerequisite: ECN 111 or 112.

ECN 404 History of Economic Thought. (3) N

Development of economic doctrines, theories of mercantilism, physiocracy, classicism, neo-classicism, Marxism, and contemporary economics. Prerequisite: ECN 314 or instructor approval. *General Studies: SB.*

ECN 421 Earnings and Employment. (3) A
Analysis of earnings, employment, unemployment, training, education, and related topics. Policy issues are emphasized. Prerequisite: ECN 314 or instructor approval. *General Studies: L2/SB.*

ECN 436 International Trade Theory. (3) A
The comparative-advantage doctrine, including practices under varying commercial policy approaches. The economic impact of international disequilibrium. Prerequisite: ECN 314 or instructor approval. *General Studies: SB, G.*

ECN 438 International Monetary Economics. (3) A
History, theory, and policy of international monetary economics. Balance of payments and exchange rates. International financial markets including Eurocurrency markets. Prerequisite: ECN 313 or instructor approval. *General Studies: SB, G.*

ECN 441 Public Finance. (3) A
Public goods, externalities, voting models, public expenditures, taxation, and budget formation with emphasis on the federal government. Prerequisite: ECN 314 or instructor approval. *General Studies: L2/SB.*

ECN 450 Law and Economics. (3) A
Economics of the legal system including analysis of property, contracts, torts, commercial law, and other topics. Discussion, analysis. Prerequisite: ECN 314. *General Studies: L2.*

ECN 453 Government and Business. (3) A
Development of public policies toward business. Antitrust activity. Economic effects of government policies. Prerequisite: ECN 314 or instructor approval.

ECN 480 Introduction to Econometrics. (3) A
Elements of regression analysis: estimation, hypothesis tests, prediction. Emphasis is on use of econometric results in assessment of economic theories. Prerequisite: instructor approval. *General Studies: N2.*

ECN 484 Economics Internship. (3) F, S, SS
Academic credit for professional work organized through the Internship Program. Prerequisites: ECN 313, 314; outstanding academic record.

ECN 485 Mathematical Economics. (3) A
Integration of economic analysis and mathematical methods into a comprehensive body of knowledge within contemporary economic theory. Prerequisite: instructor approval.

ECN 494 Special Topics. (3) N
Current economic topics of domestic or international interest. Analytical emphasis may be macro, micro or both. See current *Schedule of Classes* for offerings. Prerequisites: ECN 313 and 314 or instructor approval.

ECN 498 Pro-Seminar. (3) A

Topic chosen from current area of interest. Prerequisites: ECN 313 and 314 or instructor approval.

ECN 502 Managerial Economics. (3) F, S
Application of microeconomic analysis to managerial decision-making in areas of demand, production, cost, and pricing. Evaluation of competitive strategies. Prerequisite: MBA degree program student.

ECN 503 Global Economics for Managers. (3) F, S

Macroeconomic analysis of issues related to economic growth, inflation, interest rates behavior, unemployment, exchange rate determination, and global competitiveness.

ECN 504 History of Economic Thought. (3) S

Historical development of economic theory. Emphasis on the development of economic analysis from preclassical economics through Keynes. Prerequisite: ECN 510 or instructor approval.

ECN 509 Macroeconomic Theory and Applications. (3) F

Theory of income, output, employment, and price level. Influence on business and economic environment. Prerequisites: ECN 111 and calculus or instructor approval.

ECN 510 Microeconomic Theory and Applications. (3) F, S

Application of economic theory to production, consumer demand, exchange, and pricing in a market economy. Prerequisites: ECN 112 and calculus or instructor approval.

ECN 511 Macroeconomic Analysis I. (3) F
Current theories of output, employment, inflation, and asset prices as well as major aggregates. Introduction to dynamic optimization techniques. Prerequisites: ECN 313 and calculus or instructor approval.

ECN 512 Microeconomic Analysis I. (3) F
Theory of production, consumer demand, resource use, and pricing in a market economy. Prerequisites: ECN 314 and calculus or instructor approval.

ECN 513 Macroeconomic Analysis II. (3) F
Focus on growth theory, dynamic general equilibrium models, monetary theory, open-economy issues. Prerequisite: ECN 511 or instructor approval.

ECN 514 Microeconomic Analysis II. (3) S
General equilibrium, welfare economics, production, and capital theory. Prerequisite: ECN 512 or instructor approval.

ECN 515 Advanced Macroeconomic Analysis. (3) F

Focus on current research areas in macroeconomics and monetary theory with emphasis on methods in economic dynamics and numerical techniques. Prerequisite: ECN 511 or instructor approval.

ECN 516 Economics of Uncertainty, Information, and Strategic Behavior. (3) F
Economic behavior under uncertainty; markets and contracts under asymmetric information; the theory of games with incomplete information and applications. Prerequisite: ECN 512 or instructor approval.

ECN 517 Monetary Theory. (3) F

Traditional and post-Keynesian monetary theory, interest rate determination, the demand and supply of money. Prerequisite: ECN 511 or instructor approval.

ECN 521 Labor Economics I. (3) F

Development of basic theoretical models for analyzing labor market issues. Prerequisite: ECN 510 or instructor approval.

ECN 522 Labor Economics II. (3) N

Extensions/criticisms of labor market theories. Applications to a variety of policy issues. Prerequisite: ECN 521.

ECN 525 Econometrics I. (3) S

Problems in the formulation of econometric models. Emphasis on estimation, hypothesis testing, and forecast of general linear models. Prerequisite: 6 hours of statistics or instructor approval.

ECN 526 Econometrics II. (3) F

Estimation and inference of qualitative and limited dependent variable models as well as general multiple equation models. Prerequisite: ECN 525 or instructor approval.

ECN 527 Econometrics III. (3) S

Generalized method of moment estimation, estimation with censored and truncated samples, nonlinear models, panel-data models, econometrics of nonstationarities. Prerequisite: ECN 526 or instructor approval.

ECN 531 Comparative Economic Systems. (3) F

Philosophical foundations of major economic systems and of properties of principal system models. Comparison of alternative institutions and system components of contemporary economies. Prerequisites: ECN 509 and 510 or instructor approval.

ECN 536 International Trade Theory. (3) S

Theories of comparative advantage and their empirical verification. Theory and political economy of commercial policy. Resource transfers and the role of the multinational corporation. Prerequisites: ECN 509 and 510 or instructor approval.

ECN 538 International Monetary Theory and Policy. (3) F

The foreign exchange market, balance of payments, and international financial institutions and arrangements; theory and applications. Prerequisites: ECN 509 and 510 or instructor approval.

ECN 541 Public Economics. (3) S

Economics of collective action, public spending, taxation, and politics. Impact of central governmental activity on resource allocation and income distribution. Prerequisite: ECN 510 or instructor approval.

ECN 553 Industrial Organization. (3) S

Analysis of structure, conduct, and performance in industrial markets; the economics of organizations. Prerequisite: ECN 510 or instructor approval.

ECN 560 Economics of Growth and Development. (3) F

Economic problems, issues, and policy decisions facing the developing nations of the world. Prerequisites: ECN 509 and 510 or instructor approval.

ECN 584 Economics Internship. (1–3) SS Academic credit for professional work organized through the Internship Program. Prerequisites: ECN 510 and 511 or instructor approval.

ECN 585 Mathematics for Economists. (3) F

Survey of mathematical ideas encountered in economics and econometrics: nonlinear programming, the Kuhn-Tucker theorem, concave programming, optimization over time. Prerequisite: calculus or instructor approval.

ECN 591 Economics Seminar. (1–3) F, S, SS

Presentations by outside speakers, department faculty, and graduate students of work in progress. Prerequisite: instructor approval.

ECN 593 Applied Projects. (3) F

Preparation of a supervised applied project typically in conjunction with an internship. Prerequisites: ECN 510, 511.

ECN 594 Conference and Workshop in Economics. (1–12) F, S, SS

Topics such as the following are offered:

- Economic Analysis Workshop. Introduction to Economic Analysis. Prerequisite: Ph.D. degree program student.
- Macroeconomic Topics Workshop. Issues in macroeconomic theory. Prerequisite: ECN 513 or instructor approval.
- Microeconomic Topics Workshop. Issues in microeconomic theory. Prerequisite: ECN 514 or instructor approval.

ECN 598 Special Topics. (3) N

Advanced topics in economics. Consult the *Schedule of Classes* for offerings. Prerequisite: instructor approval.

QUANTITATIVE BUSINESS ANALYSIS (QBA)

For additional QBA courses see "Department of Management," page 164.

QBA 221 Statistical Analysis. (3) F, S Methods of statistical description. Application of probability theory and statistical inference in business. Prerequisite: MAT 119. *General Studies: N2.*

QBA 321 Applied Quality Analysis I. (3) A Applications of statistical tools employed in empirical studies related to quality analysis. Applications focus on service processes. Prerequisite: QBA 221. *General Studies: L2.*

QBA 391 Management Science. (3) N Study of mathematical models and solution techniques which can be used to aid decision makers. Prerequisites: MAT 119, 210, 242; QBA 221; professional program business student. *General Studies: N2.*

QBA 410 Applied Business Forecasting. (3) N Application of forecasting techniques in business and institutional environments. Prerequisite: QBA 321.

QBA 421 Applied Quality Analysis II. (3) A Applications of statistical tools employed in manufacturing and experimental research. Applications focus on design and improvement of processes. Prerequisite: QBA 321.

QBA 505 Management Science. (3) N

Quantitative approaches to decision making, including linear programming and simulation, with an emphasis on business applications. Prerequisites: MAT 210; QBA 502.

QBA 511 Sampling Techniques in Business. (3) N

Planning, execution and analysis of surveys in business research. Prerequisite: QBA 502.

QBA 525 Applied Regression Models. (3) A Simple linear regression, multiple regression, indicator variables, and logistic regression. Emphasis on business and economic applications. Prerequisite: MAT 210.

QBA 527 Categorical Data Analysis. (3) A Discrete data analysis in business research. Multidimensional contingency tables and other discrete models. Prerequisite: QBA 525.

QBA 530 Experimental Design. (3) A Experimental designs used in business research. Balanced and unbalanced factorial designs, repeated measures designs, and multivariate analysis of variance. Prerequisite: QBA 525 or equivalent.

QBA 535 Multivariate Methods. (3) A Advanced statistical methods used in business research. Multivariate analysis of association and interdependence. Prerequisite: QBA 525.

QBA 540 Forecasting. (3) N

Foundation of statistical forecasts and forecast intervals; application of classical and computer-assisted forecasting methods to business forecasting problems. Prerequisites: MAT 210; QBA 502.

QBA 550 Intermediate Decision Analysis. (3) N

Quantitative decision analysis methods for business decision making under uncertainty, including decision diagrams, subjective probabilities, and preference assessment. Prerequisites: MAT 210; QBA 502.

QBA 552 Statistical Decision Theory. (3) N Statistical decision methods for business decision making under uncertainty, including Bayesian inference, optimal statistical decisions, and value of information assessment. Prerequisites: MAT 210; QBA 550.

QBA 560 Probabilistic Models. (3) N Development and application of probabilistic models for quantitative business analysis. Prerequisites: MAT 210; QBA 502.

QBA 561 Mathematical Programming. (3) N Techniques for solving mathematical programming models of business problems. Prerequisites: MAT 210, 242.

QBA 562 Network Flow Models. (3) N Introduction to network structure, applications, and algorithms; development of data structures for network algorithms applied to business problems. Prerequisites: QBA 561 (or MAT 242) and QBA 505.

QBA 564 Nonlinear Optimization. (3) N Basic properties of solutions and algorithms for constrained and unconstrained minimization, basic descent methods, and barrier methods. Prerequisites: QBA 561 (or MAT 242) and QBA 505.

Department of Finance

Herbert M. Kaufman
Chair
(BAC 519) 602/965-3131
www.cob.asu.edu/fin

PROFESSORS

BOOTH, COLES, JOEHNK,
KAUFMAN, POE, SUSHKA

ASSOCIATE PROFESSORS

BESSEMBINDER, CESTA,
CHAN, GALLINGER, HERTZEL,
HOFFMEISTER, MARTIN, WILT

ASSISTANT PROFESSORS

GRIFFIN, LEMMON

LECTURER

OAKES

The study of finance prepares students to understand the financial implications inherent in virtually all business decisions. Students majoring in Finance are prepared for entry-level careers in corporate management, depository institutions, investment management, and financial services. The finance curriculum emphasizes financial markets, evaluation of investments, and efficient allocation of resources.

The major in Finance consists of the following courses:

ACC 315	Financial Accounting and Reporting	3
FIN 331	Financial Markets and Institutions	3
FIN 361	Managerial Finance	3
FIN 421	Security Analysis and Portfolio Management	3
	Two additional 400-level FIN courses	6
Total		18

As part of the requirements, all Finance majors must complete ACC 250 Introductory Accounting Lab. Finance majors are strongly advised to take ACC 316 Management Uses of Accounting.

ACC 250 must be completed before taking ACC 315. ACC 315 must be completed before taking 400-level FIN courses.

MAJOR PROFICIENCY REQUIREMENTS

Students must receive grades of “C” or higher in upper-division courses for the major. If a student receives a grade below “C” in any course in the major, this course must be repeated before taking any further courses for which this course is a prerequisite. If a second grade below “C” is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79–83 for university graduation requirements and pages 144–146 for college requirements.

FINANCE (FIN)

FIN 300 Fundamentals of Finance. (3) F, S, SS

Theory and problems in financial management of business enterprises. Prerequisites: ACC 240; ECN 112; QBA 221.

FIN 331 Financial Markets and Institutions. (3) F, S

Analysis of financial markets and intermediaries. Theory of financial intermediation, interest rate theory, money and capital market instruments, and government regulation. Prerequisite with a grade of “C” or higher: FIN 300.

FIN 361 Managerial Finance. (3) F, S

Theories and problems in resource allocation, cost of capital, CAPM and capital budgeting, asset valuation, capital structure, and financing policy. Prerequisite with a grade of “C” or higher: FIN 300.

FIN 380 Personal Financial Management. (3) F, S

Dynamic analysis of personal financial planning, including time value of money, stock and bond investment, and retirement and estate planning. Prerequisites: minimum cumulative GPA of 2.00; junior standing; non-Finance major.

FIN 421 Security Analysis and Portfolio Management. (3) F, S

Security analysis theory and practice. Selection and management of financial asset portfolios. Securities markets and portfolio risk-return analysis. Lecture, discussion. Prerequisite: professional program business student. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361.

FIN 427 Derivative Financial Securities. (3) A

Study of stock options, index options, convertible securities, financial futures, warrants, subscription rights, and arbitrage pricing theory. Lecture, discussion. Prerequisites: FIN 421; professional program business student.

FIN 431 Management of Financial Institutions. (3) A

Asset/liability and capital management in financial institutions. Influence of market factors and regulatory agencies. Emphasis on commercial banks. Lecture, discussion. Prerequisite: professional program business student. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361.

FIN 451 Working Capital Management. (3) N

Analysis of short-term profitability and liquidity. Emphasis on managing cash, accounts receivable, inventory, and current liabilities. Lecture, discussion. Prerequisite: professional program business student. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361.

FIN 456 International Financial Management. (3) A

Exchange rate determination, financial markets, managing multinational corporations, capital budgeting, and hedging currency risk exposure from an international perspective. Prerequisite: professional program business student. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361.

FIN 461 Financial Cases and Modeling. (3) A

Case-oriented capstone course in managerial finance. Contemporary issues of liquidity management, capital budgeting, capital structure, and financial strategy. Lecture, discussion, group work. Prerequisite: professional program business student. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361. *General Studies: L2.*

FIN 481 Honors Seminar in Finance. (3) A

Honors course covering topics that include theory and applications concerning managerial finance, investments, and financial institutions. Lecture, discussion. Prerequisites: professional program business student; honors student or senior Finance major with minimum 3.40 GPA. Prerequisites with a grade of “C” or higher: ACC 315; FIN 331, 361.

FIN 502 Managerial Finance. (3) A

Theory and practice of financial decision making, including risk analysis, valuation, capital budgeting, cost of capital, and working capital management. Prerequisites: ACC 502; ECN 502; QBA 502.

FIN 521 Investment Management. (3) A

Valuation of equities, fixed incomes, and options/financial futures in an individual security and portfolio context; mathematical asset allocation approaches. Lecture, discussion. Prerequisite: FIN 502.

FIN 527 Derivative Financial Securities. (3) S

Analysis of forwards, futures, and option contracts on bonds, commodities, equities, and foreign exchange. Design of speculative and hedging strategies. Lecture, discussion. Prerequisites: FIN 502, 521.

FIN 531 Capital Markets and Institutions. (3) A

Recent theoretical and operational developments in economic sectors affecting capital markets and institutions. Lecture, discussion. Prerequisite: FIN 502.

FIN 551 Financial Statement Analysis. (3) A

Analysis of corporations’ financial statements to ascertain their financial strength and default risk. Emphasis is on studying cash flows. Lecture, cases. Prerequisites: ACC 502; FIN 502.

FIN 556 International Financial Management. (3) A

Behavior of real and nominal currency exchange rates, management of international investment portfolios, corporate exchange exposure, and hedging exchange risk. Lecture, discussion. Prerequisite: FIN 502.

FIN 561 Financial Management Cases. (3) N

Case-oriented course in applications of finance theory to management issues. Acquisition, allocation, and management of funds within the business enterprise. Working capital management, capital budgeting, capital structure, and financial strategy. Lecture, discussion, presentation. Prerequisite: FIN 502.

FIN 581 Applied Corporate Finance. (3) A

Application of theories in corporate finance. Market efficiency, capital structure, “principal-agent” theory, corporate control, dividend policy, and capital budgeting. Prerequisite: FIN 502.

FIN 781 Theory of Finance. (3) A

Fundamental tools of financial economics; asset pricing, arbitrage, option pricing, capital structure, dividend policy, asymmetric information, and transaction-cost economics. Prerequisites: FIN 502, 521, 531.

FIN 791 Doctoral Seminar in Finance. (3) A

- Financial Institutions and Markets. Economic and monetary theory applied to financial markets and institutions; implications of financial structure for market performance and efficiency. Prerequisite: FIN 581.
- Financial Management. Financial theory pertaining to capital structure, dividend policy, valuation, cost of capital, and capital budgeting. Prerequisite: FIN 581.
- Investments. Investments and market theory; efficient markets hypothesis; option and commodity markets. Prerequisite: FIN 581.

School of Health Administration and Policy

Eugene S. Schneller

Director

(BAC 554) 602/965-7778

www.cob.asu.edu/hap

PROFESSORS

FORSYTH, JOHNSON, KIRKMAN-LIFF, KRONENFELD, SCHNELLER, WESBURY, WILLIAMS

GRADUATE PROGRAMS

The faculty in the School of Health Administration and Policy offer the Master of Health Services Administration (M.H.S.A.) degree. The M.H.S.A. program is accredited by the Accrediting Commission on Education for

Health Services Administration. Students enrolled in the school may earn concurrent M.H.S.A./M.B.A. degrees. The school also collaborates with the College of Law to allow students to earn concurrently the M.H.S.A./J.D. degrees, and the College of Nursing to allow students to earn concurrently the M.H.S.A. degree and the M.S. degree in Nursing with a concentration in nursing administration.

Through the Arizona Graduate Program in Public Health, the school faculty administer a health administration and policy concentration that leads to a Master of Public Health (M.P.H.) degree granted by the University of Arizona. The M.P.H. is accredited by the Council on Education for Public Health. Courses pertaining to the M.P.H. program include

HSA 598	Biostatistics	3
HSA 598	Epidemiology	3
HSA 598	Health Care Finance	3
HSA 598	Health Care Organization and Systems	3
HSA 598	Health Services Administration and Policy	3
HSA 598	Policy Issues in Healthcare	3
HSA 598	Principles of Health Economics	3

Undergraduates may register in the above courses with permission of the instructor using the HSA 498 designation.

For more information on programs, see the *Graduate Catalog*.

HEALTH SERVICES ADMINISTRATION (HSA)

HSA 473 Comparative Health Systems. (3) A

Comparison of health care financing and delivery in industrialized countries; covers insurance, hospital management and physician payment. Lecture, discussion. Cross-listed as HSA 573.

HSA 494 Special Topics in Health Administration. (3) A

Seminar topics, including comparative health care systems, ambulatory care administration, behavioral health, long term care, and health economics. Prerequisite: instructor approval.

HSA 498 Biostatistics. (3) F

Aspects of descriptive statistics and statistical inference most relevant to health issues, including data, rates, and confidence intervals. Cross-listed as HSA 561.

HSA 498 Health Care Finance. (3) S

Overview of the acquisition, allocation, and management of financial resources by health care providers. Focuses on economic, financial, and accounting principles. Cross-listed as HSA 564.

HSA 498 Health Economics. (3) S

Introduction to concepts and methods used to direct and understand production and distribution of health care services. Cross-listed as HSA 563.

HSA 498 Health Services Administration and Policy. (3) F

Introduction to organizational theory and management of complex organization within the historical and contemporary contexts of the U.S. public health. Cross-listed as HSA 560.

HSA 498 Policy Issues in Health Care. (3) F

Current policy issues in health through concepts of access, cost, and quality; issues relating to disease trends and policy formulation. Cross-listed as HSA 565.

HSA 502 Health Care Organization. (3) A

Concepts, structures, functions, and values which characterize contemporary health care systems in the United States.

HSA 505 Community Health Care Perspectives. (3) A

Epidemiological, sociological and political perspectives, and techniques for analyzing health problems and responding to health care needs in communities. Prerequisite: HSA 502.

HSA 512 Health Care Economics. (3) A

Economics of production and distribution of health care services, with special emphasis on the impact of regulation, competition, and economic incentives. Prerequisite: HSA 502.

HSA 520 Health Care Organizational Structure and Policy. (3) A

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics. Cross-listed as HSA 562. Prerequisite: HSA 502.

HSA 522 Health Care Management Systems. (3) A

Systems concepts, quantitative methods, and information systems applied to management problems in health institutions and community health planning. Prerequisites: HSA 505; QBA 502.

HSA 532 Financial Management of Health Services. (3) A

Acquisition, allocation, and management of financial resources within the health care enterprise. Budgeting, cost analysis, financial planning, and internal controls. Prerequisites: ACC 503; FIN 502; HSA 502.

HSA 542 Health Care Jurisprudence. (3) A

Legal aspects of health care delivery for hospital and health services administration. Legal responsibilities of the hospital administrator and staff. Prerequisites: HSA 505, 520.

HSA 560 Health Services Administration and Policy. (3) F

Introduction to organizational theory and management of complex organization within the historical and contemporary contexts of the U.S. public health. Cross-listed as HSA 498.

HSA 561 Biostatistics. (3) F

Aspects of descriptive statistics and statistical inference most relevant to health issues, including data, rates, and confidence intervals. Cross-listed as HSA 498.

HSA 562 Health Care Organization and Systems. (3) F

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics. Cross-listed as HSA 520.

HSA 563 Health Economics. (3) S

Introduction to concepts and methods used to direct and understand production and distribution of health care services. Cross-listed as HSA 498.

HSA 564 Health Care Finance. (3) S

Overview of the acquisition, allocation, and management of financial resources by health care providers. Focuses on economic, financial, and accounting principles. Cross-listed as HSA 498.

HSA 565 Policy Issues in Health Care. (3) F

Current policy issues in health through concepts of access, cost, and quality; issues relating to disease trends and policy formulation. Cross-listed as HSA 498.

HSA 571 Ambulatory Care Management. (3) A

The evolution, planning, and management of multispecialty group practices, health maintenance organizations, and other alternative delivery systems. Prerequisite: HSA 502.

HSA 573 Comparative Health Systems. (3) A

Comparison of health care financing and delivery in industrialized countries; covers insurance, hospital management and physician payment. Lecture, discussion. Cross-listed as HSA 473.

HSA 575 Chronic Care Administration. (3) A

Management of long-term care services and facilities, including behavioral health and rehabilitation programs.

HSA 589 Integrative Seminar. (3) A

Capstone assessment of current policies, problems, and controversies across the broad spectrum of health services administration. Prerequisites: HSA 505, 520, 522, 532.

HSA 591 Seminar. (3) A

Seminar topics such as the following may be offered:

- Behavioral Health
- Chronic Care Administration
- Comparative Health Care Systems
- Cost Containment and Quality Assurance
- Health Care Economics
- Health Care Labor Law
- Human Resources Management
- Managing Physicians
- Multihospital Systems
- Topics in Health Services Research

HSA 593 Applied Project. (3) F, S, SS

Optional on-site experience in advanced development of managerial skills in health services administration and policy. Minimum of 10 weeks. Prerequisites: 18 hours of credit toward program of study; director approval.

HSA 598 Special Topics. (3) A

Special topics such as the following may be offered:

- Epidemiology

International Business Studies

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 Director
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www.cob.asu.edu/up/aap.html

Certificate in International Business Studies

The program of study leading to the Certificate in International Business Studies is designed to prepare students for positions with multinational firms, banks, government agencies, and international organizations. This program is not a substitute for the listed areas of business specialization; rather, the courses required for the certificate add an international dimension to the student's chosen major.

Requirements for the certificate are designed to provide an understanding of international business environments, principles and operations, to provide an awareness of global social processes and a sensitivity to foreign cultures, and to develop competence in a foreign language. These objectives are met in the following ways: international business principles and operations, global and area studies, foreign language, and GPA proficiency.

International Business Principles and Operations. At least 15 semester hours of approved courses in international business are required. Students must take either IBS 300 Principles of International Business or ECN/IBS 306 Survey of International Economics and the international course in their major. Other international business courses from which the remaining hours are selected include:

ECN 331	Comparative Economic Systems <i>SB, G*</i>	3
ECN 360	Economic Development <i>SB, G*</i>	3
ECN 365	Economics of Russia and Eastern Europe <i>SB, G*</i>	3
ECN 436	International Trade Theory <i>SB, G*</i>	3
ECN 438	International Monetary Economics <i>SB, G*</i>	3

ECN 494	ST: Multinational Firm in the World Economy	3
FIN 456	International Financial Management	3
IBS 394/494	ST: Regional Business Environment of Southeast Asia	3
	or IBS 494 ST: Regional Business (3)	
IBS 400	Cultural Factors in International Business <i>G</i>	3
IBS 494	Independent Study of International Business	3
MGT 459	International Management	3
MGT 494	ST: International Management	3
MKT 435	International Marketing	3
MKT 494	ST: International Marketing ..	3
SCM 463	International Transportation and Logistics	3

* College of Business students may not use this course to fulfill General Studies SB requirements.

Honors students who select an international topic for their thesis may use that as part of the 15 hours of international course work for the certificate.

Global and Area Studies. This requirement can be satisfied either by means of course work or through participation in approved College of Business exchange programs with foreign schools of business, or by some combination of the two. The course work option requires at least 15 semester hours of approved electives in international and area studies. A minimum of six semester hours must be in courses that provide a cross-cultural perspective from the global point of view of one or more disciplines. A minimum of nine semester hours must be in courses that provide an understanding of one region of the world.

Students who participate in an approved College of Business exchange program with a foreign business school for two semesters are deemed to have fulfilled the global and area studies requirements of the Certificate in International Business upon the successful completion of this exchange program. Students who participate in such an exchange program for one semester are deemed to have satisfied the required nine hours of area studies courses. Students who participate in a business

seminar need only complete six hours of area studies courses to meet the requirements of the certificate.

Foreign Language. Evidence of competence in a foreign language equivalent to one year of college study is required.

GPA Proficiency. Applicants for the Certificate in International Business must earn a "C" or higher in each of the courses selected for the certificate, have at least a 2.50 GPA for all course work applied to the certificate, and complete at least 50% of the course work at ASU Main.

Advising. When planning and selecting courses to meet the requirements for the certificate and to take advantage of opportunities for participation in exchanges with foreign schools of business, students should consult with an international business faculty advisor or Adela Gasca, Coordinator of International Programs, BA 122, 602/965-4066, or visit the Web site.

INTERNATIONAL BUSINESS STUDIES (IBS)

IBS 300 Principles of International Business. (3) A

Multidisciplinary analysis of international economic and financial environment. Operations of multinational firms and their interaction with home and host societies. Prerequisite: ECN 112. *General Studies: G.*

IBS 306 Survey of International Economics. (3) A

Survey of international trade issues, commercial policy, trade theory, customs unions, and international monetary topics. Not for Economics majors. Lecture, discussion. Cross-listed as ECN 306. Prerequisites: ECN 111 or 112; 2.00 ASU GPA; junior standing. *General Studies: SB.*

IBS 400 Cultural Factors in International Business. (3) S

Anthropological perspectives on international business relations; applied principles of cross-cultural communication and management; regional approaches to culture and business. Cross-listed as ASB 400. *General Studies: G.*

Department of Management

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 www.cob.asu.edu/mgt

PROFESSORS

BOHLANDER, CARDY, DOOLEY,
 GLICK, GOMEZ-MEJIA, HERSHAUER,
 HOM, KINICKI, KIRKWOOD, KULIK,
 PENLEY, REIF, RUCH

ASSOCIATE PROFESSORS

ASHFORTH, BRENNENSTUHL,
 BROOKS, CALLARMAN, COOK,
 KEATS, KEEFER, KELLER,
 MOORHEAD, OLIVAS,
 OSTROFF, ROBERSON,
 D. SMITH-DANIELS, V. SMITH-DANIELS,
 VAN HOOK, VERDINI

ASSISTANT PROFESSORS

AMUNDSON, BLANCERO,
 BOYD, WISEMAN

SENIOR LECTURERS

CALCATERRA, DORAN,
 KREITNER, LEA

Widely recognized for their work in the areas of strategic management, organizational behavior, human resource management, operations management, and management science, the faculty in ASU's Department of Management emphasize high tech management, quality, process and project management, decision and risk analysis, globalization, di-

versity, small business and entrepreneurship, change management, systems dynamics, organizational identity, corporate governance, and human resource management practices in their research, consulting, and teaching.

Department of Management faculty take great pride in their teaching excellence and have been very active in continuous improvement of collaborative teaching techniques. Six management faculty and teaching assistants have won recent college- or university-level awards for their excellence in teaching effectiveness.

MAJOR IN MANAGEMENT: A SKILLS EMPHASIS

Understanding of theory and concepts of management are enhanced by experiencing and testing these concepts in skill-based exercises and cases throughout the curriculum. After analyzing surveys of graduates, their employers, and members of the Dean's Council of 100, the department concluded that the major should have a strong emphasis on measurable, competency-based skills. Based on the survey data, we identified major skill areas that encompass the most important competencies, including

Administrative
 conflict management
 diversity awareness/management
 project management
 Analytical
 creativity/innovation
 critical analysis skills
 planning/decision-making skills

Coaching/Facilitating
 employee motivation
 employee training/development
 mentoring
 Communication
 persuasion and negotiation
 verbal
 written
 Team Orientation
 delegation and empowerment
 develop and maintain teamwork
 relationship building

The faculty focus on both understanding theory and developing competency in these specific skills in all management courses, particularly the three courses taken by all management majors, MGT 311 Human Resource Management, MGT 352 Human Behavior in Organizations, and MGT 463 Strategic Management. The emphasis is on special participative exercises and assignments to practice the skills. Some of these skills, such as communication, team building, and critical analysis are also emphasized in college core classes (MGT 301 Management and Organization Behavior and OPM 301 Operations and Logistics Management). Further, all undergraduate management classes emphasize skill development exercises for appropriate course topics. Management majors can choose their electives in one of four tracks: general management, managing human resources, small business and entrepreneurship, or managing business processes.

GENERAL MANAGEMENT

The central purpose of the Management major is to prepare men and women for managerial leadership in a world characterized by demands for continuous improvements in quality; growing technological sophistication; racial, cultural, and gender diversity in the work force; and expanding globalized markets. This emphasis is on accomplishing the organization's goals in a changing environment by successfully coordinating all available resources. As technological change and global markets create new opportunities for modern organizations, there are increasingly complex challenges to be met by the contemporary manager.

To prepare students to meet these challenges, the general management track curriculum is designed to provide exercises and cases that focus on devel-

oping competency-based skills. Applications orientations in classroom settings will promote the development of administrative, analytic, and communication skills; coaching and facilitating skills; and a team orientation. This pragmatic focus is developed in both internal and external contexts:

1. legal environment of management activity;
2. the range of human behavior encountered in organizational settings;
3. the interrelation of the component functions of a business;
4. the responsibilities of a firm in contemporary society;
5. the challenges to an organization active in an international arena; and
6. the role of the entrepreneur in the growth of businesses.

The following courses must be taken to complete this track:

MGT 311	Human Resource Management	3
MGT 352	Human Behavior in Organizations	3
MGT 434	Social Responsibility of Management	3
MGT 459	International Management	3
MGT 463	Strategic Management L2	3
MGT	elective	3
Total		18

This generalist perspective addresses such current issues as diversity in the workplace, global involvement, total quality management, ethics, and other managerial emphases that promote success. An interactive, cooperative learning environment is stressed.

As the preferred track for the individual wanting a general grounding in the management discipline, students find a broad range of opportunities available upon graduation. Service and manufacturing firms, for-profit and not-for-profit organizations, and large and small organizations will immediately benefit from the preparation of these graduates and recruit them for challenging trainee positions or entry-level management positions.

MANAGING HUMAN RESOURCES

People are the common denominator in all organizations. The efficient and effective management of people is central to the success of the organization. Management has been defined as “the process of getting things done through people.” The human resource management track in the Management major introduces students to the spectrum of knowledge necessary to the effective management of people.

This track is designed to train and familiarize future employees, general managers, and human resource specialists with the human resource functional areas, such as performance appraisal, dismissal, and the legal environment surrounding the employment relationship.

Students in this track develop key skills in work force diversity, team building, and negotiation. Focus in this track is on developing skills in managing people. Students are involved in class activities such as cases and experiential exercises, which develop skills in preventing and solving human resource problems.

The following courses must be taken to complete this track:

MGT 311	Human Resource Management	3
MGT 352	Human Behavior in Organizations	3
MGT 413	Compensation Management ..	3
MGT 423	Employee-Management Relations	3
MGT 463	Strategic Management L2	3
MGT	elective	3
Total		18

Large corporations in manufacturing and service, as well as small businesses and consulting firms, hire students in this track.

SMALL BUSINESS AND ENTREPRENEURSHIP

Managing, growing, developing, and starting small businesses is one of the most vital and challenging segments of the economy. Most new innovations spring from small to midsize firms. New venture opportunities emerge each day. Smaller firms constitute the job-creation engine of the nation. The po-

tential for individual wealth creation largely resides among entrepreneurial firms. And in an era of downsizing, many current and former corporate employees are looking toward self-employment as a long-term career option. The sequence of courses in the small business and entrepreneurship track does not limit student ability to seek employment in the corporate environment. Rather, it provides an enhanced skill set many firms will value, and it offers alternative career options.

The small business and entrepreneurship course sequence provides a broad-based understanding of the entrepreneurial process and the unique problems and challenges faced by smaller firms. In addition, students gain an opportunity to develop their own potential venture concepts.

The following courses must be taken to complete this track:

MGT 311	Human Resource Management	3
MGT 352	Human Behavior in Organizations	3
MGT 440	Entrepreneurship	3
MGT 463	Strategic Management L2	3
MGT 494	ST: Business Plan Development	3
	or MGT 494 ST: Small Business Planning (3)	
MGT	elective	3
Total		18

Note that MGT 494 ST: Business Plan Development (BPD) and MGT 494 ST: Small Business Planning (SBP) will have some overlapping sessions. All students will learn about developing business plans and working in small business. Students in the BPD course will prepare a full-scale business plan. Students in the SBP class will complete a “small business experience.” Students may not get credit for both classes.

Students completing the small business and entrepreneurship track are most likely to work in small businesses or new ventures within larger corporations. Students in this track (or other business majors) may also be interested in the Certificate in Small Business and Entrepreneurship described on page 147.

MANAGING BUSINESS PROCESSES

Processes are central to all organizations. Designing and manufacturing a product involves a series of steps in a transformation process starting with raw materials acquisition and continuing through product production, delivery, and use. Determining and delivering a service involves a series of steps in setting service characteristics and providing the service. Specific theories and tools for managing, changing, and continuously improving business processes have been developed and are key ingredients to successfully managing businesses in our global economy.

Students in this track develop key skills in communications and working with people, particularly in planning and managing process changes. The focus in this track is on understanding key aspects of process design and analysis. Students are involved in case studies and industry projects dealing with actual process issues. Students in this track focus on developing knowledge and skills in product/service design and management, process improvement and problem solving, analysis of process costs, change management, team approaches to solving process problems, and project management skills.

The following courses must be taken to complete this track:

MGT 311	Human Resource Management	3
MGT 352	Human Behavior in Organizations	3
MGT 433	Management Decision Analysis	3
	or MGT 468 Management Systems (3)	
	or MGT 480 Team Management Skills (3)	
	or MGT 494 ST: Total Quality Management and Human Resource Management (3)	
MGT 463	Strategic Management L2	3
QBA 321	Applied Quality Analysis I L2	3
	or ECE 394 Manufacturing Processes (3)	
	or QBA 391 Management Science N2 (3)	
	or SCM 432 Materials Management (3)	
QBA 450	Operations and Process Analysis	3
Total		18

Because managing and controlling the quality of processes is a key issue in process management, students electing this track are strongly urged to also complete the Certificate in Quality Analysis described on page 147 of this catalog.

Although large corporate manufacturing and service firms will hire students in this new track, there will also be special opportunities for these students to have a strong positive impact in the many start-up and medium-size businesses in Arizona. Many management consulting firms that recruit college graduates are very interested in students from this track.

Approved Electives for Management.
The following electives have been approved for the management tracks.

ACC 316	Management Uses of Accounting	3
MGT 413	Compensation Management ..	3
MGT 422	Training and Development	3
MGT 423	Employee-Management Relations	3
MGT 424	Employee Selection and Appraisal	3
MGT 433	Management Decision Analysis	3
MGT 434	Social Responsibility of Management	3
MGT 440	Entrepreneurship	3
MGT 442	Small Business Management	3
MGT 459	International Management	3
MGT 468	Management Systems	3
MGT 480	Team Management Skills	3
MGT 494	ST: Business Plan Development	3
MGT 494	ST: Small Business Planning	3
MKT 302	Fundamentals of Marketing Management	3
QBA 450	Operations and Process Analysis	3

Hot Links to Major in Management.
Further information, hot links to courses and current faculty, and any updates on the undergraduate major in Management can be found at www.cob.asu.edu/mgt.

MAJOR PROFICIENCY REQUIREMENTS

Students must receive grades of “C” or higher in upper-division courses for the major. If a student receives a grade below “C” in any course in the major, this course must be repeated. If a second grade below “C” is received in either an upper-division course in the ma-

major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79–83 for university graduation requirements and pages 144–146 for college requirements for undergraduate students.

GRADUATE PROGRAMS

The Department of Management participates actively in several masters and Ph.D. programs, particularly the technology M.B.A., executive M.B.A., evening M.B.A., and day M.B.A. programs. These programs are described more fully in the *Graduate Catalog*. Areas of concentration offered by the Department of Management for technology, evening, and executive M.B.A. students include: process management in high technology organizations; globalization and diversity management; entrepreneurship and small business development; and management consulting.

The Department of Management has adopted a modular approach to Ph.D. education to improve our ability to deliver focused, high quality seminars, give students more flexibility in defining their areas of expertise, increase their rate of quality publications, and enhance the quality of Ph.D. placements.

Hot Links to Graduate Programs.

Further information, hot links to courses and current faculty, and any updates on the Department of Management areas of concentration for the M.B.A. programs can be found at www.cob.asu.edu/mgt.

General information on the M.B.A. programs can be found at www.cob.asu.edu/mba.

Further information, application procedures, hot links to current faculty, and any updates on the Ph.D. program in Management can be found at www.cob.asu.edu/mgt/degree/phdmainpg.htm.

MANAGEMENT (MGT)**MGT 301 Management and Organization Behavior.** (3) F, S, SS

Administrative, organizational, and behavioral theories and functions of management, contributing to the effective and efficient accomplishment of organizational objectives. Prerequisites: 1 psychology (social and behavioral) course and 1 sociology course.

MGT 311 Human Resource Management. (3) F, S, SS

Human resource planning, staffing, training and development, compensation, appraisal, and labor relations. Prerequisite: MGT 301.

MGT 352 Human Behavior in Organizations. (3) F, S, SS

Human aspects of business as distinguished from economic and technical aspects and how they influence efficiency, morale, and management practice. Prerequisite: MGT 301.

MGT 380 Management and Strategy for Nonmajors. (3) F

Introduction to the functions and applications of management in organizations, including controlling, decision making, leadership, motivation, planning, and social responsibility.

MGT 394 Special Topics. (3) F, S, SS

Current topics in management, primarily designed for nonbusiness majors. See the *Schedule of Classes* for current offerings. Some of the following may be offered:

- (a) Business Plan Development for Nonmajors
 - (b) Small Business and Entrepreneurship for Nonmajors
 - (c) Small Business Planning for Nonmajors
- Note that students may not get credit for both Small Business Planning and Business Plan Development.

MGT 413 Compensation Management. (3) F, S

Establishing base and incentive pay with job analysis, job evaluation, and wage surveys; performance appraisal; conformance to compensation laws. Prerequisites: MGT 311; professional program business student.

MGT 422 Training and Development. (3) F, S

Learning theory, orientation and basic level training, management development, resource materials and methods. Prerequisites: MGT 311; professional program business student.

MGT 423 Employee-Management Relations. (3) F, S

Employment relationship in union/nonunion setting. Employee-management rights/responsibilities, complaint administration, negotiations, union structure, and mock government negotiations.

MGT 424 Employee Selection and Appraisal. (3) F, S

Concepts and methods of personnel selection and performance appraisal. Includes job analysis, measurement, and legal issues. Experiential exercises emphasized. Prerequisite: MGT 311.

MGT 433 Management Decision Analysis. (3) F, S

Decision-making concepts and methods in the private and public sectors and their application to organizational problems. Understanding of individual and group decision making. Prerequisites: MGT 301; professional program business student.

MGT 434 Social Responsibility of Management. (3) F, S, SS

Relationship of business to the social system and its environment. Criteria for appraising management decisions. Managers as change agents. Prerequisites: MGT 301; professional program business student.

MGT 440 Entrepreneurship. (3) F, S, SS

Opportunities, risks, and problems associated with small business development and operation.

MGT 441 Venture Design and Development. (3) N

Analysis, design, and development of a business plan for a new venture. Prerequisite: ACC 240.

MGT 442 Small Business Management. (3) N

Students, acting as management consultants, apply business principles and make recommendations to small businesses while learning to manage small firms. Prerequisite: business core except MGT 463.

MGT 459 International Management. (3) F, S, SS

Concepts and practices of multinational and foreign firms. Objectives, strategies, policies, and organizational structures for operating in various environments. Prerequisite: MGT 301.

MGT 463 Strategic Management. (3) F, S, SS

Strategic formulation and administration of the total organization, including integrative analysis and strategic planning. To be taken last semester of senior year. Prerequisites: completion of 108 hours, including all other business administration core requirements; professional program business student. *General Studies: L2.*

MGT 468 Management Systems. (3) F, S

Systems theory and practice applied to organization process and research. Organizations seen as open systems interacting with changing environments. Prerequisite: MGT 301.

MGT 480 Team Management Skills. (3) F, S

A cooperative education class teaching team skills in active listening, conflict resolution, decision making, effective meetings, norming, and team roles. Cooperative learning.

MGT 494 Special Topics. (3) N

Current topics in management, primarily designed for business majors. See the *Schedule of Classes* for current offerings.

Some of the following may be offered:

- (a) Business Plan Development
- (b) Small Business Planning
- (c) Total Quality Management and Human Resource Management

Note that students may not get credit for both Small Business Planning and Business Plan Development.

MGT 502 Organization Theory and Behavior. (3) A

Important concepts and applications in management, including communication, decision making, group dynamics, leadership, motivation, organization change, and organization design. Prerequisites: computer literacy; graduate degree program student.

MGT 589 Strategic Management. (3) F, S

Formulation of strategy and policy in the organization, emphasizing the integration of decisions in the functional areas. Prerequisite: completion or concurrent enrollment in all other core courses in the M.B.A. program.

MGT 591 Seminar. (3) N

Topics such as the following offered:

- (a) Business Plan Competition
- (b) Entrepreneurship
- (c) Human Resource Activity and the Management of Diversity
- (d) International Management
- (e) Management Consulting
- (f) Organizational Change and Business Process Consulting

MGT 593 Applied Projects. (3) A

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Prerequisite: completion or concurrent enrollment in all core courses in the M.B.A. program.

MGT 598 Special Topics. (3) N

Graduate special topics chosen from human resources, strategic management, and international management including special topics in international management in Asia or Europe. Prerequisite: instructor approval.

MGT 791 Seminar: Doctoral Seminar in Management. (1) A

Short module seminars such as:

- (a) Causal Modeling
- (b) Change and Coping
- (c) Cognition: Micro and Macro Perspectives
- (d) Economic Theories of the Firm
- (e) Motivation and Attitudes
- (f) Organizational Identity and Identification
- (g) Organizational Learning and Organizational Identity
- (h) Organizational Performance and Reward Systems
- (i) Organizational Strategy and Culture
- (j) Organizational Structure, Technology, and Information Systems
- (k) Organizational Withdrawal
- (l) Performance Appraisal
- (m) Power and Organizational Change
- (n) Selection
- (o) Teams, Groups, and Leadership
- (p) The Craft of Research

OPERATIONS AND PRODUCTION MANAGEMENT (OPM)**OPM 301 Operations and Logistics Management.** (3) F, S, SS

Identification and integration of major components of operations and logistics management and their impact on organizational productivity and performance. Lecture, lab. Prerequisite: QBA 221.

OPM 394 Special Topics. (3) N

Current topics in operations and production management, primarily designed for nonbusiness majors. See the *Schedule of Classes* for current offerings, which may, for example, include Operations and Logistics Management for nonmajors.

OPM 502 Operations Management. (3) A Contemporary management issues, including environmental, project, and supply chain management; new product development; quality control; TQM. Prerequisites: computer literacy; graduate degree program student.

OPM 540 Quality and Productivity Management. (3) N

Organizational factors influencing quality and productivity in the production of goods and services. Quality and productivity strategies, improvement programs, and measurement systems. Prerequisite: OPM 502 or instructor approval.

OPM 582 Capacity Management and Scheduling. (3) A

Decisions regarding management of technology for manufacturing and service firms. Facilities location, layout, process design and selection, and manufacturing strategy. Prerequisite: QBA 561 or instructor approval.

OPM 585 Facilities Design and Management of Technology. (3) A

Decisions regarding management of facilities and technology for manufacturing and service firms. Facilities location, layout, process design, and selection. Prerequisite: QBA 561.

OPM 587 Project Management. (3) A

Planning, scheduling and controlling of projects in R & D, manufacturing, construction and services. Project selection, financial considerations, and resource management. Prerequisite: QBA 502.

OPM 591 Seminar. (3) A

Topics such as the following offered:

- (a) High Performance Management Systems
- (b) Manufacturing Strategy
- (c) New Product and Process Development

OPM 593 Applied Projects. (3) A

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Prerequisite: completion or concurrent enrollment in all core courses in the M.B.A. program.

OPM 791 Doctoral Seminars in Operations and Production Management. (1) N

Short module seminars such as:

- (a) Management of Technology
- (b) Manufacturing Strategy
- (c) Operations Management
- (d) Project Management

QUANTITATIVE BUSINESS ANALYSIS (QBA)

For additional QBA courses see "Department of Economics," page 156.

QBA 450 Operations and Process Analysis. (3) A

Implementation of quantitative techniques for the analysis of quality problems related to operations and process analysis. Prerequisites: OPM 301; QBA 221. *General Studies: L2.*

QBA 502 Managerial Decision Analysis. (3) F, S

Fundamentals of quantitative analysis to aid management decision making under uncertainty. Prerequisites: MAT 210; computer literacy; graduate degree program student.

QBA 591 Seminar. (3) F, S

Current topics in Quantitative Business Analysis primarily designed for technology, evening, and executive M.B.A. students. Elective courses for these programs may include:

- (a) Decision Models.
- (b) Management Problem Solving.
- (c) Product and Service Innovation.
- (d) Strategic Decision Analysis.

QBA 791 Doctoral Seminars in Quantitative Business Analysis. (1) N

The Department of Management has adopted a modular approach to Ph.D. education. Topics such as the following may be offered:

- (a) Chaos Theory.
- (b) Risk Analysis.
- (c) Strategic Decision Making.
- (d) Systems Dynamics.

Department of Marketing

Michael P. Mokwa
Chair
(BAC 460) 602/965-3621
www.cob.asu.edu/mkt

PROFESSORS

BITNER, BROWN, GWINNER, HUTT, JACKSON, KUMAR, LASTOVICKA, MOKWA, L. OSTROM, REINGEN, SCHLACTER, WARD, WOOD

ASSOCIATE PROFESSORS

BLASKO, SINHA, STEPHENS, WALKER

ASSISTANT PROFESSORS

NOWLIS, A. OSTROM, ROUNDTREE

SENIOR LECTURER

SPIERS

Study in the field of marketing involves analysis of how organizations plan, organize, deploy, and control their resources to achieve market objectives.

Focus is placed on market forces, growth, and the deployment of firms in competitive markets and on the marketing strategy and tactics of the firm.

Through the proper selection of courses, a student may prepare for a career in

1. advertising and promotion management,

2. business to business marketing,
3. international marketing,
4. market research and planning,
5. selling and sales management,
6. services marketing,
7. general marketing management, or
8. retail management.

The major in Marketing consists of 18 semester hours. The following courses must be included:

MKT 302	Fundamentals of Marketing Management	3
MKT 304	Consumer Behavior	3
MKT 451	Marketing Research	3
MKT 460	Strategic Marketing L2	3
Total	.....	12

To complete the major, students, in consultation with their faculty advisors, select six additional hours from among the following list of courses:

MKT 301	Principles of Advertising	3
MKT 310	Principles of Selling	3
MKT 311	Creative Strategy in Marketing	3
MKT 411	Sales Management	3
MKT 412	Promotion Management	3
MKT 424	Retail Management	3
MKT 430	Marketing for Service Industries	3
MKT 434	Industrial Marketing	3
MKT 435	International Marketing	3
MKT 484	Internship	3

MAJOR PROFICIENCY REQUIREMENTS

Students must receive grades of "C" or higher in upper-division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in the major.

GRADUATION REQUIREMENTS

In addition to fulfilling major requirements, students seeking a degree must meet all university and college requirements. See pages 79-83 for university graduation requirements and pages 144-146 for college requirements.

GRADUATE PROGRAMS

The department offers a distinctive M.B.A. curriculum in services marketing and management. For more information, see the *Graduate Catalog*.

MARKETING (MKT)

MKT 300 Principles of Marketing. (3) F, S, SS

Role and process of marketing within the society, economy, and business organization. Prerequisite: ECN 112.

MKT 301 Principles of Advertising. (3) F, S, SS

Advertising as a communications tool in marketing and business management. Survey of market segmentation, creative strategy, media, and effectiveness measures. Prerequisite: MKT 300.

MKT 302 Fundamentals of Marketing Management. (3) F, S, SS

Marketing planning, implementation, and control by organizations, with special emphasis on identifying market opportunities and developing marketing programs. Prerequisite: MKT 300.

MKT 304 Consumer Behavior. (3) F, S, SS

Application of behavioral concepts in the analysis of consumer behavior and the use of behavioral analysis in marketing strategy formulation. Prerequisite: MKT 300.

MKT 310 Principles of Selling. (3) A

Basic principles underlying the selling process and their practical application in the sale of industrial goods, consumer goods, and intangibles. Prerequisite: MKT 300.

MKT 311 Creative Strategy in Marketing. (3) A

Discussion, application and evaluation of creative concepts and strategies. Creation of a portfolio addressing distinctive advertising/marketing problems and opportunities. Prerequisites: MKT 301; nonbusiness majors must obtain department approval.

MKT 382 Advertising and Marketing Communication (3) F, S

Introduction for nonbusiness majors to the communication process within marketing and advertising. Creation and presentation of an ad campaign. Not open to business majors. Prerequisites: junior or senior standing; 2.00 ASU GPA.

MKT 411 Sales Management. (3) N, F, S

Application of management concepts to the administration of the sales operation. Prerequisite: MKT 302.

MKT 412 Promotion Management. (3) A

Integration of the promotional activities of the firm including advertising, personal selling, public relations, and sales promotion. Prerequisite: MKT 302.

MKT 424 Retail Management. (3) A

Role of retailing in marketing. Problems and functions of retail managers within various retail institutions. Prerequisite: MKT 300.

MKT 430 Marketing For Service Industries. (3) A

Concepts and strategies for addressing distinctive marketing problems and opportunities in service industries. Current issues and trends in the service sector. Prerequisites: MKT 300, professional program business student.

MKT 434 Industrial Marketing. (3) A

Strategies for marketing products and services to industrial, commercial, and governmental markets. Changing industry and market structures. Prerequisite: MKT 302 or instructor approval.

MKT 435 International Marketing. (3) S

Analysis of marketing strategies developed by international firms to enter foreign markets and to adapt to changing international environments. Prerequisites: MKT 302 or instructor approval; professional program business student.

MKT 451 Marketing Research. (3) F, S, SS

Integrated treatment of methods of market research and analysis of market factors affecting decisions in the organization. Prerequisites with a grade of "C" or higher: MKT 302 and QBA 221.

MKT 460 Strategic Marketing. (3) F, S, SS

Policy formulation and decision making by the marketing executive. Integration of marketing programs and consideration of contemporary marketing issues. Prerequisite: professional program business student. Prerequisites with a grade of "C" or higher: MKT 302, 304, 451. *General Studies: L2.*

MKT 502 Marketing Management. (3) F, S, SS

Managing the marketing function; market and environmental analysis; marketing planning, strategy, and control concepts. Development and management of marketing programs. Prerequisite: ECN 502.

MKT 520 Strategic Perspectives of Buyer Behavior. (3) N

Concepts and theories from the behavioral sciences as they relate to marketing strategy formulation. Prerequisite: MKT 502 or equivalent or instructor approval.

MKT 522 Marketing Information. (3) N

Marketing research, marketing information systems, and modern statistical techniques in marketing decision making. Prerequisite: MKT 502.

MKT 524 Services Marketing. (3) A

Strategies for marketing services emphasizing the distinctive challenges and approaches that make marketing of services different from marketing manufactured goods. Prerequisite: MKT 502 or equivalent.

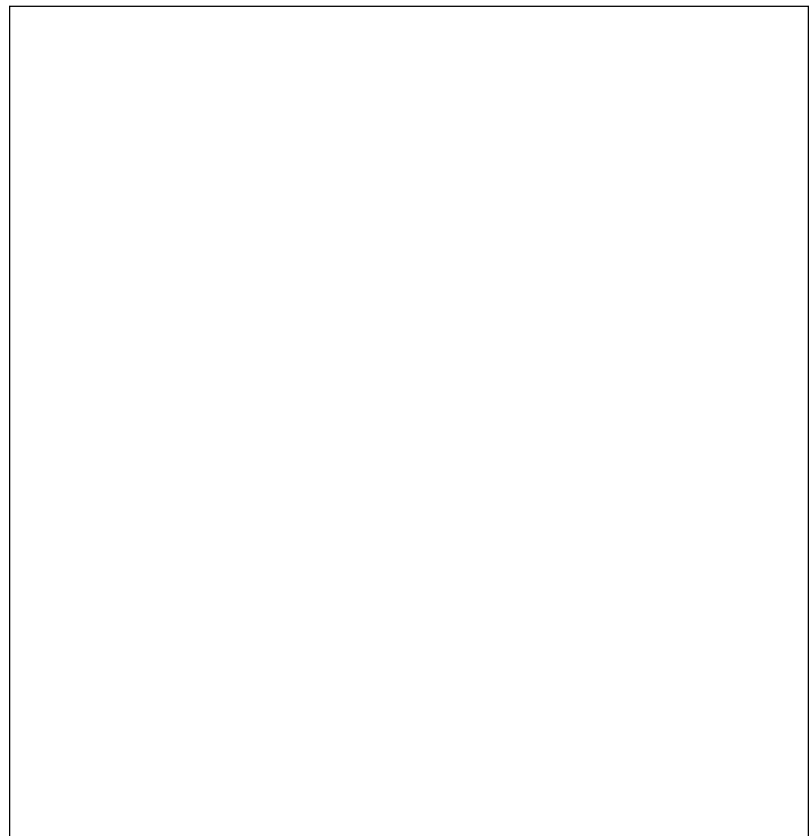
MKT 563 Marketing Strategy. (3) A

Planning and control concepts and methods for developing and evaluating strategic policy from a marketing perspective. Prerequisite: MKT 502.

MKT 591 Seminar. (3) A

Topics such as the following will be offered:

- (a) Competitive Analysis and Strategy for Service Organizations
- (b) Consumer Behavior in Service Environment
- (c) Customer Satisfaction and Service Quality Management
- (d) Service Production
- (e) Services Marketing and Management



Palm Walk provides a picturesque north-south passageway across campus.

Tim Trumble photo

College of Education

David C. Berliner, Ph.D.
Dean

PURPOSE

For students, choosing a professional college is an important step because it establishes the foundation on which a career will be built. The College of Education provides a stimulating, challenging forum wherein scholars and practitioners interact in the discovery and mastery of the science and art of educational endeavors. This balanced approach, in which research and practice are viewed as essential and complementary, enables the college to produce superior educators.

The purposes of the faculty of the College of Education are as follows:

1. to engage in the scholarly, scientific, and professional study of education;
2. to prepare competent professionals who will serve in a variety of critical educational roles;
3. to develop productive scholars who will make significant contributions to the educational literature and to the quality of educational practice; and
4. to serve the education profession at the local, national, and international levels.

In accord with these purposes, the College of Education is committed to producing quality scholarship and research and to excellence in teaching.

Information about the college can be found on the Web at tikun.ed.asu.edu/coe.

ORGANIZATION

The College of Education is organized into three divisions. These divisions and their academic program areas are listed below:

Division of Curriculum and Instruction

Early Childhood Education
Educational Media and Computers
Elementary Education
Multicultural Education
Reading and Library Science
Secondary Education
Special Education

Division of Educational Leadership and Policy Studies

Education Policy Studies
Educational Administration and Supervision
Higher and Postsecondary Education

Division of Psychology in Education

Counseling Psychology
Counselor Education
Learning and Instructional Technology
Lifespan Developmental Psychology
Measurement, Statistics, and Methodological Studies
School Psychology

Services to students and the community are provided through the centers and offices described below.

Center for Bilingual Education and Research.

The Center for Bilingual Education and Research conducts interdisciplinary research on classroom interaction, language development, and cognitive development. The focus of these research efforts is bilingual and bicultural students in Arizona.

Center for Indian Education.

The Center for Indian Education serves as a service agency to Native American communities, school districts, and students attending ASU. The center also conducts research on Indian education in Arizona and other states with American Indian populations.

Office of Student Affairs. The Office of Student Affairs assists individuals interested in teacher preparation programs through advising, admission, and retention activities and certification assistance. Other services include program of study validation, petition review, student communications, and high school and community college articulation/relations.

Office of Professional Field Experiences.

The Office of Professional Field Experiences places all teacher preparation students in public schools and similar institutions for internships and student teaching, monitors students' progress in their field experiences, sponsors courses for mentor teachers, and conducts research on student performance in the field.

Office of Diversity, Recruitment, and Support Programs.

The Office of Diversity, Recruitment, and Support Programs counsels students regarding College of Education scholarships and provides recruitment and support services for students wishing to enter the Professional Teacher Preparation Program (PTPP).

Center for Academic Precocity. The Center for Academic Precocity provides academic services to intellectually advanced students in grades pre-K through 11. These services include individual assessment, talent identification, and a variety of courses.

Counselor Training Center. The Counselor Training Center provides counseling for ASU students, staff, and the community at large in personal and career development, stress management, and marriage and family issues. Counseling is conducted by graduate students in counseling and counseling psychology under the supervision of certified psychologists.

Other Units. Other units within the college offering specialized research and educational services include the College of Education Preschool, Arizona Educational Information System, and Technology Based Learning and Research.

Teacher Education

Programs that prepare students for teacher certification by the state are available to both the undergraduate pursuing a first degree and the individual with a college degree in a non-education field.

Undergraduate students interested in teacher certification in art, music, dance, or theatre enroll through programs offered by the College of Fine Arts. These students must also meet the same eligibility requirements for admission to the Professional Teacher Preparation Program (PTPP).

Undergraduate programs leading to the Bachelor of Arts in Education degree are described in the text that follows. Descriptions of graduate degree programs can be found in the *Graduate Catalog*.

ADMISSION

Preprofessional Admission

Students admitted to ASU during their freshman and sophomore years may also be admitted to the College of Education with preprofessional status. Preprofessional students should seek advising within the College of Education through its Office of Student Affairs, EDB 7.

Admission to ASU with preprofessional status in the College of Education does not guarantee admission to the PTPP. Admission to the PTPP is a separate process.

Professional Program Admission

Students are eligible for consideration for admission to the PTPP if they meet the following criteria:

1. admission to ASU as a classified student;
2. a minimum cumulative GPA of 2.50;
3. completion of at least 56 semester hours by the time of PTPP admission;
4. submission of scores from either the American College Test (ACT) or Pre-Professional Skills Test (PPST) (a minimum score is not required; an applicant may be referred for additional skill development while matriculating through the program of study);
5. completion of ENG 101 and 102 and General Studies L1 or S1 and N1 requirements with a grade of "C" or higher (courses in progress do not satisfy this requirement); and
6. a special application with additional supporting materials (great emphasis is placed on prior experience, paid or volunteer, working with the age or group of the certification area sought).

Admission is competitive and not guaranteed to all who satisfy the minimum admission criteria. Emphasis is placed on prior volunteer or paid experience working with the age or group of the certification area sought.

Some academic units have additional requirements. Students seeking admission to K–12 or secondary education programs should consult the Office of Student Affairs in the College of Education (602/965–3877) to determine if there are additional admission requirements for their teaching fields.

PTPP application deadlines are February 15 for fall admission and September 15 for spring admission. Applicants should contact the Office of Student Affairs for an application.

Because PPST or ACT scores must be included for an application to be complete, applicants should plan to take the test *well in advance* of application deadlines.

Transfer Students

To be considered for admission to the PTPP, transfer students must first be formally admitted to ASU (see pages 62–64). Transfer students must also meet all PTPP admission requirements and should contact the Office of Student Affairs within the College of Education for admission procedures and advising. ASU Undergraduate Admissions should receive the application for admission to ASU, transcripts, applicable test scores, and other required information at least three months before the PTPP application deadline date for the desired PTPP admission semester.

Students completing their first two years of course work at a community college or at a four-year institution in Arizona other than ASU should consult an advisor in Cross-college Advising Services for advice in planning a sequence of courses that will meet the ASU General Studies requirements.

Program of Study

A program of study must be filed during the first semester of enrollment in the PTPP. Preprofessional students completing 87 hours (the university limit for registering without a program of study) who have not been admitted to the PTPP are provided a registration waiver by the College of Education. See pages 79–83 for "University Graduation Requirements."

ADVISING

All students pursuing teaching certificates should seek early advising from the Office of Student Affairs in the College of Education, 602/965–3877. Careful planning and early advising in developing an approved program of study are essential if teacher candidates are to complete certification and graduation requirements within the typical 120-semester-hour undergraduate degree program.

Mandatory Advising. Transfer students are required to meet with an academic advisor before registering for their first semester classes. Freshmen must meet with an advisor before registering for each of their first two semesters.

DEGREES

Bachelor of Arts in Education

The faculty in the College of Education offer the Bachelor of Arts in Education (B.A.E.) degree. Candidates for the Bachelor of Arts in Education degree must complete the PTPP offered by the College of Education. Graduates of this program are able to demonstrate proficiency in specified knowledge areas or skills, including the following:

1. principles and application of effective instruction;
2. classroom organization and management;
3. content or subject matter;
4. specific curriculum and teaching strategies;
5. interrelationship of culture and schooling in a multicultural society;
6. human development;
7. communication skills;
8. theories of learning and motivation;
9. assessment and evaluation; and
10. computer literacy.

Each student in the PTPP selects one of five major areas that provide specialized instruction and preparation. The program areas are

1. Bilingual/ESL Education,
2. Early Childhood Education (birth–third grade),
3. Elementary Education,
4. Secondary Education, and
5. Special Education.

Students in Secondary Education may be certified for grades 7–12 in a specific academic specialization. Students in art, foreign languages, music, or physical education complete a K–12 endorsement in their field. Special Education majors may be certified for grades K–12 in mental retardation

(MR), emotionally disabled (ED), or learning disabilities (LD).

PTPP Areas and Options or Endorsements

Early Childhood Education
Elementary Education
bilingual education
English as a second language
Secondary Education
certification in specific academic specializations
K–12 endorsements in art, music, or physical education
Special Education
emotionally disabled
learning disabilities
mental retardation

PTPP students in areas other than Special Education complete a common core of courses as well as courses specific to the area or option selected. Early Childhood Education and Elementary Education prepare students for certification by the state in grades K–8. Students who select these majors develop the knowledge and skills needed to teach children from a variety of language, cultural, and developmental backgrounds. The Early Childhood Education concentration prepares students to work in infant programs, preschools, and grades K–3. The Elementary Education bilingual education/English as a second language (ESL) concentration prepares students to work in bilingual/ESL settings in grades K–8. The Special Education major prepares students to teach mildly handicapped students in diverse settings and for certification in grades K–12 in MR, ED, or LD. Students completing the Elementary Education major must also complete the human development requirements and an academic specialization.

Secondary Education offers programs that prepare students for certification by the state in specific academic subjects in grades 7–12. Students with teaching majors in the College of Fine Arts earn the appropriate bachelor's degree from that college.

Courses for the academic specialization are determined by the faculty in the academic discipline. Therefore, students with majors in Secondary Education in the College of Fine Arts have

two academic advisors: one in the college and department of the academic specialization and one in the Office of Student Affairs in the College of Education. For more information, refer to the following section titled, "Academic Specialization," page 170.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 hours of approved course work in General Studies, as described on pages 84–87. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. General Studies courses are listed on pages 87–108 in the *General Catalog* following the section on "General Studies," in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

Preprofessional students should complete as many of the General Studies courses as possible before admission to the PTPP. Students are encouraged to consult with an academic advisor to ensure they comply with all necessary requirements.

COLLEGE DEGREE REQUIREMENTS

A minimum of 120 semester hours are required for the B.A.E. degree in these categories:

1. academic specialization;
2. human development (Bilingual/English as a Second Language Education, Early Childhood Education, Elementary Education, and Secondary Education majors only); and
3. PTPP.

The College of Education expects its degree candidates to meet individual course assessment standards, field-experience observation criteria, courses required for teacher certification, and

College of Education Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Early Childhood Education	B.A.E.	Division of Curriculum and Instruction
Elementary Education	B.A.E.	Division of Curriculum and Instruction
Concentration: bilingual education/English as a second language		
Secondary Education	B.A.E.	Division of Curriculum and Instruction
Academic specializations: biological sciences; business education; chemistry; Chinese; communication; economics; English; family resources and human development (home economics); French; geography; German; history; Japanese; journalism; mathematics; mathematics/chemistry; mathematics/physics; physical education; physics; physics/chemistry; political science; Russian; social studies; Spanish		
Selected Studies in Education ¹	B.A.E.	College of Education
Special Education	B.A.E.	Division of Curriculum and Instruction
Graduate Degrees		
Counseling	M.C.	Division of Psychology in Education
Counseling Psychology	Ph.D.	Division of Psychology in Education
Counselor Education	M.Ed.	Division of Psychology in Education
Concentration: counseling and student personnel		
Curriculum and Instruction	M.A., M.Ed.	Division of Curriculum and Instruction
Concentrations: bilingual education, communication arts, early childhood education, elementary education, English as a second language, Indian education, mathematics education, multicultural education, ¹ reading education, science education, secondary education, social studies education		
Curriculum and Instruction	Ed.D.	Division of Curriculum and Instruction
Concentrations: bilingual education, communication arts, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, mathematics education, multicultural education, ¹ reading education, science education, secondary education, social studies education		
Curriculum and Instruction	Ph.D. ²	Interdisciplinary Committee on Curriculum and Instruction
Concentrations: curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, music education, physical education, reading education, science education, special education		
Educational Administration and Supervision	M.Ed., Ed.D.	Division of Educational Leadership and Policy Studies
Educational Leadership and Policy Studies	Ph.D.	Division of Educational Leadership and Policy Studies
Educational Media and Computers	M.Ed.	Division of Curriculum and Instruction
Concentration: business education		
Educational Psychology	M.A., M.Ed.	Division of Psychology in Education
Educational Psychology	Ph.D.	Division of Psychology in Education
Concentrations: lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology		

¹ Applications are not being accepted at this time.

² This program is administered jointly by the College of Education and the Graduate College. See the "Graduate College" section on pages 282–292.

Major	Degree	Administered by
Higher and Postsecondary Education Concentration: higher education	M.Ed., Ed.D.	Division of Educational Leadership and Policy Studies
Learning and Instructional Technology	M.A., M.Ed.	Division of Psychology in Education
Learning and Instructional Technology Concentrations: instructional technology, learning	Ph.D.	Division of Psychology in Education
Social and Philosophical Foundations of Education	M.A.	Division of Educational Leadership and Policy Studies
Special Education	M.A.	Division of Curriculum and Instruction
Special Education Concentrations: gifted, mildly handicapped, multiculturally exceptional, severely/multiply handicapped	M.Ed.	Division of Curriculum and Instruction

other proficiency standards and performance criteria required to demonstrate knowledge and skill in the areas listed under the Bachelor of Arts in Education description on page 168.

Program Requirements

Progress toward the B.A.E. degree involves meeting university, college, and division requirements. The degree program also includes courses and academic content required for teacher certification by the State of Arizona. Students seeking certification in one of the fine arts must complete degree requirements in the College of Fine Arts and specified courses through the PTPP.

MAJOR REQUIREMENTS

Academic Specialization

Courses in the academic specialization give students a greater depth of knowledge in one academic area. Elementary Education majors complete 18 hours in a single academic subject. A Secondary Education major completes 36 to 60 hours, depending upon the area, in the subject in which the student wishes to be certified; fine arts may require more. Teacher candidates should confer with the Office of Student Affairs regarding acceptable academic specializations. Refer to the pages shown for descriptions of the academic specializations in the following table:

Academic Specialization	Page(s)
Art education ¹	251
Biological sciences	316
Business education	See advisor.
Chemistry	321
Chinese	351
Communication	410
Dance education ¹	260
Economics	See advisor.
English	326–327
French	351
Geography	338
German	351
History	343
Home economics (family studies/child development)	335
Japanese	351
Journalism	414
Mathematics	362
Mathematics/chemistry	362
Mathematics/physics	362
Music ²	264–265
Physical education	331
Physics	373–374
Physics/chemistry	373–374
Political science	381
Russian	351
Social studies	390
Spanish	351
Theatre education ¹	278

¹ Art education, dance education, and theatre education concentrations are under corresponding B.F.A. majors.

² Students focus on either the choral-general music or instrumental music concentration under the B.M. degree.

Human Development

The programs that prepare students for teacher certification by the state in elementary and early childhood education require students to complete 15 credits selected from specific human development courses pertinent to the teaching area. Teacher candidates

should confer with an academic advisor in the Office of Student Affairs regarding course selection.

Professional Teacher Preparation Program (PTPP)

The PTPP is a four-semester sequential program consisting of 35 to 44 semester hours. Ranging from 10 to 14 hours per semester, the courses for one semester must be completed before enrolling in the next semester. In other words, courses for one semester may not be taken at the same time as those scheduled for another semester. In addition to the PTPP courses, students continue completing the General Studies requirement and human development and academic specialization requirements through the third semester of the program.

**Four-Semester Requirements
Professional Teacher
Preparation Program**

Elementary Education (K–8) Major

Semester I

DCI 396	Field Experience I	0
EED 433	Language Arts Methods, Management, and Assessment in the Elementary School	3
EED 455	Social Studies Methods, Management, and Assessment in the Elementary School	3
EMC 300	Computers in Education	1
SPF 301	Culture and Schooling <i>L2</i>	3
Total		10

Semester II

DCI 397	Field Experience II	0
EED 420	Science Methods, Manage- ment, and Assessment in the Elementary School	3
EED 480	Mathematical Methods, Management, and Assessment in the Elementary School	3
SPE 394	ST: Quality Practices in the Collaborative Classroom	3
Total		9

Semester III

EED 444	Organizing the Classroom Culture	1
EED 496	Field Experience	0
RDG 481	Practicum: Elementary Reading	3
RDG 494	ST: Reading/Decoding	3
Total		7

Semester IV

EED 478	Student Teaching in the Elementary School	10–12
SPF 401	Theory and Practice in Education	1
Total		11–13

**Elementary Education (K–8) Major
with a Concentration in
Bilingual Education/English
as a Second Language**

Semester I

DCI 396	Field Experience I	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development <i>L2</i>	3
SPF 301	Culture and Schooling <i>L2</i>	3
Total		8

Semester II

BLE 400	Principles of Instruction in Language Minority Education	3
DCI 397	Field Experience II	0
ECD 315	Classroom Organization and Guidance in the Early Years	2
EDP 302	Assessment and Evaluation in Education	1
EMC 300	Computers in Education	1
Total		7

Semester III

BLE 401	Teaching Science and Social Studies to Children	4
BLE 402	Teaching Strategies in Mathematics	2
BLE 405	Teaching Reading in BLE/ESL	3
BLE 406	Reading Practicum	3
BLE 407	Language Arts	2
BLE 496	Field Experience	0
Total		14

Semester IV

BLE 478	Student Teaching in the Elementary School	12
SPF 401	Theory and Practice in Education	2
Total		14

**Early Childhood Education Major
with K–8 Teacher Certification**

Semester I

ECD 300	Principles of Interprofes- sional Collaboration	3
ECD 400	Inquiry into Teaching and Learning	3
ECD 403	Educational Environments: Preschool/Kindergarten/ Primary Grades	3
ECD 496	Field Experience	0

EMC 300	Computers in Education	1
SHS 394	ST: Communication and Language Development in Early Years	3
Total		13

Semester II

ECD 401	Integrated Curriculum and Assessment: Social Studies and Creative Arts	3
ECD 404	Language Arts	2
ECD 496	Field Experience	0
ECD 498	PS: Guidance in the Early Years	2
MCE 498	PS: Diverse Families/ Community	3
or SOC 415	The Family (3)	
Total		10

Semester III

ECD 402	Integrated Curriculum and Assessment: Math and Science	3
ECD 496	Field Experience	0
ECD 498	PS: Interprofessional Practicum	1
RDG 401	The Teaching of Reading	3
RDG 402	Reading Practicum	3
SPF 394	ST: Quality Practice in College Classrooms	3
Total		13

Semester IV

EED 478	Student Teaching	10–12
SPF 401	Theory and Practice in Education	1
Total		11–13

Secondary Education (7–12) Major

Semester I

DCI 396	Field Experience I	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development <i>L2</i>	3
SPF 301	Culture and Schooling	3
Total		8

Semester II

DCI 397	Field Experience II	0
EDP 302	Assessment and Evaluation in Education	1
EMC 300	Computers in Education	1
RDG 301	Literacy and Instruction in the Content Areas	3
SED 400	Principles of Effective Instruction in Secondary Education	3
Total		8

Semester III

SED 403	Principles, Curricula, and Methods	3
SED 496	Field Experience	0

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Methods course in academic specialization	3
Total	6

Semester IV

SED 478 Student Teaching in the Secondary Schools	12
SPF 401 Theory and Practice in Education	2
Total	14

Special Education (K–12) Major**Semester I**

SPE 311 Orientation to Education of Exceptional Children <i>SB</i>	3
SPE 314 Introduction to Bilingual/Multicultural Special Education	3
SPE 361 Introduction to Learning Disabilities	3
SPE 394 ST: Basic Special Education Curriculum	3
SPE 498 PS: Field Experience	1
SPF 301 Culture and Schooling <i>L2</i>	3
Total	16

Semester II

SPE 312 Mental Retardation	3
SPE 336 Behavioral and Emotional Problems in Children	3
SPE 412 Evaluating Exceptional Children	3
SPE 413 Methods in Language, Reading, and Arithmetic for Exceptional Children	3
SPE 498 PS: Field Experience	3
Total	15

Semester III

SPE 411 Parent Involvement and Regulatory Issues	3
SPE 414 Methods and Strategies in Behavior Management	3
SPE 415 Social Behavior Problems of Exceptional Children	3
SPE 494 ST: Instruction in Content Areas: Science/Social Studies	3
SPE 498 PS: Field Experience	3
Total	15

Semester IV

SPE 478 Student Teaching in Special Education	12
(one certification area)	—
Total	12

SPE 311, 312, 314, 336, and 361 may be taken before formal PTPP admission. Satisfactory completion of these courses does not guarantee admission to the PTPP.

Field Experience Requirements

In addition to course work, students admitted to the PTPP are required to participate in directed field experiences during each of the four semesters of the program. The field experiences progress from short-term observation and participation to long-term supervised practice teaching.

Students should expect these field experiences to be above and beyond the class times listed in the *Schedule of Classes* for each semester. Such field experiences typically take place in public schools throughout the greater Phoenix area. Regular attendance is required during all field experiences. Students should plan extra travel time and expect to confer with placement teachers and field facilitators before or after scheduled field experiences. To meet field experience requirements, students must plan to have their own transportation and *be available during regular school hours*.

Teaching is a highly demanding and extraordinarily complex profession. Students desiring to become teachers must maintain academic standards and demonstrate requisite qualifications for successful teaching, including effective interpersonal skills, basic communication skills, appropriate professional conduct, and satisfactory performance during field experience assignments.

Observation and participation assignments in the schools during first, second, and third semester field experience placements are designed to prepare students for the highly demanding performance-based student teaching during semester four.

Student Teaching. The culminating field experience, called *student teaching*, occurs in the fourth semester of the PTPP and is a full-day, full-semester obligation. Student teaching is possible only during fall and spring semesters.

Admission to Student Teaching (Semester IV). To be admitted to student teaching, a student must have attained a high level of professional standards in previous field experience assignments and meet the following requirements:

1. be in good standing as defined in this policy;

2. have no incompletes in PTPP courses;
3. complete all PTPP courses, with the exception of SPF 401; and
4. have an approved program of study on file.

There are additional requirements for certain programs:

1. Secondary Education majors may have no more than two required courses remaining in the academic specialization and have no more than two courses to complete in General Studies. Students must also receive approval from their specialization advisor.
2. Elementary and Special Education majors must have completed all human development courses, all methods courses, and may only have two additional courses to complete.

Students must complete the application procedure and approval to student teach from the Office of Professional Field Experiences at least 10 weeks before the beginning of the student teaching term. Student teachers must adhere to the calendar, regulations, and philosophy of the schools in which they are placed. Beginning and ending dates for student teaching are determined by the Office of Professional Field Experiences in cooperation with the placement schools. Because student teaching is on a full-day schedule, 8:00 A.M. to 4:00 P.M. Monday through Friday for 15 consecutive weeks, student teachers are strongly encouraged to avoid extra activities and course work that would interfere with the heavy demands placed upon them while student teaching.

ACADEMIC STANDARDS**Preprofessional Status**

Students admitted to the College of Education on *preprofessional status* are subject to the general standards of academic good standing of the university. However, students who maintain standards of academic good standing during their freshman and sophomore years do not necessarily qualify for admission to any teacher preparation program offered by the College of Education.

Professional Program Status

Students admitted to the PTPP within the College of Education must maintain academic standards and demonstrate requisite qualifications for successful teaching, including sound physical and mental health, interpersonal skills, basic communication skills, a positive attitude, appropriate professional conduct, and satisfactory performance in field experiences. Because PTPP standards are higher than those for the university, a student who is suspended from the PTPP may still be eligible to enroll in other non-PTPP courses.

A copy of the Retention and Disqualification Policy for the PTPP may be secured in the Office of Student Affairs, EDB 7.

Students demonstrating behaviors or characteristics that make it questionable whether they can succeed in the teaching profession are reviewed by the director of the Office of Professional Field Experiences and the director of the Division of Curriculum and Instruction. If necessary, a review panel composed of faculty members who have had direct involvement with the student is convened. Following this review, the student may be referred to the Division of Curriculum and Instruction Standards and Appeals Committee. The committee's review may result in a decision to disqualify the student or the specification of conditions under which continued participation is permitted, i.e., probation.

Students who wish to appeal decisions of the Division of Curriculum and Instruction Standards and Appeals Committee may do so in writing to the dean of the college or the Main Campus Standards Committee. Any exceptions to the retention and disqualification policies and procedures must be approved by the Division of Curriculum and Instruction Standards and Appeals Committee and the dean of the College of Education.

Postbaccalaureate Programs for Initial Teacher Certification

Postbaccalaureate programs that prepare students for initial teacher certification by the state are designed for those who hold a bachelor's degree in an area other than education. The col-

lege offers postbaccalaureate programs in early childhood education, elementary education, secondary education, and special education. Special education students must qualify for and be concurrently admitted to a master's degree program in special education. Information on postbaccalaureate programs is available through the Office of Student Affairs, EDB 7. The office provides academic advising and information regarding requirements, procedures, and deadline dates.

A student who wishes to be considered for entry must meet the College of Education admission requirements for postbaccalaureate programs:

1. an earned bachelor's degree from an accredited institution;
2. a cumulative GPA of 2.50 or higher for the last 60 semester hours of credit earned;
3. submission of a completed application form and supporting materials by the appropriate deadline dates during the semester before admission; and
4. completion of an academic specialization for secondary education (consult the Office of Student Affairs, EDB 7).

Admission to postbaccalaureate programs is selective. Not all students who meet the minimum requirements are admitted to the program.

A student who also wishes to pursue a master's degree in conjunction with teacher certification by the state should contact the program area office in the intended area of study. The master's degree student must meet the admission requirements of both the College of Education and the Graduate College. *No more than nine semester hours of graduate credit earned before formal admission to the Graduate College and a master's degree program can be included in a candidate's master's degree program of study.*

Student Teaching

Students in a postbaccalaureate program for initial teacher certification must file student teaching applications early in the semester before the student teaching term. Application deadlines are October 15 for spring semester and

February 15 for fall semester. To be accepted for student teaching, students must

1. attain a cumulative GPA of 2.50 or higher in required professional education course work;
2. complete all required professional education course work other than one preapproved course that can be taken concurrently with student teaching (Secondary Education students must also receive approval from their academic specialization advisors);
3. remove all academic deficiencies such as grades of "D," "E," or "I" before placement; and
4. obtain a final approval from the Office of Professional Field Experiences (this review considers performance in field settings and academic achievement).

Certification for Teaching

The curricula for both the undergraduate and postbaccalaureate teacher education programs meet the requirements for teacher certification in the State of Arizona.

In addition to the course requirements specified in this catalog, there are other requirements for teacher certification mandated by the State of Arizona including the U.S. Constitution and Arizona Constitution requirement. Some teaching areas have specific math, science, and fine arts requirements.

Because these requirements vary over program areas and may be changed at any time, students are encouraged to maintain close contact with the Office of Student Affairs regarding the most current state certification requirements.

The College of Education is approved by the Arizona Department of Education for the preparation of elementary, secondary, and special education teachers. Students who complete an approved program of study and meet all graduation requirements of the university and the college are recommended for certification to the Arizona Department of Education. The Office of Student Affairs maintains information about current certification requirements in Arizona and other states.

The College of Education also offers courses for certified teachers leading to special endorsements by the Arizona Department of Education. Of special interest are endorsements in the areas of bilingual education, English as a second language (ESL), middle school education, reading, and school library science. The bilingual education endorsement is required of all teachers specifically responsible for providing bilingual instruction. The ESL endorsement is required of all teachers specifically responsible for providing ESL instruction. Students should contact the Office of Student Affairs for information and advising regarding teaching concentrations or special teaching endorsements.

Independent Learning Course Work for Credit

It is the general policy of the College of Education not to accept course credit for *courses in education* taken through independent learning. Exceptions to this policy may be approved if the independent learning course work has been approved in advance of enrollment in the course by the student's advisor, respective program coordinator, and division director. In all such cases, an appropriate rationale must be submitted with the request to enroll.

COLLEGE OF EDUCATION (COE)

See the *Graduate Catalog* for the COE courses.

Division of Curriculum and Instruction

Nicholas Appleton
Director
(ED 409) 602/965-1644
tikun.ed.asu.edu/coe/candi

PROFESSORS

BARONE, BITTER, CHRISTIE,
EDELISKY, FAAS, FALTIS,
GREATHOUSE, GRYDER,
HUDELSON, McISAAC, PRIETO, RAY,
RUTHERFORD, SEARFOSS, STAHL,
STALEY, ZUCKER

ASSOCIATE PROFESSORS

ANDERSON, ARIAS, BAKER,
BENAVIDES, BLUMENFELD-JONES,
COHEN, COHN, Di GANGI, FLORES,
GOMEZ, GUZZETTI, HATFIELD,
KNAUPP, McCOY, McGOWAN,
J. NELSON, J. R. NELSON,
PIBURN, RADER, SANTOS,
SURBECK, VALLEJO

ASSISTANT PROFESSORS

FLEMISTER, MIDDLETON, TRUJILLO

Program Areas

Early Childhood Education
Educational Media and Computers
Elementary Education
Multicultural Education
Reading and Library Science*
Secondary Education
Special Education

* Applications are not being accepted in Library Science.

Degrees: B.A.E., M.A., M.Ed., Ed.D., Ph.D.

DEGREES

Bachelor of Arts in Education—B.A.E.

The faculty in the Division of Curriculum and Instruction offer several undergraduate academic programs. The undergraduate programs are designed to prepare persons to teach effectively in early childhood, elementary, secondary, and special education settings. Concentrations available at the undergraduate level include bilingual education, English as a second language (ESL), Indian education, and multicultural education. Programs in special education lead to Arizona teacher certification in the mentally handicapped, emotionally disabled, learning disabilities, and early childhood education for the handicapped areas. Programs of study leading to special endorsements by the Arizona Department of Education are bilingual education, ESL, middle school education, reading, and school library science.

GRADUATE PROGRAMS

The faculty in the Division of Curriculum and Instruction offer several graduate degrees in a number of majors.

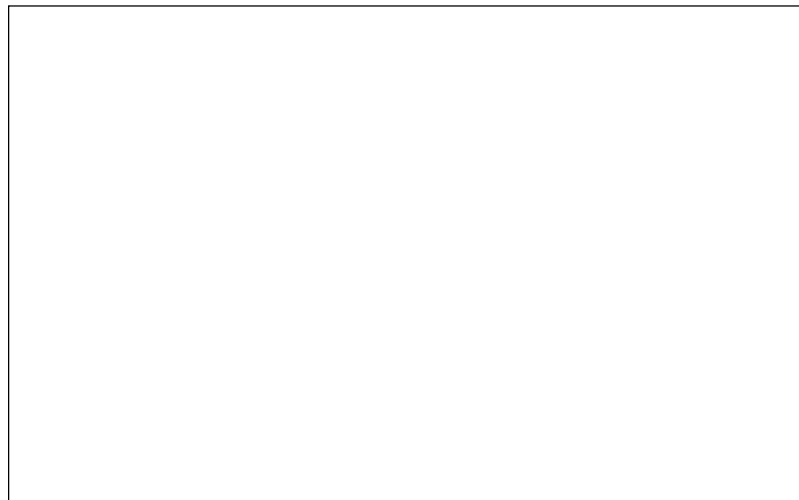
For more information on courses, faculty, and programs, see the *Graduate Catalog*.

CURRICULUM AND INSTRUCTION (DCI)

DCI 302 Principles and Applications of Effective Instruction. (3) F, S
Principles of teaching identified by research on teaching effectiveness. Application of principles to classroom practice. Prerequisites: EDP 303; education major.

DCI 396 Field Experience I. (0) F, S
First-semester PTPP. Observation and limited participation in a school setting. Focus on observation of development, learning, management, instruction, assessment, and motivation. 4 hours required per week. Corequisite: semester I of the PTPP.

DCI 397 Field Experience II. (0) F
Second-semester PTPP. Observation and limited participation in a school setting. Focus on observation of development, learning, management, instruction, assessment, and motivation. 6 hours required per week. Corequisite: semester II of the PTPP.



DCI 510 Teacher as Researcher. (3) F, S, SS

Introduces teacher research as a new research genre; offers teachers guidance on planning and conducting research on their practice. Lecture, workshop.

DCI 701 Curriculum Theory and Practice. (3) F, S

Curriculum theory and practice as a field of study. Its current orientations and applications, modes of inquiry, and community of scholars and practitioners. Seminar. Corequisite: master's-level curriculum course.

Early Childhood Education Program Area

EARLY CHILDHOOD EDUCATION (ECD)

ECD 300 Principles of Interprofessional Collaboration. (3) F, S

Focuses on the dispositions, experiences, knowledge, and skills necessary for interprofessional collaboration designed for young children and their families. Prerequisite: admission to the Professional Teacher Preparation Program (PTPP).

ECD 310 Educational Environments: Infants/Toddlers. (3) F, S, SS

Organizing, planning, and implementing developmentally appropriate educational practices to provide optimal learning environments for infants and toddlers in group settings.

ECD 314 The Developing Child. (3) F, S, SS
Provides a base for understanding and working with young children. Examines all aspects of development of children, birth through age eight, with implications for teachers and parents.

ECD 315 Classroom Organization and Guidance in the Early Years. (2) F, S

Develops understanding and application of classroom organization and management principles, strategies, and procedures. Prerequisites: EDP 301, 303; SPF 301; education major.

ECD 322 Communication Arts in Early Childhood Education. (3) F

Factors affecting language development. Setting conditions for learning in listening, speaking, reading, and writing. Prerequisites: ENG 213 or equivalent; postbaccalaureate certification program admission.

ECD 378 Practicum in Early Childhood Development. (3) F, S

Provides a field-based experience in selected early childhood settings (outside the public schools before student teaching). Prerequisite: ECD 314.

ECD 400 Inquiry Into Teaching and Learning. (3) F, S

Foundational basis of the early childhood field, including historical roots, current practices, ethics, models of teaching, and application in early childhood settings. Prerequisite: post-baccalaureate certification program admission.

ECD 401 Integrated Curriculum and Assessment: Social Studies and Creative Arts. (3) F, S

Presents materials, techniques, and resources for a balanced program of social studies and aesthetic expression appropriate for children in preschool through 3rd grade, with emphasis on the integrated curriculum. Corequisites: ECD 402, 496; RDG 401, 402.

ECD 402 Integrated Curriculum and Assessment: Math and Science. (3) F, S

Emphasizes developmentally appropriate educational strategies and instructional techniques in teaching mathematics and science to children (preschool through 3rd grade), within an integrated curriculum approach. Prerequisites: BIO 100; MAT 114 or 117 or equivalent; MTE 180 or equivalent; PHS 110 or equivalent. Corequisites: ECD 401, 496; RDG 401, 402.

ECD 403 Educational Environments: Preschool/Kindergarten/Primary Grades. (3) F, S

A focus on interactions between young learners and the physical and social environments encountered in preschool, kindergarten, and primary settings.

ECD 404 Language Arts. (2) F, S

Presents theory on the social nature of oral and written language and congruent classroom practices. Prerequisites: DCI 396; EDP 301, 303; SPF 301. Corequisites: DCI 397; ECD 315; EDP 302; EMC 300.

ECD 414 Interprofessional Practicum. (3) F, S

Investigation of services and agencies available in the local community to parents of children with special needs. Practical experiences with an intermittent seminar format. Dispositions, knowledge, experiences, and skills necessary for interprofessional collaboration across multiple agencies and programs.

ECD 496 Field Experience. (0) F, S

Application of course content in a preschool through 3rd grade setting. Emphasis on observation, focus on child-centered curriculum, planning and delivering instruction, and assessment. Corequisites: ECD 401, 402; RDG 401, 402.

ECD 501 Interprofessional Collaboration. (3) F

Dispositions, knowledge, experiences, and skills necessary for interprofessional collaboration required of professionals who work with multineed families with young children. Prepares students to implement effective strategies and workable plans to support interprofessional collaboration for providing integrative services to young children and their families.

ECD 521 Primary/Elementary Communication Arts in Bilingual Education. (3) S

Examination of bilingual/biliterate development of elementary school children, bringing together native and second language, oral language, and literacy development findings with educational practices. Cross-listed as BLE 521. Prerequisite: BLE 511.

ECD 522 Developmental Social Experiences in Early Childhood Education. (3) F
Materials, techniques, aesthetic expression, creative activities, and values in the integrated curriculum.

ECD 525 Communication Arts in Early Childhood Education. (3) S

Problems and trends of current programs and oral language development. Effort to bring together language acquisition findings with educational practices. Opportunity for self-directed learning/study. Prerequisite: ECD 322 or equivalent.

ECD 527 Mathematics in Early Childhood Education. (3) F

Theory and practice in the use of manipulative materials for teaching mathematics to preschool and primary grade children. Prerequisite: ECD 402 or EED 380 or 402 or equivalent.

ECD 544 Play Education. (3) S, SS

Theories of play and the educational implications of each. Practical applications at the early childhood level.

ECD 555 Modern Practices in Early Childhood Education. (3) F, SS

Trends and practices, instructional and resource materials, and methods and techniques in early childhood education.

ECD 601 Theories and Issues in Early Childhood Education. (3) F, SS

Current theories and issues in early childhood education. Presents issues of early childhood best practices, policy, theory, research, and evaluation that are of significance to the early childhood professional. Highlights building on the child development conceptual framework as related to theory and practice.

ECD 733 Social and Emotional Development. (3) A

Inquiry into the social and emotional development dynamics in children, such as peer relationships, self-concept, and parenting processes, with implications for teachers.

ECD 744 Evaluative Procedures: Young Children. (3) S

A critical examination and use of developmentally appropriate evaluative procedures for children from birth through age eight.

Educational Media and Computers Program Area

EDUCATIONAL MEDIA AND COMPUTERS (EMC)

- EMC 300 Computers in Education.** (1) F, S
An introduction to word processing, databases, spreadsheets, teacher utility programs, and evaluation of educational software. Required for majors in the College of Education.
- EMC 321 Computer Literacy.** (3) F, S, SS
Survey of the role of computers in business and education. Laboratory experience in using word processing, database, and spreadsheet software. 2 hours lecture, 2 hours lab. *General Studies: N3.*
- EMC 323 Computer Applications.** (3) F, S
Introduction to computer applications such as HyperCard, Telecommunications, Authoring Languages, and Expert Systems. Lecture, lab. *General Studies: N3.*
- EMC 405 Presentation Technology for Multimedia.** (3) F
An exploration of multimedia hardware and software used in creating presentations for educational, corporate, and commercial applications.
- EMC 406 Computer Graphics and Animation.** (3) S
The study and application of design and animation techniques for use in video or computer-based presentations.
- EMC 455 Animation and Special Effects.** (3) F
An examination of the art, science, and impact of animation and other special effects used in film.
- EMC 503 Current Issues and Problems in Media/Computer Education.** (3) F
Introduction to current theory and practice in instructional media and computers. Overview of production areas.
- EMC 505 Presentation Techniques for Multimedia.** (3) F
An exploration of multimedia hardware and software used in creating presentations for educational, corporate, and commercial applications. Lecture, lab.
- EMC 506 Computer Graphics and Animation.** (3) S
The study and application of design and animation techniques for use in video or computer-based presentations. Lecture, lab.
- EMC 507 Computers in Educational Administration.** (3) F, S
Survey of computer use and applications in educational administration. Lecture, lab. Cross-listed as EDA 507.

EMC 511 Computer Applications in Education. (3) F, SS

Use and evaluation of computers for word processing, information management, graphics, and authoring instruction in educational settings.

EMC 513 Introduction to Multimedia. (3) F
Introduction to multimedia, emphasizing applications for business, industry, and public and higher education.

EMC 521 Instructional Media Design. (3) F, S
Preparing specifications for instructional television, film, slide/tape programs, and computer-based instruction. CD-ROM. Prerequisite: EMC 511 or instructor approval.

EMC 522 Evaluating Computer Materials. (3) S, SS
Selection, utilization, design, and evaluation of instructional computer material. Focus on learning theory, criteria for evaluating educational software. Prerequisite: EMC 521 or instructor approval.

EMC 523 Telecommunication for Instruction. (3) F
Introduction to Internet resources for educators. Instructional applications of distance-learning technologies.

EMC 524 Imaging Technology. (3) F
Use of optical scanning and digital data manipulation of photographs for use in educational presentations and publications.

EMC 525 Presentation Graphics. (3) S
Design, production, and display of computer graphics for group presentations. Prerequisite: EMC 521 or instructor approval.

EMC 527 Instructional Television. (3) F
Design and production of instructional programs for television. Lecture, lab. Prerequisite: EMC 521 or instructor approval.

EMC 528 Photomedia Production. (3) S
Design and production of multimedia programs. Emphasis on slide/tape format. Prerequisites: EMC 521 and 524 and 525 or instructor approval.

EMC 530 Development of Computer-Based Instruction. (3) S
The systematic design, development, and formative evaluation of computer-based instruction. Prerequisite: EMC 511 or instructor approval.

EMC 531 Hypermedia. (3) F
The application of HyperCard and other support software in the design and production of instructional computer-based material for business, industry, and public and higher education. Lecture, lab.

EMC 532 Desktop Publishing. (3) F, SS
Design and production of educational materials using computer-based word processing, graphics, and page layout programs. Lecture, lab.

EMC 535 Interactive Video. (3) S
The use of various authoring systems and support programs to assist in the design and production of regular and repurposed interactive video. Lecture, lab.

EMC 584 Educational Media Internship. (1-6) F, S, SS
Prerequisites: EMC 521; LNT 502; instructor approval.

EMC 637 Computers in Elementary School Curriculum. (3) S

Experiences with educational uses of computers; computer awareness, family/societal impact, classroom applications/software, and curriculum development.

EMC 701 Advanced Technologies in Education. (3) S
Examining the role and impact of artificial intelligence, expert systems, and related advanced technologies in education.

EMC 702 Research in Technology-Based Education. (3) F
Critical exposure to theories, research, and methods in technology-based education.

EMC 703 Research in Educational Telecommunications. (3) S
Seminar with emphasis on research in telecommunications and distance education. Prerequisite: EMC 523 or instructor approval.

Elementary Education Program Area

ELEMENTARY EDUCATION (EED)

- EED 320 Teaching Science to Children.** (3) F, S, SS
Develops students' personal philosophies of the nature of elementary school science; why teach science and how children learn science. Knowledge and skills in planning instruction, using instructional models, integrating the curriculum, employing current science programs and materials, and evaluating children's learning. Limited to students admitted to the post-baccalaureate certification program. Prerequisite: a basic biological and physical science course.
- EED 333 Communication Arts in the Elementary School.** (3) F, S, SS
Factors affecting language growth. Setting conditions for teaching oral and written language. Limited to students admitted to the postbaccalaureate certification program.
- EED 334 Children's Literature and Elementary School Curriculum.** (3) F, S
Selecting and using children's literature in various curriculum areas in elementary school classrooms with diverse student populations. Lecture, discussion, lab. Cross-listed as RDG 334.
- EED 344 Elementary School Organization and Management.** (3) F, S, SS
Overall program of the elementary school. Practical approaches to discipline and to planning, organizing, and managing the classroom. Limited to students admitted to the postbaccalaureate certification program.
- EED 355 Social Studies in the Elementary School.** (3) F, S, SS
Methods and materials for teaching Social Studies in the elementary grades. Limited to students admitted to the postbaccalaureate certification program.

EED 380 The Teaching of Mathematics in the Elementary School. (3) F, S, SS

A beginning course in methods and materials used. Laboratory experiences and computer applications with curriculum materials. Classroom observation required. Limited to students admitted to the postbaccalaureate certification program. Prerequisite: MTE 180 or equivalent.

EED 400 Principles of Effective Instruction in Elementary Education. (3) F, S, SS

Principles and models of teaching identified by research on instructional effectiveness. Application of principles to classroom practice in elementary schools. Prerequisite: PTPP admission.

EED 401 Teaching Science and Social Studies to Children. (4) F, S

Examines core functions, processes, concepts, materials, goals, objectives, scope and sequence, unit and lesson planning, and models of instruction. Corequisites: EED 402, 404, 496; RDG 401, 402.

EED 402 Teaching Mathematics in the Elementary School. (2) F, S

A beginning course in the teaching of mathematics in grades K–8. Laboratory experiences, use of technology, problem solving, integration with other subjects, instructional strategies, application of learning theories, current research and trends. Classroom observation and participation required. Prerequisites: MAT 114 or 117 or equivalent; MTE 180 or equivalent.

EED 404 Language Arts. (2) F, S

Presents theory on the social nature of oral and written language and congruent classroom practices. Corequisites: EED 401, 402, 496; RDG 401, 402.

EED 420 Science Methods, Management, and Assessment in the Elementary School. (3) F, S

Examines philosophies of science and how these relate to the implementation, management, and assessment of science teaching. Lecture, discussion, lab. Prerequisites: one physical science and one biological science course. Contact the College of Education Student Affairs Office for the approved list of courses. Corequisites: EED 397, 480.

EED 433 Language Arts Methods, Management, and Assessment in the Elementary School. (3) F, S

Theory on the social nature of oral and written language and congruent teaching, management, and assessment practices. Lecture, discussion, lab. Corequisites: EED 396, 455.

EED 444 Organizing the Classroom Culture. (1) F, S

Examines how teachers can create and maintain a classroom learning community within the context of an elementary school program. Discussion, workshop, lab. Prerequisites: EED 420, 433, 455, 480. Corequisites: EED 496; RDG 414, 481.

EED 455 Social Studies Methods, Management, and Assessment in the Elementary School. (3) F, S

Teaching methods, classroom management strategies, and assessment techniques for social studies instruction in the elementary grades. Lecture, discussion, lab. Corequisites: EED 396, 433.

EED 478 Student Teaching in the Elementary School. (3–15) F, S

Supervised teaching in the area of specialization. A synthesized experience in curriculum, instruction, and classroom management. Prerequisites: 2.50 GPA; completion of professional course sequence; approval of Office of Professional Field Experiences.

EED 480 Mathematics Methods, Management, and Assessment in the Elementary School. (3) F, S

A beginning course in the teaching, management, and assessment of mathematics in grades K–8. Lecture, discussion, lab. Prerequisite: MTE 180 or equivalent. Corequisites: EED 397, 420.

EED 496 Field Experience. (0) F, S

Application of course content in a (K–8) school classroom. Emphasis on observation, pupil management, planning and delivery of instruction, and assessment. Corequisites: EED 401, 402, 404; RDG 401, 402.

EED 511 Principles of Curriculum Development. (3) F, S, SS

Contemporary curriculum theories. Curriculum as an interrelated entity. Principles of conceiving and effecting change.

EED 526 Communication Arts in the Elementary School. (3) S, SS

A critical examination of school language arts teaching, focusing on theoretical assumptions regarding oral- and written-language development.

EED 528 Social Studies in the Elementary School. (3) F, SS

Problems and trends of current programs. Development of a balanced and articulated program of social studies. Prerequisite: EED 355 or equivalent.

EED 529 Science in the Elementary School. (3) S

Problems and trends of current programs. Development of a balanced and articulated science program. Prerequisite: EED 320 or equivalent.

EED 530 Outdoor/Environmental Education. (3) SS

Use of various outdoor settings as laboratories for classroom-related experience, study, observation, inquiry, research, and recreation. Includes strategies and materials for developing environmental literacy.

EED 537 Mathematics in the Elementary School. (3) F, SS

Contemporary mathematics teaching. Content, materials, and approaches to instruction. Prerequisite: EED 380 or 402 or equivalent.

EED 578 Student Teaching in the Elementary School. (9–15) F, S

Supervised teaching for postbaccalaureate students, synthesized experience in curriculum, instruction, and classroom management. Prerequisites: completion of 21 hours of identified course work from an approved program of study; a GPA of 2.50 (postbaccalaureate nondegree) or 3.00 (postbaccalaureate degree); approval of the Office of Professional Field Experiences.

EED 581 Diagnostic Practices in Mathematics. (3) F, S

Specific skills in diagnosing/treating children's learning difficulties in mathematics. Includes practicum experiences, both on and off campus, in identifying strengths/weaknesses and initial remediation. Prerequisite: EED 380 or 402 or instructor approval.

EED 720 Language in Education. (3) A Sociolinguistic seminar on language issues in education, including language acquisition, classroom interaction, language attitudes, relation language, and class-gender ethnicity.

Multicultural Education Program Area

BILINGUAL EDUCATION (BLE)**BLE 400 Principles of Instruction in Language Minority Education.** (3) F, S

History, theory, and practice of educating bilingual and ESL students. Addresses second language acquisition, program models, methodology, public policy, research, and linguistic diversity. Lecture, discussion. Prerequisite: PTPP admission.

BLE 401 Teaching Science and Social Studies to Children. (4) F, S

Introduction of teaching strategies to be utilized in working in bilingual/ESL classroom settings. Corequisites: BLE 402, 405, 406, 407, 496.

BLE 402 Teaching Strategies in Mathematics. (2) F, S

Introduction and implementation concepts for teaching mathematics to minority language populations. Prerequisites: MAT 114 or 117 or equivalent; MTE 180 or equivalent. Corequisites: BLE 401, 405, 406, 407, 496.

BLE 405 Teaching Reading in BLE/ESL. (3) F, S

Teaching reading in BLE/ESL settings. An integrated classroom curriculum and literature-based instruction will be emphasized. Strategies for teaching decoding (phonics), vocabulary, comprehension, study skills, and area reading are also included. Prerequisite: ENG 213 or equivalent. Corequisite: BLE 406.

BLE 406 Reading Practicum. (3) F, S

Supervised school-based experience in teaching reading to bilingual/ESL students. Prerequisite: ENG 213 or equivalent. Corequisite: BLE 405.

BLE 407 Language Arts. (2) F, S

Theory of the social nature of oral and written language and congruent classroom practices for students preparing to teach bilingual and ESL students. Corequisites: BLE 401, 402, 405, 406, 496.

BLE 478 Student Teaching in the Elementary School. (3–15) F, S

Supervised teaching in the area of specialization. A synthesized experience in curriculum instruction and classroom management in a bilingual education/ESL setting. Prerequisites: 2.50 GPA; completion of professional course sequence; approval of Office of Professional Field Experiences.

BLE 496 Field Experience. (0) F, S

Application of course content in a bilingual/ESL school setting. Emphasis on observation, pupil management, planning and delivering instruction, and assessment. Corequisites: BLE 401, 402, 405, 406, 407.

BLE 511 Introduction to Language Minority Education. (3) A

Historical, philosophical, theoretical, and pedagogical foundations of language minority education in the United States.

BLE 514 Bilingual/Multicultural Aspects of Special Education. (3) S

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

BLE 515 Instructional Methods for Bilingual Students. (3) F

An introduction to general dual language teaching approaches and assessment strategies. Focuses on the effective teaching of limited English proficient populations. Prerequisite: BLE 511.

BLE 520 ESL For Children. (3) S

Examines approaches to second language development and assessment for children congruent with recent research in second language acquisition in children. Prerequisite: BLE 511.

BLE 521 Primary/Elementary Communication Arts in Bilingual Education. (3) S

Examination of bilingual/biliterate development of elementary school children, bringing together native and second language, oral language, and literacy development findings with educational practices. Cross-listed as ECD 521. Prerequisite: BLE 511.

BLE 522 Literacy/Biliteracy Development. (3) F

Acquaints teachers with first and second language literacy research, practice, and assessment in elementary school settings (Spanish-English emphasis). Lecture, discussion. Cross-listed as RDG 522. Prerequisite: BLE 511.

BLE 524 Secondary Sheltered ESL Content Teaching. (3) F

Teaching and assessing ESL adolescents in the content areas with an emphasis on integrating language acquisition principles with content learning. Lecture, small group work. Corequisite: BLE 541.

BLE 528 Social Studies for Bilingual/ESL Teachers. (3) S

Provides language and instructional methodologies and assessment strategies relevant to bilingual/multicultural students in social studies content delivered in Spanish and English. Prerequisite: BLE 511.

BLE 533 Literacy in Secondary BLE/ESL Settings. (3) F, S

Examines first and second language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as RDG 533. Prerequisite: BLE 511.

BLE 535 Sociolinguistic Issues in Bilingual Education. (3) F

Survey of major theoretical issues (e.g., language situations, communicative competence, language attitudes) interrelating language, social processes, and bilingual education. Prerequisite: BLE 511.

BLE 541 Nature of Bilingualism/Second Language Acquisition. (3) A

Bilingual and second language acquisition, with emphasis on children and adolescents. Cognitive, social, and cultural aspects are stressed. Prerequisite: BLE 511.

BLE 543 Bilingual Education Models. (3) A Bilingual education programs in other countries; analysis of political, social, economic, and educational implications; practice in planning bilingual education curricula. See also offerings under MCE, SED, SPE, and SPF. Prerequisite: BLE 511.

BLE 561 Parent Involvement in Language Minority Education Programs. (3) F, S

Examines issues, approaches, and strategies for improving parental and community involvement in the schooling of language minority children and youth. Prerequisite: BLE 511.

BLE 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3) S

Selecting, analyzing, and utilizing literature for Hispanic and Spanish speaking children and adolescents. Cross-listed as LIS 565.

BLE 580 Practicum. (1–6) F, S

Provides for practical application in school settings of principles of bilingual education or English as a Second Language. Special permission required.

INDIAN EDUCATION (IED)**IED 411 Foundations of Indian Education.** (3) F, S

Historical development of Indian affairs and Indian education, including contemporary educational issues, traditional Indian concepts of education, and Indian cultures.

IED 422 Methods of Teaching Indian Students. (3) F

Philosophies, methodologies, and materials used in Indian education. Examination of local and tribal classroom materials. Experimentation with new teaching concepts. Prerequisite: IED 411.

IED 433 Counseling the Indian Student. (3) A

Techniques and methods used in counseling, with emphasis on understanding Indian cultures and values. Experimentation with new counseling concepts. Prerequisite: IED 411.

IED 498 PS: Navajo Language. (3) F, S

Course is designed for Navajo and non-Navajo speaking students that have little or no knowledge of the Navajo language in its written form. Emphasis on development of reading, writing, and speaking skills.

IED 500 Administration and Management of Indian Education Programs. (3) A

Emphasis on educational leadership research and practice in the schooling of American Indian students. Effective practices will be examined.

IED 594 Workshop in Indian Education. (6) SS

Curriculum, pedagogy, community involvement, current issues, and research will be examined.

MULTICULTURAL EDUCATION (MCE)**MCE 446 Understanding the Culturally Diverse Child.** (3) A

Survey of cultural and linguistic diversity in American education, including education equity, pluralism, learning styles, and roles of schools in a multiethnic society. *General Studies: C.*

Reading and Library Science Program Area

LIBRARY SCIENCE (LIS)

LIS 410 Children's Literature. (3) F, S, SS Selecting, analyzing, and using modern and classic literature with young readers.

LIS 510 Computers and Technology in the School Library. (3) F

Library uses of technology and computers. Fundamental concepts and issues in library media centers. Prerequisites: LIS 571 and 581 or instructor approval.

LIS 533 Current Library Problems. (3) F Critical analysis of current practices and problems in school librarianship. Prerequisites: LIS 540 and 561 and 571 and 581 or instructor approval.

LIS 540 Classification and Cataloging. (3) F Descriptive cataloging and Dewey Decimal Classification of print and nonprint library materials.

LIS 561 Selection of Library Materials. (3) F Principles and procedures used in the selection of materials for the school library.

LIS 563 Children's Literature. (3) F, S, SS Selecting and using children's literature and related nonprint media to support the elementary school curriculum. Cross-listed as RDG 563.

LIS 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3) S Selecting, analyzing, and utilizing literature for Hispanic and Spanish speaking children and adolescents. Cross-listed as BLE 565.

LIS 571 Basic Reference Resources. (3) S Providing reference service in the school library. Content and use of basic resources.

LIS 581 School Library Administration. (3) S Administration of K–12 libraries and media centers.

LIS 584 School Library Internship. (1–6) F, S Prerequisites: LIS 410, 540, 561, 571, 581; instructor approval.

READING EDUCATION (RDG)**RDG 301 Literacy and Instruction in the Content Areas.** (3) F, S, SS

Required course for all Secondary Education candidates. Introduces theory and instructional strategies for learning written and oral texts across academic disciplines.

RDG 314 Introduction to Teaching of Reading. (3) F, S, SS

For elementary teachers-in-training. Survey course provides basic teacher skills (including decoding/phonics), evaluation, classroom environments, and reading methods. Limited to students admitted to the postbaccalaureate certification program. Prerequisite: ENG 213 or equivalent.

RDG 315 Integrated, Holistic Approaches to Reading Instruction. (3) F, S, SS
Emphasizes literature-based, integrated, and holistic approaches to reading instruction. Limited to students admitted to the postbaccalaureate certificate program. May be taken concurrently with RDG 481. Prerequisite: RDG 314.

RDG 334 Children's Literature and Elementary School Curriculum. (3) F, S
Selecting and using children's literature in various curriculum areas in elementary school classrooms with diverse student populations. Lecture, discussion, lab. Cross-listed as EED 334.

RDG 401 The Teaching of Reading. (3) F, S
Teaching reading as part of an integrated classroom curriculum and literature-based instruction will be emphasized. Strategies and skills for teaching decoding (phonics), vocabulary, comprehension, study skills, and content area reading are also included. Prerequisite: ENG 213 or equivalent. Corequisites: DCI 396 and EDP 303 and EMC 300 or ECD 401, 402, 496 or EED 401 and 402 and 404 and 496 and RDG 402.

RDG 402 Reading Practicum. (3) F, S
Application of concepts from RDG 401 The Teaching of Reading in classroom settings. Students will demonstrate teaching strategies under supervision. Required for Elementary, Early Childhood, and Special Education candidates. Corequisites: DCI 396 and EDP 303 and EMC 300 or ECD 401 and 402 and 496 or EED 401 and 402 and 404 and 496 and RDG 401.

RDG 481 Practicum: Elementary Reading. (3) F, S, SS
Practicum experience through supervised tutoring of K–8 public school students experiencing reading difficulty. Conducted in public school setting. Limited to students admitted to postbaccalaureate program. May be taken concurrently with RDG 315. Prerequisite: RDG 314.

RDG 494 ST: Reading/Decoding. (3) F, S

RDG 505 Developmental Reading. (3) F, S, SS
For classroom and special reading teachers. Specific professional skills in decoding, comprehension, and evaluation. Required for Special Reading Endorsement. Prerequisite: teaching certificate.

RDG 507 Content Area Literacy. (3) F, S, SS
Theory, teaching strategies, and practical application concerning learning from text across subject matter disciplines.

RDG 522 Literacy/Biliteracy Development. (3) S
Acquaints teachers with first and second language literacy research, practice, and assessment in elementary school settings (Spanish-English emphasis). Lecture, discussion. Cross-listed as BLE 522. Prerequisite: BLE 511.

RDG 533 Literacy in Secondary BLE/ESL Settings. (3) F, S

Examines first and second language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as BLE 533. Prerequisite: BLE 511.

RDG 544 Secondary Reading Programs. (3) S

Examines rationale for secondary reading programs (grades 7–12), teaching strategies, research, and program assessment. Prerequisite: RDG 507.

RDG 550 Practicum Experiences in Reading. (3) F, S, SS

Practicum experience utilizing assessment and instructional techniques for classroom settings. (See RDG 557 for State of Arizona reading endorsement.) Prerequisite: RDG 505 or equivalent.

RDG 556 Assessment Procedures in Reading. (3) F, S

Techniques for classroom and clinical reading assessment and instruction. Emphasis on continuous assessment. May be taken concurrently with RDG 557. Recommended for State of Arizona reading endorsement. Prerequisite: RDG 505.

RDG 557 Advanced Reading Practicum. (3) F, S

Advanced practicum experience utilizing specialized reading and other assessment and instruction techniques for classroom and clinic settings. Lab sections. Recommended for State of Arizona reading endorsement. May be taken concurrently with RDG 556. Prerequisites: RDG 505; instructor approval.

RDG 563 Children's Literature. (3) F, S, SS

Selecting and using children's literature and related nonprint media to support the elementary school curriculum. Cross-listed as LIS 563.

RDG 581 Literature-Based Reading Programs. (3) F, S, SS

For classroom and special reading teachers. The role of literature in the acquisition and development of literacy. Specific suggestions for helping students learn to read and/or expand their reading ability with literature. Introduction to literature studies. Prerequisite: teaching certificate.

RDG 582 Practicum: Literature Studies. (3) S

Practical application of literature study group principles in field sites or through on-campus simulations. Lecture, supervised practice. Prerequisite: RDG 581 or instructor approval.

RDG 596 Gender, Culture, and Literacies. (3) S

Influence of gender and culture on written, oral, and post-typographical texts. Seminar.

RDG 630 Research in Reading. (3) F

For advanced graduate students interested in applied research problems, literature of reading instruction, and major issues related to reading research. Prerequisite: instructor approval.

Secondary Education Program Area

BUSINESS EDUCATION (BUE)

BUE 480 Teaching Business Subjects. (3) S

Organization and presentation of appropriate content for business subjects in the secondary school.

BUE 501 Principles of Business Education. (3) F

History, philosophy, principles, and objectives of business and distributive education.

BUE 502 Organization and Management of Cooperative Programs. (3) F

Work-study programs for business occupations in high schools and community colleges.

BUE 503 Competency-Based Business and Vocational Education. (3) S

Development and administration of competency-based individualized programs in business and vocational education.

BUE 505 Current Literature in Business and Vocational Education. (3) S

Critical analyses, generalizations, and trends in business and vocational education.

BUE 506 Information Processing for Business and Vocational Teachers. (3) SS

Development of curriculum and strategies for teaching information processing; hardware/software evaluation and equipment acquisition techniques in business and vocational education.

BUE 512 Technology in Business and Vocational Education. (3) SS

Emerging curricula and instructional technology in business and vocational education.

SECONDARY EDUCATION (SED)

SED 400 Principles of Effective Instruction in Secondary Education. (3) F, S, SS

Different models of education are examined. Appropriate teaching practices for each model are developed and applied to secondary school classrooms. Lecture, discussion. Prerequisite: PTPP admission.

SED 403 Principles, Curricula, and Methods. (3) F, S, SS

Advanced level of development of knowledge and skills of instructional planning and methods of teaching and evaluating in the secondary school. Observation/participation required. Corequisite: SED 496.

SED 478 Student Teaching in Secondary Schools. (3–12) F, S

The practice of teaching. The relationship of theory and practice in teaching. Prerequisite: two complete semesters of block or equivalent.

SED 480 Special Methods of Teaching Social Studies. (3) F, S

Interdisciplinary approaches; production and collection of materials.

SED 496 Field Experience. (0) F, S

Application of course content in a secondary school setting. Emphasis on observation, pupil management, planning and delivering instruction, and assessment. Corequisite: SED 403.

SED 501 Introduction to Effective Instruction. (6) F, S, SS

Introductory course for postbaccalaureate certification program in secondary education. Emphasis upon developing basic classroom management, instruction, and evaluation. Includes a field assignment of at least 120 hours. Prerequisite: admission to postbaccalaureate certification program.

SED 522 Secondary School Curriculum Development. (3) F, S, SS

Social processes, issues, principles, patterns, and procedures in curriculum development.

SED 533 Improving Instruction in Secondary Schools. (3) F, S, SS

Analyses of procedures, methods, techniques, and experiments in teaching in secondary schools. Prerequisites: SED 478, 578.

SED 577 Issues and Trends in Secondary Education. (3) N

Analyses of lay and professional reports; problems and issues in American secondary education. Prerequisites: SED 478, 578.

SED 578 Student Teaching in the Secondary Schools. (3–12) F, S

The practice of teaching. The relationship of theory and practice in teaching. Postbaccalaureate students only. Prerequisites: completion of approved postbaccalaureate program; a minimum 2.50 GPA; approval of the Office of Professional Field Experiences.

SED 588 Human Relations in the Secondary Schools. (3) A

Problems in human relations inherent in the interaction of pupils, teachers, administrators, nonprofessional staff, and laymen. Prerequisites: SED 478, 578.

SED 711 Secondary Curriculum Development. (3) S, SS

Theories and processes of developing curriculum; evaluation of research. Prerequisites: SED 478, 522 (or equivalent), 578.

SED 722 Improvement of Instruction in the Secondary School. (3) F

Evaluation of the research; issues and theories related to the improvement of instruction. Prerequisite: SED 533.

Special Education Program Area

SPECIAL EDUCATION (SPE)**SPE 311 Orientation to Education of Exceptional Children.** (3) F, S, SS

Includes gifted, mildly handicapped, severely handicapped, and the bilingual/multicultural exceptional child. *General Studies: SB.*

SPE 312 Mental Retardation. (3) F, S, SS
Characteristics and assessment specific to mental retardation. Terminology, development, educational programming, and therapeutic procedures will be emphasized. Prerequisite: SPE 311.

SPE 314 Introduction to Bilingual/Multicultural Special Education. (3) F, S, SS

Theoretical background and practical application of general issues regarding the education of bilingual/multicultural handicapped children. Prerequisite: SPE 311.

SPE 336 Behavioral and Emotional Problems in Children. (3) F, S, SS

Characteristics and assessment specific to emotionally and behaviorally disturbed children. Terminology, development, and educational programming emphasized. Prerequisite: SPE 311.

SPE 361 Introduction to Learning Disabilities. (3) F, S, SS

Characteristics and assessment specific to learning disabilities. Terminology, development, and educational programming emphasized. Prerequisite: SPE 311.

SPE 394 Special Topics. (3) F, S

- (a) Basic Special Education Curriculum
- (b) Quality Practices in the Collaborative Classroom

SPE 411 Parent Involvement and Regulatory Issues. (3) F, S

Emphasis on parent and school relations through effective communication and state and federal regulations impacting services for the handicapped. Prerequisites: SPE 311; majors only.

SPE 412 Evaluating Exceptional Children. (3) F, S

Normative and criterion-referenced diagnostic techniques, including formative evaluation. Emphasis upon application. Daily practicum required. Prerequisites: DCI 396; EDP 303; EED 404; EMC 300; RDG 401; SPE 311. Corequisites: EED 402; SPE 413, 496.

SPE 413 Methods in Language, Reading, and Arithmetic for Exceptional Children. (3) F, S

Methods, techniques, and materials for use in prescriptive teaching. Daily practicum required. Prerequisites: DCI 396; EDP 303; EED 404; EMC 300; RDG 401; SPE 311. Corequisites: EED 402; SPE 412, 496.

SPE 414 Methods and Strategies in Behavior Management. (3) F, S

The organization and delivery of instruction, including formative evaluation techniques. Techniques of behavior management. Daily practicum required. Prerequisites: RDG 401, 402; SPE 412, 413. Corequisites: SPE 415, 496.

SPE 415 Social Behavior Problems of Exceptional Children. (3) F, S

Analysis and intervention into social behavior problems of exceptional populations. Daily practicum required. Prerequisites: RDG 401, 402; SPE 412, 413. Corequisites: SPE 414, 496.

SPE 455 Early Childhood and the Handicapped. (3) F

Early childhood education as it applies to the handicapped child.

SPE 478 Student Teaching in Special Education. (3–15) F, S

“Y” grade only. Prerequisites: approval of special education program coordinator; completion of Special Education prerequisites.

SPE 496 Field Experience. (0) N

Application of course content in a special education setting. Emphasis on observation pupil management, planning and delivering instruction, and assessment. Corequisites: SPE 411 (or 413), 412, 414, 415.

SPE 498 PS: Field Experience. (1–3) F, S

Application of course content in a special education setting. Emphasis on observation pupil management, planning and delivering instruction, and assessment. Corequisites: SPE 411 (or 413), 412, 414, 415.

SPE 511 The Exceptional Child. (3) F, S, SS

Educational needs of exceptional children and adults. Not recommended for students who have completed SPE 311.

SPE 512 Individuals with Mental Retardation. (3) F, S, SS

Etiology, diagnosis, and management of individuals with mental retardation. Current trends in prevention, programming, and teacher preparation. Not recommended for students who have completed SPE 312.

SPE 514 Bilingual/Multicultural Aspects of Special Education. (3) F, S, SS

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

SPE 515 Methods for the Remediation of Learning Problems of Exceptional Children. (3) S

Methods and materials for remediating the basic academic problems of exceptional children. Prerequisites: SPE 511; a methods course in the teaching of reading and mathematics.

SPE 522 Academic Assessment of Exceptional Children. (3) F

Normative and criterion referenced assessment of learning problems in exceptional children. Formative evaluation included. Practicum required. Lecture, practicum. Prerequisites: SPE 311 or 511; elementary methods courses; program approval.

SPE 523 Prescriptive Teaching with Exceptional Children. (3) F

Language, reading, and arithmetic methods, techniques, and materials used in individualized instruction. Practicum required. Lecture, practicum. Prerequisites: elementary methods courses; SPE 311 (or 511), 522 (or concurrent and program approval).

SPE 524 Effective Classroom Behavior Management. (3) S

Organization and delivery of instruction including formative evaluation and techniques of academic behavior management for exceptional children. Practicum required. Lecture, practicum. Prerequisites: SPE 311 (or 511), 522, 523; program approval.

SPE 525 Social Behavior Interventions. (3) S

Analysis and intervention into social behavior problems of exceptional students. Focus on strategies to change maladaptive social behavior. Practicum required. Prerequisites: SPE 311 or 511 or 522 or 523; program approval.

SPE 531 Behavior Management Approaches with Exceptional Children. (3) F, SS

Behavior management approaches for classroom behavior of exceptional children. Prerequisite: SPE 511 or equivalent.

SPE 536 Characteristics of Children with Behavioral Disorders. (3) F, S1, SS

Variables contributing to behavior patterns of behaviorally disordered children.

SPE 551 Teaching Young Children with Special Needs. (3) S

Methods, materials, and curriculum for preschool and primary-aged children with special needs. Prerequisites: SPE 455 and 511 or equivalents.

SPE 552 Management of Individuals with Severe Handicaps. (3) S

Instruction and management of school-aged and adult individuals with severe, physical, or multiple handicaps. Prerequisites: SPE 511 or equivalent; instructor approval.

SPE 553 Developmental/Functional Assessment. (3) F

Teacher-focused developmental/functional assessment of preschool and severely, physically, and multiply handicapped individuals. Field experience required. Prerequisites: SPE 511 and 512 and 574 or equivalents.

SPE 554 The Parent/School Partnership.

(3) S
Includes knowledge and procedures for involvement and training of parents and caregivers of preschool and severely handicapped individuals. Field experience required. Prerequisites: SPE 455 and 511 or equivalents.

SPE 561 Characteristics/Diagnosis of Learning Disabilities. (3) F, S1, SS

Theories related to learning disabilities, including identification and characteristics.

SPE 562 Methods of Teaching Students with Learning Disabilities. (3) N

Various methods and intervention strategies for remediating learning disabilities of children and youth. Prerequisite: SPE 361 or 561.

SPE 574 Educational Evaluation of Exceptional Children. (3) F

Design and statistical considerations of normative and criterion-referenced tests. Collection, recording, and analysis of data from formative evaluation. Prerequisites: SPE 511 or equivalent; a methods course in the teaching of reading and mathematics.

SPE 575 Current Issues in the Education of Exceptional Children. (3) F

Mainstreaming, noncategorical, financing, legal diagnostic, labeling, legislative, and other critical and controversial issues related to the education of exceptional children.

SPE 577 Mainstreaming Methods. (3) S

Successful mainstreaming methods, practical problem-solving sessions related to teacher's classroom needs, and individual contracts focusing on mainstreaming issues are addressed. General educators encouraged.

SPE 578 Student Teaching in Special Education. (9–15) F, S

“Y” grade only. Prerequisites: completion of specified courses; approval by the special education program coordinator.

SPE 582 Classroom Research with Exceptional Children. (3) S

Introduction to interpreting research. Specific research techniques with primary emphasis on classroom research, including applied behavior analysis.

SPE 585 Creativity: Research and Development. (3) S

Nature of creativity explored in terms of philosophical underpinnings, empirical evidence, human development, self-actualization, and the ecology surrounding the creative event.

SPE 586 Advising the Gifted Child. (3) A

Focus on educational planning and guidance, social and emotional development, and family problem solving regarding needs of gifted children.

SPE 587 Controversies in Educating the Gifted. (3) F

In-depth analysis of major controversies in educating the gifted, including nature/nurture, the role of mental tests, and sex differences.

SPE 588 The Gifted Child. (3) F, SS

Gifted children's characteristics, identification, needs, school and home environments, definitions, and misunderstandings. Research by Pressey, Stanley, Terman, and others.

SPE 589 Methods in Teaching the Gifted. (3) S, SS

Methods in teaching elementary and secondary school gifted children, including individualized and computer-assisted instruction, team teaching. Prerequisite: SPE 588.

SPE 774 Characteristics and Causation of Exceptionality. (3) F

In-depth analysis of literature pertaining to causes of exceptionality and learning, educational, personal-social, and cognitive characteristics. Lecture, discussion.

SPE 775 Evaluation and Intervention in Special Education. (3) S

In-depth analysis of research and literature on evaluation procedures and intervention approaches for exceptional individuals at all age levels. Lecture, discussion.

SPE 781 Research and Evaluation in Special Education. (3) S

Issues and problems in conducting research and/or evaluation programs involving exceptional children.



The campus is laid out in broad pedestrian malls that are surrounded by desert and tropical landscaping.

Tim Trumble photo

Division of Educational Leadership and Policy Studies

Thomas H. Metos
Director
 (EDB 108) 602/965-6248
tikun.ed.asu.edu/elps

REGENTS' PROFESSOR BERLINER

PROFESSORS

APPLETON, FENSKE, GLASS,
 METOS, NORTON, RENDÓN,
 RICHARDSON, SIMMONS, SMITH,
 STOUT, VALVERDE, WEBB

ASSOCIATE PROFESSORS

CASANOVA, HARTWELL-HUNNICUTT,
 LEVAN, WILKINSON

ASSISTANT PROFESSORS

MARGOLIS, PEÑA

Program Areas

Education Policy Studies
 Educational Administration and
 Supervision
 Higher and Postsecondary Education

Degrees: M.A., M.Ed., Ed.D., Ph.D.

GRADUATE PROGRAMS

The faculty in the Division of Educational Leadership and Policy Studies offer several graduate degrees in a number of majors.

For more information on courses, faculty, and programs, contact the division office or see the *Graduate Catalog*.

EDUCATIONAL ADMINISTRATION AND SUPERVISION (EDA)

See the *Graduate Catalog* for the EDA courses.

HIGHER AND POSTSECONDARY EDUCATION (HED)

See the *Graduate Catalog* for the HED courses.

EDUCATIONAL POLICY STUDIES (SPF)

SPF 111 Exploration of Education. (3) F, S
 Education as an instrument in the development of the individual and society, and its significance as an American institution.

SPF 301 Culture and Schooling. (3) F, S
 For the professional teacher preparation program: an overview of the cultural, social, and political milieus in which formal schooling takes place in the United States. For education majors only. *General Studies: L2.*

SPF 401 Theory and Practice in Education. (1-2) F, S

For the professional teacher preparation program. The analysis and interpretation of classroom behavior from perspectives derived from philosophy, social science, and law. Prerequisite: education major.

SPF 510 Introduction to Organization and Administration of American Public Schools. (3) F, S

Organizational structure and administration of public education are explored through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as EDA 510.

SPF 511 School and Society. (3) F, S, SS
 Interrelationship of school and society and the role of education in social change.

SPF 515 Education of Women. (3) N
 Analysis of roles and status of women, educational practices, and alternatives.

SPF 520 Cultural Diversity in Education. (3) S
 Philosophic and sociological investigation of cultural diversity in the United States and how it relates to education.

SPF 533 Comparative Education in the Western World. (3) N
 Educational practices and traditions in the leading nations of Europe and the Soviet Union.

SPF 544 Philosophical Foundations of Education. (3) F
 Theories of education in ancient, medieval, and modern classical and contemporary philosophies.

SPF 566 History of Education. (3) S
 Development of educational institutions and ideas in the Western World, from ancient times to the 20th century.

SPF 612 Evaluation Theory. (3) F
 Explores the major theories of evaluation (inquiry leading to value judgments) in educational policy through examination of cases.

SPF 622 Theory of Educational Organizations. (3) S

An investigation of how educational organizations function and the implications of these views on role definition and performance of administrators as they design organizational processes. Cross-listed as HED 688.

SPF 711 Social and Historical Foundations of Education. (3) N
 Problems of American education and their sociohistorical context.

Division of Psychology in Education

Raymond Kulhavy
Interim Director
 (EDB 301) 602/965-3384
seamonkey.ed.asu.edu/~gail/division/divintro.htm

REGENTS' PROFESSORS

BERLINER, KULHAVY

PROFESSORS

BARONA, BERNSTEIN, CABIANCA,
 CLAIBORN, FREEMAN, GLASS,
 HACKETT, HARRIS, HORAN,
 B. KERR, N. KERR, KLEIN, KRUS,
 KURPIUS, McWHIRTER, NELSEN,
 SMITH, STROM, SULLIVAN, ZIMILES

ASSOCIATE PROFESSORS

ARCINIEGA, BEHRENS, BETZ,
 BLANCHARD, BROWN, COHN,
 HOOD, KINNIER, MOORE,
 SANTOS DE BARONA,
 SAVENYE, SHELL

ASSISTANT PROFESSORS

FISHER, MATTHEWS, NAKAGAWA,
 ROBERTS, STAFFORD

Program Areas

Counseling Psychology
 Counselor Education
 Learning and Instructional Technology
 Lifespan Development Psychology
 Measurement, Statistics, and
 Methodological Studies
 School Psychology

Degrees: M.A., M.C., M.Ed., Ed.D., Ph.D.

GRADUATE PROGRAMS

The faculty in the Division of Psychology in Education offer graduate degrees in a number of majors.

For more information on courses, faculty, and programs, contact the division office or see the *Graduate Catalog*.

COUNSELOR EDUCATION (CED)

See the *Graduate Catalog* for the CED courses.

COUNSELING PSYCHOLOGY (CPY)

See the *Graduate Catalog* for the CPY courses.

EDUCATIONAL PSYCHOLOGY (EDP)**EDP 301 Learning and Motivation in Education.** (2) F, S

Using a case format, learning and motivation principles are applied to education contexts. Prerequisite: education major.

EDP 302 Assessment and Evaluation in Education. (1) F, S

Using a case format, assessment and evaluation principles are applied to education contexts. Prerequisite: education major.

EDP 303 Human Development. (3) F, S

Selected aspects of child and adolescent development. Emphasis on possibilities for influence by teachers and parents. Prerequisites: CDE 232 or equivalent; education major. *General Studies: L2.*

EDP 310 Educational Psychology. (1–6) F, S, SS

Human behavior in educational situations presented through instructional modules. Students may re-enroll for credit to a total of 6 hours. *General Studies: SB.*

EDP 313 Childhood and Adolescence. (3) F, S, SS

Principles underlying total development of pre- and early-adolescent children. Emphasis on physical, intellectual, social, and emotional development with practical implications for teachers grades 5–9. Prerequisite: EDP 303 or admission to College of Education postbaccalaureate program.

EDP 454 Statistical Data Analysis in Education. (3) F, S, SS

The role of data analysis in research and decision making. Elements of exploratory data analysis, descriptive indexes, and statistical inference. Lecture, lab. Prerequisite: MAT 117. *General Studies: N2.*

EDP 502 Introduction to Quantitative Methods. (3) F, S, SS

Topics in statistical analysis, measurement, and research design. Exploratory data analysis, estimation theory, and statistical inference. Use of computers for data analysis. Cross-listed as COE 502.

EDP 503 Introduction to Qualitative Research. (3) F, S, SS

Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory, and hermeneutics), and qualitative versus quantitative social sciences; methods of inquiry. Cross-listed as COE 503.

EDP 504 Learning and Instruction. (3) F, S, SS

Introduction to psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as COE 504.

EDP 510 Essentials of Classroom Learning. (3) F, S, SS

Theoretical and empirical foundations of learning in the classroom milieu. Critical exposure to research and method in instructional psychology. Cross-listed as LNT 510.

EDP 513 Child Development. (3) F, S, SS

Examination of problems and achievements experienced by children growing up in a technological society. Emphasis on discovering the child's perspective.

EDP 514 Psychology of the Adolescent. (3) F, S, SS

Cognitive, physical, and social development of adolescents in contemporary society. Impact of family, school, and work place on adolescent development. Prerequisite: EDP 310 or PGS 100 or equivalent.

EDP 530 Theoretical Issues and Research in Human Development. (3) F

Psychological theories, research, and methods relevant to human development, emphasizing the relations between early development and later performance.

EDP 534 Principles of Behavior Modification. (3) F

Principles of conditioning as applied to behavior modification; current research on the experimental analysis of behavior in educational psychology.

EDP 540 Theoretical Views of Learning. (3) F, S

Classical and cognitive theories of learning, plus recent orientations. Illustrative experimental and rational foundations; implications for educational practice. Cross-listed as LNT 540.

EDP 542 The Psychology of Learning and Instruction. (3) S

Critical review and evaluation of research on learning variables relevant to acquisition and retention of instructional materials. Lab. Cross-listed as LNT 542.

EDP 550 Introduction to Measurement in Education. (3) F, S

Nature and types of educational measures. Critiquing and selecting appropriate measuring devices. Constructing measuring devices. Social controversies about tests. Lecture, lab. Prerequisite: EDP 502 or instructor approval.

EDP 552 Quantitative Data Analysis in Education I. (3) F, S, SS

Continued treatment of statistical estimation, testing, and research synthesis. Inferential techniques including ANOVA and multiple regression with computers. Lecture, lab. Prerequisite: EDP 502 or instructor approval.

EDP 554 Quantitative Data Analysis in Education II. (3) F, S, SS

Advanced issues in applied multiple regression and ANOVA. Introduction to ANCOVA. Use of computers for data analysis. Lecture, lab. Prerequisite: EDP 552 or instructor approval.

EDP 556 Data Processing Techniques in Measurement and Research. (3) A

Use of statistical packages for data analysis. Emphasis on data management, data structures, and related statistical procedures. Lecture, lab. Prerequisite: EDP 552. Pre- or co-requisite: EDP 554 or instructor approval.

EDP 560 Individual Intellectual Assessment. (1–6) F, S

Experience in administering and interpreting individual tests. Theoretical basis for ability testing, ethical considerations, and diagnostic use of test results. Initial enrollment, 3-hour minimum. Lab experience. Prerequisites: EDP 454 and admission to a program in professional psychology or instructor approval.

EDP 562 School Psychology: Theory and Practice. (3) F

Development and present status of school psychology, including an overview of assessment and intervention strategies and professional issues.

EDP 563 Interventions in School Psychology. (3) F

Examination of case-based consultation and consultation research relevant to school psychology practice. Field experience. Prerequisite: school psychology program or instructor approval.

EDP 566 Diagnosis of Learning Difficulties. (3) S

Clinical diagnosis of learning difficulties, emphasizing specific academic problems. Use and interpretation of diagnostic instruments in practical school situations. Prerequisites: EDP 560 and 562 or equivalents; instructor approval.

EDP 567 School Psychological Services to Minority Students. (3) S

Historical perspectives and major issues in psychological and academic assessment and interventions with minority school children.

EDP 651 Methods and Practices of Qualitative Research. (3) S

Advanced course for students familiar with theory and extant work. Topics include data collection, analysis, reporting, and an extensive fieldwork project. Prerequisite: COE 503.

EDP 652 Multivariate Procedures in Data Analysis I. (3) F

Introduction to matrix algebra. Application of MANOVA, MANCOVA, power analysis, effect size, discriminant and repeated measures analysis with computers. Lecture, lab. Prerequisite: EDP 554 or instructor approval.

EDP 654 Multivariate Procedures in Data Analysis II. (3) S

Treatment of applied multivariate multiple regression, canonical correlation, factor analysis, log-linear models, and structural equation models with computers. Lecture, lab. Prerequisite: EDP 652 or instructor approval.

LEARNING AND INSTRUCTIONAL TECHNOLOGY (LNT)

See the *Graduate Catalog* for the LNT courses.

College of Engineering and Applied Sciences

Peter E. Crouch, Ph.D.
Dean

PURPOSE

The purpose of the College of Engineering and Applied Sciences is to provide students with a range of educational opportunities by which they may achieve competence in the major branches of engineering, in computer science, and construction. Considerable effort is spent on the development and delivery of well-rounded programs that enhance student preparation for professional careers, lifelong learning, and responsible participation as a member of society.

For more information, visit the college's Web site at www.eas.asu.edu.

ORGANIZATION

The College of Engineering and Applied Sciences is composed of the following academic and service units:

Del E. Webb School of Construction

School of Engineering

Department of Chemical, Bio,
and Materials Engineering
Department of Civil and
Environmental Engineering
Department of Computer Science
and Engineering
Department of Electrical
Engineering
Department of Industrial and
Management Systems
Engineering
Department of Mechanical and
Aerospace Engineering

Research Centers. The college is committed to the development of research programs of national prominence and to the concept that research is an important part of its educational role. The college encourages the participation of both qualified undergraduate students and graduate students in various research activities. Most of the faculty are involved in government or industry-sponsored research programs in a wide variety of topics. A partial list of these topics includes aerodynamics, biotechnology, computer design, computer-integrated manufacturing, environmental fluid dynamics, innovative engineering education, microelectronics manufacturing, power systems, semiconductor materials and devices, signal processing, solar energy, solid-state electronic devices, structural dynamics, telecommunications, thermosciences, and transportation systems.

This research is carried out in the departments and schools listed above and in the following interdisciplinary research centers:

Center for Innovation in Engineering Education
Center for Low Power Electronics
Center for Research in Engineering and Applied Sciences
Center for Solid-State Electronics Research
Manufacturing Institute
Center for System Science and Engineering Research
Telecommunications Research Center

Center for Professional Development. The Center for Professional Development, often in cooperation with the college's academic units and research centers, provides a variety of technical conferences, seminars, short courses, and televised and satellite-transmitted programs to enable engineers, scientists, and managers to continue the life-long learning that is so necessary in a constantly changing world.

Programs may be conducted on campus, at various off-campus locations, or at company sites upon request. For more information, contact the Center for Professional Development, located in EC G148, at 602/965-1740, by e-mail at asu.cpd@asu.edu, or visit the center's Web site at www.eas.asu.edu/cpd.

ADMISSION

Individuals wishing to be admitted to freshman standing in the College of Engineering and Applied Sciences should have completed certain secondary-school units. These units are identified in the requirements for each of the two schools in the college. If these conditions are not met, additional university course work, possibly unacceptable for degree credit, may be required.

Students who are not admissible to programs in this college and who enroll in another college at ASU may not register for any 300- or 400-level courses in this college unless they are required in their degree programs and the students have the proper course prerequisites.

Entrance requirements of this college may differ from those of other ASU academic units. Students may be admitted under one of two different

classifications, professional or preprofessional.

Professional Status. For admission to *professional status*, Arizona residents must meet one of the requirements as listed in the table, “Professional Status Requirements for Residents,” and a nonresident must meet one of the requirements as listed in the table, “Professional Status Requirements for Nonresidents” on this page. In addition, an international student must satisfy minimum TOEFL score requirements as shown in the table.

Students admitted to the university after successful completion of the General Education Development (GED) examination are admitted as preprofessional students within their major. Professional status is attained by meeting the minimum ACT or SAT score required for admission as listed in the table, “Professional Status Requirements.”

Preprofessional Status. A student not admissible to professional status within the college but otherwise regularly admissible to ASU as stated on page 60, “Undergraduate Admission,” may be admitted as a *preprofessional* student to any one of the academic programs of the college. International students whose TOEFL scores do not meet the required minimum shown in the tables below may also be admitted to preprofessional status. A student admitted into this classification follows the freshman-sophomore sequence of courses as required by the chosen major. Courses are selected with the assistance of an academic advisor. After

completing a minimum of 30 semester hours of required or approved elective courses with a *cumulative GPA equivalent to that required of transfer students and corresponding to the chosen major*, students may apply for admission to professional status. *International students must also submit a TOEFL score equivalent to that required for admission to professional status* (refer to the table below). Preprofessional students are not permitted to register for 300- and 400-level courses in the College of Engineering and Applied Sciences until their status is changed to the professional classification.

Readmission. Students applying for readmission to professional status for any program in this college must have a cumulative GPA for all college course work equal to that of the transfer admission requirements shown in the table, “Professional Status Requirements for Transfer Students,” on page 186.

Transfer into and within the College. Students transferring between academic programs within the college or from other colleges within the university must meet both the cumulative GPA requirement and the catalog requirements of the desired program in effect at the time of transfer. Students who are transferring from an Arizona community college and have been in continuous residence may continue under the catalog in effect at the time of their entrance into the community college.

Transfer Students. A student who contemplates transferring into this col-

lege from another institution, whether a community college or four-year institution, should carefully study the catalog material pertaining to the particular program and consult an advisor in this college before enrolling in the other institution. These steps assure a smooth transition at the time of transfer. Transfer students may request admission to either preprofessional or professional status in any of the programs offered by this college.

The minimum requirements for admission of resident, nonresident, and international transfer students to the professional program are listed in the table, “Professional Status Requirements for Transfer Students,” on this page. The academic units may impose additional admission and graduation requirements beyond the minimum specified by the college.

Credit is granted for transferred courses deemed equivalent to corresponding courses in the selected program of study, subject to grade and ASU resident credit requirements. No grades lower than “C” are accepted as transfer credit to meet the graduation requirements of this college. Credits transferred from a community college or two-year institution are applied only as lower-division credits. Prospective Arizona community college transfer students should consult their advisors and refer to the annual *Arizona Higher Education Course Equivalency Guide* (CEG) for a listing of the acceptable courses transferable to the various college degree programs.

It should be noted that some courses taken in other colleges of this university or other universities may be acceptable for general university credit but may not be acceptable toward the degree requirements of this college. Determination of those particular courses acceptable to a specific degree program is made within the appropriate academic unit with the approval of the dean.

Cooperative Education. The co-op program is a work-study plan of education that alternates periods of academic study with periods of employment in business, industry, or government. Students who choose this program ideally complete 12 months of employment and graduate with both the academic background and practical experience gained from working with professionals in a chosen field.

Professional Status Requirements for Residents

School	High School Rank	Minimum Scores	
		ACT	SAT
Construction	Upper 25%	23	1140
Engineering	Upper 25%	23	1140

Professional Status Requirements for Nonresidents

School	High School Rank	Minimum Scores		
		ACT	SAT	TOEFL*
Construction	Upper 25%	24	1140	550
Engineering	Upper 25%	24	1140	550

* For international students (see page 64).

Professional Status Requirements for Transfer Students

School	Transfer GPA ¹		
	Resident	Nonresident	TOEFL ²
Construction Engineering	2.25 2.50	2.50 2.50	550 550

¹ The cumulative GPA is calculated using all credits from ASU as well as those from other colleges and universities.

² For international students (see page 64).

A student in the college is eligible to apply to the co-op program upon completion of 45 or more hours of classes required for the selected major. Transfer students are required to complete at least one semester at ASU before beginning work. All student applicants must have a GPA of at least 2.50 and the approval of an advisor.

To maintain continuous student status in the university, each co-op student must be enrolled in ASE 399 Cooperative Work Experience for one semester hour during each work session. Such credit cannot be applied toward degree requirements. For more information, contact the director of Student Academic Services at 602/965-1750 (EC G102) or the Career Services office at 602/965-2350 (SSV C359).

ADVISING

For assistance and counseling in planning a program of study, each student in this college is assigned a faculty advisor who is familiar with the chosen field of specialization and who must be consulted before registering each semester. The student should inform the advisor of any outside work or activity so that course loads may be adjusted accordingly.

Most students attending college find it necessary to obtain part-time employment; consequently, it is suggested that a careful balance of work and class requirements be considered in order to avoid academic problems.

Students enrolled in this college may register for a maximum of 19 semester hours each semester. Any student wanting to register for more than the maximum must petition the CEAS Standards Committee and must have an approval on file before registering for the overload.

DEGREES

The faculty in the College of Engineering and Applied Sciences offer programs leading to the B.S. and B.S.E. degrees with majors in the subjects shown in the "College of Engineering and Applied Sciences Degrees, Majors, and Concentrations" table, pages 187-188. Each major is administered by the academic unit indicated.

Integrated B.S.E.—M.S. Program.

To provide greater program flexibility, qualified students of the School of Engineering may undertake a program with an integrated fourth- and fifth-year sequence of study in one of several fields of specialization in engineering. This program provides an opportunity to meet the increasing demands of the profession for graduates who can begin their engineering careers at an advanced level.

Students admitted to this program are assigned a faculty committee that supervises a program of study in which there is a progression in the course work and in which earlier work is given application in the later engineering courses for both the bachelor's and master's degrees. Entry into the integrated program requires an application submitted to the dean through the faculty advisor and the department chair. Applications are reviewed by a school committee that recommends the appropriate action to the dean. The application may be submitted in the fifth semester.

GRADUATE PROGRAMS

The faculty in the College of Engineering and Applied Sciences offer a Master of Computer Science (M.C.S.) degree; a Master of Science (M.S.) degree with majors in Computer Science, Construction, and Engineering Science; a Master of Science in Engineering

(M.S.E.) degree; and a Ph.D. degree in Engineering or Computer Science. The faculty in the Department of Industrial and Management Engineering also participate with the American Graduate School of International Management (Thunderbird) to offer the Master of Science in Engineering (Industrial Engineering)/Master of International Management of Technology.

For more information on courses, faculty, and programs, see the *Graduate Catalog*.

DEGREE REQUIREMENTS

For detailed information on the degree requirements of a major in the College of Engineering and Applied Sciences, refer to that department's or school's individual description on the following pages.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to department and school requirements, students must meet all university graduation requirements (see pages 79-83). A well-planned program of study enables students to meet all requirements in a timely fashion. Students are encouraged to consult with an academic advisor in planning a program to ensure that they comply with all necessary requirements.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 hours of approved course work in General Studies, as described on pages 84-87. General Studies courses are listed on pages 87-108 in the *General Catalog*, in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

First-Year Composition Requirement

As a minimum, completion of ENG 101 and 102, or ENG 107 and 108, or ENG 105 with grades of "C" or higher is required for graduation from ASU in any baccalaureate program. See "First-Year Composition Requirement," page 79. Any student whose written or spoken English in any course is unsatisfactory may be required by the appropriate director or department chair to take additional course work.

**College of Engineering and Applied Sciences
Degrees, Majors, and Concentrations**

Major	Degree	Administered by
Baccalaureate Degrees		
Del E. Webb School of Construction		
Construction ¹ Options: general building construction, heavy construction, residential construction, specialty construction	B.S.	Del E. Webb School of Construction
School of Engineering		
Aerospace Engineering Emphases: aerodynamics, aerospace materials, aerospace structures, computer methods, design, mechanical, propulsion, system dynamics and control	B.S.E.	Department of Mechanical and Aerospace Engineering
Bioengineering ¹ Emphases: biochemical engineering, bioelectrical engineering, biomaterials engineering, biomechanical engineering, biomedical imaging engineering, biosystems engineering, molecular and cellular bioengineering, premedical engineering	B.S.E.	Department of Chemical, Bio, and Materials Engineering
Chemical Engineering ¹ Emphases: biochemical, biomedical, environmental, materials, premedical, process engineering, semiconductor processing	B.S.E.	Department of Chemical, Bio, and Materials Engineering
Civil Engineering ¹ Option: environmental engineering	B.S.E.	Department of Civil and Environmental Engineering
Computer Science ¹	B.S.	Department of Computer Science and Engineering
Computer Systems Engineering ¹	B.S.E.	Department of Computer Science and Engineering
Electrical Engineering ¹	B.S.E.	Department of Electrical Engineering
Engineering Interdisciplinary Studies ²	B.S.	School of Engineering
Engineering Special Studies ¹ Options: manufacturing engineering premedical engineering	B.S.E.	School of Engineering Department of Industrial and Management Systems Engineering
Industrial Engineering ¹	B.S.E.	Department of Industrial and Management Systems Engineering
Materials Science and Engineering ¹ Emphases: biomaterials, ceramic materials, energy systems, integrated circuit materials, manufacturing and materials processing, mechanical metallurgy, metallic materials systems, polymers and composites	B.S.E.	Department of Chemical, Bio, and Materials Engineering
Mechanical Engineering Emphases: aerospace; biomechanical; computer methods; control and dynamic systems; design; energy systems; engineering mechanics; manufacturing; stress analysis, failure prevention, and materials; thermosciences	B.S.E.	Department of Mechanical and Aerospace Engineering

¹ This major requires more than 120 semester hours to complete.

² Applications for this program are not being accepted at this time.

Major	Degree	Administered by
Graduate Degrees		
Del E. Webb School of Construction		
Construction Concentrations: construction science, facilities, management	M.S.	Del E. Webb School of Construction
School of Engineering		
Aerospace Engineering	M.S., M.S.E., Ph.D.	Department of Mechanical and Aerospace Engineering
Bioengineering	M.S., Ph.D.	Department of Chemical, Bio, and Materials Engineering
Chemical Engineering Concentrations: biomedical and clinical engineering, chemical process engineering, chemical reactor engineering, energy and materials conversion, environmental control, solid-state processing, transport phenomena	M.S., M.S.E., Ph.D.	Department of Chemical, Bio, and Materials Engineering
Civil Engineering Concentrations: environmental/sanitary, geotechnical/soil mechanics, structures, transportation, water resources/hydraulics	M.S., M.S.E., Ph.D.	Department of Civil and Environmental Engineering
Computer Science	M.C.S., M.S., Ph.D.	Department of Computer Science and Engineering
Electrical Engineering	M.S., M.S.E., Ph.D.	Department of Electrical Engineering
Engineering Science	M.S., M.S.E., Ph.D.	School of Engineering
Industrial Engineering	M.S., M.S.E., Ph.D.	Department of Industrial and Management Systems Engineering
Mechanical Engineering	M.S., M.S.E., Ph.D.	Department of Mechanical and Aerospace Engineering
Science and Engineering of Materials Concentrations: high-resolution nanostructure analysis, solid-state device materials design	Ph.D. ³	Committee on the Science and Engineering of Materials

¹ This major requires more than 120 semester hours to complete.

² Applications for this program are not being accepted at this time.

³ This program is administered by the Graduate College. See "Graduate College," pages 282–292.

COLLEGE DEGREE REQUIREMENTS

Pass/Fail Grades

Students enrolled in the College of Engineering and Applied Sciences do not receive degree credit for pass/fail courses taken at this institution. In addition, no course in this college is offered for pass/fail credit. Students requesting credit for pass/fail courses taken at another institution must file a Petition for Adjustment to Curriculum Requirements. Each request is judged on its particular merits.

Entry into Upper-Division Courses

Before enrolling in courses at the 300 level and above, students must be in good academic standing in professional program status and have the ap-

proval of their advisors. A student who is not in good academic standing must secure approval from his or her advisor and the college's Student Academic Services. Students whose grades in 300-level courses are unsatisfactory may be required to retake one or more courses for which credit has previously been granted.

The departments and schools have certain additional requirements that must be met in addition to the above college requirements and students should consult them for details.

Course Work Currency

Courses taken more than five years before admission to degree programs in this college are not normally accepted for transfer credit at the option of the department in which the applicant

wishes to enroll. Courses completed within the five years preceding admission are judged as to their applicability to the student's curriculum.

MAJOR REQUIREMENTS

For detailed information on the degree requirements of a major in the College of Engineering and Applied Sciences, refer to that department's or school's individual description on the following pages.

ACADEMIC STANDARDS

Retention. A student is expected to make satisfactory progress toward completion of degree requirements in order to continue enrollment in the College of Engineering and Applied Sciences. Any one of the following condi-

tions is considered unsatisfactory progress and results in the student being placed on probationary status:

1. a semester or summer session with a GPA less than or equal to 1.50;
2. two successive semesters with GPAs less than 2.00; or
3. an ASU cumulative GPA less than 2.00.

Students on probation are subject to disqualification if (1) they do not attain a semester GPA of 2.25; (2) their cumulative GPA is below 2.00 at the end of the probationary semester; or (3) they are placed on probation for two consecutive semesters.

Courses completed during the summer sessions may not be used to reevaluate a student's fall semester probationary status.

Students on academic probation are not allowed to register for more than 13 semester hours of course work. Probationary students may not register for the next semester without a special permit from an advisor in Student Academic Services. Special permits are not given until grades are recorded by the registrar for the current semester.

Disqualification. During a semester on academic probation, a student who fails to meet the retention standards specified above is disqualified. Students may request a review of their disqualification status by contacting the associate director of Student Academic Services in EC G102. Any disqualified student who is accepted by another college at ASU may not register for courses in this college unless the courses are required for the new major. Disqualified students who do register for courses in this college may be withdrawn from these courses any time during that semester. Furthermore, students at the university who have been disqualified academically by this college are not eligible to enroll in summer session courses in this college until the disqualification period has expired and they have been reinstated.

Reinstatement. The College of Engineering and Applied Sciences does not accept an application for reinstatement until the disqualified student has remained out of this college for at least a 12-month period. Merely having remained in a disqualified status for this period of time does not, in itself, constitute a basis for reinstatement. Proof

of ability to do satisfactory college work in the chosen discipline is required, for example, completing at least 15 semester hours of pertinent courses in the discipline at a community college with higher than average grades, and a cumulative GPA of 2.50 or higher for all courses completed.

STUDENT RESPONSIBILITIES

Course Prerequisites. Students should consult the *Schedule of Classes* and the catalog for course prerequisites. Students who register for courses without the designated prerequisites may be withdrawn without the student's consent at any time before the final examination. Such withdrawal may be initiated by the instructor, the chair of the department offering the course, the director of Student Academic Services, or the dean of the college. In such cases, students will not receive monetary reimbursement. However, such withdrawal is considered to be unrestricted as described on page 73 and does not count against the number of restricted withdrawals allowed.

SPECIAL PROGRAMS

Foundation Coalition. ASU is a member of the Foundation Coalition, a National Science Foundation-funded group of seven institutions of higher learning across the U.S. that is working to improve engineering education. Foundation Coalition programs are intended to

1. demonstrate and promote the interrelationships of subject matter within the curriculum;
2. improve the interpersonal skills of students and the understanding of concepts through the use of more teaming and cooperative learning environments;
3. increase the use of technology in the curriculum; and
4. assess and evaluate intended improvements.

Such changes address the desires of employers, increase the numbers of baccalaureate degrees earned by members of currently underrepresented groups, and promote curriculum improvement. Foundation Coalition improvements are presently available to all freshmen and sophomores except those in Chemical, Bio, and Materials Engineering, and to juniors and seniors

in Electrical Engineering and Industrial and Management Systems Engineering.

Foundation Coalition programs offer students a more hands-on, team-based, computer-intensive approach to the curriculum. The freshman programs provide an important opportunity for new students to get to know a small group of students, making a large university seem less overwhelming. The programs also involve more interactions with faculty and access to special tutors. All students will get a team-based, computer-intensive education in ECE 100, Introduction to Engineering Design, but the Foundation Coalition program extends this experience to many more subjects and courses.

Freshmen Foundation Coalition programs offer both an integrated set of courses which include engineering, calculus, physics, and English in both the first and second semesters, and smaller integration packages that include engineering and English. In these packages, the same set of students take all of the courses in the package in high-tech, team-promoting classrooms while the faculty work together to deliver a unified set of courses. Sophomore programs presently involve courses in mathematics, mechanics, and electrical circuits.

Students interested in these programs should see their department advisor or inquire in the office of the Center for Innovation in Engineering Education in room EC G205 or call 602/965-5350, or visit our Web site at www.eas.asu.edu/~asufc.

Minority Engineering Program. The staff of the Minority Engineering Program (MEP) is available to assist the academic and professional development of prospective, newly admitted, and continuing students through a variety of support services. In addition, advice on financial aid, scholarships, and employment is provided. Visit the MEP office located in room EC G307 or call 602/965-8275, or visit our Web site at www.eas.asu.edu/~omep.

Women in Applied Sciences and Engineering Program. The Women in Applied Sciences and Engineering (WISE) Program hosts seminars and workshops, and provides outreach programs to high school and community college students. WISE offers a professional development course, STE 194 Engineering for Undecided, to acquaint

students with a variety of technical careers. The WISE Center, located in room EC G214, is open for study groups, tutoring, and informal discussions. The phone number is 602/965-6882. The Web address is www.eas.asu.edu/~wise.

Student Academic Services. The dean's office of the College of Engineering and Applied Sciences maintains a special office staffed to assist students in various matters. This office coordinates the work of the College Admissions and Standards Committee and administers the probation, disqualification, and readmission processes for students who are academically deficient.

Academic Honors. Students completing baccalaureate degree requirements receive the appropriate honors designations on their diplomas consistent with the requirements specified by the university.

Students in the College of Engineering and Applied Sciences are encouraged to seek information concerning entry into those honor societies for which they may qualify. Membership in such organizations enhances the student's professional stature. The following honor societies are active within the college:

- Alpha Pi Mu—Industrial Engineering Honor Society
- Chi Epsilon—Civil Engineering Honor Society
- Eta Kappa Nu—Electrical Engineering Honor Society
- Pi Tau Sigma—Mechanical Engineering Honor Society
- Sigma Gamma Tau—Aerospace Engineering Honor Society
- Sigma Lambda Chi—Construction Honor Society
- Tau Beta Pi—National Engineering Honor Society
- Upsilon Pi Epsilon—National Computer Science Honor Society

Information on any of these organizations may be obtained from the respective department or school offices.

University Honors College. The College of Engineering and Applied Sciences participates in the programs of the University Honors College, which provides enhanced educational experi-

ences to academically superior undergraduate students. Participating students can major in any academic program. A description of the requirements and the opportunities offered by the University Honors College can be found on pages 293-295.

Scholarships. Information and applications for academic scholarships for continuing students may be obtained by contacting the college's Student Academic Services or the various department or school offices. Other scholarships may be available through the university Student Financial Assistance Office.

ASU 3+2 Programs. Students desiring to earn a baccalaureate degree from Grand Canyon University (Phoenix, Arizona) in Mathematics, Chemistry, Construction, or Physics or from Southwestern University (Georgetown, Texas) in Physical Science and a baccalaureate degree in one of the engineering majors or the Construction major from ASU can take advantage of a 3+2 program approved by these institutions. Such students complete the first three years of study at their respective college or university and the last two years of study at ASU. At the end of the fourth or fifth year, assuming all degree requirements have been met, the baccalaureate degree is awarded by the student's respective college or university and the appropriate engineering or construction baccalaureate degree is awarded by ASU.

A similar 3+2 program is available to qualified students from Long Island University/C.W. Post Campus, College of Arts and Sciences, who wish to earn both a B.S. degree from C.W. Post in Mathematics or Physics and a Bachelor of Science in Engineering degree from ASU in Civil, Chemical, Electrical, Industrial, or Mechanical Engineering.

More information can be obtained by writing to one of the following offices:

OFFICE OF THE ADMINISTRATIVE
VICE PRESIDENT
GRAND CANYON UNIVERSITY
3300 W CAMELBACK RD
PHOENIX AZ 85017-1097

PROVOST AND DEAN OF THE BROWN
COLLEGE OF ARTS AND SCIENCES
SOUTHWESTERN UNIVERSITY
GEORGETOWN TX 78626

DEAN, COLLEGE OF ARTS AND
SCIENCES
C.W. POST CAMPUS
LONG ISLAND UNIVERSITY
BROOKVILLE NY 11548

OFFICE OF THE DEAN
COLLEGE OF ENGINEERING AND
APPLIED SCIENCES
ARIZONA STATE UNIVERSITY
PO Box 875506
TEMPE AZ 85287-5506

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC programs are required to take from 12 to 20 hours in the Department of Aerospace Studies or Department of Military Science. To preclude excessive overloads, these students should plan on at least one additional semester to complete degree requirements. Because of accreditation requirements, aerospace studies (AES) or military science (MIS) courses are not acceptable for degree credit in engineering as social and behavioral science or humanities and fine arts under General Studies. ROTC students must also meet all other degree requirements of this college.

GENERAL INFORMATION

Definition of Terms. The terms used in this college to describe offerings are defined below for purposes of clarity.

Program of Study. This broad term describes the complete array of courses included in the study leading to a degree.

Major. This term describes a specialized group of courses contained within the program of study. Example: program of study—engineering; major—Civil Engineering.

Area of Emphasis (Technical Electives), Option, or Concentration. Each of these terms describes a selection of courses within a major or among one or more majors. The number of technical electives varies from curriculum to curriculum. In a number of the majors, the technical electives must be chosen from preselected groups. For this reason the choice of specific technical electives for an area of emphasis should be done with the advice and counsel of an advisor. Example: major—Mechanical Engineering; area of emphasis—thermosciences.

Del E. Webb School of Construction

William W. Badger
 Director
 (JWS 268) 602/965-3615
 www.eas.asu.edu/dewsc

PROFESSORS

BADGER, MULLIGAN

ASSOCIATE PROFESSORS

BASHFORD, ERNZEN, WEBER

ASSISTANT PROFESSORS

CHASEY, KASHIWAGI,
 WALSH, WIEZEL

VISITING EMINENT SCHOLAR

SCHEXNAYDER

PURPOSE

Construction careers are so broadly diversified that no single curriculum prepares the student for universal entry into all fields. As an example, heavy construction contractors usually place more emphasis on technical and engineering science skills than do residential contractors/developers, who usually prefer a greater depth of knowledge in management and construction. To ensure a balanced understanding of the technical, professional, and philosophical standards that distinguish modern-day constructors, advisory groups representing leading associations of contractors and builders provide counsel in curriculum development. Construction has a common core of engineering science, management, and behavioral courses on which students may build defined options to suit individual backgrounds, aptitudes, and objectives. These options are not absolute but generally match major divisions of the construction industry.

DEGREES

Bachelor of Science (B.S.) Degree.

The faculty in the Del E. Webb School of Construction offer the B.S. degree in Construction. Four options are available: general building, heavy construction, residential construction, and specialty construction.

Each option is arranged to accent requisite technical skills and to develop management, leadership, and competitive qualities in the student. Prescribed are a combination of General Studies, technical courses basic to engineering and construction, and a broad range of applied management subjects fundamental to the business of construction contracting.

Master of Science (M.S.) Degree.

The Del E. Webb School of Construction also offers the M.S. degree in Construction. Additional details for this degree are found in the *Graduate Catalog*.

Professional Accreditation and Affiliations.

The Del E. Webb School of Construction is a member of the Associated Schools of Construction, an organization dedicated to the development and advancement of construction education. The construction program is accredited by the American Council for Construction Education (ACCE).

SPECIAL PROGRAMS

The Del E. Webb School of Construction maintains a cooperative agreement with community colleges within Arizona and also with selected out-of-state colleges and universities to structure courses that are directly transferable into the construction program at ASU.

ASU 3+2 Program. The Del E. Webb School of Construction also participates in the ASU 3+2 program with Grand Canyon University and Southwestern University. See page 190 for details.

Student Organizations. The school has a chapter of Sigma Lambda Chi (SLC), a national honor society that recognizes high academic achievement in accepted construction programs. The school is also host to the Associated General Contractors of America (AGC) student chapter, the National Association of Home Builders (NAHB) student chapter, and the National Association of Women in Construction (NAWIC) student chapter.

Scholarships. Apart from those given by the university, a number of scholarships from the construction industry are awarded to students registered in the construction program. The scholar-

ships are awarded on the basis of academic achievement and participation in activities of the construction program.

ADMISSION

See pages 59–78, 184–185, and 188–189 for information regarding requirements for admission, transfer, retention, qualification, and reinstatement. A preprofessional category is available for applicants deficient in regular admission requirements. Vocational and craft-oriented courses taught at the community colleges are not accepted for credit toward a bachelor's degree in Construction.

BASIC REQUIREMENTS

Students complete the following basic requirements before registering for advanced courses: (1) all first-semester, first-year courses and the university First-Year Composition requirement (see page 79) must be completed by the time the student has accumulated 48 semester hours of program requirements, and (2) all second-semester, first-year courses must be completed by the time the student has completed 64 semester hours of program requirements. Transfer students are given a one-semester waiver.

Any student not making satisfactory progress is permitted to register for only those courses required to correct any deficiencies.

DEGREE REQUIREMENTS

A minimum of 128 semester hours with at least 50 hours at the upper-division level is required for graduation in the general building construction, heavy construction, residential construction, and specialty construction options. Students in all options are required to complete a construction core of science-based engineering, construction, and management courses.

GRADUATION REQUIREMENTS

In addition to fulfilling school and major requirements, majors must satisfy the General Studies requirements as noted on pages 84–87 and all university graduation requirements as noted on pages 79–83. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

SCHOOL COURSE REQUIREMENTS

The school requires that the General Studies requirement be satisfied in the following manner:

*Humanities and Fine Arts/
Social and Behavioral Sciences*

CON 101	Construction and Culture: A Built Environment <i>HU, G, H</i>	3
ECN 111	Macroeconomic Principles <i>SB</i>	3
ECN 112	Macroeconomic Principles <i>SB</i>	3
HU, SB, and	awareness area courses as needed	6
Total	.....	15

Literacy and Critical Inquiry

COM 225	Public Speaking <i>L1</i>	3
ECE 400	Engineering Communications <i>L2</i>	3
	or ETC 400 Technical Communications <i>L2</i> (3)	—
Total	.....	6

Natural Sciences

PHY 111	General Physics <i>S1/S2</i> ¹	3
PHY 112	General Physics <i>S1/S2</i> ²	3
PHY 113	General Physics Laboratory <i>S1/S2</i> ¹	1
PHY 114	General Physics Laboratory <i>S1/S2</i> ²	1
Natural Sciences total	.....	8

Numeracy

MAT 270	Calculus with Analytic Geometry <i>I NI</i>	4
STP 226	Elements of Statistics <i>N2</i>	3
Total	.....	7
General Studies/school requirements total ³	.....	36

¹ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

² Both PHY 112 and 114 must be taken to secure S1 or S2 credit.

³ Because of the school's requirement for MAT 270, the total semester hours exceed the General Studies requirement of 35.

Construction Major Requirements Common to All Options (Except as Noted)

ACC 394	ST: Financial Analysis and Accounting for Small Businesses	3
CEE 310	Testing of Materials for Construction	3
CEE 340	Hydraulics and Hydrology	3

CEE 450	Soil Mechanics in Construction	3
CON 221	Applied Engineering Mechanics: Statics	3
CON 243	Heavy Construction Equipment, Methods, and Materials	3
CON 251	Microcomputer Applications for Construction	3
CON 252	Building Construction Methods, Materials, and Equipment	3
CON 273	Electrical Construction Fundamentals	3
CON 323	Strength of Materials	3
CON 341	Surveying	3
CON 345	Mechanical Systems	3
CON 371	Construction Management and Safety	3
CON 383	Construction Estimating	3
CON 389	Construction Cost Accounting and Control <i>N3</i>	3
CON 424	Structural Design	3
CON 453	Construction Labor Management	3
CON 463	Foundations	3
CON 495	Construction Planning and Scheduling <i>N3</i>	3
CON 496	Construction Contract Administration <i>L2</i>	3
ECE 100	Introduction to Engineering Design <i>N3</i>	4
LES 306	Business Law	3
Science elective with lab	.....	4
Total common to all options	.....	71

Advisor-approved alternates/transfer credits for these courses may vary from the total required semester hours indicated. Such variances do not reduce the minimum of 128 semester hours required for the degree.

The course work for the first two years is the same for the general building, heavy, residential, and speciality construction options.

First Semester

CON 101	Construction and Culture: A Built Environment <i>HU, G, H</i>	3
ECN 111	Macroeconomic Principles <i>SB</i>	3
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry <i>I NI</i>	4
PHY 111	General Physics <i>S1/S2</i> ¹	3
PHY 113	General Physics Laboratory <i>S1/S2</i> ¹	1
Total	.....	17

Second Semester

ECE 100	Introduction to Engineering Design <i>N3</i>	4
ECN 112	Microeconomic Principles <i>SB</i>	3
ENG 102	First-Year Composition	3
PHY 112	General Physics <i>S1/S2</i> ²	3
PHY 114	General Physics Laboratory <i>S1/S2</i> ²	1
HU elective	.....	3
Total	.....	17

Third Semester

CON 221	Applied Engineering Mechanics: Statics	3
CON 243	Heavy Construction Equipment, Methods, and Materials	3
CON 251	Microcomputer Applications for Construction	3
STP 226	Elements of Statistics <i>N2</i>	3
Basic science elective with lab	.....	4
Total	.....	16

Fourth Semester

ACC 394	ST: Financial Analysis and Accounting for Small Businesses	3
COM 225	Public Speaking <i>L1</i>	3
CON 252	Building Construction Methods, Materials, and Equipment	3
CON 273	Electrical Construction Fundamentals	3
CON 323	Strength of Materials	3
Total	.....	15

¹ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

² Both PHY 112 and 114 must be taken to secure S1 or S2 credit.

Option in General Building Construction

The general building construction option provides a foundation for students who wish to pursue careers as estimators, project managers, project engineers, and, eventually, owners of firms engaged in the construction of residential, commercial, and institutional structures. Educational focus is on building systems required for the mass development and production of large-scale projects. General building construction is addressed as an integrated process from conception through delivery of completed facilities to users.

Requirements

CON 472	Development Feasibility Reports L2	3
CON 483	Advanced Building Estimating	3
PUP 432	Planning and Development Control Law or PUP 433 Zoning Ordinances, Subdivision Regulations, and Building Codes (3)	3
REA 394	Real Estate Fundamentals	3
	Upper-Division Technical Elective	3
Total		15

Option in Heavy Construction

The heavy construction option prepares students for careers related to the public works discipline. Typical projects in which they are involved are highways, railroads, airports, power plants, rapid transit systems, process plants, harbor and waterfront facilities, pipelines, dams, tunnels, bridges, canals, sewerage and water works, and mass earthwork.

Requirements

CON 344	Route Surveying	3
CON 486	Heavy Construction Estimating	3
	Upper-division technical elective	9
Total		15

Option in Residential Construction

The residential construction option prepares students for careers in the residential sector of the industry. This option covers the specific methods and processes during the planning, production, marketing and business-related activities, common to residential construction.

Requirements

CON 377	Residential Construction Production Procedures	3
CON 477	Residential Construction Business Practices	3
MKT 300	Principles of Marketing	3
PUP 432	Planning and Development Control Law or PUP 433 Zoning Ordinances, Subdivision Regulations, and Building Codes (3)	3
	Internship	3
Total		15

Option in Specialty Construction

The specialty construction option prepares students for careers with specialty constructors, such as mechanical and electrical construction firms. It emphasizes the construction process at the subcontractor level.

Requirements

CON 455	Construction Office Methods	3
CON 468	Mechanical and Electrical Estimating	3
	Upper-division technical electives	9
Total		15

CONSTRUCTION (CON)

CON 101 Construction and Culture: A Built Environment. (3) F, S

An analysis of the cultural context of construction, emphasizing its centrality in the evolution and expansion of built environments as expressions of ethical and historical value systems. Lecture, speakers, field trips. *General Studies: HU, G, H.*

CON 221 Applied Engineering Mechanics: Statics. (3) F, S

Vectors, forces and moments, force systems, equilibrium, analysis of basic structures and structural components, friction, centroids, and moments of inertia. Prerequisites: MAT 270; PHY 111, 113.

CON 243 Heavy Construction Equipment, Methods, and Materials. (3) F, S

Emphasis on "Horizontal" construction. Fleet operations, maintenance programs, methods, and procedures to construct tunnels, roads, dams, and the excavation of buildings. Lab, field trips.

CON 251 Microcomputer Applications for Construction. (3) F, S

Applications of the microcomputer as a problem-solving tool for the constructor. Use of spreadsheets, information management, and multimedia software. Prerequisite: ECE 100.

CON 252 Building Construction Methods, Materials, and Equipment. (3) F, S

Emphasis on "Vertical" construction. Methods, materials, codes, and equipment used in building construction corresponding to the 16 division "Master Format." Lecture, lab.

CON 273 Electrical Construction Fundamentals. (3) F, S

Circuits and machinery. Power transmission and distribution, with emphasis on secondary distribution systems. Measurements and instrumentation. Lecture, field trips. Prerequisites: MAT 270 or equivalent; PHY 112, 114.

CON 323 Strength of Materials. (3) F, S

Analysis of strength and rigidity of structural members in resisting applied forces. Stress, strain, shear, moment, deflections, combined stresses, connections, and moment distribution. Both US and SI units of measurement. Prerequisite: CON 221.

CON 341 Surveying. (3) F, S

Theory and field work in construction and land surveys. Lecture, lab. Prerequisite: MAT 170.

CON 344 Route Surveying. (3) S

Simple, compound, and transition curves, including reconnaissance, preliminary, and location surveys. Calculation of earthwork. Dimensional control for construction projects. Lecture, lab. Prerequisites: CON 243, 341.

CON 345 Mechanical Systems. (3) F, S

Design parameters and equipment related to heating and cooling systems for mechanical construction. Computer-aided calculations. Lecture, field trips. Prerequisites: CON 252; PHY 111, 113.

CON 371 Construction Management and Safety. (3) F, S

Organization and management theory applied to the construction process. Leadership functions. Safety procedures and equipment. OSHA requirement for construction. Prerequisite: junior standing.

CON 377 Residential Construction Production Procedures. (3) F

The process used in residential construction. How a house is built: design, permits, scheduling, codes, contracting, site management, mechanical/electrical. Prerequisite: CON 252.

CON 383 Construction Estimating. (3) F, S

Drawings and specifications. Methods and techniques used in construction estimating procedures. Introduction to computer software used in industry. Lecture, project workshops. Prerequisites: CON 243 and 251 and 252 and 273 and Construction major or instructor approval.

CON 389 Construction Cost Accounting and Control. (3) F, S

Nature of construction cost. Depreciation and tax theory and variable equipment costs. Cash flow theory, investment models, profitability, and analysis. Computer applications. Funding sources and arrangements. Builder's insurance. Prerequisites: ACC 394 ST: Survey of Accounting; CON 251. *General Studies: N3.*

CON 424 Structural Design. (3) F, S

Economic use of concrete, steel, and wood in building and engineered structures. Design of beams, columns, concrete formwork, and connections. Lecture, field trips. Prerequisite: CEE 310.

CON 453 Construction Labor Management. (3) F, S

Labor and management history, union, and open shop organization of building and construction workers; applicable laws and government regulations; goals, economic power, jurisdictional disputes, and grievance procedures. Lecture, lab. Prerequisites: CON 371; ECN 112.

CON 455 Construction Office Methods. (3) F, S

Administrative systems and procedures for the construction company office, including methods improvement and work simplification, policy and procedures. Pre- or corequisite: CON 389.

CON 463 Foundations. (3) F, S

Subsurface construction theory and practice for description, excavations, exploration, foundations, pavements, and slopes. Evaluation of specifications and plans of work. Lecture, recitation, field trips. Prerequisites: CEE 450; CON 424.

CON 468 Mechanical and Electrical Estimating. (3) F

Analysis and organization of performing a cost estimate for both mechanical and electrical construction projects. Computer usage. Prerequisites: CON 273 and 345 and 383 or instructor approval.

CON 472 Development Feasibility Reports. (3) F, S

Integration of economic location theory, development cost data, market research data, and financial analysis into a feasibility report. Computer orientation. Prerequisite: REA 394 ST: Real Estate Fundamentals. *General Studies: L2.*

CON 477 Residential Construction Business Practices. (3) F, S

Topics addressed will include development, marketing, financing, legal issues, and sales. Prerequisite: CON 377 or instructor approval.

CON 483 Advanced Building Estimating. (3) S

Concepts of pricing and markup, development of historic costs, life cycle costing, change order and conceptual estimating, and emphasizing microcomputer methods. Prerequisite: CON 383.

CON 486 Heavy Construction Estimating. (3) F

Methods analysis and cost estimation for construction of highways, bridges, tunnels, dams, and other engineering works. Lecture, field trips. Prerequisite: CON 383. Pre- or corequisite: CON 344.

CON 495 Construction Planning and Scheduling. (3) F, S

Various network methods of project scheduling, such as AOA, AON Pert, bar-charting, line-of-balance, and VPM techniques. Microcomputers used for scheduling, resource allocation, and time/cost analysis. Lecture, lab. Prerequisites: CON 383; STP 226. Pre- or corequisite: CON 389. *General Studies: N3.*

CON 496 Construction Contract Administration. (3) F, S

Survey administrative procedures of general and subcontractors. Study documentation, claims, arbitration, litigation, bonding, insurance, and indemnification. Discuss ethical practices. Lecture, field trips. Prerequisites: ECE 400 (or ETC 400); senior standing. Pre- or corequisite: CON 371. *General Studies: L2.*

CON 533 Strategies of Estimating and Bidding. (3) F

Course will explore advanced concepts of the estimating process, such as modeling and statistical analysis, to improve bid accuracies. Prerequisite: CON 483 or 486 or instructor approval.

CON 540 Construction Productivity. (3) F

Productivity concepts. Data collection. Analysis of productivity data and factors affecting productivity. Means for improving production and study of productivity improvement programs. Pre- or corequisite: CON 495.

CON 543 Construction Equipment Engineering. (3) S

Analysis of heavy construction equipment productivity using case studies. Applies engineering fundamentals to the planning, selection, and utilization of equipment. Lecture, case studies.

CON 545 Construction Project Management. (3) S

Theory and practice of construction project management. Roles of designer, owner, general contractor, and construction manager. Lecture, field trips. Pre- or corequisite: CON 495.

CON 547 Strategic Planning. (3) S

The business planning process of the construction enterprise. Differences between publicly held and closely held businesses and their exposure.

CON 561 International Construction. (3) S

An investigation of the cultural, social, economic, political, and management issues related to construction in foreign countries and remote regions.

CON 577 Construction Systems Engineering. (3) F

Systems theory as applied to the construction process. Alternates for structuring information flows and the control of projects. Prerequisite: IEE 476 or equivalent.

CON 589 Construction Company Financial Control. (3) F

Financial accounting and cost control at the company level in construction companies. Accounting systems. Construction project profit calculations. Financial analysis. Lecture, case studies.

School of Engineering

Daniel F. Jankowski

Director

(EC G104) 602/965-1726

PURPOSE

A large percentage of all engineering degree holders are found in leadership positions in a wide variety of industrial settings. Although an education in engineering is generally considered to be one of the best technical educations, it also provides an opportunity for the development of many additional attributes, including ethical and professional characteristics. In this era of rapid technological change, an engineering education serves our society well as a truly liberal education. Society's needs in the decades ahead call for engineering contributions on a scale not previously experienced. The well-being of our civilization as we know it may depend upon how effectively this resource is developed.

Students studying engineering at ASU are expected to acquire a thorough understanding of the fundamentals of mathematics and the sciences and their applications to the solution of problems in the various engineering fields. The program is designed to develop a balance between science and engineering and an understanding of the economic and social consequences of engineering activity. The goals include the promotion of the general welfare of the engineering profession.

The courses offered are designed to meet the needs of the following students:

1. those who wish to pursue a career in engineering;
2. those who wish to do graduate work in engineering;
3. those who wish to have one or two years of training in mathematics, applied science, and engineering in preparation for some other technical career;
4. those who desire pre-engineering for the purpose of deciding which program to undertake or those who desire to transfer to another college or university; and
5. those who wish to take certain electives in engineering while pursuing another program in the university.

ADMISSION

See pages 59–78, 184–185, and 188–189 for information regarding requirements for admission, transfer, retention, disqualification, and reinstatement.

Individuals who are beginning their initial college work in the School of Engineering should have completed certain secondary school units in addition to the minimum university requirements. Four units are required in mathematics. A course with trigonometry should be included. The laboratory sciences chosen must include at least one unit in physics and one unit in chemistry. Calculus, biology, and computer programming are recommended. Students who do not meet the college's subject matter requirements may be required to complete additional university course work that may not apply toward an engineering degree. One or more of the courses—CHM 113 General Chemistry, CSE 181 Applied Problem Solving with BASIC, MAT 170 Precalculus, and PHY 105 Basic Physics—may be required to satisfy omissions or deficiencies.

DEGREES

The Bachelor of Science in Engineering (B.S.E.) degree consists of three parts:

1. university requirements (e.g., General Studies, First-Year Composition);

2. an engineering core; and
3. a major.

The courses identified for each of these parts are intended to meet requirements imposed by the university and by the professional accrediting agency, Accreditation Board for Engineering and Technology, Inc. (ABET), for programs in engineering.

The B.S. degree in Computer Science consists of two parts:

1. university requirements (e.g., General Studies, First-Year Composition); and
2. a major.

The courses identified for each of these parts are intended to meet requirements imposed by the university and by the professional accrediting agency, the Computer Science Accreditation Board (CSAB), for programs in computing science.

In addition to First-Year Composition, the university requires, under the heading of General Studies, courses in literacy and critical inquiry, humanities and fine arts, social and behavioral sciences, numeracy, and natural sciences (see pages 84–87). There are also requirements in historical awareness, global awareness, and cultural diversity in the United States. ABET and CSAB impose additional requirements, particularly in mathematics and the basic sciences and in the courses for the major.

The engineering core is an organized body of knowledge that serves as a foundation to engineering and for further specialized studies in a particular engineering major.

The courses included in the engineering core are taught in such a manner that they serve as basic background material: (1) for all engineering students who will be taking subsequent work in the same and related subject areas; and (2) for those students who may not desire to pursue additional studies in a particular subject area. Thus, subjects within the engineering core are taught with an integrity and quality appropriately relevant to the particular discipline but always with an attitude and concern for both engineering in general and for the particular major(s).

The majors available are of two types: (1) those associated with a particular department within the School of Engineering (for example, Electrical Engineering and Civil Engineering) and

(2) those offered as options in Engineering Special Studies (for example, manufacturing engineering and pre-medical engineering). With the exception of the Computer Science major, all curricula are extensions beyond the engineering core and cover a wide variety of subject areas within each field. Some of the credits in the major are reserved for the student's use as an area of emphasis. These credits are traditionally referred to as *technical electives*.

Majors and areas of emphasis are offered by the six departments: Chemical, Bio, and Materials Engineering; Civil and Environmental Engineering; Computer Science and Engineering; Electrical Engineering; Industrial and Management Systems Engineering; and Mechanical and Aerospace Engineering. The major in Engineering Special Studies is administered by the Office of the Dean. Engineering Special Studies makes use of the general structure of the engineering curricula noted above and provides students with an opportunity for study in engineering options not available in the traditional engineering curricula at ASU.

The first two years of study are concerned primarily with general education requirements, English proficiency, and the engineering core. The final two years of study are concerned with the engineering core and the major, with a considerable part of the time being spent on the major.

The semester-by-semester selection of courses may vary from one field to another, particularly at the upper-division level, and is determined by the student in consultation with a faculty advisor. An example of a typical full-time freshman schedule is shown below; depending on a particular student's circumstances, many other examples are possible.

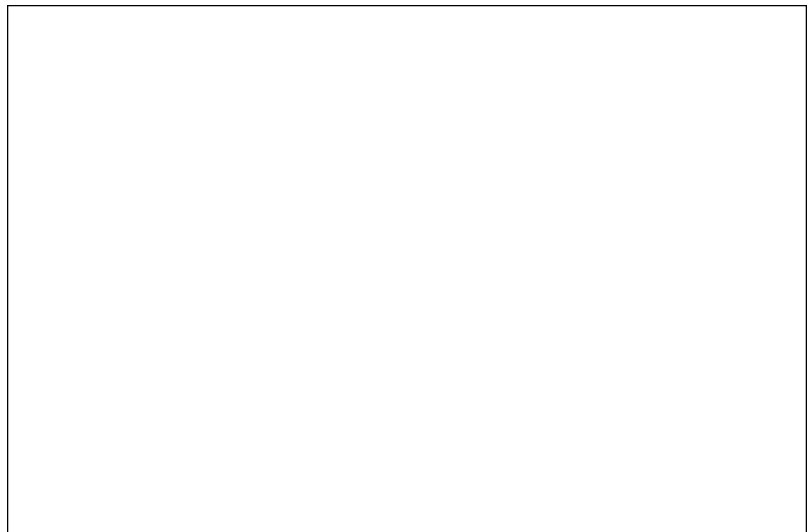
Typical Freshman Year

First Semester

CHM	114	General Chemistry for Engineers <i>S1/S2</i>	4
ECE	100	Introduction to Engineering Design <i>N3</i>	4
ECN	111	Macroeconomic Principles <i>SB</i>	3
		or ECN 112 Microeconomic Principles <i>SB</i> (3)	
ENG	101	First-Year Composition	3
ENG	102	First-Year Composition	3
MAT	270	Calculus with Analytic Geometry I <i>NI</i>	4
MAT	271	Calculus with Analytic Geometry II	4
PHY	121	University Physics I: Mechanics <i>S1/S2*</i>	3
PHY	122	University Physics Laboratory I <i>S1/S2*</i>	1
		HU, SB, and awareness area course	3
Total			32

* Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

Well-prepared students who have no outside commitments can usually complete the program of study leading



Under direction from regents' professor John Spence (center), Uwe Weierstall (left) and research assistant J.M. Zuo work on silicon surface reconstruction.

to an undergraduate degree in engineering in four years (eight semesters at 16 semester hours per semester). Many students, however, find it advantageous or necessary to devote more than four years to the undergraduate program by pursuing, in any semester, fewer studies than are regularly prescribed. Where omissions or deficiencies exist, e.g., in chemistry, computer programming, English, mathematics, and physics, the student must complete more than the minimum of 128 semester hours. Therefore, in cases of inadequate secondary preparation, poor health, or financial necessity requiring considerable time for outside work, the undergraduate program is extended beyond four years.

DEGREE REQUIREMENTS

The degree programs in engineering at ASU are intended to develop habits of quantitative thought having equal utility for both the practice of engineering and other professional fields. In response to the opportunities provided by changing technology, educational research, and industrial input, possible improvements of various aspects of these programs are routinely considered. It is the intent of the faculty that all students be appropriately prepared in the four areas described below.

1. *Oral and written English.* Communication skills are an essential component of an engineering education. All engineering students must complete the university First-Year Composition requirement (see page 79) and the literacy and critical inquiry component (see page 85) of the General Studies requirement, which involves two courses beyond First-Year Composition.
2. *Selected nonengineering topics.* This area ensures that the engineering student acquires a satisfactory level of basic knowledge in the humanities and fine arts, social and behavioral sciences, numeracy, and the natural sciences. Courses in these subjects give engineers an increased awareness of their social responsibilities, provide an understanding of related factors in the decision-making process, and also

provide a foundation for the study of engineering. Required courses go toward fulfilling the General Studies requirement. Additional courses in mathematics and the basic sciences are selected to meet ABET requirements.

Because of accreditation requirements, aerospace studies (AES) and military science (MIS) courses are not acceptable for engineering degree credit in fulfilling the humanities and fine arts and social and behavioral science portions of the General Studies requirement.

3. *Selected engineering topics.* This area involves courses in engineering science and engineering design. The courses further develop the foundation for the study of engineering and provide the base for specialized studies in a particular engineering discipline. The specific courses are included in the engineering core and in the major. While some departmental choices are allowed, all students are required to take ECE 100 Introduction to Engineering Design and ECE 300 Intermediate Engineering Design as part of the engineering core. These courses, together with other experiences in the engineering core and in the major, serve to integrate the study of design, the "process of devising a system, component, or process to meet desired needs" (ABET), throughout the engineering curricula.
4. *Specific engineering discipline.* This area provides a depth of understanding of a more definitive body of knowledge that is appropriate for a specific engineering discipline. Courses build upon the background provided by the earlier completed portions of the curriculum and include a major design experience as well as technical electives that may be selected by the student with the assistance of an advisor. The catalog material for the individual engineering majors describes specific departmental requirements.

COURSE REQUIREMENTS

A summary of the degree requirements is as follows:

First-Year Composition	3-6
General Studies/School Requirements	58
Engineering core	15-19
Major (including area of emphasis)	45-49
The requirements for each of the majors offered are described on the following pages.	
Total	128

The specific course requirements for the B.S. and B.S.E. degrees follow.

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105	
	Advanced First-Year Composition (3)	
	or ENG 107, 108	
	English for Foreign Students (6)	
Total		6

General Studies/School Requirements

Humanities and Fine Arts/

Social and Behavioral Sciences

Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU or SB requirements.

ECN 111	Macroeconomic Principles SB	3
	or ECN 112 Microeconomic Principles SB (3)	
HU course(s)		6 or 10
SB course(s)		7 or 3
Total		16

Literacy and Critical Inquiry

ECE 300	Intermediate Engineering Design L1	3
ECE 400	Engineering Communications L2	3
	or approved department L2 course (3)	
Total		6

Natural Sciences/Basic Sciences

CHM 114	General Chemistry for Engineers S1/S2	4
	or CHM 116 General Chemistry S1/S2 (4)	
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1

Department basic science elective	3
Total	15
<i>Numeracy/Mathematics</i>	
ECE 100 Introduction to Engineering Design N3	4
MAT 270 Calculus with Analytic Geometry I/II	4
MAT 271 Calculus with Analytic Geometry II	4
MAT 272 Calculus with Analytic Geometry III	4
MAT 274 Elementary Differential Equations	3
Department mathematics elective	2
Total	21
General Studies/school requirements total	58

- ¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Engineering Core

A minimum of five of the following eight courses are required, totaling 15 to 19 semester hours. Courses selected are subject to departmental approval. See department requirements.

ECE 210 Engineering Mechanics I: Statics	3
ECE 301 Electrical Networks I	4
ECE 312 Engineering Mechanics II: Dynamics	3
ECE 313 Introduction to Deformable Solids	3
ECE 334 Electronic Devices and Instrumentation	4
ECE 340 Thermodynamics	3
or CHM 441 General Physical Chemistry (3) or MSE 430 Thermodynamics of Materials (3)	
ECE 350 Structure and Properties of Materials	3
or CHM 442 General Physical Chemistry (3) or ECE 351 Engineering Materials (3) or ECE 352 Properties of Electronic Materials (4)	
Choose from one of the microcomputer/microprocessor courses below	3-4
BME 470 Microcomputer Applications in Bioengineering (4)	
CHE 461 Process Control N3 (4)	
CSE/EEE 225 Assembly Language Programming and Microprocessors (Motorola) (4)	
CSE/EEE 226 Assembly Language Programming and Microprocessors (Intel) (4)	

IEE 463 Computer-Aided Manufacturing and Control N3 (3)	—
Engineering core minimum total	15

GRADUATION REQUIREMENTS

To qualify for graduation from the School of Engineering, a student must have a minimum cumulative GPA of 2.00 in addition to having a GPA of at least 2.00 for the courses in the major field.

PROFESSIONAL ACCREDITATION

The undergraduate programs in Aerospace Engineering, Bioengineering, Chemical Engineering, Civil Engineering, Computer Systems Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, and Engineering Special Studies are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410/347-7700. The Bachelor of Science program in Computer Science is accredited by the Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board (CSAB).

ANALYSIS AND SYSTEMS (ASE)

- ASE 100 College Adjustment and Survival.** (2) F, S
 Exploration of career goals and majors. Emphasis on organization and development of study skills, including time management, stress management, and use of the library.
- ASE 399 Cooperative Work Experience.** (1) F, S, SS
 Usually involves two six-month work periods with industrial firms or government agencies alternated with full-time semester and summer sessions studies. Not open to students from other colleges on campus. May be repeated for credit. Prerequisites: at least 45 hours completed in major area with minimum 2.50 GPA; instructor approval.
- ASE 485 Engineering Statistics.** (3) F, S, SS
 Designing statistical studies for solutions to engineering problems. Methods include regression, design and analysis of experiments, and other statistical topics. Prerequisite: ECE 380. *General Studies: N2.*
- ASE 490 Project in Design and Development.** (2-3) F, S, SS
 Individual project in creative design and synthesis. Course may be repeated. Prerequisite: senior standing.
- ASE 496 Professional Seminar.** (0) F, S
 Topics of interest to students in the engineering special and interdisciplinary studies.

- ASE 500 Research Methods: Engineering Statistics.** (3) F, S, SS
 Designing statistical studies for solutions to engineering problems. Methods include regression, design and analysis of experiments, and other statistical topics. Prerequisite: ECE 380.
- ASE 582 Linear Algebra in Engineering.** (3) F
 Development and solution of systems of linear algebraic equations. Applications from mechanical, structural, and electrical fields of engineering. Prerequisite: MAT 242 or equivalent.
- ASE 586 Partial Differential Equations in Engineering.** (3) S
 Development and solution of partial differential equations in engineering. Applications in solid mechanics, vibrations, and heat transfer. Prerequisites: ECE 386; MAT 242, 274.

ENGINEERING CORE (ECE)

- ECE 100 Introduction to Engineering Design.** (4) F, S
 Introduction to engineering design philosophy and methodology: computer modeling of systems, processes, and components; design for customer satisfaction, profitability, quality and manufacturing; economic analysis; flow charting; sketching CAD; and teaming. A term design project is included. Prerequisites: high school computing and physics and algebra courses or equivalents. *General Studies: N3.*
- ECE 210 Engineering Mechanics I: Statics.** (3) F, S, SS
 Force systems, resultants, equilibrium, distributed forces, area moments, fluid statics, internal stresses, friction, energy criterion for equilibrium, and stability. Lecture, recitation. Prerequisites: ECE 100; MAT 271 (or 291); PHY 121, 122.
- ECE 300 Intermediate Engineering Design.** (3) F, S, SS
 Engineering design process concentrating on increasing the student's ability to prepare well-written technical communication and to define problems and generate and evaluate ideas. Teaming skills enhanced. Prerequisites: ECE 100; ENG 102 (or 105 or 108); at least two other engineering core courses. *General Studies: L1.*
- ECE 301 Electrical Networks I.** (4) F, S, SS
 Introduction to electrical networks. Component models, transient, and steady-state analysis. Lecture, lab. Prerequisite: ECE 100. Pre- or corequisites: MAT 274; PHY 131, 132.
- ECE 312 Engineering Mechanics II: Dynamics.** (3) F, S, SS
 Kinematics and kinetics of particles, translating and rotating coordinate systems, rigid body kinematics, dynamics of systems of particles and rigid bodies, and energy and momentum principles. Lecture, recitation. Prerequisites: ECE 210; MAT 274.
- ECE 313 Introduction to Deformable Solids.** (3) F, S, SS
 Equilibrium, strain-displacement relations, and stress-strain-temperature relations. Applications to force transmission and deformations in axial, torsional, and bending of bars. Combined loadings. Lecture, recitation. Prerequisites: ECE 210; MAT 274.

ECE 314 Engineering Mechanics. (4) F, S, SS

Force systems, resultants, moments and equilibrium. Kinematics and kinetics of particles, systems of particles and rigid bodies. Energy and momentum principles. Lecture, recitation. Prerequisites: ECE 100; MAT 274; PHY 121, 122.

ECE 334 Electronic Devices and Instrumentation. (4) F, S, SS

Application of electric network theory to semiconductor circuits. Diodes/transistors/amplifiers/opamps/digital logic gates, and electronic instruments. Lecture, lab. Prerequisite: ECE 301.

ECE 340 Thermodynamics. (3) F, S, SS

Work, heat, and energy transformations and relationships between properties; laws, concepts, and modes of analysis common to all applications of thermodynamics in engineering. Lecture, recitation. Prerequisites: CHM 114 (or 116); ECE 210; PHY 131. Pre- or co-requisite: MAT 274.

ECE 350 Structure and Properties of Materials. (3) F, S, SS

Basic concepts of material structure and its relation to properties. Application to engineering problems. Prerequisites: CHM 114 (or 116); PHY 121.

ECE 351 Engineering Materials. (3) F, S

Structure and behavior of civil engineering materials. Laboratory investigations and test criteria. Lecture, lab. Prerequisite: ECE 313.

ECE 352 Properties of Electronic Materials. (4) F, S, SS

Schrodinger's wave equation, potential barrier problems, bonds of crystals, the band theory of solids, semiconductors, superconductor dielectric, and magnetic properties. Prerequisites: MAT 274; PHY 241.

ECE 380 Probability and Statistics for Engineering Problem Solving. (3) F, S

Applications oriented course with computer-based experience using statistical software for formulating and solving engineering problems. 2 hours lecture, 2 hours lab. Prerequisite: MAT 271. *General Studies: N2.*

ECE 384 Numerical Analysis for Engineers I. (2) F, S

Numerical solution of algebraic and transcendental equations and systems of linear equations. Numerical integration. Curve fitting. Error bounds and error propagation. Emphasis on use of digital computer. Prerequisite: MAT 272 or 291.

ECE 385 Numerical Analysis for Engineers II. (2) S

Continuation of ECE 384. Numerical solution of partial differential equations and mixed equation systems. Introduction to experimental design and optimization techniques. Prerequisite: ECE 384.

ECE 386 Partial Differential Equations for Engineers. (2) F, S

Boundary value problems, separation of variables, and Fourier series as applied to initial-boundary value problems. Prerequisite: MAT 274.

ECE 400 Engineering Communications. (3) F, S, SS

Planning and preparing engineering publications and oral presentations, based on directed library research related to current engineering topics. Prerequisites: ENG 102 (or 105 or 108); completion of General Studies L1 requirement (or ECE 300); senior standing in an engineering major. *General Studies: L2.*

SOCIETY, VALUES, AND TECHNOLOGY (STE)

STE 201 Introduction to Bioengineering. (3) F

Impact of bioengineering on society. Developing an awareness of the contributions of bioengineering to solve medical and biological problems. Cross-listed as BME 201. Prerequisite: ENG 102 or 105 or 108. *General Studies: L1.*

STE 208 Patterns in Nature. (4) F, S

Project-oriented science course with computer training to develop critical thinking, and technical skills for student-oriented science lessons K-12. Lecture, lab. Cross-listed as PHS 208. Prerequisite: college-level science course or instructor approval. *General Studies: S1/S2.*

Department of Chemical, Bio, and Materials Engineering

Eric J. Guilbeau
Chair
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www.eas.asu.edu/~cbme

The faculty in the Department of Chemical, Bio, and Materials Engineering offer the B.S. degree in three exciting disciplines: chemical engineering, bioengineering, and materials science and engineering. Each of these majors builds on a broad base of knowledge within the basic and mathematical sciences and the engineering core. Each offers excellent career opportunities.

Chemical engineers design and operate processes that may include chemical change. They combine the science of chemistry with the discipline of engineering in order to solve complex problems in a wide variety of industries. Challenging job opportunities exist not only in the chemical and petroleum industries, but also in the plastics, electronics, computer, metals, space, food, drug, and health care industries. In these industries, chemical engineers

practice in a wide variety of occupations including environmental control, surface treatments, energy and materials transformation, biomedical applications, fermentation, protein recovery, extractive metallurgy, and separations. In the environmental area, chemical engineers develop methods to reduce the pollution created in manufacturing processes, devise techniques to recover usable materials from wastes, design waste storage and treatment facilities, and design pollution control strategies.

Bioengineering (synonyms: biomedical engineering or medical engineering) is the discipline of engineering that applies principles and methods from engineering, the life sciences, and the medical sciences to understand, define, and solve problems in medicine, physiology, and biology. Bioengineering students typically pursue either a career in the medical-device/biotechnology industry or a career in bioengineering, medical or biotechnology research or enter a postgraduate program in clinical or veterinary medicine or dentistry. The practicing bioengineer uses engineering principles and technology to develop instrumentation, biomaterials, diagnostic and therapeutic devices, artificial organs, and other equipment needed in medicine and biology. They also discover new fundamental principles regarding the functioning and structure of living systems.

Materials science and engineering uses fundamental knowledge in chemistry and physics to correlate relationships between the structure and processing of materials and their properties. Students educated in this discipline decide how to optimize existing materials or how to develop new advanced materials and processing techniques. Students who major in materials science and engineering will find employment opportunities in a variety of industries and research facilities which include aerospace, electronics, energy conversion, manufacturing, medical devices, semiconductors, and transportation.

The following sections describe the curriculum requirements for the Bachelor of Science in Engineering degree in each of these disciplines. Faculty within the department also participate

in the Engineering Special Studies program in premedical engineering which is described separately on page 238.

**CHEMICAL ENGINEERING—
B.S.E.**

PROFESSORS

BERMAN, CALE, GUILBEAU,
KUESTER, RAUPP, SATER, ZWIBEL

ASSOCIATE PROFESSORS

BECKMAN, BELLAMY, BURROWS,
GARCIA, RIVERA, TORREST

ASSISTANT PROFESSOR

S. BEAUDOIN

LECTURER

D. BEAUDOIN

Chemical engineers are generally concerned with transfer within and between liquid, gas, and solid phases and the chemical changes that may also occur. They design and operate processes that accommodate such changes, including the chemical activation of materials. Typically this involves complex multicomponent systems wherein the interactions between species have to be considered and analyzed. The new challenge in chemical engineering is to apply the principles of fluid dynamics, mass transfer, solution thermodynamics, reaction kinetics, and separation techniques to technological endeavors such as pollution control within manufacturing and the environment, integrated circuit design, solid-state surface treatments, and materials processing.

Consequently, in addition to the chemical and petroleum industries, chemical engineers find challenging opportunities in the plastics, solid-state, electronics, computer, metals, space, food, drug, and health care industries, where they practice in a wide variety of occupations, such as environmental control, surface treatments, energy and materials transformations, biomedical applications, fermentation, protein recovery, extractive metallurgy, and separations. While a large percentage of the industrial positions are filled by graduates with bachelor's degrees, there are lucrative and creative opportunities in research and development for those who acquire post-graduate education.

Subspecializations have developed within the profession. However, the same broad body of knowledge is generally expected of all chemical engineers for maximum flexibility in industrial positions. The preparation for chemical engineering is accomplished by a blend of classroom instruction and laboratory experience.

DEGREE REQUIREMENTS

A minimum of 128 semester hours is necessary for the B.S.E. degree in Chemical Engineering. A minimum of 50 upper-division semester hours is required.

The course work for the undergraduate degree can be classified into the following categories (in semester hours):

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105 Advanced First-Year Composition (3) or ENG 107, 108 English for Foreign Students (6)	—
Total		6

General Studies/School Requirements

Humanities and Fine Arts/Social and Behavioral Sciences

ECN 111	Macroeconomic Principles SB	3
	or ECN 112 Microeconomic Principles SB (3)	—
SB, HU, and awareness area courses ¹		13
Total		16

Literacy and Critical Inquiry

CHE 352	Transport Laboratories L2	3
ECE 300	Intermediate Engineering Design L1	3
Total		6

Natural Sciences/Basic Sciences

CHM 113	General Chemistry S1/S2	4
CHM 116	General Chemistry S1/S2	4
CHM 331	General Organic Chemistry	3
CHM 335	General Organic Chemistry Laboratory	1
PHY 121	University Physics I: Mechanics S1/S2 ²	3
PHY 122	University Physics Laboratory S1/S2 ²	1
Total		16

Numeracy/Mathematics

ECE 100	Introduction to Engineering Design N3	4
ECE 384	Numerical Analysis for Engineers I	2

MAT 270	Calculus with Analytic Geometry I N1	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
Total		21
General Studies/school requirements total		59

Engineering Core

CHE 342	Applied Chemical Thermodynamics	4
CHE 461	Process Control N3	4
ECE 394	ST: Conservation Principles	4
ECE 394	ST: Properties that Matter	4
ECE 394	ST: Engineering Systems	4
Total		20

Major

CHE 311	Introduction to Chemical Processing	3
CHE 331	Transport Phenomena I: Fluids	3
CHE 332	Transport Phenomena II: Energy Transfer	3
CHE 333	Transport Phenomena III: Mass Transfer	3
CHE 432	Principles of Chemical Engineering Design	3
CHE 442	Chemical Reactor Design	3
CHE 451	Chemical Engineering Laboratory	2
CHE 462	Process Design	3
CHM 332	General Organic Chemistry	3
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
ECE 385	Numerical Analysis for Engineers II	2
Technical electives		12
Total		43

¹ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU or SB requirements. See page 195.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

Consult with your department academic advisor to ensure that all requirements are met.

The technical elective courses must be selected from upper-division courses with an advisor's approval and must include the following: two three-semester-hour chemistry courses; a three-semester-hour natural science or materials course; and a three-semester-hour chemical engineering course.

To fulfill accreditation requirements and to prepare adequately for the advanced chemistry courses, Chemical Engineering majors are required to take the CHM 113 and 116 introductory chemistry sequence (CHM 117 and 118 are acceptable substitutes). Other freshman chemistry courses are *not acceptable*, and transfer students who have taken another chemistry course may be required to enroll in CHM 113 and 116.

The faculty in the Department of Chemical, Bio, and Materials Engineering also offer graduate programs leading to the M.S.E., M.S., and Ph.D. degrees. These programs provide a blend of classroom instruction and research. A wide variety of topical and relevant research projects are available for thesis topics. Students interested in these programs should contact the department for up-to-date descriptive literature.

Chemical Engineering Areas of Emphasis

Students who wish to specialize may develop an area of interest through the use of technical electives and selective substitutions for required courses. Substitutions must be approved by the advisor and the Department Standards Committee and must be consistent with ABET accreditation criteria. No substitution of CHE 462 is allowed. The following are possible elective areas of emphasis with suggested courses. A student may choose electives within the general department guidelines and does not have to select one of the areas listed.

Biochemical. Students wishing to prepare for a career in biotechnology, fermentation, food processing, pharmaceuticals, and other areas within biochemical engineering should select from the following:

Chemistry Electives

CHM 361	Principles of Biochemistry	.... 3
CHM 461	General Biochemistry	..... 3
CHM 462	General Biochemistry	..... 3

Technical Electives

AGB 423	Food and Industrial Microbiology	..... 3
AGB 424	Food and Industrial Fermentations	..... 4
AGB 425	Food Safety	..... 3

AGB 426	Food Chemistry	..... 4
CHE 475	Biochemical Engineering	..... 3
CHE 476	Bioreaction Engineering	..... 3
CHE 477	Bioseparation Processes	..... 3

Biomedical. Students who are interested in biomedical engineering but wish to maintain a strong, broad chemical engineering base should select from the following:

Chemistry Electives

CHM 361	Principles of Biochemistry	.... 3
CHM 461	General Biochemistry	..... 3
CHM 462	General Biochemistry	..... 3

Technical Electives

BME 318	Biomaterials	..... 3
BME 411	Biomedical Engineering I	..... 3
BME 412	Biomedical Engineering II	.... 3
BME 413	Biomedical Instrumentation L2	..... 3
BME 435	Physiology for Engineers	..... 4

Environmental. ASU does not offer a B.S.E. degree in Environmental Engineering, but students with this interest are encouraged to pursue a B.S.E. degree in Chemical Engineering with this area of emphasis. Students interested in the management of hazardous wastes and air and water pollution should select from the following:

Chemistry Electives

CHM 302	Environmental Chemistry	..... 3
CHM 361	Principles of Biochemistry	.... 3
CHM 461	General Biochemistry	..... 3
CHM 481	Geochemistry	..... 3

Technical Electives

CEE 361	Introduction to Environmental Engineering	... 4
CEE 362	Environmental Engineering	... 3
CEE 561	Physical-Chemical Treatment of Water and Waste	..... 3
CEE 563	Environmental Chemistry Laboratory	..... 3
CHE 474	Chemical Engineering Design for the Environment	.. 3
CHE 478	Industrial Water Quality Engineering	..... 3
CHE 479	Air Quality Control	..... 3
CHE 533	Transport Processes I	..... 3

Materials. Students interested in the development and production of new materials such as alloys, ceramics, composites, polymers, semiconductors, and superconductors should select from the following:

Chemistry Electives

CHM 441	General Physical Chemistry 3
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CHM 442	General Physical Chemistry 3
CHM 453	Inorganic Chemistry 3
CHM 471	Solid-State Chemistry 3

Technical Electives

BME 318	Biomaterials	..... 3
CHE 458	Semiconductor Material Processing	..... 3
ECE 352	Properties of Electronic Materials	..... 4
MSE 353	Introduction to Materials Processing and Synthesis	..... 3
MSE 354	Experiments in Materials Synthesis and Processing I	.... 2
MSE 431	Corrosion and Corrosion Control	..... 3
MSE 453	Experiments in Materials Synthesis and Processing II	... 2
MSE 454	Advanced Materials Processing and Synthesis	..... 3
MSE 470	Polymers and Composites	.... 3

Premedical. Students planning to attend medical school should select courses from those listed under the biomedical emphasis. In addition, BIO 181, 182, and CHM 336 must be taken to satisfy medical-school requirements but are not counted toward the Chemical Engineering bachelor's degree.

Process Engineering. The engineering core and required chemical engineering courses serve as a suitable background for students intending to enter the traditional petrochemical and chemical process industries. Students can build on this background by selecting courses with the approval of their advisor. Examples of these courses are as follows:

Energy Conversion and Conservation

CHE 528	Process Optimization Techniques	..... 3
CHE 554	New Energy Technology	..... 3
CHE 556	Separation Processes	..... 3
MAE 436	Combustion	..... 3
MAE 437	Direct Energy Conversion	.... 3

Plant Administration and Management

CHE 479	Air Quality Control	..... 3
CHE 528	Process Optimization Techniques	..... 3
IEE 300	Economic Analysis for Engineers	..... 3
IEE 431	Engineering Administration	..... 3

Simulation, Control, and Design

CHE 494	Special Topics	..... 1-4
CHE 527	Advanced Applied Mathematical Analysis in Chemical Engineering	..... 3

CHE 528	Process Optimization Techniques	3
CHE 556	Separation Processes	3
CHE 563	Chemical Engineering Design	3

Semiconductor Processing. Students who are interested in the development and manufacturing of semiconductor and other electronic devices should select from the following:

Chemistry Elective

CHM 441	General Physical Chemistry	3
CHM 442	General Physical Chemistry	3
CHM 453	Inorganic Chemistry	3
CHM 471	Solid-State Chemistry	3

Technical Electives

CHE 458	Semiconductor Material Processing	3
CHE 494	Special Topics	1-4
ECE 352	Properties of Electronic Materials	4
EEE 435	Microelectronics	3
EEE 436	Fundamentals of Solid-State Devices	3
EEE 439	Semiconductor Facilities and Cleanroom Practices	3
MSE 353	Introduction to Materials Processing and Synthesis	3
MSE 354	Experiments in Materials Synthesis and Processing I	2
MSE 453	Experiments in Materials Synthesis and Processing II	2
MSE 454	Advanced Materials Processing and Synthesis	3
MSE 472	Integrated Circuit Materials Science	3

Chemical Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM 113	General Chemistry S1/S2	4
ECE 100	Introduction to Engineering Design N3	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I N3	4
Total		15

Second Semester

CHM 116	General Chemistry S1/S2	4
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics S1/S2*	3
PHY 122	University Physics Laboratory I S1/S2*	1
Total		15

Second Year

First Semester

CHE 311	Introduction to Chemical Processing	3
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
ECE 394	ST: Conservation Principles	4
ECN 111	Macroeconomic Principles SB or ECN 112 Microeconomic Principles SB (3)	3
MAT 274	Elementary Differential Equations	3
Total		16

Second Semester

CHE 331	Transport Phenomena I: Fluids	3
ECE 384	Numerical Analysis for Engineers I	2
ECE 394	ST: Properties that Matter	4
MAT 272	Calculus with Analytic Geometry III	4
HU or SB elective		4
Total		17

Third Year

First Semester

CHE 332	Transport Phenomena II: Energy Transfer	3
CHE 342	Applied Chemical Thermodynamics	4
CHM 331	General Organic Chemistry	3
CHM 335	General Organic Chemistry Laboratory	1
ECE 300	Intermediate Engineering Design L1	3
HU or SB elective		3
Total		17

Second Semester

CHE 333	Transport Phenomena III: Mass Transfer	3
CHE 352	Transport Laboratories L2	3
CHE 432	Principles of Chemical Engineering Design	3
CHM 332	General Organic Chemistry	3
ECE 385	Numerical Analysis for Engineers II	2
ECE 394	ST: Engineering Systems	4
Total		18

Fourth Year

First Semester

CHE 442	Chemical Reactor Design	3
CHE 451	Chemical Engineering Laboratory	2
CHE 461	Process Control N3	4
HU, SB, and awareness area courses		3
Technical elective		3
Total		15

Second Semester

CHE 462	Process Design	3
HU, SB, and awareness area courses		3

Technical elective	9
Total	15
Total degree requirements:	128

* Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

BIOENGINEERING—B.S.E.

- PROFESSORS**
GUILBEAU, TOWE
- ASSOCIATE PROFESSORS**
GARCIA, HE, PIZZICONI,
SWEENEY, YAMAGUCHI
- ASSISTANT PROFESSOR**
KIPKE
- LECTURER**
D. BEAUDOIN

Bioengineering (synonyms: biomedical engineering, medical engineering) is the discipline of engineering that applies principles and methods from engineering, the physical sciences, the life sciences, and the medical sciences to understand, define, and solve problems in medicine, physiology, and biology. Bioengineering bridges the engineering, physical, life, and medical sciences. More specifically, the bioengineering program at ASU educates engineering students to use engineering principles and technology to develop instrumentation, materials, diagnostic and therapeutic devices, artificial organs, and other equipment needed in medicine and biology and to discover new fundamental principles regarding the functioning and structure of living systems. The multidisciplinary approach to solving problems in medicine and biology has evolved from exchanges of information between specialists in the concerned areas.

Because a depth of knowledge from at least two diverse disciplines is required in the practice of bioengineering, students desiring a career in bioengineering should plan for advanced study beyond the bachelor's degree. The Bioengineering major at ASU is especially designed for students desiring graduate study in bioengineering, a career in the medical-device/biotechnology industry, a career in biomedical research, a career in biotechnology research, or entry into a medical college.

Graduate degree programs in Bioengineering are offered at ASU at both the master's and doctoral levels. For more information concerning these degree programs, consult the *Graduate Catalog*.

DEGREE REQUIREMENTS

A minimum of 128 semester hours is necessary for the B.S.E. in Bioengineering degree. A minimum of 50 upper-division semester hours is required.

GRADUATION REQUIREMENTS

In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

COURSE REQUIREMENTS

The course work, in semester hours, for the undergraduate degree can be classified into the following categories:

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105 Advanced First-Year Composition (3) or ENG 107, 108 English for Foreign Students (6)	
Total		6

General Studies/School Requirements

Humanities and Fine Arts/Social and Behavioral Sciences

ECN 111	Macroeconomic Principles SB	3
	or ECN 112 Microeconomic Principles SB (3)	
SB, HU, and awareness area courses		13
Total		16

Literacy and Critical Inquiry

BME 413	Biomedical Instrumentation L2	3
BME 423	Biomedical Instrumentation Laboratory L2	1
ECE 300	Intermediate Engineering Design L1	3
Total		7

Natural Sciences/Basic Sciences

CHM 113	General Chemistry S1/S2	4
CHM 116	General Chemistry S1/S2	4
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3

PHY 132	University Physics Laboratory II S1/S2 ²	1
Total		16

Numeracy/Mathematics

ECE 100	Introduction to Engineering Design N3	4
MAT 242	Elementary Linear Algebra	2
	or ECE 384 Numerical Analysis for Engineers I (2) or ECE 386 Partial Differential Equations for Engineers I (2)	
MAT 270	Calculus with Analytic Geometry I N1	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
Total		21
General Studies/school requirements total		60

Engineering Core

ECE 210	Engineering Mechanics I: Statics	3
ECE 301	Electrical Networks I	4
ECE 334	Electronic Devices and Instrumentation	4
ECE 340	Thermodynamics	3
ECE 350	Structure and Properties of Materials	3
Total		17

Major

BIO 181	General Biology S1/S2	4
BME 201	Introduction to Bioengineering L1	3
BME 318	Biomaterials	3
BME 331	Biomedical Engineering Transport I: Fluids	3
BME 334	Bioengineering Heat and Mass Transfer	3
BME 416	Biomechanics	3
BME 417	Biomedical Engineering Capstone Design I	3
BME 435	Physiology for Engineers	4
BME 470	Microcomputer Applications in Bioengineering	4
BME 490	Biomedical Engineering Capstone Design II	1–5
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
Technical electives		9
Minimum total		45

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

The major BME courses require a grade of “C” or higher to advance in

the program and to receive a baccalaureate degree.

Bioengineering Areas of Emphasis

Students interested in a career in bioengineering may elect to emphasize either biochemical, bioelectrical, biomaterials engineering, biomechanical, bionuclear, biosystems, molecular and cellular bioengineering, or premedical engineering.

Biochemical Engineering. This emphasis is designed to strengthen the student’s knowledge of chemistry and transport phenomena and is particularly well suited for students interested in biotechnology. Technical electives must include: CHM 331, 332, and 361.

Bioelectrical Engineering. This emphasis is designed to strengthen the student’s knowledge of electrical systems, electronics, and signal processing. Students considering a career in bioelectrical phenomena, biocontrol systems, medical instrumentation, non-invasive imaging, neural engineering, and electrophysiology should consider this area of emphasis. Technical electives must include the following:

BME 350	Signals and Systems for Bioengineers	3
	or EEE 303 Signals and Systems (3)	
BME 419	Biocontrol Systems	3
EEE 302	Electrical Networks II	3
Total		9

Biomaterials Engineering. This area of emphasis integrates the student’s knowledge of materials science and engineering with biomaterials science and engineering concepts for the design of materials intended to be used for the development of medical and diagnostic devices. It emphasizes structure-property relationships of engineering materials (metals, polymers, ceramics, and composites) and biological materials, biomaterial-host response phenomena, technical and regulatory aspects of biomaterials testing and evaluation. Students interested in careers in the biomaterials, medical device, or biotechnology industries should consider this area of emphasis. Technical electives must include the following:

MSE 353	Introduction to Materials Processing and Synthesis	3
MSE 355	Introduction to Materials Science and Engineering	3

MSE 470	Polymers and Composites	..... 3
	or MSE 471 Introduction to Ceramics (3)	—
Total		..... 9

Biomechanical Engineering. This emphasis is designed to strengthen the student's knowledge of mechanics and control theory. Students interested in careers related to biomechanical design, orthotic/prosthetic devices, rehabilitation engineering, and orthopedic implants should consider this area of emphasis. It also provides the fundamentals for the study of neuromuscular control and the study of human motion. The following course is a required selection in the engineering school requirements (page 202):

ECE 384	Numerical Analysis for Engineers I	..... 2
	or MAT 242 Elementary Linear Algebra (2)	—

Technical electives must include the following:

BME 419	Biocontrol Systems	..... 3
	or BME 350 Signals and Systems for Bioengineers (3)	—
	or EEE 303 Signals and Systems (3)	—
ECE 312	Engineering Mechanics II: Dynamics	..... 3
ECE 313	Introduction to Deformable Solids	..... 3
Total		..... 9

Biomedical Imaging Engineering. This emphasis is designed to strengthen the student's knowledge of radiation interactions, health physics, medical diagnostic imaging (MRI, PET, X-ray, CT), radiation protection, and nuclear instrumentation. Students considering careers in medical engineering or health physics should consider this area of emphasis. Technical electives include the following:

PHY 361	Introductory Modern Physics	..... 3
	Department-approved electives	..... 6
Total		..... 9

Biosystems Engineering. This emphasis is designed to strengthen the background of students interested in physiological systems modeling and analysis and design and evaluation of artificial organs and medical devices. Analyzing

physiological systems and designing artificial organs requires knowledge in integrating electrical, mechanical, transport, and thermofluid systems. Students considering careers in medical device industries, clinical engineering, or artificial organs should consider this area of emphasis. Technical electives must include the following:

BME 411	Biomedical Engineering I	..... 3
	or BME 412 Biomedical Engineering II (3)	—
BME 415	Biomedical Transport Processes	..... 3
BME 419	Biocontrol Systems	..... 3
	or BME 350 Signals and Systems for Bioengineers (3)	—
Total		..... 9

Molecular and Cellular Bioengineering. This emphasis is designed to strengthen and integrate the student's knowledge of molecular and cellular biology, biochemistry, and biomaterials science and engineering for the design of biomolecular and cellular-based hybrid medical and diagnostic devices. It is particularly suited for students interested in pursuing graduate studies in molecular and cellular bioengineering and health-related biotechnology. Technical electives must include the following:

BIO 353	Cell Biology	..... 3
CHM 331	General Organic Chemistry	... 3
CHM 361	Principles of Biochemistry	.... 3
Total		..... 9

Premedical Engineering. This emphasis is designed to meet the needs of students desiring entry into a medical, dental, or veterinary school. The course sequence provides an excellent background for advanced study leading to a career in research in the medical or life sciences. Technical electives must include the following:

CHM 331	General Organic Chemistry	... 3
CHM 332	General Organic Chemistry	... 3
CHM 335	General Organic Chemistry Laboratory	..... 1
CHM 336	General Organic Chemistry Laboratory	..... 1
Total		..... 8

To fulfill medical school admission requirements, BIO 182 General Biology is also required in addition to the degree requirements.

**Bioengineering Program of Study
Typical Four-Year Sequence
First Year**

First Semester

CHM 113	General Chemistry S1/S2	..... 4
ECE 100	Introduction to Engineering Design N3	..... 4
ENG 101	First-Year Composition	..... 3
MAT 270	Calculus with Analytic Geometry I N1	..... 4
Total		..... 15

Second Semester

CHM 116	General Chemistry S1/S2	..... 4
ENG 102	First-Year Composition	..... 3
MAT 271	Calculus with Analytic Geometry II	..... 4
PHY 121	University Physics I: Mechanics S1/S2 ¹	..... 3
PHY 122	University Physics Laboratory I S1/S2 ¹	..... 1
Total		..... 15

Second Year

First Semester

BIO 181	General Biology S1/S2	..... 4
BME 201	Introduction to Bioengineering L1	..... 3
ECE 210	Engineering Mechanics I: Statics	..... 3
MAT 272	Calculus with Analytic Geometry III	..... 4
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	..... 3
PHY 132	University Physics Laboratory II S1/S2 ²	..... 1
Total		..... 18

Second Semester

ECE 301	Electrical Networks I	..... 4
ECE 350	Structure and Properties of Materials	..... 3
MAT 274	Elementary Differential Equations	..... 3
HU, SB, and awareness area courses ³		..... 6
Total		..... 16

Third Year

First Semester

BME 331	Biomedical Engineering Transport I: Fluids	..... 3
BME 435	Physiology for Engineers	..... 4
ECE 300	Intermediate Engineering Design L1	..... 3
ECE 340	Thermodynamics	..... 3
ECN 111	Macroeconomic Principles SB	..... 3
	or ECN 112 Microeconomic Principles SB (3)	—

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MAT 242	Elementary Linear Algebra	2
	or ECE 384 Numerical Analysis for Engineers I (2) or ECE 386 Partial Differential Equations for Engineers (2)	—

Total 18

Second Semester

BME 318	Biomaterials	3
BME 334	Bioengineering Heat and Mass Transfer	3
ECE 334	Electronic Devices and Instrumentation	4
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
HU, SB, and awareness area courses ³	.....	4

Total 17

Fourth Year

First Semester

BME 413	Biomedical Instrumentation L2	3
BME 416	Biomechanics	3
BME 417	Biomedical Engineering Capstone Design I	3
BME 423	Biomedical Instrumentation Laboratory L2	1
HU, SB, and awareness area course ³	.....	3
Technical electives .....	.....	3

Total 16

Second Semester

BME 470	Microcomputer Applications in Bioengineering	4
BME 490	Biomedical Engineering Capstone Design II	3
Technical electives .....	.....	6

Total 13

Total degree requirements: 128

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU and SB requirements. See page 196.

MATERIALS SCIENCE AND ENGINEERING—B.S.E.

REGENTS' PROFESSOR
MAYER

PROFESSORS
DEY, KRAUSE, MAHAJAN

ASSOCIATE PROFESSOR
ADAMS

ASSISTANT PROFESSOR
ALFORD

Materials science and engineering is concerned with the study of fundamental relationships between the structure and processing of materials and their properties. The program develops a knowledge of materials that allows graduates to decide how to optimize design of engineering components with existing materials or how to develop new advanced materials and processing techniques.

All major industries and many research laboratories are involved with the selection, utilization, and development of materials used for designing and producing engineering systems. Students who major in materials science and engineering will find employment opportunities in a variety of industries and research facilities which include aerospace, automotive, electronics, energy conversion, manufacturing, medical devices, and semiconductors.

The responsibilities of a materials engineer include research and development of materials to meet new demands of advancing technologies, to select the best material for a specific application, and to devise novel processing methods to improve the performance or cost of a material in an engineering component.

In essence, a materials engineer uses the fundamental principles of chemistry and physics for the benefit of mankind in areas such as communication, computation, medicine, and transportation.

DEGREE REQUIREMENTS

A minimum of 128 semester hours is necessary for the B.S.E. degree in Materials Science and Engineering. A minimum of 50 upper-division semester hours is required.

Graduation Requirements. In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

Course Requirements. The undergraduate curriculum requires that students take a series of interdisciplinary courses of fundamental importance to an understanding of all engineering materials. Following these are additional courses that may be taken as technical electives to develop an area of emphasis. The courses for the undergraduate degree can be classified into the following categories (in semester hours):

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105	—
	Advanced First-Year Composition (3) or ENG 107, 108	—
	English for Foreign Students (6)	—

Total 6

General Studies/School Requirements

Humanities and Fine Arts/Social and Behavioral Sciences

ECN 111	Macroeconomic Principles SB	3
	or ECN 112 Microeconomic Principles SB (3)	—
HU, SB, and awareness area courses	.....	13

Total 16

Literacy and Critical Inquiry

ECE 300	Intermediate Engineering Design L1	3
ECE 400	Engineering Communications L2	3

Total 6

Natural Sciences/Basic Sciences

CHM 113	General Chemistry S1/S2	4
CHM 116	General Chemistry S1/S2	4
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1

Total 16

Numeracy/Mathematics

ECE 100	Introduction to Engineering Design N3	4
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MAT 242	Elementary Linear Algebra	2
MAT 270	Calculus with Analytic Geometry I/II	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
Total	.....	21
General Studies/school requirements total	.....	59
Engineering Core		
ECE 210	Engineering Mechanics: Statics	3
ECE 301	Electrical Networks I	4
ECE 313	Introduction to Deformable Solids	3
ECE 350	Structure and Properties of Materials	3
MSE 430	Thermodynamics of Materials	3
Total	.....	16
Major		
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
MSE 353	Introduction to Materials Processing and Synthesis	3
MSE 354	Experiments in Materials Synthesis and Processing I	2
MSE 355	Introduction to Materials Science and Engineering	3
MSE 420	Physical Metallurgy	3
MSE 421	Physical Metallurgy Laboratory	1
MSE 430	Thermodynamics of Materials	3
MSE 440	Mechanical Properties of Solids	3
MSE 450	X-ray and Electron Diffraction	3
MSE 470	Polymers and Composites	3
MSE 471	Introduction to Ceramics	3
MSE 482	Materials Engineering Design	3
MSE 490	Capstone Design Project	3
Select two of the following four courses ³	.....	6
CHM 325	Analytical Chemistry (3)	
CHM 331	General Organic Chemistry (3)	
CHM 341	Elementary Physical Chemistry (3)	
PHY 361	Introductory Modern Physics (3)	
Technical electives ⁴	.....	8
Total	.....	50

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

³ In order to take CHM 341 Elementary Physical Chemistry, CHM 331 Organic Chemistry must be taken as the prerequisite.

⁴ Three of the eight hours must be a non-MSE upper-division engineering elective course.

Materials Science and Engineering Areas of Emphasis

Technical electives may be selected from one or more of the following areas. A student may, with prior approval of the department, select a general area or a set of courses that would support a career objective not covered by the following categories.

Biomaterials. Students interested in the materials used in the body and other living systems to improve or replace body components should choose from the following technical electives:

BME 318	Biomaterials	3
BME 411	Biomedical Engineering I	3
BME 412	Biomedical Engineering II	3
BME 413	Biomedical Instrumentation	3
BME 416	Biomechanics	3

Ceramic Materials. Students who want to develop an understanding of the chemistry and processing that control the structure and properties of ceramics and their application should select from these technical electives:

CHM 331	General Organic Chemistry ...	3
CHM 332	General Organic Chemistry ...	3
CHM 471	Solid-State Chemistry	3
EEE 435	Microelectronics	3
EEE 436	Fundamentals of Solid-State Devices	3
EEE 439	Semiconductor Facilities and Cleanroom Practices	3
MSE 453	Experiments in Materials Synthesis and Processing II ...	2
MSE 454	Advanced Materials Processing and Synthesis	3
MSE 472	Integrated Circuit Materials Science	3

Energy Systems. Students interested in the materials used in energy conversion systems such as solar energy or nuclear energy should choose from the following technical electives:

MAE 441	Principles of Design	3
MAE 442	Mechanical Systems Design	3
MSE 431	Corrosion and Corrosion Control	3
MSE 441	Analysis of Material Failures	3

Integrated Circuit Materials. Students interested in the materials used in the semiconductor industry and in how they are processed to achieve the desired properties should choose from the following technical electives:

CHE 458	Semiconductor Material Processing	3
EEE 435	Microelectronics	3
EEE 436	Fundamentals of Solid-State Devices	3
EEE 439	Semiconductor Facilities and Cleanroom Practices	3
MSE 453	Experiments in Materials Synthesis and Processing II ...	2
MSE 454	Advanced Materials Processing and Synthesis	3
MSE 471	Introduction to Ceramics	3

Manufacturing and Materials Processing. Students interested in the manufacturing and processing of materials for a broad base of applications should choose from the following technical electives:

CHE 458	Semiconductor Material Processing	3
MAE 422	Mechanics of Materials	4
MAE 441	Principles of Design	3
MAE 442	Mechanical Systems Design ..	3
MSE 431	Corrosion and Corrosion Control	3
MSE 441	Analysis of Material Failures	3
MSE 453	Experiments in Materials Synthesis and Processing II ...	2
MSE 454	Advanced Materials Processing and Synthesis	3
MSE 472	Integrated Circuit Materials Science	3

Mechanical Metallurgy. Students interested in the materials used in the semiconductor industry and in how they are processed to achieve the desired properties should choose from the following technical electives:

MAE 415	Vibration Analysis	4
MAE 422	Mechanics of Materials	4
MAE 441	Principles of Design	3
MAE 442	Mechanical Systems Design	3
MSE 431	Corrosion and Corrosion Control	3
MSE 441	Analysis of Material Failures	3

Metallic Materials Systems. Students interested in building an understanding of the basis for the design and processing of metals and alloys should choose from the following technical electives:

MAE 351	Manufacturing Processes	3
MSE 431	Corrosion and Corrosion Control	3

MSE	441	Analysis of Material Failures	3
MSE	472	Integrated Circuit Materials Science	3

Polymers and Composites. Students who desire to build an understanding of the chemical and processing basis for the properties of polymers and their applications, including composite systems, should select from the following technical electives:

CHM	331	General Organic Chemistry ...	3
CHM	332	General Organic Chemistry ...	3
CHM	471	Solid-State Chemistry	3
MSE	441	Analysis of Material Failures	3
MSE	472	Integrated Circuit Materials Science	3

Materials Science and Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM	113	General Chemistry <i>S1/S2</i>	4
ECE	100	Introduction to Engineering Design <i>N3</i>	4
ENG	101	First-Year Composition	3
MAT	270	Calculus with Analytic Geometry I <i>NI</i>	4
Total			15

Second Semester

CHM	116	General Chemistry <i>S1/S2</i>	4
ENG	102	First-Year Composition	3
MAT	271	Calculus with Analytic Geometry II	4
PHY	121	University Physics I: Mechanics <i>S1/S2</i> ¹	3
PHY	122	University Physics Laboratory I <i>S1/S2</i> ¹	1
Total			15

Second Year

First Semester

ECE	210	Engineering Mechanics I: Statics	3
ECN	111	Macroeconomic Principles <i>SB</i>	3
MAT	242	Elementary Linear Algebra	2
MAT	272	Calculus with Analytic Geometry III	4
PHY	131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ²	3
PHY	132	University Physics Laboratory II <i>S1/S2</i> ²	1
Total			16

Second Semester

ECE	301	Electrical Networks I	4
ECE	313	Introduction to Deformable Solids	3
ECE	350	Structure and Properties of Materials	3
ECE	380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
MAT	274	Elementary Differential Equations	3
Total			16

Third Year

First Semester

ECE	300	Intermediate Engineering Design <i>L1</i>	3
MSE	353	Introduction to Materials Processing and Synthesis	3
MSE	355	Introduction to Materials Science and Engineering	3
		Advanced science course ⁴	3
		HU, SB, and awareness area courses ³	4
Total			16

Second Semester

MSE	354	Experiments in Materials Synthesis and Processing I	2
MSE	420	Physical Metallurgy	3
MSE	421	Physical Metallurgy Laboratory	1
MSE	430	Thermodynamics of Materials	3
MSE	450	X-ray and Electron Diffraction	3
		HU, SB, and awareness area courses ³	6
Total			18

Fourth Year

First Semester

MSE	440	Mechanical Properties of Solids	3
MSE	470	Polymers and Composites	3
MSE	471	Introduction to Ceramics	3
MSE	482	Materials Engineering Design	3
		Technical elective	4
Total			16

Second Semester

ECE	400	Engineering Communications <i>L2</i>	3
MSE	490	Capstone Design Project	3
		Advanced science course ⁴	3
		HU, SB, and awareness area course ³	3
		Technical electives	4
Total			16
		Degree requirements total	128

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU and SB requirements. See page 196.

⁴ In order to take CHM 341 Elementary Physical Chemistry, CHM 331 Organic Chemistry must be taken as the prerequisite.

BIOENGINEERING (BME)

BME 201 Introduction to Bioengineering.

(3) F
Impact of bioengineering on society. Developing an awareness of the contributions of bioengineering to solve medical and biological problems. Cross-listed as STE 201. Prerequisite: ENG 102 or 105 or 108. *General Studies: L1.*

BME 202 Global Awareness Within Biomedical Engineering Design.

(3) F
Introduction to ethical, legal, social, economic, and technical issues arising from the design and implementation of bioengineering technology. Lecture, critical discourse. Prerequisites: ECE 100; ECN 111 or 112; ENG 102. *General Studies: L1, HU.*

BME 318 Biomaterials.

(3) S
Material properties of natural and artificial biomaterials. Tissue and blood biocompatibility. Uses of materials to replace body parts. Prerequisite: ECE 350.

BME 331 Biomedical Engineering Transport I: Fluids.

(3) F, S
Transport phenomena with emphasis on biomedical engineering fluid systems. Prerequisites: MAT 274; PHY 131.

BME 334 Bioengineering Heat and Mass Transfer.

(3) S
Application of the principles of heat and mass transfer phenomena to solution of problems in medicine and medical device design. Prerequisite: ECE 340. Prerequisite with a grade of "C" or higher: BME 331.

BME 350 Signals and Systems for Bioengineers.

(3) S
Application of principles of calculus and ordinary differential equations to modeling and analysis of responses, signals, and signal transfers in bio-systems. Prerequisites: ECE 301; MAT 272, 274.

BME 411 Biomedical Engineering I. (3) F
Review of diagnostic and prosthetic methods using engineering methodology. Introduction to transport, metabolic, and autoregulatory processes in the human body. Prerequisite with a grade of "C" or higher: BME 334.

BME 412 Biomedical Engineering II. (3) S
Review of electrophysiology and nerve pacing applications, introduction to biomechanics and joint/limb replacement technology, cardiovascular and pulmonary fluid mechanics, and the application of mathematical modeling. Prerequisite: instructor approval.

BME 413 Biomedical Instrumentation. (3) F
Principles of medical instrumentation. Studies of medical diagnostic instruments and techniques for the measurement of physiologic variables in living systems. Prerequisites: ECE 300, 334. Prerequisite with a grade of "C" or higher: BME 435. Corequisite: BME 423. *General Studies: L2.*

BME 415 Biomedical Transport Processes. (3) A

Principles of momentum, heat, and mass transport with applications to medical and biological systems and medical device design. Prerequisites: MAT 274; PHY 131.

BME 416 Biomechanics. (3) F

Mechanical properties of bone, muscle, and soft tissue. Static and dynamic analysis of human movement tasks such as locomotion. Prerequisite with a grade of "C" or higher: BME 318.

BME 417 Biomedical Engineering Capstone Design I. (3) F

Technical, regulatory, economic, legal, social, and ethical aspects of medical device systems engineering design. Lecture, field trips. Prerequisites with a grade of "C" or higher: BME 318, 334.

BME 419 Biocontrol Systems. (3) F

Application of linear and nonlinear control systems techniques toward analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body. Prerequisites: ECE 301; MAT 274.

BME 423 Biomedical Instrumentation**Laboratory.** (1) F

Laboratory experience with problems, concepts, and techniques of biomedical instrumentation in static and dynamic environments. Lab. Prerequisites: ECE 300, 334. Prerequisite with a grade of "C" or higher: BME 435. Corequisite: BME 413. *General Studies: L2.*

BME 435 Physiology for Engineers. (4) F

Physiology of the nervous, muscular, cardiovascular, endocrine, renal, and respiratory systems. Emphasizes use of quantitative methods in understanding physiological systems. Lecture, lab. Prerequisites: BIO 181 and CHM 116 and PHY 131 or instructor approval.

BME 470 Microcomputer Applications in Bioengineering. (4) S

Use of microcomputers for real-time data collection, analysis, and control of experiments involving actual and simulated physiological systems. Lecture, lab. Prerequisites: ECE 100, 334. Prerequisite with a grade of "C" or higher: BME 435.

BME 490 Biomedical Engineering Capstone Design II. (1–5) F, S

Individual projects in medical systems or medical device design and development. Lecture, lab. Prerequisite with a grade of "C" or higher: BME 417.

BME 496 Professional Seminar. (1–3) F, S Professional and ethical aspects with a discussion of responsibilities. Lecture, field trips. Prerequisite: instructor approval.

BME 511 Biomedical Engineering. (3) A Diagnostic and prosthetic methods using engineering methodology. Transport, metabolic, and autoregulatory processes in the body.

BME 512 Biomedical Engineering II. (3) A

Electrophysiology and nerve pacing applications, introduction to biomechanics and joint/limb replacement, technology, cardiovascular and pulmonary fluid mechanics, and mathematical modeling.

BME 513 Biomedical Instrumentation I. (3) A

Principles of medical instrumentation. Studies of medical diagnostic instruments and techniques for the measurement of physiologic variables in living systems.

BME 514 Advanced Biomedical Instrumentation. (3) F

Principles of applied biophysical measurements using bioelectric and radiological approach. Prerequisites: ECE 334; MAT 274 (or equivalent).

BME 515 Biomedical Transport Processes. (3) N

Principles of momentum, heat, and mass transport with applications to medical and biological systems and medical device design. Prerequisite: instructor approval.

BME 516 Topics in Biomechanics. (3) F

Mechanical properties of bone, muscle, and soft tissue. Static and dynamic analysis of human movement tasks, including in-depth project. Prerequisite: instructor approval.

BME 518 Introduction to Biomaterials. (3) S

Topics include structure property relationships for synthetic and natural biomaterials, biocompatibility, and uses of materials to replace body parts. Prerequisite: ECE 350 or equivalent or instructor approval.

BME 519 Topics in Biocontrol Systems. (3) F

Linear and nonlinear control systems analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body, including in-depth project. Prerequisites: ECE 301 and MAT 274 or instructor approval.

BME 520 Bioelectric Phenomena. (3) N

Study of the origin, propagation, and interactions of bioelectricity in living things; volume conductor problem, mathematical analysis of bioelectric interactions, and uses in medical diagnostics.

BME 521 Neuromuscular Control Systems. (3) S

Overview of sensorimotor brain structures. Application of nonlinear, adaptive, optimal, and supervisory control theory to eye-head-hand coordination and locomotion.

BME 522 Biosensor Design and Application. (3) A

Theory and principles of biosensor design and application in medicine and biology. Principles of measurements with biosensors. Prerequisite: instructor approval.

BME 523 Physiological Instrumentation Lab. (1) F

Laboratory experience with problems, concepts, and techniques of biomedical instrumentation in static and dynamic environments. Lab. Pre- or corequisites: AGB/BME 435; BME 413; ECE 334.

BME 524 Fundamentals of Applied Neural Control. (3) A

Fundamental concepts of electrical stimulation and recording in the nervous system with the goal of functional control restoration. Pre- or corequisite: BME 435 or instructor approval.

BME 525 Surgical Techniques. (2) S

Principles of surgical techniques, standard operative procedures, federal regulations, guidelines, and state-of-the-art methods. Lecture, lab.

BME 532 Prosthetic and Rehabilitation Engineering. (3) A

Analysis and critical assessment of design and control strategies for state-of-the-art medical devices used in rehabilitation engineering. Pre- or corequisite: BME 416 or 516 or EPE 610.

BME 533 Transport Processes I. (3) F

Unified treatment of momentum, heat, and mass transfer from molecular theory, and continuum points of view. Continuum equations of microscopic and macroscopic systems and multicomponent and multiphase systems. Cross-listed as CHE 533.

BME 534 Transport Processes II. (3) S

Continuation of BME/CHE 533, emphasizing mass transfer. Cross-listed as CHE 534. Prerequisite: BME/CHE 533.

BME 543 Thermodynamics of Chemical Systems. (3) F

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions. Cross-listed as CHE 543.

BME 544 Chemical Reactor Engineering. (3) S

Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as CHE 544. Prerequisite: BME/CHE 543.

BME 551 Movement Biomechanics. (3) S

Mechanics applied to the analysis and modeling of physiological movements. Computational modeling of muscles, tendons, joints, and the skeletal system with application to sports and rehabilitation. Prerequisite: BME 416 or 516 or instructor approval.

BME 566 Medical Imaging Instrumentation. (3) N

Design and analysis of imaging systems and nuclear devices for medical diagnosis, therapy, and research. Laboratory experiments using diagnostic radiology, fluoroscopy, ultrasound, and CAT scanning. Lecture, lab. Prerequisite: instructor approval.

BME 567 Radiation Shielding and Transport. (3) F

Shielding for radiation therapy, diagnostic radiology, cyclotrons, and nuclear reactors. Monte Carlo and empirical computational methods, regulations, and design problems. Cross-listed as EEE 567. Prerequisite: EEE 465.

BME 568 Medical Imaging. (3) S

CT, SPECT, PET, and MRI. 3-dimensional *in vivo* measurements. Instrument design, physiological modeling, clinical protocols, reconstruction algorithms, and quantitation issues. Prerequisite: instructor approval.

CHEMICAL ENGINEERING (CHE)**CHE 311 Introduction to Chemical Processing.** (3) F, S

Application of chemical engineering analysis and problem solving to chemical processes material and energy balance methods and skills. Prerequisites: CHM 116; MAT 271.

CHE 331 Transport Phenomena I: Fluids. (3) F, S

Transport phenomena, with emphasis on fluid systems. Prerequisites: CHE 311; ECE 394 ST: Conservation Principles; MAT 274.

CHE 332 Transport Phenomena II: Energy Transfer. (3) F, S

Continuation of transport principles, with emphasis on energy transport in stationary and fluid systems. Prerequisite: CHE 331.

CHE 333 Transport Phenomena III: Mass Transfer. (3) F, S

The application of transport phenomena to mass transfer. The design of mass transfer equipment, including staged processes. Prerequisite: CHE 332.

CHE 342 Applied Chemical Thermodynamics. (4) F, S

Application of conservation and accounting principles with non-ideal property estimation techniques to model phase and chemical equilibrium processes. Lecture, recitation. Prerequisites: CHE 311; ECE 394 ST: Conservation Principles, ECE 394 ST: Properties that Matter. Pre- or corequisite: MAT 272.

CHE 352 Transport Laboratories. (3) S

The demonstration of transport phenomena principles with experiments in fluid flow, heat, and mass transfer. Prerequisites: CHE 332; ECE 300. Pre- or corequisite: CHE 333. *General Studies: L2.*

CHE 432 Principles of Chemical Engineering Design. (3) F

Multicomponent distillation, engineering economics, equipment sizing and costs, plant operation economics, and simulation and optimization techniques. Prerequisites: CHE 332, 342.

CHE 442 Chemical Reactor Design. (3) F, S
Application of kinetics to chemical reactor design. Prerequisite: CHE 342. Pre- or corequisite: CHE 333.

CHE 451 Chemical Engineering Laboratory. (2) F

Operation, control, and design of experimental and industrial process equipment; independent research projects. 6 hours lab. Prerequisites: CHE 333, 352; ECE 384.

CHE 458 Semiconductor Material Processing. (3) N

Introduction to the processing and characterization of electronic materials for semiconductor applications. Prerequisites: CHE 333, 342.

CHE 461 Process Control. (4) F

Process dynamics, instrumentation, and feedback applied to automatic process control. Lecture, lab. Prerequisite: ECE 394 ST: Systems. *General Studies: N3.*

CHE 462 Process Design. (3) S

Application of economic principles to optimize equipment selection and design; development and design of process systems. Prerequisites: CHE 432, 442.

CHE 474 Chemical Engineering Design for the Environment. (3) F

Conflict of processing materials and preserving the natural resources. Students will understand/value the environment and attempt to control our impact. Prerequisites: CHE 333, 342.

CHE 475 Biochemical Engineering. (3) N

Application of chemical engineering methods, mass transfer, thermodynamics, and transport phenomena to industrial biotechnology. Prerequisite: instructor approval.

CHE 476 Bioreaction Engineering. (3) N

Principles of analysis and design of reactors for processing with cells and other biologically active materials; applications of reaction engineering in biotechnology. Prerequisite: instructor approval.

CHE 477 Bioseparation Processes. (3) N

Principles of separation of biologically active chemicals; the application, scaleup, and design of separation processes in biotechnology. Prerequisite: instructor approval.

CHE 478 Industrial Water Quality Engineering. (3) F

Chemical treatment processing, quality criteria and control, system design, and water pollutants. Prerequisites: CHE 331; senior standing.

CHE 479 Air Quality Control. (3) F

Air pollutant control, effects, and origins. Chemical and physical processes, including combustion, control equipment design, dispersion, and sampling. Prerequisites: CHE 331; senior standing.

CHE 490 Chemical Engineering Projects.

(1–5) F, S, SS
Individual projects in chemical engineering operations and design. Prerequisite: instructor approval.

CHE 496 Professional Seminar. (1–3) F, S

Professional and ethical aspects with a discussion of responsibilities. Lecture, field trips. Prerequisite: instructor approval.

CHE 501 Introduction to Transport Phenomena. (3) F, S

Transport phenomena, with emphasis on fluid systems. Prerequisite: transition student with instructor approval.

CHE 502 Introduction to Energy Transport. (3) F, S

Continuation of transport principles, with emphasis on energy transport in stationary and fluid systems. Prerequisite: transition student with instructor approval.

CHE 503 Introduction to Mass Transport.

(3) F, S
The application of transport phenomena to mass transfer. The design of mass transfer equipment, including staged processes. Prerequisite: transition student with instructor approval.

CHE 504 Introduction to Chemical Thermodynamics. (3) F, S

Energy relations and equilibrium conversions based on chemical potentials and phase equilibria. Prerequisite: transition student with instructor approval.

CHE 505 Introduction to Chemical Reactor Design. (3) F, S

Application of kinetics to chemical reactor design. Prerequisite: transition student with instructor approval.

CHE 527 Advanced Applied Mathematical Analysis in Chemical Engineering. (3) F

Formulation and solution of complex mathematical relationships resulting from the description of physical problems in mass, energy, and momentum transfer and chemical kinetics.

CHE 528 Process Optimization Techniques. (3) S

Method for optimizing engineering processes. Experimental design and analysis; linear and nonlinear regression methods; classical, search, and dynamic programming algorithms.

CHE 533 Transport Processes I. (3) F

Unified treatment of momentum, heat, and mass transfer from molecular theory, and continuum points of view. Continuum equations of microscopic and macroscopic systems and multicomponent and multiphase systems. Cross-listed as BME 533.

CHE 534 Transport Processes II. (3) S

Continuation of CHE/BME 533, emphasizing mass transfer. Cross-listed as BME 534. Prerequisite: BME/CHE 533.

CHE 536 Convective Mass Transfer. (3) N

Turbulent flow for multicomponent systems, including chemical reactions with applications in separations and air pollution. Prerequisite: CHE 533 or MAE 571.

CHE 543 Thermodynamics of Chemical Systems. (3) F

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions. Cross-listed as BME 543.

CHE 544 Chemical Reactor Engineering.

(3) S
Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as BME 544. Prerequisite: BME/CHE 543.

CHE 548 Topics in Catalysis. (3) N

Engineering catalysis, emphasizing adsorption, kinetics, characterization, diffusional considerations, and reactor design. Other topics include mechanisms, surface analyses, and electronic structure.

CHE 552 Industrial Water Quality Engineering. (3) N

Water pollutants, quality criteria and control, chemical treatment processing, and system design. Case studies. Prerequisite: CHE 331 or equivalent.

CHE 553 Air Quality Control. (3) N

Air pollutant origins, effects, and control. Physical and chemical processes, including dispersion, combustion, sampling, control equipment design, and special topics. Prerequisite: CHE 331 or equivalent.

CHE 554 New Energy Technology. (3) N

Gasification, liquefaction pyrolysis, and combustion processes for coal, wastes, and other raw materials. In-situ processes for coal, oil, shale, and geothermal energy. Environmental quality issues.

CHE 556 Separation Processes. (3) N

Topics in binary/multicomponent separation, rate governed and equilibration processes, mass transfer criteria, energy requirements, separating agents and devices, and staged operations.

CHE 558 Electronic Materials. (3) N

Processing and characterization of electronic materials for semiconductor type uses. Thermodynamics and transport phenomena, phase equilibria and structure, mass transfer, and diffusion and thermal properties.

CHE 561 Advanced Process Control. (3) S

Dynamic process representation, linear optimal control, optimal state reconstruction, and parameter and state estimation techniques for continuous and discrete time systems.

CHE 563 Chemical Engineering Design. (3) N

Computational methods; the design of chemical plants and processes.

MATERIALS SCIENCE AND ENGINEERING (MSE)

MSE 353 Introduction to Materials Processing and Synthesis. (3) F

Principles of materials structure and properties with emphasis on applications in bulk and thin film materials processing and synthesis. Prerequisites: CHM 116 and PHY 131 or equivalents.

MSE 354 Experiments in Materials Synthesis and Processing I. (2) S

Small groups of students complete three experiments selected from a list. Each is supervised by a selected faculty member. Lab. Prerequisite: MSE 353 or equivalent.

MSE 355 Introduction to Materials Science and Engineering. (3) F

Elements of the structure of metals and alloys, measurement of mechanical properties, and optical metallography. Lecture, lab, field trips. Prerequisite: CHM 114 or 116.

MSE 420 Physical Metallurgy. (3) F

Crystal structure and defects. Phase diagrams, metallography, solidification and casting, deformation, and annealing. Prerequisite: ECE 350.

MSE 421 Physical Metallurgy Laboratory. (1) S

Focuses on analysis of microstructure of metals and alloys and includes correlation with mechanical properties to some extent. Lab. Pre- or corequisite: MSE 420.

MSE 430 Thermodynamics of Materials. (3) N

Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: ECE 340.

MSE 431 Corrosion and Corrosion Control. (3) S

Introduction to corrosion mechanisms and methods of preventing corrosion. Topics include the following: electrochemistry, polarization, corrosion rates, oxidation, coatings, and cathodic protection. Prerequisite: ECE 350.

MSE 440 Mechanical Properties of Solids. (3) S

Effects of environmental and microstructural variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: ECE 350.

MSE 441 Analysis of Material Failures. (3) S

Identification of types of failures. Analytical techniques. Fractography, SEM, nondestructive inspection, and metallography. Mechanical and electronic components. Prerequisite: ECE 350.

MSE 450 X-ray and Electron Diffraction. (3) F

Fundamentals of X-ray diffraction, transmission electron microscopy, and scanning electron microscopy. Techniques for studying surfaces, internal microstructures, and fluorescence. Lecture, demonstrations. Prerequisite: ECE 350.

MSE 453 Experiments in Materials Synthesis and Processing II. (2) F

A continuation of MSE 354, with emphasis on characterization. Small groups complete three experiments supervised by selected faculty members. Lab. Prerequisites: MSE 353 and 354 or equivalents.

MSE 454 Advanced Materials Processing and Synthesis. (3) S

Case studies from published literature of current techniques in materials processing and synthesis. Student participation in classroom presentations. Lecture, recitation. Prerequisites: MSE 353 and 354 or equivalents.

MSE 470 Polymers and Composites. (3) F

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems. Cross-listed as MAE 455. Prerequisite: ECE 350.

MSE 471 Introduction to Ceramics. (3) F

Principles of structure and property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: ECE 350.

MSE 472 Integrated Circuit Materials Science. (3) N

Principles of materials science applied to semiconductor processing and fabrication in metals, ceramics, polymers, and semiconductors. Prerequisite: ECE 350.

MSE 482 Materials Engineering Design. (3) F, S

Principles of the design process. Feasibility and optimization. Manufacturing processes, materials selection, failure analysis, and economics. Prerequisites: ECE 313, 350.

MSE 490 Capstone Design Project. (1–3) F, S

For small groups in fundamental or applied aspects of engineering materials; emphasis on experimental problems and design. Prerequisites: MSE 430, 440, 450.

MSE 496 Professional Seminar. (1–3) F, S

Professional and ethical aspects with a discussion of responsibilities. Lectures, field trips. Prerequisite: instructor approval.

MSE 510 X-ray and Electron Diffraction. (3) F

Fundamentals of X-ray diffraction, transmission electron microscopy, and scanning electron microscopy. Techniques for studying surfaces, internal microstructures, and fluorescence. Lecture, demonstrations. Prerequisite: transition student with instructor approval.

MSE 511 Corrosion and Corrosion Control. (3) S

Introduction to corrosion mechanisms and methods of preventing corrosion. Topics include the following: electrochemistry, polarization, corrosion rates, oxidation, coatings, and cathodic protection. Prerequisite: transition student with instructor approval.

MSE 512 Analysis of Material Failures. (3) S

Identification of types of failures. Analytical techniques. Fractography, SEM, nondestructive inspection, and metallography. Mechanical and electronic components. Prerequisite: transition student with instructor approval.

MSE 513 Polymers and Composites. (3) F Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

MSE 514 Physical Metallurgy. (4) F

Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Lecture, lab. Prerequisite: transition student with instructor approval.

MSE 515 Thermodynamics of Materials. (3) N

Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: transition student with instructor approval.

MSE 516 Mechanical Properties of Solids. (3) S

Effects of environmental and microstructural variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: transition student with instructor approval.

MSE 517 Introduction to Ceramics. (3) F

Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

MSE 518 Integrated Circuits Materials Science. (3) N

Principles of materials science applied to semiconductor processing and fabrication in metals, ceramics, polymers, and semiconductors. Prerequisite: transition student with instructor approval.

MSE 520 Theory of Crystalline Solids. (3) F Anisotropic properties of crystals; tensor treatment of elastic, magnetic, electric and thermal properties, and crystallography of Martensitic transformations.

MSE 521 Defects in Crystalline Solids. (3) S

Introduction to the geometry, interaction, and equilibrium between dislocations and point defects. Relations between defects and properties will be discussed. Prerequisite: ECE 350 or instructor approval.

MSE 530 Materials Thermodynamics and Kinetics. (3) S

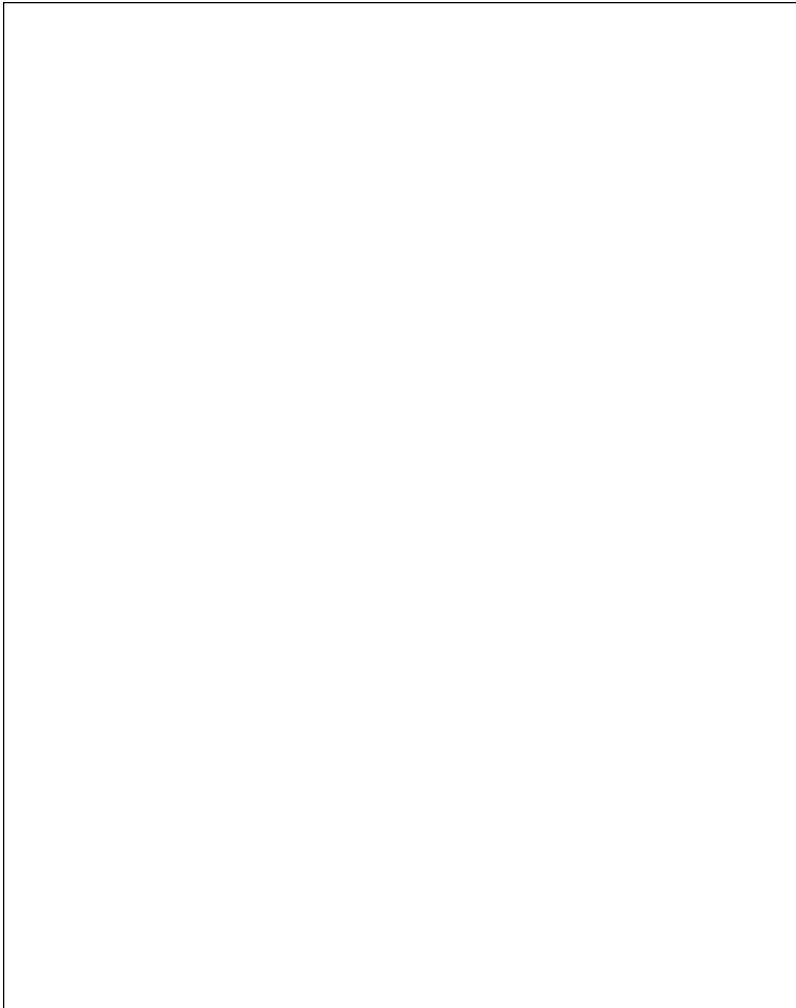
Thermodynamics of alloy systems, diffusion in solids, kinetics of precipitation, and phase transformations in solids. Prerequisites: ECE 340, 350.

MSE 540 Fracture, Fatigue, and Creep. (3) F

Relationship between microstructure and fracture; fatigue and creep properties of materials. Environmental effects and recent developments. Current theories and experimental results. Prerequisite: MSE 440 or equivalent.

MSE 550 Advanced Materials Characterization. (3) N

Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.



Sean Dengler demonstrates equipment in the Integrated Manufacturing Engineering Laboratory. Created by partnerships between the university and the high-tech industry, the lab offers students practical experience in engineering and manufacturing.

Tim Trumble photo

MSE 556 Electron Microscopy Laboratory. (3) F

Lab support for MSE 558. Cross-listed as SEM 556. Pre- or corequisite: MSE/SEM 558.

MSE 557 Electron Microscopy Laboratory. (3) S

Lab support for MSE 559. Cross-listed as SEM 557. Pre- or corequisite: MSE/SEM 559.

MSE 558 Electron Microscopy I. (3) F

Microanalysis of the structure and composition of materials using images, diffraction and X-ray, and energy loss spectroscopy. Knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables is required. Cross-listed as SEM 558. Prerequisite: instructor approval.

MSE 559 Electron Microscopy II. (3) S

Microanalysis of the structure and composition of materials using images, diffraction and X-ray, and energy loss spectroscopy. Knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables is required. Cross-listed as SEM 559. Prerequisite: instructor approval.

MSE 560 Strengthening Mechanisms. (3) S

Deformation of crystalline materials. Properties of dislocations. Theories of strain hardening, solid solution, precipitation, and transformation strengthening. Prerequisite: ECE 350 or equivalent.

MSE 561 Phase Transformation in Solids.

(3) N

Heterogeneous and homogeneous precipitation reactions, shear displacive reactions, and order-disorder transformation.

MSE 562 Ion Implantation. (3) S

Includes defect production and annealing. Generalized treatment, including ion implantation, neutron irradiation damage, and the interaction of other incident beams. Prerequisite: MSE 450.

MSE 570 Polymer Structure and Properties. (3) F

Relationships between structure and properties of synthetic polymers, including glass transition, molecular relaxations, crystalline state viscoelasticity, morphological characterization, and processing.

MSE 571 Ceramics. (3) A

Includes ceramic processing, casting, molding, firing, sintering, crystal defects, and mechanical, electronic, and physical properties. Prerequisites: MSE 521, 561.

MSE 573 Magnetic Materials. (3) A

Emphasis on ferromagnetic and ferrimagnetic phenomena. Domains, magnetic anisotropy, and magnetostriction. Study of commercial magnetic materials. Prerequisite: MSE 520 or equivalent.

Department of Civil and Environmental Engineering

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PROFESSORS

S. HOUSTON, W. HOUSTON,
 MAMLOUK, MATTHIAS, MAYS,
 RAJAN, SINGHAL, UPCHURCH

ASSOCIATE PROFESSORS

DUFFY, FAFITIS, FOX,
 HINKS, JOHNSON

ASSISTANT PROFESSORS

BAKER, MUCCINO, OWUSU-ANTWI,
 WESTERHOFF, ZHU

CIVIL ENGINEERING

Civil Engineering is primarily concerned with the public domain. The profession includes analysis, planning, design, construction, and maintenance of many types of facilities for government, commerce, and industry. These include high-rise office towers, factories, schools, airports, tunnels and subway systems, dams, canals, and water purification and environmental protection facilities such as solid waste and wastewater treatment systems. Civil engineers are concerned with the impact of their projects on the public and the environment, and they attempt to coordinate the needs of society with technical and economic feasibility.

Career opportunities in the field.

University graduates with the B.S.E. degree in Civil Engineering readily find employment. Civil engineers work in many different types of companies, from large corporations to small, private consulting firms, or in governmental agencies. A civil engineering background is an excellent foundation for jobs in management and public service. Civil engineering is one of the best engineering professions from the viewpoint of international travel opportunities or for eventually establishing one's own consulting business.

Uniqueness of the program at ASU.

The faculty in the Department of Civil and Environmental Engineering at ASU offer a challenging program of study designed to provide the student with the resources and background to pursue a career in a wide range of specialty areas. Some of these areas are structural, geotechnical, environmental and water resources, transportation and materials engineering. The Civil Engineering program is fully accredited by ABET. With the program, students will be prepared for the Fundamentals of Engineering (FE) examination and professional registration.

The Department of Civil and Environmental Engineering offers challenging programs of study designed to provide students with the scientific and technical resources to pursue a broad and multifaceted range of careers. Areas of study in the civil engineering curriculum are described below.

Geotechnical engineering. This area of study includes the analysis and design of foundation systems, seepage control, earthdams and water resource structures, earthwork operations, fluid flow-through porous media, and response of foundations and embankments to earthquakes.

Structural engineering. This area of study considers the planning, analysis and design of steel and concrete bridges, buildings, dams; special offshore and space structures; composite materials.

Transportation and materials engineering. This area of study is pursued in two major areas and several interrelated areas: (1) transportation planning, design, and operation, and (2) pavements and materials. Transportation planning, design, and operation emphasizes the highway mode but also encompasses public transit and airport planning and design. Urban transport planning, geometric design of facilities, traffic operations, and evaluation of highway capacity and safety are also a part of transportation planning. The application of advanced technology to the vehicle and the roadway is included in the study of intelligent vehicle/highway systems. Pavements and materials focus on pavement analysis and design; pavement maintenance and rehabilitation; pavement evaluation and

management; and characterization of highway materials such as asphalt, concrete, portland cement, and portland cement concrete; durability of highway structures; and structural retrofit of existing bridges.

Water resources engineering. This area of study is concerned with surface and groundwater flow, planning and management of water supply, and water distribution system modeling.

The undergraduate program provides an excellent background for entry to graduate study in engineering.

Environmental Engineering Option

The environmental engineering option has been developed and recently implemented at ASU. Environmental engineering is a multidisciplinary field based on the traditional engineering principles, and chemistry, biology, and geology. Environmental engineers are involved with the design and operation of water and wastewater treatment systems, remediation of contaminated soils and waters, construction of hazardous waste containment systems, analysis of the fate and transport of pollutants in natural environments, water conservation and reuse, and surface water quality management.

Career opportunities in the field.

University graduates with the B.S.E. in Civil Engineering (environmental engineering option) find employment in consulting firms, municipalities, regulatory agencies, and industry. The growth of environmental engineering positions has been balanced by the growing number of students entering the field, resulting in a stable job market. International opportunities are great and are likely to expand. After earning the undergraduate B.S.E. degree in Civil Engineering (environmental engineering option), many students continue their education by enrolling in an environmental engineering graduate degree program.

Uniqueness of the program at ASU.

The environmental engineering option at ASU is presently one of a few such programs in the country. The curriculum includes a solid core of engineering fundamentals, in accordance with an ABET-accredited Civil and Environmental Engineering degree program, so

that students will be prepared for the Fundamentals of Engineering (FE) examination and professional registration. The curriculum also includes a strong emphasis on chemistry, microbiology, and water and wastewater treatment processes.

ENTRANCE REQUIREMENTS

See “Admission,” and “Degrees,” pages 194–195 for information regarding entrance requirements.

DEGREE REQUIREMENTS

The B.S.E. degree in Civil Engineering and the B.S.E. degree in Civil Engineering with an option in environmental engineering require a minimum of 128 semester hours of course work. A minimum of 50 upper-division semester hours is required. The minimum requirements are for a student who has successfully completed at least a year (each) of high school chemistry, physics, computer programming; and pre-calculus, algebra, and trigonometry.

The B.S.E. degree program consists of the following categories:

Civil Engineering

First-Year Composition	6
General Studies/School Requirements	54
Engineering Core	19–20
Major	49–48
Total	128

Environmental Engineering Option

First-Year Composition	6
General Studies/School Requirements	54
Engineering Core	19
Major	49
Total	128

Graduation Requirements

In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

Course Requirements. See pages 196–197 for General Studies, school, and engineering core requirements.

DEGREE REQUIREMENTS FOR MAJOR IN CIVIL ENGINEERING

Civil Engineering Core

Twenty-seven hours are required. CEE courses, except CEE 296, may not be taken until all mathematics (MAT) and all engineering core courses (ECE),

except ECE 380 and 384 have been completed with an average grade of “C” or higher. No CEE 400-level courses may be taken until ECE 380 and 384 have been completed.

CEE 296	Civil Engineering Systems	3
CEE 321	Structural Analysis and Design	4
CEE 341	Fluid Mechanics for Civil Engineers	4
CEE 351	Geotechnical Engineering	4
CEE 361	Introduction to Environmental Engineering	4
CEE 372	Transportation Engineering ...	4
CEE 496	Topics in Civil Engineering Practice	1
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
Total .....	.....	27

Civil Engineering Design Electives

Six semester hours from the following list are required.

CEE 423	Structural Design	3
CEE 441	Water Resources Engineering	3
CEE 452	Foundations	3
CEE 466	Sanitary Systems Design	3
CEE 475	Highway Geometric Design	3

Civil Engineering Technical Electives

Fifteen to 16 semester hours are required. The design elective courses that have not been selected to satisfy the design electives requirement (see above) may be used as technical electives.

A maximum of seven hours may be selected from outside of civil engineering with advisor’s approval. Students must select technical electives from at least three different CEE areas of study.

Construction. A maximum of three hours may be selected from any of the following Construction (CON) courses.

CON 341	Surveying	3
CON 383	Construction Estimating	3
CON 495	Construction Planning and Scheduling <i>N3</i>	3
CON 496	Construction Contract Administration	3

Environmental Engineering. This area includes water treatment, industrial and domestic waste treatment and disposal, public health engineering, and industrial hygiene.

CEE 362	Environmental Engineering ...	3
CEE 466	Sanitary Systems Design	3
CHM 231	Elementary Organic Chemistry	3
MIC 220	Biology of Microorganisms ... 3 or MIC 205 Microbiology <i>S2</i> (3) and MIC 206 Microbiology Laboratory <i>S2</i> (1)	3

Geotechnical Engineering. This area includes assessment of engineering properties and design utilizing soils and rocks as engineering materials.

CEE 452	Foundations	3
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Structural Engineering. This area includes analysis and design of structures for buildings, bridges, space frames, structural mechanics.

CEE 322	Steel Structures	3
CEE 323	Concrete Structures	3
CEE 423	Structural Design	3
CEE 432	Matrix and Computer Applications in Structural Engineering	3

Transportation/Materials Engineering. This area includes analysis and design of transportation facilities, transportation planning and economics, and transportation in the urban environment.

CEE 412	Pavement Analysis and Design	3
CEE 471	Intelligent Transportation Systems	3
CEE 475	Highway Geometric Design	3

Water Resources Engineering. This area includes planning and design of facilities for collection, storage and distribution of water, water systems management, and estimating availability of water resources.

CEE 440	Engineering Hydrology	3
CEE 441	Water Resources Engineering	3

Civil Engineering Program of Study A Four-Year Sequence First Year

First Semester

CHM 114	General Chemistry for Engineers <i>S1/S2</i>	4
ECE 100	Introduction to Engineering Design <i>N3</i>	4
ENG 101	First-Year Composition	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MAT 270	Calculus with Analytic Geometry I <i>NI</i>	4
Total	.....	15

Second Semester

CEE 296	Civil Engineering Systems	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ¹	3
PHY 122	University Physics Laboratory I <i>S1/S2</i> ¹	1
Total	.....	14

Second Year

First Semester

ECE 210	Engineering Mechanics I: Statics	3
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ²	3
PHY 132	University Physics Laboratory II <i>S1/S2</i> ²	1
HU, SB, and awareness area course ³	.....	3
Total	.....	17

Second Semester

ECE 312	Engineering Mechanics II: Dynamics	3
ECE 313	Introduction to Deformable Solids	3
ECE 340	Thermodynamics	3
	or ECE 301 Electrical Networks I (4)	
ECE 384	Numerical Analysis for Engineers I	2
ECN 111	Macroeconomic Principles <i>SB</i>	3
	or ECN 112 Microeconomic Principles <i>SB</i> (3)	
Basic science elective	.....	3
Total	.....	17

Third Year

First Semester

CEE 321	Structural Analysis and Design	4
CEE 341	Fluid Mechanics for Civil Engineers	4
ECE 300	Intermediate Engineering Design <i>L1</i>	3
ECE 351	Engineering Materials	3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
Total	.....	17

Second Semester

CEE 351	Geotechnical Engineering	4
CEE 361	Introduction to Environmental Engineering ...	4
CEE 372	Transportation Engineering ...	4

HU, SB, and awareness area course ³	.....	3
Total	.....	15

Fourth Year

First Semester

CEE 496	Topics in Civil Engineering Practice	1
Design elective	.....	3
HU, SB, and awareness area course(s) ³	.....	4
Technical electives	.....	9
Total	.....	17

Second Semester

CEE 486	Integrated Civil Engineering Design <i>L2</i>	3
Design elective	.....	3
HU, SB, and awareness area course ³	.....	3
Technical electives	.....	6-7
Total	.....	15-16
Graduation requirement total	.....	128

- ¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
- ² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.
- ³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU or SB requirements. See page 196.

A maximum of two graduate courses may be taken for undergraduate credit by students whose cumulative GPA is 3.00 or higher and with the approval of the instructor, advisor, department chair, and the dean of the college.

Concurrent Studies in Architecture and Civil Engineering

Undergraduate. Qualified lower-division students interested in combining studies in architecture and civil engineering may prepare for upper-division and graduate courses in both programs by taking courses listed in option B of the School of Architecture.

DEGREE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING OPTION

Environmental Engineering Core

See pages 196-197 for General Studies, school, and engineering core requirements.

Thirty semester hours are required. CEE courses, except CEE 296, may not be taken until mathematics (MAT), and engineering core (ECE) courses, except ECE 380 and 384, have been completed with an average grade of "C" or higher. No CEE 400-level courses may be taken until ECE 380 and 384 have been completed.

CEE 296	Civil Engineering Systems	3
CEE 321	Structural Analysis and Design	4
CEE 341	Fluid Mechanics for Civil Engineers	4
CEE 351	Geotechnical Engineering	4
CEE 361	Introduction to Environmental Engineering ...	4
CEE 372	Transportation Engineering ...	4
CEE 496	Topics in Civil Engineering Practice	1
CHM 341	Elementary Physical Chemistry	3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
Total	.....	30

Environmental Design Courses

CEE 441	Water Resources Engineering	3
CEE 466	Sanitary Systems Design	3
Total	.....	6

Environmental Technical Courses

BIO 320	Fundamentals of Ecology	3
	or PUP 442 Environmental Planning (3)	
	or PUP 475 Environmental Impact Assessment (3)	
	or CHM 302 Environmental Chemistry (3)	
	or CHM 361 Principles of Biochemistry (3)	
CEE 362	Environmental Engineering ...	3
CEE 440	Engineering Hydrology	3
MIC 205	Microbiology <i>S2</i>	3
MIC 206	Microbiology Laboratory <i>S2</i>	1
Total	.....	13

Environmental Engineering Program of Study A Four-Year Sequence First Year

First Semester

CHM 114	General Chemistry for Engineers <i>S1/S2</i>	4
ECE 100	Introduction to Engineering Design <i>N3</i>	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I <i>NI</i>	4
Total	.....	15

Second Semester

CEE 296	Civil Engineering Systems	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ¹	3
PHY 122	University Physics Laboratory I <i>S1/S2</i> ¹	1
Total	.....	14

Second Year

First Semester

ECE 210	Engineering Mechanics I: Statics	3
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i>	3
PHY 132	University Physics Laboratory II <i>S1/S2</i>	1
HU, SB, and awareness area course ³	.....	3
Total	.....	17

Second Semester

CHM 231	Elementary Organic Chemistry	3
ECE 312	Engineering Mechanics II: Dynamics	3
ECE 313	Introduction to Deformable Solids	3
ECE 340	Thermodynamics	3
ECE 384	Numerical Analysis for Engineers I	2
ECN 111	Macroeconomic Principles <i>SB</i>	3
	or ECN 112 Microeconomic Principles <i>SB</i> (3)	—
Total	.....	17

Third Year

First Semester

CEE 321	Structural Analysis and Design	4
CEE 341	Fluid Mechanics for Civil Engineers	4
ECE 300	Intermediate Engineering Design <i>L1</i>	3
ECE 351	Engineering Materials	3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
Total	.....	17

Second Semester

CEE 351	Geotechnical Engineering	4
CEE 361	Introduction to Environmental Engineering ...	4
CEE 372	Transportation Engineering ...	4
CHM 341	Physical Chemistry	3
HU, SB, and awareness area course ³	.....	3
Total	.....	18

Fourth Year

First Semester

CEE 362	Environmental Engineering ...	3
CEE 440	Engineering Hydrology	3
CEE 466	Sanitary Systems Design	3
CEE 496	Topics in Civil Engineering Practice	1
MIC 205	Microbiology <i>S2</i>	3
MIC 206	Microbiology Laboratory <i>S2</i>	1
HU, SB, and awareness area courses ³	.....	4
Total	.....	18

Second Semester

BIO 320	Fundamentals of Ecology	3
	or CHM 302 Environmental Chemistry (3)	—
	or CHM 361 Principles of Biochemistry (3)	—
	or PUP 442 Environmental Planning (3)	—
	or PUP 475 Environmental Impact Assessment (3)	—
CEE 441	Water Resources Engineering	3
CEE 486	Integrated Civil Engineering Design <i>L2</i>	3
HU, SB, and awareness area course ³	.....	3
Total	.....	12
Graduation requirement total	.....	128

- ¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
- ² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.
- ³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU or SB requirements. See page 196.

A maximum of two graduate courses may be taken for undergraduate credit by students whose cumulative GPA is 3.00 or higher and with the approval of the instructor, advisor, department chair, and the dean of the college.

CIVIL ENGINEERING (CEE)

- CEE 296 Civil Engineering Systems.** (3) F, S
Introduction to civil engineering. Problem solving, economics, description of civil engineering systems, design concepts, ethics, and professional responsibilities. Lecture, field trips. Pre- or corequisite: ECE 100.
- CEE 310 Testing of Materials for Construction.** (3) F, S
Structural and behavioral characteristics, engineering properties, measurements, and application of construction materials. Lecture, lab. Not open to engineering students. Prerequisite: CON 323.
- CEE 321 Structural Analysis and Design.** (4) F, S
Statically determinate and indeterminate structures (trusses, beams, and frames) by classical and matrix methods. Introduction to structural design. Lecture, recitation. Prerequisites: ECE 312, 313. Pre- or corequisites: ECE 380, 384.
- CEE 322 Steel Structures.** (3) F
Behavior of structural components and systems. Design of steel members and connections. Load and resistance factor design methods. Lecture, recitation. Prerequisite: CEE 321.
- CEE 323 Concrete Structures.** (3) S
Behavior of concrete structures and the design of reinforced and prestressed concrete members, including footings. Partial design of concrete building system. Lecture, recitation. Prerequisite: CEE 321.

CEE 340 Hydraulics and Hydrology. (3) F, S
Application of hydraulic engineering principles to flow of liquids in pipe systems and open channels; hydrostatics; characteristics of pumps and turbines. Introduction to hydrology. Not open to engineering students. Lecture, lab. Prerequisite: CON 221.

CEE 341 Fluid Mechanics for Civil Engineers. (4) F, S
Fundamental principles and methods of fluid mechanics forming the analytical basis for water resources engineering. Conduit and open channel flow. 3 hours lecture, 1 hour lab. Prerequisites: ECE 312, 313. Pre- or corequisites: ECE 380, 384.

CEE 351 Geotechnical Engineering. (4) F, S
Index properties and engineering characteristics of soils. Compaction, permeability and seepage, compressibility and settlement, and shear strength. Lecture, lab. Prerequisites: ECE 312, 313. Pre- or corequisites: ECE 380, 384.

CEE 361 Introduction to Environmental Engineering. (4) F, S
Concepts of air and water pollution; environmental regulation, risk assessment, chemistry, water quality modeling, water and wastewater treatment systems designs. Lecture, lab. Prerequisites: ECE 312, 313. Pre- or corequisites: ECE 380, 384.

CEE 362 Environmental Engineering. (3) S
Natural environment, the carbon cycle and biochemistry of wastes, principles of waste treatment, and drainage systems. Prerequisite: CEE 361.

CEE 371 Introduction to Urban Planning. (3) N
Theoretical and practical aspects of city planning. Interrelationships among physical planning, environment, government, and society. Not acceptable as a technical elective for CEE students.

CEE 372 Transportation Engineering. (4) F, S
Highway, rail, water, and air transportation. Operational characteristics and traffic control devices of each transport mode. Impact on urban form. Prerequisites: ECE 312, 313. Pre- or corequisites: ECE 380, 384.

CEE 412 Pavement Analysis and Design. (3) F
Design of flexible and rigid pavements for highways and airports. Surface, base, and subgrade courses. Cost analysis and pavement selection. Prerequisites: CEE 351; ECE 351.

CEE 423 Structural Design. (3) F
Analysis and design of reinforced concrete steel, masonry, and timber structures. Lecture, lab. Prerequisite: CEE 323. Corequisite: CEE 322.

CEE 432 Matrix and Computer Applications in Structural Engineering. (3) S
Matrix and computer applications to structural engineering and structural mechanics. Stiffness and flexibility methods, finite elements, and differences. Prerequisite: CEE 321.

CEE 440 Engineering Hydrology. (3) F
Descriptive hydrology; hydrologic cycle, models, and systems. Rain-runoff models. Hydrologic design. Concepts, properties, and basic equations of groundwater flow. Prerequisite: CEE 341.

CEE 441 Water Resources Engineering. (3) S

Application of the principles of hydraulics and hydrology to the engineering of water resources projects; design and operation of water resources systems; water quality. Prerequisite: CEE 341.

CEE 450 Soil Mechanics in Construction. (3) F, S

Soil mechanics as applied to the construction field, including foundations, highways, retaining walls, and slope stability. Relationship between soil characteristics and geologic formations. Not open to engineering students. Lecture, lab. Prerequisite: CON 323.

CEE 452 Foundations. (3) F, S

Applications of soil mechanics to foundation systems, bearing capacity, lateral earth pressure, and slope stability. Prerequisite: CEE 351.

CEE 466 Sanitary Systems Design. (3) F

Capacity, planning and design of water supply, domestic and storm drainage, and solid waste systems. Prerequisite: CEE 361.

CEE 471 Intelligent Transportation Systems. (3) F

Application of advanced technology to the vehicle and the roadway to solve traffic congestion, safety, and air quality problems. Prerequisite: CEE 372 or instructor approval.

CEE 475 Highway Geometric Design. (3) S

Design of the visible elements of the roadway. Fundamental design controls with application to rural roads, at-grade intersections, freeways, and interchanges. Lecture, recitation. Prerequisite: CEE 372.

CEE 486 Integrated Civil Engineering Design. (3) F, S

Students are required to complete a civil engineering design in a simulated practicing engineering environment. Lecture, team learning. Limited to undergraduates in their final semester. Prerequisites: CEE 321, 341, 351, 361, 372. *General Studies: L2.*

CEE 496 Topics in Civil Engineering Practice. (1) F, S

Professional engineering practice. Interviewing and résumé writing, professional registration requirements, continuing education, graduate study, financial planning, and employment. Prerequisite: senior standing.

CEE 512 Pavement Performance and Management. (3) S

Pavement management systems, including data collection, evaluation, optimization, economic analysis, and computer applications for highway and airport design. Prerequisite: CEE 412.

CEE 514 Bituminous Materials and Mixture. (3) F

Types of bituminous materials used in pavement mixtures. Chemical composition and physical properties, desirable aggregate characteristics, and optimum asphalt contents. Lecture, lab. Prerequisite: ECE 351.

CEE 515 Properties of Concrete. (3) S

Materials science of concrete. Cement chemistry, mechanisms of hydration, interrelationships among micro and macro properties of cement-based materials. Mechanical properties, failure theories, fracture mechanics of concrete materials. Cement-based composite materials and the durability aspects. Lecture, lab. Prerequisite: ECE 350 or 351.

CEE 521 Stress Analysis. (3) F

Advanced topics in the analytical determination of stress and strain. Prerequisite: CEE 321.

CEE 524 Advanced Steel Structures. (3) S

Strength properties of steel and their effects on structural behavior. Elastic design of steel structures. Plastic analysis and design of beams, frames, and bents. Plastic deflections. Plastic design requirements. Multistory buildings. Prerequisite: CEE 322.

CEE 526 Finite Element Methods in Civil Engineering. (3) F

Finite element formulation for solutions of structural, geotechnical, and hydraulic problems. Prerequisite: CEE 432.

CEE 527 Advanced Concrete Structures. (3) N

Ultimate strength design. Combined shear and torsion. Serviceability. Plastic analysis. Special systems. Prerequisite: CEE 323.

CEE 530 Prestressed Concrete. (3) S

Materials and methods of prestressing. Analysis and design for flexure, shear, and torsion. Prestress losses due to friction, creep, shrinkage, and anchorage set. Statically indeterminate structures. Design of flat slabs, bridges, and composite beams. Prerequisite: CEE 323.

CEE 533 Structural Optimization. (3) S

Linear and nonlinear programming. Problem formulation. Constrained and unconstrained optimization. Sensitivity analysis. Approximate techniques. FEM-based optimal design of mechanical and aerospace structures. Cross-listed as MAE 521. Prerequisite: instructor approval.

CEE 536 Structural Dynamics. (3) F

Structures and structural members subjected to dynamic loadings, response spectra theory applications to bridges and power plants, investigations of the responses of multidegree of freedom structures, and matrix and numerical methods of analysis. Lecture, recitation. Prerequisites: CEE 321; instructor approval.

CEE 537 Topics in Structural Engineering. (1–3) F, S

Advanced topics, including, wind engineering, earthquake engineering, probabilistic concepts, and bridge and building engineering. Prerequisite: instructor approval.

CEE 540 Groundwater Hydrology. (3) F

Physical properties of aquifers, well pumping, subsurface flow modeling, unsaturated flow, numerical methods, land subsidence, and groundwater pollution. Prerequisite: CEE 440 or instructor approval.

CEE 541 Surface Water Hydrology. (3) S

Hydrologic cycle and mechanisms, including precipitation, evaporation, and transpiration; hydrograph analysis; flood routing; statistical methods in hydrology and hydrologic design. Prerequisite: CEE 440 or instructor approval.

CEE 542 Water Resources Systems Planning. (3) N

Philosophy of water resources planning; economic, social, and engineering interaction; introduction to the theory and application of quantitative planning methodologies in water resources planning. Guest lecturers, case studies. Prerequisite: instructor approval.

CEE 543 Water Resources Systems I. (3) F

Theory and application of quantitative planning methodologies for the design and operation of water resources systems; class projects using a computer; case studies. Pre- or corequisite: CEE 542 or instructor approval.

CEE 545 Foundations of Hydraulic Engineering. (3) S

Review of incompressible fluid dynamics. Flow in pipes and channels; unsteady and varied flows; wave motion. Prerequisite: CEE 341.

CEE 546 Free Surface Hydraulics. (3) N

Derivation of 1-dimensional equations used in open channel flow analysis; computations for uniform and nonuniform flows, unsteady flow, and flood routing. Mathematical and physical models. Prerequisite: CEE 341.

CEE 547 Principles of River Engineering. (3) N

Uses of rivers, study of watershed, and channel processes. Sediment sources, yield, and control; hydrologic analysis. Case studies. Prerequisite: CEE 341 or instructor approval.

CEE 548 Sedimentation Engineering. (3) N

Introduction to the transportation of granular sedimentary materials by moving fluids. Degradation, aggregation, and local scour in alluvial channels. Mathematical and physical models. Prerequisite: CEE 547 or instructor approval.

CEE 550 Soil Behavior. (3) S

Physicochemical aspects of soil behavior, stabilization of soils, and engineering properties of soils. Prerequisite: CEE 351.

CEE 551 Advanced Geotechnical Testing. (3) N

Odometer, triaxial (static and cyclic) back pressure saturated and unsaturated samples, pore pressure measurements, closed-loop computer-controlled testing, in-situ testing, and sampling. Lecture, lab. Prerequisite: CEE 351.

CEE 552 Geological Engineering. (3) S

Geological investigations for engineering purposes, case histories, geologic structure, weathering, remote sensing, geophysics, and air photo interpretation for engineering site locations. Lecture, field trips. Prerequisite: CEE 351.

CEE 553 Advanced Soil Mechanics. (3) N

Application of theories of elasticity and plasticity to soils, theories of consolidation, failure theories, and response to static and dynamic loading. Prerequisite: CEE 351.

CEE 554 Shear Strength and Slope Stability. (3) S

Shear strength of saturated and unsaturated soils strength-deformation relationships, time-dependent strength parameters, effects of sampling, and advanced slope stability. Prerequisite: CEE 351.

CEE 555 Advanced Foundations. (3) F

Deep foundations, braced excavations, anchored bulkheads, reinforced earth, and underpinning. Prerequisite: CEE 351.

CEE 556 Seepage and Earth Dams. (3) N

Transient and steady state fluid flow through soil, confined and unconfined flow, pore water pressures, and application to earth dams. Prerequisite: CEE 351.

CEE 557 Hazardous Waste: Site Assessment and Mitigation Measures. (3) F

Techniques for hazardous waste site assessment and mitigation. Case histories presented by instructor and guest speakers. Prerequisites: graduate standing; instructor approval.

CEE 559 Earthquake Engineering. (3) N

Characteristics of earthquake motions, selection of design earthquakes, site response analyses, seismic slope stability, and liquefaction. Prerequisite: CEE 351.

CEE 560 Soil and Groundwater Remediation. (3) S

Techniques for remediation of contaminated soils and groundwaters are presented with basic engineering principles. Prerequisite: instructor approval.

CEE 561 Physical-Chemical Treatment of Water and Waste. (3) F

Theory and design of physical and chemical processes for the treatment of water and waste waters. Prerequisite: CEE 361.

CEE 562 Environmental Biochemistry and Waste Treatment. (3) S

Theory and design of biological waste treatment systems. Pollution and environmental assimilation of wastes. Prerequisite: CEE 362.

CEE 563 Environmental Chemistry Laboratory. (3) F

Analysis of water, domestic and industrial wastes, laboratory procedures for pollution evaluation, and the control of water and waste treatment processes. Lecture, lab. Prerequisite: CEE 361.

CEE 566 Industrial/Hazardous Waste Treatment. (3) F

Emphasis on treatment of local industrial/hazardous waste problems, including solvent recovery and metals. Lecture, project. Prerequisites: CEE 561, 563.

CEE 573 Traffic Engineering. (3) F

Driver, vehicle, and roadway characteristics, laws and ordinances, traffic control devices, traffic engineering studies, and Transportation System Management measures. Prerequisite: CEE 372.

CEE 574 Highway Capacity. (3) S

Highway capacity for all functional classes of highways. Traffic signalization, including traffic studies, warrants, cycle length, timing, phasing, and coordination. Prerequisite: CEE 372.

CEE 575 Traffic Flow Theory and Safety Analysis. (3) N

Traffic flow theory; distributions, queuing, delay models, and car-following. Highway safety; accident records systems, accident analysis, identifying problem locations, and accident countermeasures. Prerequisite: CEE 573 or 574.

CEE 576 Airport Engineering. (3) F

Planning and design of airport facilities. Effect of aircraft characteristics, air traffic control procedures and aircraft demand for runway and passenger handling facilities, on-site selection, runway configuration, and terminal design. Prerequisite: CEE 372.

CEE 577 Urban Transportation Planning. (3) S

Application of land use parameters traffic generation theory, traffic distribution and assignment models, transit analysis, and economic factors to the solution of the urban transportation problem. Prerequisite: CEE 372.

Students enrolled in CEE 580, 590, 592, 599, 792, and 799 are required to attend graduate student seminars at the times shown in the Schedule of Classes. Each semester, every graduate student enrolled for more than eight semester hours is to enroll for at least one semester hour of CEE 592, 599, 792, or 799.

Department of Computer Science and Engineering

Stephen S. Yau

Chair

(GWC 206) 602/965-3190

www.eas.asu.edu/~csdept

PROFESSORS

ASHCROFT, BLACKLEDGE,
COLLOFELLO, FARIN, GOLSHANI,
LEWIS, NIELSON, J. URBAN,
WOODFILL, YAU

ASSOCIATE PROFESSORS

BHATTCHARYA, DASGUPTA,
DIETRICH, FALTZ, GHOSH, HUEY,
KAMBHAMPATI, LINDQUIST, MILLER,
O'GRADY, PANCHANATHAN,
PHEANIS, ROCKWOOD,
SEN, S. URBAN

ASSISTANT PROFESSORS

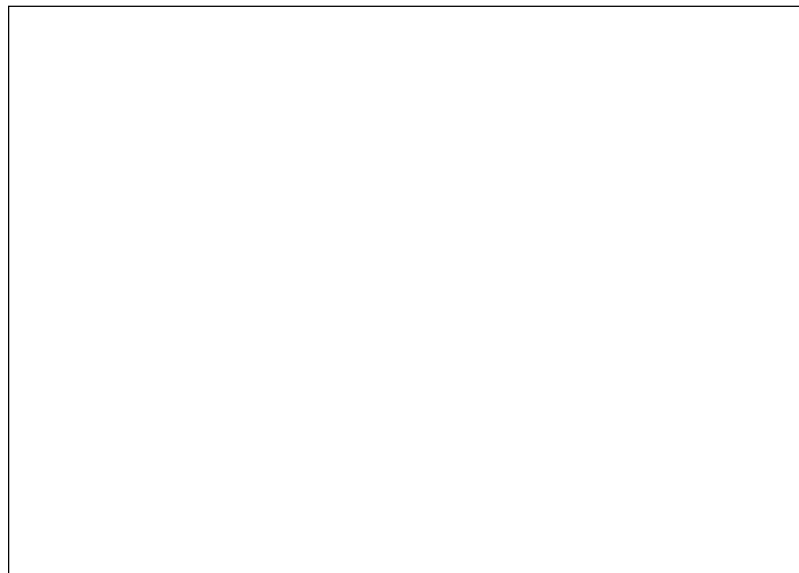
BAZZI, CANDAN, HSU, WAGNER

LECTURERS

DELIBERO, HOUSTON,
NAVABI, WHITEHOUSE

Computers have a significant impact on our daily lives, and this impact is likely to be even greater in the future as computer professionals continue to develop more powerful, smaller, faster, and less expensive computing systems. Computer science and computer engineering deal with the study, design, development, construction, and application of modern computing machinery. Other important topics include computing techniques and appropriate languages for general information processing, for scientific computation, for the recognition, storage, retrieval, and processing of data of all kinds, and for the automatic control and simulation of processes.

The curricula offered by the Department of Computer Science and Engineering prepare the student to be a participant in this rapidly changing area of technology by presenting in-depth treatments of the fundamentals of computer science and computer engineering. The department offers two undergraduate degrees: a B.S. degree in Computer Science and a B.S.E. degree in Computer Systems Engineering.



Students fast at work in a computer lab located in Wilson Hall.

Tim Trumble photo

DEGREE REQUIREMENTS

A minimum of 128 semester hours is required for the B.S. degree in Computer Science and the B.S.E. degree in Computer Systems Engineering. A minimum of 50 upper-division semester hours is required. In addition to the requirement for a cumulative GPA of 2.00 or higher, all computer science and computer systems engineering students must obtain a minimum grade of “C” in all CSE courses used for degree credit.

GRADUATION REQUIREMENTS

In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

DEGREES

Computer Science—B.S.

The faculty in the Department of Computer Science and Engineering offer a B.S. degree that prepares the student for a career in computer science. A student pursuing a B.S. degree must complete the First-Year Composition requirement, the General Studies requirement, department degree requirements, the computer science core courses, a senior-level breadth requirement in the major, technical electives, and unrestricted electives. More detail on these requirements is available at the department office, on the department Web site, or e-mail questions to cse.ugrad.desk@asu.edu.

The following list specifies departmental requirements for the B.S. degree in Computer Science.

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105	
	Advanced First-Year Composition (3)	
	or ENG 107, 108	
	English for Foreign Students (6)	—
Total		6

General Studies/Department Requirements

	<i>Humanities and Fine Arts/Social and Behavioral Sciences</i>	
HU/SB electives		18

	<i>Literacy and Critical Inquiry</i>	
L1/L2 electives		6
	<i>Natural Sciences/Basic Sciences</i>	
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1
Science elective ³		4
Total		12

Numeracy/Mathematics

ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
MAT 243	Discrete Mathematical Structures	3
MAT 270	Calculus with Analytic Geometry I N1	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 342	Linear Algebra	3
Total		21
General Studies/department requirement total		57

In addition, the following courses constitute the Computer Science core:

Computer Science Core

CSE 120	Digital Design Fundamentals	3
CSE 200	Concepts of Computer Science N3	3
CSE 210	Data Structures and Algorithms I N3	3
CSE 225	Assembly Language Programming and Microprocessors (Motorola) N3 or CSE 226 Assembly Language Programming and Microprocessors (Intel) N3 (4)	4
CSE 240	Introduction to Programming Languages	3
CSE 310	Data Structures and Algorithms II	3
CSE 330	Computer Organization and Architecture	3
CSE 340	Principles of Programming Languages	3
CSE 355	Introduction to Theoretical Computer Science	3
CSE 360	Introduction to Software Engineering	3
CSE 430	Operating Systems	3
Total computer science core		34

Computer science breadth requirement	18
Each student must complete 18 hours of CSE 400-level courses.	
Technical electives	6
Each student must complete six hours of courses chosen from the computer science technical elective list and approved by the student’s advisor.	
Unrestricted electives	7
Total	31
Degree requirements total	128

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

³ This elective may be satisfied by any physics courses requiring PHY 131 as a prerequisite or any laboratory science for majors in the discipline and satisfying the S1 or S2 General Studies requirements (except PHS 110, PHY 101, 105, 111, or 112).

**Computer Science Program of Study
Typical Four-Year Sequence
First Year**

First Semester

CSE 200	Concepts of Computer Science N3	3
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I N1	4
HU, SB, awareness area course ¹		3
Total		13

Second Semester

CSE 120	Digital Design Fundamentals	3
CSE 210	Data Structures and Algorithms I N3	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
Laboratory science S2 ²		4
Total		17

Second Year

First Semester

CSE 240	Introduction to Programming Languages	3
MAT 243	Discrete Mathematical Structures	3
MAT 272	Calculus with Analytic Geometry III	4
PHY 121	University Physics I: Mechanics S1/S2	3
PHY 122	University Physics Laboratory I S1/S2	1
HU, SB, awareness area course ¹		3
Total		17

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Second Semester

CSE 225	Assembly Language Programming and Microprocessors (Motorola)	4
CSE 310	Data Structures and Algorithms II	3
PHY 131	University Physics II: Electricity and Magnetism <i>SI/S2</i> ³	3
PHY 132	University Physics Laboratory II <i>SI/S2</i> ³	1
HU, SB, awareness area course ¹		3
L1 elective		3
Total		17

Third Year

First Semester

CSE 330	Computer Organization and Architecture	3
CSE 340	Principles of Programming Languages	3
MAT 342	Linear Algebra	3
HU, SB, awareness area course ¹		3
Unrestricted elective		4
Total		16

Second Semester

CSE 355	Introduction to Theoretical Computer Science	3
CSE 360	Introduction to Software Engineering	3
CSE 430	Operating Systems	3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
HU, SB, awareness area course ¹		3
Unrestricted elective		3
Total		18

Fourth Year

First Semester

400-level CSE computer science breadth electives	9
L2 elective	3
Technical elective	3
Total	15

Second Semester

HU, SB, awareness area course ¹	3
400-level CSE computer science breadth electives	9
Technical elective	3
Total	15

¹ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU and SB requirements. See page 196.

² This elective may be satisfied by any physics courses requiring PHY 131 as a prerequisite or any laboratory science for majors in the discipline and satisfying the S1 or S2 General Studies requirements (except PHS 110, PHY 101, 105, 111, or 112).

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Computer Systems Engineering—B.S.E.

The Department of Computer Science and Engineering offers a B.S.E. degree that prepares the student for a career in computer systems engineering. This degree program provides training in both engineering and computer science. The following list specifies departmental requirements for the B.S.E. degree in Computer Systems Engineering.

First-Year Composition

ENG 101, 102	First-Year Composition	6
	or ENG 105	
	Advanced First-Year Composition (3)	
	or ENG 107, 108	
	English for Foreign Students (6)	
Total		6

General Studies/Department Requirements

<i>Humanities and Fine Arts/Social and Behavioral Sciences</i>		
ECN 111	Macroeconomic Principles <i>SB</i>	3
	or ECN 112 Microeconomic Principles <i>SB</i> (3)	
HU/SB electives		13
Total		16

Literacy and Critical Inquiry

CSE 423	Microcomputer System Hardware <i>L2</i>	3
ECE 300	Intermediate Engineering Design <i>L1</i>	3
Total		6

Natural Sciences/Basic Sciences

CHM 114	General Chemistry for Engineers <i>SI/S2</i>	4
	or CHM 116 General Chemistry <i>SI/S2</i> (4)	
PHY 121	University Physics I: Mechanics <i>SI/S2</i> ¹	3
PHY 122	University Physics Laboratory I <i>SI/S2</i> ¹	1
PHY 131	University Physics II: Electricity and Magnetism <i>SI/S2</i> ²	3
PHY 132	University Physics Laboratory II <i>SI/S2</i> ²	1
PHY 361	Introductory Modern Physics	3
Total		15

Numeracy/Mathematics

ECE 100	Introduction to Engineering Design <i>N3</i>	4
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3

MAT 243	Discrete Mathematical Structures	3
MAT 270	Calculus with Analytic Geometry I <i>N1</i>	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
MAT 342	Linear Algebra	3
Total		28
General Studies/department requirement total		65

Engineering Core

CSE 200	Concepts of Computer Science <i>N3</i>	3
CSE 225	Assembly Language Programming and Microprocessors (Motorola)	4
ECE 210	Engineering Mechanics I: Statics	3
ECE 301	Electrical Networks	4
ECE 334	Electronic Devices and Instrumentation	4
Total		18

Computer Science Core

CSE 120	Digital Design Fundamentals	3
CSE 210	Data Structures and Algorithms I <i>N3</i>	3
CSE 240	Introduction to Programming Languages	3
CSE 310	Data Structures and Algorithms II	3
CSE 330	Computer Organization and Architecture	3
CSE 340	Principles of Programming Languages	3
CSE 355	Introduction to Theoretical Computer Science	3
CSE 360	Introduction to Software Engineering	3
CSE 421	Microprocessor System Design I	4
CSE 422	Microprocessor System Design II	4
CSE 430	Operating Systems	3
Technical electives		4
Total		39

Each student must complete four hours of courses chosen from the computer science technical elective list and approved by the student's advisor.

Degree requirement total **128**

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

**Computer Systems Engineering
Program of Study
Typical Four-Year Sequence
First Year**

First Semester

CSE 200	Concepts of Computer Science N3	3
ECE 100	Introduction to Engineering Design N3	4
ECN 111	Macroeconomic Principles SB	3
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I N1	4
Total		17

Second Semester

CHM 114	General Chemistry for Engineers S1/S2	4
CSE 120	Digital Design Fundamentals	3
CSE 210	Data Structures and Algorithms I N3	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
Total		17

Second Year

First Semester

CSE 225	Assembly Language Programming and Microprocessors (Motorola)	4
MAT 243	Discrete Mathematical Structures	3
MAT 272	Calculus with Analytic Geometry III	4
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
Total		15

Second Semester

CSE 240	Introduction to Programming Languages	3
CSE 330	Computer Organization and Architecture	3
ECE 210	Engineering Mechanics I: Statics	3
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1
Total		16

Third Year

First Semester

CSE 310	Data Structures and Algorithms II	3
ECE 300	Intermediate Engineering Design L1	3
MAT 342	Linear Algebra	3
HU, SB, awareness area courses ³		7
Total		16

Second Semester

CSE 340	Principles of Programming Languages	3
CSE 360	Introduction to Software Engineering	3
CSE 421	Microprocessor System Design I	4
ECE 380	Probability and Statistics for Engineering Problem Solving N2	3
HU, SB, awareness area course ³		3
Total		16

Fourth Year

First Semester

CSE 355	Introduction to Theoretical Computer Science	3
CSE 422	Microprocessor System Design II	4
CSE 430	Operating Systems	3
ECE 301	Electrical Networks I	4
PHY 361	Introductory Modern Physics	3
Total		17

Second Semester

CSE 423	Microcomputer System Hardware L2	3
ECE 334	Electronic Devices and Instrumentation	4
HU, SB, awareness area course ³		3
Technical electives		4
Total		14

- ¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
- ² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.
- ³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU and SB requirements. See page 196.

COMPUTER SCIENCE AND ENGINEERING (CSE)

CSE 100 Principles of Programming. (3) F, S, SS
Concepts of problem solving, algorithm design, structured programming, fundamental algorithms and techniques, and computer systems concepts. Social and ethical responsibility. Prerequisite: MAT 170. *General Studies: N3.*

CSE 120 Digital Design Fundamentals. (3) F, S, SS
Number systems, conversion methods, binary and complement arithmetic, Boolean algebra, circuit minimization, ROMs, PLAs, flipflops, synchronous sequential circuits. Lecture, lab. Cross-listed as EEE 120. Prerequisite: computer literacy.

CSE 180 Computer Literacy. (3) F, S, SS
Introduction to personal computer operations and their place in society. Problem-solving approaches using databases, spreadsheets, and word processing. May be taken for credit on either Windows or Macintosh, but not both. Lecture, demonstration. Prerequisite: nonmajor. *General Studies: N3.*

CSE 181 Applied Problem Solving with BASIC. (3) F, S, SS
Introduction to systematic definition of problems, solution formulation, and method validation. Computer solution using BASIC required for projects. Lecture, lab. Prerequisites: MAT 117; nonmajor. *General Studies: N3.*

CSE 183 Applied Problem Solving with FORTRAN. (3) F
A human-oriented, systems approach to problem definition, formulation, and solution using FORTRAN. Computer solution required for projects. Prerequisites: MAT 170; nonmajor. *General Studies: N3.*

CSE 185 Internet and the World Wide Web. (3) F, S
Fundamental Internet concepts, World Wide Web browsing, publishing, searching, advanced Internet productivity tools.

CSE 200 Concepts of Computer Science. (3) F, S, SS
Overview of algorithms, architecture, languages, operating systems, theory. Problem solving with a high level language (C++). Lecture, lab. Prerequisite: one year of high school programming with a structured language (C++ preferred) or CSE 100. *General Studies: N3.*

CSE 210 Data Structures and Algorithms I. (3) F, S, SS
Object oriented design, static and dynamic data structures (strings, stacks, queues, binary trees), recursion, and searching and sorting. Professional responsibility. Prerequisite: CSE 200. *General Studies: N3.*

CSE 225 Assembly Language Programming and Microprocessors (Motorola). (4) F, S, SS
Assembly language programming, including input/output programming and exception/interrupt handling. Register-level computer organization, I/O interfaces, assemblers, and linkers. Motorola-based assignments. Lecture, lab. Cross-listed as EEE 225. Prerequisites: CSE 100 (or 200); CSE/EEE 120.

CSE 226 Assembly Language Programming and Microprocessors (Intel). (4) F, S
CPU/Memory/peripheral device interfaces and programming. System buses, interrupts, serial and parallel I/O, DMA, coprocessors. Intel-based assignments. Lecture, lab. Cross-listed as EEE 226. Prerequisites: CSE 100 (or 200); CSE/EEE 120.

CSE 240 Introduction to Programming Languages. (3) F, S, SS

Introduction to the procedural (Ada), applicative (LISP), and declarative (Prolog) languages. Lecture, lab. Prerequisite: CSE 210.

CSE 310 Data Structures and Algorithms II. (3) F, S, SS

Advanced data structures and algorithms, including stacks, queues, trees (B, B+, AVL), and graphs. Searching for graphs, hashing, external sorting. Lecture, lab. Prerequisites: CSE 210; MAT 243.

CSE 330 Computer Organization and Architecture. (3) F, S, SS

Instruction set architecture, processor performance and design; datapath, control (hard-wired, microprogrammed), pipelining, input/output. Memory organization with cache, virtual memory. Prerequisite: CSE/EEE 225 or 226.

CSE 340 Principles of Programming Languages. (3) F, S, SS

Introduction to language design and implementation. Parallel, machine-dependent and declarative features; type theory; specification, recognition, translation, run-time management. Prerequisites: CSE 240, 310; CSE/EEE 225 (or 226).

CSE 355 Introduction to Theoretical Computer Science. (3) F, S

Introduction to formal language theory and automata, Turing machines, decidability/undecidability, recursive function theory, and introduction to complexity theory. Prerequisite: CSE 310.

CSE 360 Introduction to Software Engineering. (3) F, S, SS

Software life cycle models; project management, team development environments and methodologies; software architectures; quality assurance and standards; legal, ethical issues. Prerequisites: CSE 210, 240.

CSE 408 Multimedia Information Systems. (3) F

Design, use, and applications of multimedia systems. An introduction to acquisition, compression, storage, retrieval, and presentation of data from different media such as images, text, voice, and alphanumeric. Prerequisite: CSE 310.

CSE 412 Database Management. (3) F, S

Introduction to DBMS concepts. Data models and languages. Relational database theory. Database security/integrity and concurrency. Prerequisite: CSE 310.

CSE 420 Computer Architecture I. (3) S

Computer architecture. Performance versus cost trade-offs. Instruction set design. Basic processor implementation and pipelining. Prerequisite: CSE 330.

CSE 421 Microprocessor System Design I. (4) F, S

Assembly-language programming and logical hardware design of systems using 8-bit microprocessors and microcontrollers. Fundamental concepts of digital system design. Reliability and social, legal implications. Lecture, lab. Prerequisite: CSE/EEE 225 or 226.

CSE 422 Microprocessor System Design II. (4) F, S

Design of microcomputer systems using contemporary logic and microcomputer system components. Requires assembly language programming. Prerequisite: CSE 421.

CSE 423 Microcomputer System Hardware. (3) S

Information and techniques presented in CSE 422 are used to develop the hardware design of a multiprocessor, multiprogramming, microprocessor-based system. Prerequisite: CSE 422. *General Studies: L2.*

CSE 428 Computer-Aided Processes. (3) A

Hardware and software considerations for computerized manufacturing systems. Specific concentration on automatic inspection, numerical control, robotics, and integrated manufacturing systems. Prerequisite: CSE 330.

CSE 430 Operating Systems. (3) F, S

Operating system structure and services, processor scheduling, concurrent processes, synchronization techniques, memory management, virtual memory, input/output, storage management, and file systems. Prerequisites: CSE 330, 340.

CSE 434 Computer Networks. (3) F, S

Cryptography fundamentals; data compression; error handling; flow control; multihop routing; network protocol algorithms; network reliability, timing, security; physical layer basics. Prerequisite: CSE 330.

CSE 438 Systems Programming. (3) A

Design and implementation of systems programs, including text editors, file utilities, monitors, assemblers, relocating linking loaders, I/O handlers, and schedulers. Prerequisite: CSE 421 or instructor approval.

CSE 440 Compiler Construction I. (3) F

Introduction to programming language implementation. Implementation strategies such as compilation, interpretation, and translation. Major compilation phases such as lexical analysis, semantic analysis, optimization, and code generation. Prerequisites: CSE 340, 355.

CSE 450 Design and Analysis of Algorithms. (3) F

Design and analysis of computer algorithms using analytical and empirical methods; complexity measures, design methodologies, and survey of important algorithms. Prerequisite: CSE 310.

CSE 457 Theory of Formal Languages. (3) A

Theory of grammar, methods of syntactic analysis and specification, types of artificial languages, relationship between formal languages, and automata. Prerequisite: CSE 355.

CSE 459 Logic for Computing Scientists I. (3) F

Propositional logic, syntax and semantics, proof theory versus model theory, soundness, consistency and completeness, first order logic, logical theories, automated theorem proving, ground resolution, pattern matching unification and resolution, Dijkstra's logic, proof obligations, and program proving. Prerequisite: CSE 355.

CSE 461 Software Engineering Project I. (3) F

First of two-course software design sequence. Development planning, management; process modeling; incremental and team development using CASE tools. Lecture, lab. Prerequisite: CSE 360.

CSE 462 Software Engineering Project II. (3) S

Second of two-course software design sequence. Process, product assessment and improvement; incremental and team development using CASE tools. Lecture, lab. Prerequisite: CSE 461.

CSE 470 Computer Graphics. (3) F, S

Display devices, data structures, transformations, interactive graphics, 3-dimensional graphics, and hidden line problem. Prerequisites: CSE 310; MAT 342.

CSE 471 Introduction to Artificial Intelligence. (3) F, S

State space search, heuristic search, games, knowledge representation techniques, expert systems, and automated reasoning. Prerequisites: CSE 240, 310.

CSE 473 Nonprocedural Programming Languages. (3) S

Functional and logic programming using languages like Lucid and Prolog. Typical applications would be a Screen Editor and an Expert System. Prerequisite: CSE 355.

CSE 476 Introduction to Natural Language Processing. (3) F

Principles of computational linguistics, formal syntax, and semantics, as applied to the design of software with natural (human) language I/O. Prerequisite: CSE 310 or instructor approval.

CSE 477 Introduction to Computer-Aided Geometric Design. (3) F, S

Introduction to parametric curves and surfaces, Bezier and B-spline interpolation, and approximation techniques. Prerequisites: CSE 210, 470; MAT 342.

CSE 507 Virtual Reality Systems. (3) S

Computer generated 3D environments, simulation of reality, spatial presence of virtual objects, technologies of immersion, tracking systems. Lecture, lab. Prerequisite: CSE 408 or 470 or 508 or instructor approval.

CSE 508 Digital Image Processing. (3) S

Digital Image fundamentals, image transforms, image enhancement and restoration techniques, image encoding, and segmentation methods. Prerequisite: EEE 303 or instructor approval.

CSE 510 Advanced Database Management. (3) F, S

Advanced data modeling, deductive databases, object-oriented databases, distributed and multidatabase systems; emerging database technologies. Prerequisite: CSE 412.

CSE 512 Distributed Databases. (3) A

Fragmentation design. Query optimization. Distributed joins. Concurrency control. Distributed deadlock detection. Prerequisite: CSE 510.

CSE 513 Deductive Databases. (3) F

Logic as a data model. Query optimization emphasizing the top-down and bottom-up evaluation of declarative rules. Prerequisite: CSE 510.

CSE 514 Object-Oriented Database Systems. (3) A

Object-oriented data modeling, database and language integration, object algebras, extensibility, transactions, object managers, versioning/configuration, active data, nonstandard applications. Research seminar. Prerequisite: CSE 510.

- CSE 517 Hardware Design Languages.** (3) N
Introduction to hardware design languages using VHDL. Modeling concepts for specification, simulation, and synthesis. Prerequisite: CSE 423 or EEE 425 or instructor approval.
- CSE 518 Synthesis with Hardware Design Languages.** (3) N
Modeling VLSI design in hardware design languages for synthesis. Transformation of language-based designs to physical layout. Application of synthesis tools. Prerequisite: CSE 517.
- CSE 520 Computer Architecture II.** (3) F
Computer architecture description languages, computer arithmetic, memory-hierarchy design, parallel, vector, and multiprocessors, and input/output. Prerequisites: CSE 420, 430.
- CSE 521 Microprocessor Applications.** (4) S
Microprocessor technology and its application to the design of practical digital systems. Hardware, assembly language programming, and interfacing of microprocessor-based systems. Lecture, lab. Prerequisite: CSE 421.
- CSE 523 Microcomputer Systems Software.** (3) F
Developing system software for a multiprocessor, multiprogramming, microprocessor-based system using information and techniques presented in CSE 421, 422. Prerequisite: CSE 422.
- CSE 526 Parallel Processing.** (3) N
Real and apparent concurrency. Hardware organization of multiprocessors, multiple computer systems, scientific attached processors, and other parallel systems. Prerequisite: CSE 330 or 423.
- CSE 530 Operating System Internals.** (3) F
Implementation of process management and synchronization, system call and interrupt handling, memory management, device drivers and file systems in UNIX. Prerequisites: CSE 430; knowledge of C language.
- CSE 531 Distributed and Multiprocessor Operating Systems.** (3) N
Distributed systems architecture, remote file access, message-based systems, object-based systems, client/server paradigms, distributed algorithms, replication and consistency, and multiprocessor operating systems. Prerequisite: CSE 530 or instructor approval.
- CSE 532 Advanced Operating System Internals.** (3) F
Memory, processor, process and communication management, and concurrency control in the Windows NT multiprocessor and distributed operating system kernels and servers. Prerequisite: CSE 530 or instructor approval.
- CSE 534 Advanced Computer Networks.** (3) F
Advanced network protocols and infrastructure, applications of high-performance networks to distributed systems, high-performance computing and multimedia domains, special features of networks. Prerequisite: CSE 434.
- CSE 536 Theory of Operating Systems.** (3) S
Protection. Communication and synchronization in distributed systems, distributed file systems, deadlock theory, virtual memory theory, and uniprocessor and multiprocessor thread management. Prerequisite: CSE 430.
- CSE 540 Compiler Construction II.** (3) S
Formal parsing strategies, optimization techniques, code generation, extensibility and transportability considerations, and recent developments. Prerequisite: CSE 440.
- CSE 545 Programming Language Design.** (3) N
Language constructs, extensibility and abstractions, and runtime support. Language design process. Prerequisite: CSE 440.
- CSE 550 Combinatorial Algorithms and Intractability.** (3) N
Combinatorial algorithms, nondeterministic algorithms, classes P and NP, NP-hard and NP-complete problems, and intractability. Design techniques for fast combinatorial algorithms. Prerequisite: CSE 450.
- CSE 555 Automata Theory.** (3) N
Finite state machines, pushdown automata, linear bounded automata, Turing machines, register machines, rams, and rasps; relationships to computability and formal languages. Prerequisite: CSE 355.
- CSE 556 Expert Systems.** (3) S
Knowledge acquisition and representation, rule-based systems, frame-based systems, validation of knowledge bases, inexact reasoning, and expert database systems. Prerequisite: CSE 471.
- CSE 560 Software Engineering.** (3) F, S
Software engineering foundations, formal representations in the software process; use of formalisms in creating a measured and structured working environment. Lecture, lab. Prerequisite: CSE 360.
- CSE 562 Parallel and Distributed Software Engineering.** (3) A
Software engineering characteristics particular to parallel and distributed systems. Tools and techniques to support software engineering involving parallel processing and distributed systems. Prerequisite: CSE 560.
- CSE 563 Software Requirements and Specification.** (3) A
Examination of the definitional stage of software development; analysis of specification representations, formal methods, and techniques emphasizing important application issues. Prerequisite: CSE 560.
- CSE 564 Software Design.** (3) A
Examination of software design issues and techniques. Includes a survey of design representations and a comparison of design methods. Prerequisite: CSE 560.
- CSE 565 Software Verification, Validation, and Testing.** (3) A
Test planning, requirements-based and code-based testing techniques, tools, reliability models, and statistical testing. Prerequisite: CSE 560.
- CSE 566 Software Project, Process, and Quality Management.** (3) A
Project management, risk management, configuration management, quality management, and simulated project management experiences. Prerequisite: CSE 560.
- CSE 570 Advanced Computer Graphics I.** (3) F
Hidden surface algorithms, lighting models, and shading techniques. User interface design. Animation techniques. Fractals and stochastic models. Raster algorithms. Prerequisite: CSE 470.
- CSE 571 Artificial Intelligence.** (3) S
Definitions of intelligence, computer problem solving, game playing, pattern recognition, theorem proving, and semantic information processing; evolutionary systems; heuristic programming. Prerequisite: CSE 471.
- CSE 573 Advanced Computer Graphics II.** (3) S
Modeling of natural phenomena: terrain, clouds, fire, water, and trees. Particle systems, deformation of solids, antialiasing, and volume visualization. Lecture, lab. Prerequisite: CSE 470.
- CSE 574 Planning and Learning Methods in AI.** (3) F
Reasoning about time and action, plan synthesis and execution, improving planning performance, applications to manufacturing intelligent agents. Prerequisite: CSE 471 or equivalent.
- CSE 575 Decision-Making Strategies in AI.** (3) S
Automatic knowledge acquisition, automatic analysis/synthesis of strategies, distributed planning/problem solving, causal modeling, predictive human-machine environments. Prerequisite: CSE 471 or 571 or equivalent.
- CSE 576 Topics in Natural Language Processing.** (3) S
Comparative parsing strategies, scoping and reference problems, nonfirst-order logical semantic representations, and discourse structure. Prerequisite: CSE 476 or instructor approval.
- CSE 577 Advanced Computer-Aided Geometric Design I.** (3) F
General interpolation; review of curve interpolation and approximation; spline curves; visual smoothness of curves; parameterization of curves; introduction to surface interpolation and approximation. Prerequisites: CSE 470 and 477 or instructor approval.
- CSE 578 Advanced Computer-Aided Geometric Design II.** (3) S
Coons patches and Bezier patches; triangular patches; arbitrarily located data methods; geometry processing of surfaces; higher dimensional surfaces. Prerequisites: CSE 470 and 477 or instructor approval.
- CSE 579 NURBs: Nonuniform Rational B-Splines.** (3) S
Projective geometry, NURBs-based modeling, basic theory of conics and rational Bezier curves, rational B-splines, surfaces, rational surfaces, stereographic maps, quadrics, IGES data specification Prerequisites: CSE 470, 477.

Department of Electrical Engineering

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REGENTS' PROFESSORS

BALANIS, FERRY

PROFESSORS

ALLSTOT, BACKUS, CROUCH,
DeMASSA, GOODNICK, GORUR,
HEYDT, HIGGINS, KARADY, KOZICKI,
PALAIS, PAN, ROEDEL, SADOWSKY,
SCHRODER, SPANIAS, THORNTON

ASSOCIATE PROFESSORS

ABERLE, ALLEE, BIRD,
CHAKRABARTI, COCHRAN,
EL-GHAZALY, EL-SHARAWY,
GREENEICH, GRONDIN, HOLBERT,
MORRELL, RODRIGUEZ, C. SHEN,
J. SHEN, SI, SKROMME, TSAKALIS,
TYLAVSKY, ZHANG

ASSISTANT PROFESSORS

CAPONE, KARAM,
VASILESKA-KAFEDZISKA

The professional activities of electrical engineers directly affect the lives of most of the world's population every day. They are responsible for the design and development of radio and television transmitters and receivers, telephone networks and switching systems, computer systems, and electric power generation and distribution. Within the broad scope of these systems, the electrical engineer is concerned with a challenging and diverse array of design and development problems.

Electrical engineers design minuscule semiconductor integrated circuits that contain many thousands of elementary devices. They design systems for automatically controlling mechanical devices and a variety of processes. They are responsible for the design of satellite communication links as well as patient monitoring systems for hospitals. The development of the microprocessor has expanded the opportunities for electrical engineers to improve the design of familiar products since these devices are now incorporated in automobiles, consumer and office products, entertainment systems, and a vast vari-

ety of test and measurement instruments and machine tools.

Students who earn a B.S.E. degree in Electrical Engineering will be involved in a variety of electrical and electronic problems in the course of their careers. To ensure the necessary breadth of knowledge, the Electrical Engineering curriculum includes basic (core) engineering courses and courses in networks and electronic circuits, electromagnetic fields and waves, microprocessors, communication and control systems, solid-state electronics, electrical power systems, and other specialty courses.

ELECTRICAL ENGINEERING—B.S.E.

The goal of the Electrical Engineering undergraduate program is to prepare the graduates for entry-level positions as electrical engineers for the broad range of opportunities available in industrial, commercial, and governmental organizations, and to prepare the graduates for continued learning experiences either in a formal graduate program or in continuing education applications.

The curriculum in Electrical Engineering builds upon the base provided by the engineering core. Beyond the engineering core, the curriculum includes a number of required electrical engineering and technical elective courses. Approved technical elective courses serve to provide students with an opportunity either to broaden their background in electrical engineering or to study, in greater depth, technical subjects in which they have special interests. Successful completion of the curriculum leaves the student prepared to embark on a career in electrical engineering or to pursue advanced education in graduate school.

The engineering design experience is structured around three backbone courses employing engineering teams: ECE 100 Introduction to Engineering Design (freshman year), ECE 300 Intermediate Engineering Design (junior year), and EEE 490 Senior Design Laboratory. The integrated experience is strengthened with required courses, EEE 120 Digital Design Fundamentals, EEE 225/226 Assembly Language Programming and Microprocessors, EEE 303 Signals and Systems, and EEE 360 Energy Conversion and Transport. Students focus on design pertaining to spe-

cific electrical engineering areas in their senior technical electives before the culminating, capstone design experience in EEE 490.

DEGREE REQUIREMENTS

A minimum of 128 semester hours is necessary for the B.S.E. degree in Electrical Engineering. A minimum of 50 upper-division semester hours is required.

GRADUATION REQUIREMENTS

A student must earn a grade of "C" or higher in the mathematics and physics courses listed in the program of study. The student must also have an overall GPA of at least 2.00 for the following group of courses: CSE 100; ECE 300, 301, 334, 352; all courses with an EEE prefix; and all other courses used as technical electives.

In addition to fulfilling school and major requirements, students must satisfy all university graduation requirements. See pages 79-83.

COURSE REQUIREMENTS

The specific course requirements for the B.S.E. degree in Electrical Engineering follow.

First-Year Composition*

ENG 101, 102	First Year Composition	6
	or ENG 105	
	Advanced First-Year Composition (3)	
	or ENG 107, 108	
	English for Foreign Students (6)	
Total		6

* A minimum grade of "C" is required.

General Studies/School Requirements

<i>Humanities and Fine Arts/ Social and Behavioral Sciences</i>		
ECN 111	Macroeconomic Principles SB	3
	or ECN 112 Microeconomic Principles SB (3)	
HU courses		6-10
SB courses		3-7
Minimum total		16

Literacy and Critical Inquiry

ECE 300	Intermediate Engineering Design L1	3
EEE 490	Senior Design Laboratory L2	3
Total		6

Natural Sciences/Basic Sciences

CHM 114	General Chemistry for Engineers S1/S2 or CHM 116 General Chemistry S1/S2 (4)	4
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1
PHY 241	University Physics III	3
Total		15

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Numeracy and Mathematics

ECE 100	Introduction to Engineering Design N3	4
MAT 270	Calculus with Analytic Geometry I NI	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
MAT 342	Linear Algebra	3
MAT 362	Advanced Mathematics for Engineers and Scientists I	3
Total		25
General Studies/school requirements total		68

Engineering Core

ECE 301	Electrical Networks I	4
ECE 314	Engineering Mechanics	4
ECE 334	Electronic Devices and Instrumentation	4
ECE 352	Properties of Electronic Materials	4
EEE 225	Assembly Language Programming and Microprocessors (Motorola) or EEE 226 Assembly Language Programming and Microprocessors (Intel) (4)	4
Total		20

Electrical Engineering Major

The following courses are required to fulfill the Electrical Engineering major:

CSE 100	Principles of Programming N3	3
EEE 120	Digital Design Fundamentals	3
EEE 302	Electrical Networks II	3
EEE 303	Signals and Systems	3
EEE 340	Electromagnetic Engineering I	4
EEE 350	Random Signal Analysis	3
EEE 360	Energy Conversion and Transport	4
Total		23

Technical Electives in Electrical Engineering

The program in Electrical Engineering requires a total of 17 hours of technical electives. To ensure breadth of knowledge, students *must* select courses from at least three of the following six areas. In addition, to ensure depth, two courses must be taken in one area.

Communications

EEE 407	Digital Signal Processing	4
EEE 455	Communication Systems	4
EEE 459	Data Communication Systems	3

Control

EEE 480	Feedback Systems	4
EEE 482	Introduction to State Space Methods	3

Electromagnetics

EEE 440	Electromagnetic Engineering II	4
EEE 443	Antennas	3
EEE 445	Microwaves	4
EEE 448	Fiber Optics	4

Electronic Circuits

EEE 405	Filter Design	3
EEE 425	Digital Systems and Circuits	4
EEE 433	Analog Integrated Circuits	3

Power Systems

EEE 460	Nuclear Concepts for the 21st Century	3
EEE 463	Electrical Power Plant	3
EEE 470	Electric Power Devices	3
EEE 471	Power System Analysis	3
EEE 473	Electrical Machinery	3

Solid-State Electronics

EEE 434	Quantum Mechanics for Engineers	3
EEE 435	Microelectronics	3
EEE 436	Fundamentals of Solid-State Devices	3
EEE 437	Optoelectronics	3
EEE 439	Semiconductor Facilities and Cleanroom Practices	3

With department approval Computer Science and Engineering courses at or above the 300 level may be substituted for one of the above areas. Of the remaining technical electives, two courses may be taken outside electrical engineering. With department approval, qualified students may choose two technical electives from other courses in engineering, mathematics, and the sciences at or above the 300 level, including graduate courses. Students must have a GPA of not less than 3.00 and approval of the dean to enroll in EEE graduate-level courses. In addition, these technical electives may be chosen from the approved list of courses from the College of Business.

Electrical Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM 114	General Chemistry for Engineers S1/S2 or CHM 116 General Chemistry S1/S2 (4)	4
ECE 100	Introduction to Engineering Design N3	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I NI	4
Total		15

Second Semester

EEE 120	Digital Design Fundamentals	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
Total		14

Second Year

First Semester

CSE 100	Principles of Programming N3	3
ECN 111	Macroeconomic Principles SB or ECN 112 Microeconomic Principles SB (3)	3
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

PHY 131	University Physics II: Electricity and Magnetism <i>SI/S2</i> ²	3
PHY 132	University Physics Laboratory II <i>SI/S2</i> ²	1
Total	.....	17

Second Semester

ECE 301	Electrical Networks I	4
EEE 225	Assembly Language Programming and Micro- processors (Motorola)	4
	or EEE 226 Assembly Language Programming and Microprocessors (Intel) (4)	
MAT 362	Advanced Mathematics for Engineers and Scientists I	3
PHY 241	University Physics III	3
HU, SB, and awareness area course ³	.....	3
Total	.....	17

Third Year**First Semester**

ECE 300	Intermediate Engineering Design <i>L1</i>	3
EEE 302	Electrical Networks II	3
EEE 340	Electromagnetic Engineering I	4
MAT 342	Linear Algebra	3
HU, SB, and awareness area course(s) ³	.....	4
Total	.....	17

Second Semester

ECE 334	Electronic Devices and Instrumentation	4
ECE 352	Properties of Electronic Materials	4
EEE 303	Signals and Systems	3
EEE 360	Energy Conversion and Transport	4
Total	.....	15

Fourth Year**First Semester**

ECE 314	Engineering Mechanics	4
EEE 350	Random Signal Analysis	3
HU, SB, and awareness area course ³	.....	3
Technical electives	.....	7
Total	.....	17

Second Semester

EEE 490	Senior Design Laboratory <i>L2</i>	3
HU, SB, and awareness area course ³	.....	3
Technical electives	.....	10
Total	.....	16

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to satisfy HU or SB requirements. See page 196.

ELECTRICAL ENGINEERING (EEE)**EEE 120 Digital Design Fundamentals.** (3) F, S, SS

Number systems, conversion methods, binary and complement arithmetic, Boolean algebra, circuit minimization, ROMs, PLAs, flipflops, synchronous sequential circuits. Lecture, lab. Cross-listed as CSE 120. Prerequisite: computer literacy.

EEE 225 Assembly Language Programming and Microprocessors (Motorola). (4) F, S, SS

Assembly language programming, including input/output programming and exception/interrupt handling. Register-level computer organization, I/O interfaces, assemblers, and linkers. Motorola-based assignments. Lecture, lab. Cross-listed as CSE 225. Prerequisites: CSE 100 (or 200); CSE/EEE 120.

EEE 226 Assembly Language Programming and Microprocessors (Intel). (4) F, S CPU/memory/peripheral device interfaces and programming. System buses, interrupts, serial and parallel I/O, DMA, coprocessors. Intel-based assignments. Lecture, lab. Cross-listed as CSE 226. Prerequisites: CSE 100 (or 200); CSE/EEE 120.

EEE 302 Electrical Networks II. (3) F, S, SS Analysis of linear and nonlinear networks. Analytical and numerical methods. Prerequisite: ECE 301.

EEE 303 Signals and Systems. (3) F, S, SS Introduction to continuous and discrete time signal and system analysis, linear systems, Fourier, and z-transforms. Prerequisite: EEE 302. Pre- or corequisite: MAT 342.

EEE 340 Electromagnetic Engineering I. (4) F, S, SS

Static and time varying vector fields; boundary value problems; dielectric and magnetic materials; Maxwell's equations; boundary conditions. Prerequisites: MAT 362; PHY 131.

EEE 350 Random Signal Analysis. (3) F, S Probabilistic and statistical analysis as applied to electrical signals and systems. Pre- or corequisite: EEE 303 or MAE 317.

EEE 360 Energy Conversion and Transport. (4) F, S

Three phase circuits. Energy supply systems. Magnetic circuit analysis, synchronous generators, transformers, induction and DC machines. Transmission Line Modeling and Design. Lecture, lab. Prerequisite: EEE 302.

EEE 405 Filter Design. (3) F

Principles of active and passive analog filter design, frequency domain approximations, sensitivity and synthesis of filters. Prerequisite: EEE 303.

EEE 407 Digital Signal Processing. (4) F

Time and frequency domain analysis, difference equations, z-transform, FIR and IIR Digital Filter Design, Discrete Fourier Transform, FFT, and random sequences. Lecture, lab. Prerequisites: EEE 303; MAT 342.

EEE 425 Digital Systems and Circuits. (4) F, S

Digital logic gate analysis and design. Propagation delay times, fan out, power dissipation, noise margins. Design of MOS and bipolar logic families, including NMOS, CMOS, standard and advanced TTL, ECL, and BiCMOS. Inverter, combinational and sequential logic circuit design, MOS memories, VLSI circuits. Computer simulations using PSPICE. Lecture, lab. Prerequisite: ECE 334.

EEE 433 Analog Integrated Circuits. (3) S Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies. Prerequisite: ECE 334.

EEE 434 Quantum Mechanics for Engineers. (3) F

Angular momentum, wave packets, Schrodinger wave equation, probability, problems in one dimension, principles of wave mechanics, scattering, tunneling, central forces, angular momentum, hydrogen atom, perturbation theory, variational techniques. Prerequisites: ECE 352; EEE 340.

EEE 435 Microelectronics. (3) S

Practice of solid-state device fabrication techniques, including thin film and integrated circuit fabrication principles. Lecture, lab. Pre- or corequisite: EEE 436.

EEE 436 Fundamentals of Solid-State Devices. (3) F, S

Semiconductor fundamentals, pn junctions, metal-semiconductor contacts, metal-oxide-semiconductor capacitors and field-effect transistors, bipolar junction transistors. Prerequisite: ECE 352.

EEE 437 Optoelectronics. (3) N

Basic operating principles of various types of optoelectronic devices which play important roles in commercial and communication electronics; light emitting diodes, injection lasers, and photodetectors. Prerequisite: EEE 436.

EEE 439 Semiconductor Facilities and Cleanroom Practices. (3) F

Microcontamination, controlled environments, cleanroom layout and systems, modeling, codes and legislation, ultrapure water, production materials, personnel and operations, hazard management, advanced concepts. Prerequisite: EEE 435 or instructor approval.

EEE 440 Electromagnetic Engineering II. (4) F, S

Second half of an introductory course in electromagnetic theory and its application in electrical engineering. Analytical and numerical solution of boundary value problems. Advanced transmission lines; waveguides; antennas; radiation and scattering. Lecture, lab. Prerequisite: EEE 340 or equivalent.

EEE 443 Antennas. (3) S

Fundamental parameters; engineering principles and radiation integrals; linear wire antennas; loops and arrays; numerical computations; measurements. Prerequisite: EEE 340 or equivalent.

EEE 445 Microwaves. (4) F

Waveguides; circuit theory for waveguiding systems; microwave devices, systems, and energy sources; striplines and microstrips; impedance matching transformers; measurements. Lecture, lab. Prerequisite: EEE 340 or equivalent.

EEE 448 Fiber Optics. (4) F

Principles of fiber-optic communications. Lecture, lab. Prerequisites: EEE 303, 340.

EEE 455 Communication Systems. (4) F, S Signal analysis techniques applied to the operation of electrical communication systems. An introduction to and overview of modern digital and analog communications. Lecture, lab. Prerequisites: EEE 303, 350.

- EEE 459 Data Communication Systems.** (3) S
System characteristics. Communications media. Communication codes. Data validity checking. Line protocols, terminals, and system configurations. Examples. Prerequisites: EEE 303, 350.
- EEE 460 Nuclear Concepts for the 21st Century.** (3) N
Radiation interactions, damage, dose, and instrumentation. Cosmic rays, satellite effects; soft errors; transmutation doping. Fission reactors, nuclear power. TMI, Chernobyl. Radioactive waste. Prerequisite: PHY 241 or 361.
- EEE 463 Electrical Power Plant.** (3) F
Nuclear, fossil, and solar energy sources. Analysis and design of steam supply systems, electrical generating systems, and auxiliary systems. Power plant efficiency and operation. Prerequisites: ECE 301, 340 (or PHY 241).
- EEE 470 Electric Power Devices.** (3) F
Analysis of devices used for short circuit protection, including circuit breakers, relays, and current and voltage transducers. Protection against switching and lightning over voltages. Insulation coordination. Prerequisite: EEE 360.
- EEE 471 Power System Analysis.** (3) S
Review of transmission line parameter calculation. Zero sequence impedance, symmetrical components for fault analysis, short circuit calculation, review of power flow analysis, power system stability, and power system control concepts. Prerequisite: EEE 360.
- EEE 473 Electrical Machinery.** (3) F
Operating principles, constructional details, and design aspects of conventional DC and AC machines, transformers and machines used in computer disc drives, printers, wrist watches, and automobiles. Prerequisite: EEE 360.
- EEE 480 Feedback Systems.** (4) F, S
Analysis and design of linear feedback systems. Frequency response and root locus techniques, series compensation, and state variable feedback. Lecture, lab. Prerequisite: EEE 303.
- EEE 482 Introduction to State Space Methods.** (3) F
Discrete and continuous systems in state space form controllability, stability, and pole placement. Observability and observers. Pre- or corequisites: EEE 303, 480; MAT 342.
- EEE 490 Senior Design Laboratory.** (3) F, S
Project-oriented laboratory. Each student must complete one or more design projects during the semester. Lecture, lab. Prerequisites: ECE 300, 334; EEE 303; senior status. *General Studies: L2.*
- EEE 506 Digital Spectral Analysis.** (3) S
Principles and applications of digital spectral analysis, least squares, random sequences, parametric, and nonparametric methods for spectral estimation. Prerequisites: EEE 407, 554.
- EEE 507 Multidimensional Signal Processing.** (3) F
Processing and representation of multidimensional signals. Design of systems for processing multidimensional data. Introduction to image and array processing issues. Prerequisite: EEE 407 or instructor approval.
- EEE 508 Digital Image Processing and Compression.** (3) S
Fundamentals of digital image perception, representation, processing, and compression. Emphasis on image coding techniques. Signals include still pictures and motion video. Prerequisites: EEE 350 and 407 or equivalents.
- EEE 511 Artificial Neural Computation Systems.** (3) F
Networks for computation, learning function representations from data, learning algorithms and analysis, function approximation and information representation by networks, applications in control systems and signal analysis. Prerequisite: instructor approval.
- EEE 523 Advanced Analog Integrated Circuits.** (3) F
Analysis and design of analog integrated circuits: analog circuit blocks, reference circuits, operational-amplifier circuits, feedback, and nonlinear circuits. Prerequisite: EEE 433 or equivalent.
- EEE 525 VLSI Design.** (3) F, S
Analysis and design of Very Large Scale Integrated (VLSI) Circuits. Physics of small devices, fabrication, regular structures, and system timing. Open only to graduate students.
- EEE 526 VLSI Architectures.** (3) F
Special-purpose architectures for signal processing. Design of array processor systems at the system level and processor level. High-level synthesis. Prerequisite: CSE 330 or EEE 407 or instructor approval.
- EEE 530 Advanced Silicon Processing.** (3) S
Thin films, CVD, oxidation, diffusion, ion-implantation for VLSI, metallization, silicides, advanced lithography, dry etching, rapid thermal processing. Pre- or corequisite: EEE 435.
- EEE 531 Semiconductor Device Theory I.** (3) F
Transport and recombination theory, pn and Schottky barrier diodes, bipolar and junction field-effect transistors, and MOS capacitors and transistors. Prerequisite: EEE 436 or equivalent.
- EEE 532 Semiconductor Device Theory II.** (3) S
Advanced MOSFETs, charge-coupled devices, solar cells, photodetectors, light-emitting diodes, microwave devices, and modulation-doped structures. Prerequisite: EEE 531.
- EEE 533 Semiconductor Process/Device Simulation.** (3) F
Process simulation concepts, oxidation, ion implantation, diffusion, device simulation concepts, pn junctions, MOS devices, bipolar transistors. Prerequisite: EEE 436 or equivalent.
- EEE 534 Semiconductor Transport.** (3) S
Carrier transport in semiconductors. Hall effect, high electric field, Boltzmann equation, correlation functions, and carrier-carrier interactions. Prerequisites: EEE 434, 436 (or 531).
- EEE 536 Semiconductor Characterization.** (3) S
Measurement techniques for semiconductor materials and devices. Electrical, optical, physical, and chemical characterization methods. Prerequisite: EEE 436 or equivalent.
- EEE 537 Semiconductor Optoelectronics I.** (3) F
Electronic states in semiconductors, quantum theory of radiation, absorption processes, radiative processes, nonradiative processes, photoluminescence, and photonic devices. Prerequisites: EEE 434, 436 (or 531).
- EEE 538 Semiconductor Optoelectronics II.** (3) S
Material and device physics of semiconductor lasers, light-emitting diodes, and photodetectors. Emerging material and device technology in III-V semiconductors. Prerequisite: EEE 537.
- EEE 539 Introduction to Solid-State Electronics.** (3) F
Crystal lattices, reciprocal lattices, quantum statistics, lattice dynamics, equilibrium, and nonequilibrium processes in semiconductors. Prerequisite: EEE 434.
- EEE 541 Electromagnetic Fields and Guided Waves.** (3) F
Polarization and magnetization; dielectric, conducting, anisotropic, and semiconducting media; duality, uniqueness, and image theory; plane wave functions, waveguides, resonators, and surface guided waves. Prerequisite: EEE 440 or equivalent.
- EEE 543 Antenna Analysis and Design.** (3) F
Impedances, broadband antennas, frequency independent antennas, miniaturization, aperture antennas, horns, reflectors, lens antennas, and continuous sources design techniques. Prerequisite: EEE 443 or equivalent.
- EEE 544 High Resolution Radar.** (3) N
Fundamentals; wideband coherent design, waveforms, and processing; stepped frequency; synthetic aperture radar (SAR); inverse synthetic aperture radar (ISAR); imaging. Prerequisites: EEE 303 and 340 or equivalents.
- EEE 545 Microwave Circuit Design.** (3) S
Analysis and design of microwave attenuators, in-phase and quadrature-phase power dividers, magic tee's, directional couplers, phase shifters, DC blocks, and equalizers. Prerequisite: EEE 445 or instructor approval.
- EEE 546 Advanced Fiber-Optics.** (3) N
Theory of propagation in fibers, couplers and connectors, distribution networks, modulation, noise and detection, system design, and fiber sensors. Prerequisite: EEE 448 or instructor approval.

EEE 547 Microwave Solid-State Circuit Design I. (3) N

Application of semiconductor characteristics to practical design of microwave mixers, detectors, limiters, switches, attenuators, multipliers, phase shifters, and amplifiers. Prerequisite: EEE 545 or instructor approval.

EEE 548 Coherent Optics. (3) N

Diffraction, lenses, optical processing, holography, electro-optics, and lasers. Prerequisite: EEE 440 or equivalent.

EEE 549 Lasers. (3) N

Theory and design of gas, solid, and semiconductor lasers. Prerequisite: EEE 448 or instructor approval.

EEE 550 Transform Theory and Applications. (3) N

Introduction to abstract integration, function spaces, and complex analysis in the context of integral transform theory. Applications to signal analysis, communication theory, and system theory. Prerequisite: EEE 303.

EEE 551 Information and Coding Theory. (3) N

Fundamental theorems of information theory for sources and channels; convolutional and burst codes. Prerequisites: EEE 553, 554.

EEE 552 Digital Communications I. (3) S

Fundamentals of digital communications: complex signal theory; modulation; optimal coherent and incoherent receivers; coded modulation and the Viterbi algorithm. Prerequisites: EEE 455, 554.

EEE 553 Error-Correcting Codes. (3) S

Application of modern algebra to the design of random error-detecting and error-correcting block codes. Prerequisite: EEE 455.

EEE 554 Random Signal Theory I. (3) F

Application of statistical techniques to the representation and analysis of electrical signals and to communications systems analysis. Prerequisites: EEE 303 and 350 or instructor approval.

EEE 555 Random Signal Theory II. (3) S

Processing of signals in the presence of noise. Random signals, correlation, frequency spectra, estimation, filtering, noise, prediction, and transients. Prerequisite: EEE 554.

EEE 556 Detection and Estimation Theory. (3) S

Combination of the classical techniques of statistical inference and the random process characterization of communication, radar, and other modern data processing systems. Prerequisites: EEE 455, 554.

EEE 558 Digital Communications II. (3) F

Continuation of EEE 552. Advanced topics in digital communications: synchronization; multipath and fading; equalization; miscellaneous topics. Prerequisite: EEE 552.

EEE 571 Power System Transients. (3) N

Simple switching transients. Transient analysis by deduction. Damping of transients. Capacitor and reactor switching. Transient recovery voltage. Travelling waves on transmission lines. Lightning. Protection of equipment against transient overvoltages. Introduction to computer analysis of transients. Prerequisite: EEE 471.

EEE 572 Advanced Power Electronics. (3) N

Analysis of device operation, including thyristors, gate-turn-off thyristors, and transistors. Design of rectifier and inverter circuits. Applications such as variable speed drives, HVDC, motor control, and uninterruptable power supplies. Prerequisite: EEE 470.

EEE 574 Computer Solution of Power Systems. (3) S

Algorithms for digital computation for power flow, fault, and stability analysis. Sparse matrix and vector programming methods, numerical integration techniques, stochastic methods, solution of the least squares problem. Prerequisite: EEE 471.

EEE 577 Power Engineering Operations and Planning. (3) F

Economic dispatch, unit commitment, dynamic programming, power system planning and operation, control, generation modeling, AGC, and power production. Prerequisite: EEE 471 or graduate standing.

EEE 579 Power Transmission and Distribution. (3) S

High voltage transmission line electric design; conductors, corona, RI and TV noise, insulators, clearances. DC characteristic, feeders voltage drop, and capacitors. Prerequisite: EEE 470.

EEE 581 Filtering of Stochastic Processes. (3) N

Modeling, estimation, and filtering of stochastic processes, with emphasis on the Kalman filter and its applications in signal processing and control. Prerequisites: EEE 482, 550, 554.

EEE 582 Linear System Theory. (3) S

Controllability, observability, and realization theory for multivariable continuous time systems. Stabilization and asymptotic state estimation. Disturbance decoupling, noninteracting control. Prerequisite: EEE 482.

EEE 585 Digital Control Systems. (3) F

Analysis and design of digital and sampled data control systems, including sampling theory, z-transforms, the state transition method, stability, design, and synthesis. Prerequisites: EEE 482, 550.

EEE 586 Nonlinear Control Systems. (3) N

Stability theory, including phase-plane, describing function, Liapunov's method, and frequency domain criteria for continuous and discrete, nonlinear, and time-varying systems. Prerequisite: EEE 482.

EEE 587 Optimal Control. (3) F

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as MAE 507. Prerequisite: EEE 482 or MAE 506.

EEE 606 Adaptive Signal Processing. (3) F

Principles/applications of adaptive signal processing, adaptive linear combiner, Wiener least-squares solution, gradient search, performance surfaces, LMS/RLS algorithms, block time/frequency domain LMS. Prerequisites: EEE 506, 554.

EEE 631 Heterojunctions and Superlattices. (3) F

Principles of heterojunctions and quantum well structures, band lineups, optical, and electrical properties. Introduction to heterojunction devices. Prerequisites: EEE 436, 531.

EEE 632 Heterojunction Devices. (3) N

Principles of semiconductor heterojunctions and quantum wells are applied to the analysis of advanced electronic and optical devices. Devices studied are modulation doped field effect transistors (MODFETs), pseudomorphic MODFETs, heterojunction bipolar transistors, quantum well and superlattice optical detectors, modulators, and lasers. Prerequisites: EEE 434, 436, 531, 631.

EEE 641 Advanced Electromagnetic Field Theory. (3) N

Cylindrical wave functions, waveguides, and resonators; spherical wave functions and resonators; scattering from planar, cylindrical, and spherical surfaces; Green's functions. Prerequisite: EEE 541 or equivalent.

EEE 643 Advanced Topics in Electromagnetic Radiation. (3) N

High-frequency asymptotic techniques, geometrical and physical theories of diffraction (GTD and PTD), moment method (MM), radar cross section (RCS) prediction, Fourier transforms in radiation, and synthesis methods. Prerequisite: EEE 543.

EEE 647 Microwave Solid-State Circuit Design II. (3) F

Practical design of microwave free-running and voltage-controlled oscillators using Gunn and Impatt diodes and transistors; analysis of noise characteristics of the oscillator. Prerequisites: EEE 545, 547.

EEE 686 Adaptive Control. (3) N

Main topics covered: adaptive identification, convergence, parametric models, performance and robustness properties of adaptive controllers, persistence of excitation, and stability. Prerequisites: EEE 582 and 586 or instructor approval.

EEE 731 Advanced MOS Devices. (3) S

Threshold voltage, subthreshold current, scaling, small geometry effects, hot electrons, and alternative structures. Prerequisite: EEE 531.

EEE 732 Advanced Bipolar Devices and Circuits. (3) N

Critical examination of new bipolar device and circuit technologies. Performance trade-offs, scaling effects, and modeling techniques. Prerequisite: EEE 531.

EEE 770 Advanced Topics in Power Systems. (3) N

Power system problems of current interest, approached at an advanced technical level, for mature students. Prerequisites: EEE 577 and 579 or equivalents; instructor approval.

Department of Industrial and Management Systems Engineering

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Chair

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PROFESSORS

BAILEY, DOOLEY, HENDERSON,
HOGG, KEATS, MONTGOMERY,
SMITH, UTTAL, WOLFE

ASSOCIATE PROFESSORS

ANDERSON-ROWLAND, COCHRAN,
HUBELE, MACKULAK, MOOR,
ROBERTS, ROLLIER,
RUNGER, SHUNK

ASSISTANT PROFESSORS

CARLYLE, FOWLER, MOU

The industrial engineer (IE) provides leadership for American organizations in reestablishing competitiveness in the global marketplace through system integration and productivity improvement. No challenge can be greater than improving productivity, which is the application of knowledge and skills to provide improved goods and services to enhance the quality of life, both on and off the job. This improvement must be achieved without waste of physical and human resources while maintaining the environmental balance. Industrial engineers are the “productivity people” who provide the necessary leadership and skills to integrate technology. This gives IEs a wide range of interests and responsibilities.

As in other engineering fields, industrial engineering is concerned with solving problems through the application of scientific and practical knowledge. What sets industrial engineering apart from other engineering disciplines is its broader scope. An IE relates to the total picture of productivity. An IE looks at the “big picture” of what makes society perform best—the right combination of human resources, natural resources, synthetic structures, and equipment. An IE bridges the gap between management and operations, dealing with and motivating people as well as determining what tools should be used and how they should be used.

An IE deals with people as well as things. In fact, industrial engineering is often called the “people-oriented profession.” It is a primary function of the IE to integrate people and technology-oriented systems. Therefore, IEs are active in the fields of ergonomics and human factors.

To be competitive in this global economy, it is essential to emphasize and continually improve the quality of goods and services. Industrial engineering is the only engineering discipline offering course work in designing and implementing quality assurance systems.

The IE’s skills are applicable to every kind of organization. IEs learn how to approach, think about, and solve productivity and integration problems regardless of their settings. IEs work in manufacturing facilities, banks, hospitals, government, transportation, construction, and social services. Within this wide variety of organizations, IEs get involved in projects such as designing and implementing quality control systems, independent work groups, the work flow in a medical laboratory, real-time production control systems, computer-based management information systems, and manufacturing operating systems, to name a few. A unique feature of most industrial engineering assignments is that they involve interdisciplinary teams. For example, the IE might be the leader of a team consisting of electrical and mechanical engineers, accountants, computer scientists, and planners. This IE program gives the student the skills necessary to direct these teams. These skills include team building, brainstorming, group dynamics, and interpersonal relationships.

IEs have a sound background in technology integration, management theory and application, engineering economics and cost analysis. They are well equipped to deal with problems never seen before, making them prime candidates for promotion through the management career path, especially in high-tech organizations. In fact, more than half of all practicing IEs are in management positions. This area of expertise has placed the IE in the leadership role in the establishment of a new field of activity called “management of technology.”

Industrial engineers are well trained in the development and use of analytical tools, and their most distinctive skill is in the area of model building. IEs must quickly learn and understand the problems of their clients. In this context, good people skills and good analytic skills are essential. This industrial engineering program offers both.

INDUSTRIAL ENGINEERING—B.S.E.

Degree Requirements

A minimum of 128 semester hours is necessary for the B.S.E. degree in Industrial Engineering; including 50 upper-division semester hours.

Graduation Requirements

In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

Course Requirements

See pages 196–197 for General Studies, school, and engineering core course requirements.

Industrial Engineering Major

The following courses are required:

ASE	485	Engineering Statistics N2	.....	3
ECE	380	Probability and Statistics for Engineering Problem Solving N2	.....	3
IEE	205	Microcomputer Applications in Industrial Engineering N3	.....	3
IEE	300	Economic Analysis for Engineers	.....	3
IEE	305	Information Systems Engineering N3	.....	3
IEE	367	Methods Engineering and Facilities Design	.....	4
IEE	374	Quality Control N2	.....	3
IEE	394	ST: Introduction to Manufacturing Processes	.....	4
IEE	431	Engineering Administration	.....	3
IEE	461	Integrated Production Control	.....	3
IEE	463	Computer-Aided Manufacturing and Control N3	.....	3
IEE	475	Introduction to Simulation N3	.....	3
IEE	476	Operations Research Techniques/Applications N2	.....	4
IEE	490	Project in Design and Development	.....	3
		Technical elective	.....	3
		Total	.....	48

**Industrial Engineering
Program of Study
Typical Four-Year Sequence
First Year**

First Semester

CHM 114	General Chemistry for Engineers <i>S1/S2</i> ¹	4
ECE 100	Introduction to Engineering Design <i>N3</i>	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry <i>I N1</i>	4
Total	.....	15

Second Semester

ECN 111	Macroeconomic Principles <i>SB</i>	3
	or ECN 112 Microeconomic Principles <i>SB</i> (3)	3
ENG 102	First-Year Composition	3
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ²	3
PHY 122	University Physics Laboratory I <i>S1/S2</i> ²	1
HU, SB, and awareness area course ³	.....	3
Total	.....	17

Second Year**First Semester**

IEE 205	Microcomputer Applications in Industrial Engineering <i>N3</i>	3
IEE 300	Economic Analysis for Engineers	3
MAT 242	Elementary Linear Algebra	2
MAT 272	Calculus with Analytic Geometry III	4
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ⁴	3
PHY 132	University Physics Laboratory II <i>S1/S2</i> ⁴	1
Total	.....	16

Second Semester

ECE 210	Engineering Mechanics I: Statics	3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
MAT 274	Elementary Differential Equations	3
Core elective	.....	3
Basic science elective ⁵	.....	3
HU, SB, and awareness area course ³	.....	3
Total	.....	18

Third Year**First Semester**

ASE 485	Engineering Statistics <i>N2</i>	3
IEE 305	Information Systems Engineering <i>N3</i>	3
IEE 367	Methods Engineering and Facilities Design	4
IEE 374	Quality Control <i>N2</i>	3
HU, SB, and awareness area course(s) ³	.....	4
Total	.....	17

Second Semester

ECE 300	Intermediate Engineering Design <i>L1</i>	3
ECE 312	Engineering Mechanics II: Dynamics	3
ECE 350	Structure and Properties of Materials	3
IEE 394	ST: Introduction to Manufacturing Processes	4
IEE 476	Operations Research Techniques/Applications <i>N2</i>	4
Total	.....	17

Fourth Year**First Semester**

ECE 301	Electrical Networks I	4
IEE 431	Engineering Administration	3
IEE 461	Integrated Production Control	3
IEE 475	Introduction to Simulation <i>N3</i>	3
HU, SB, and awareness area course ³	.....	3
Total	.....	16

Second Semester

ECE 400	Engineering Communications <i>L2</i>	3
IEE 463	Computer-Aided Manufacturing and Control <i>N3</i>	3
IEE 490	Project in Design and Development	3
Technical elective	.....	3
Total	.....	12

¹ Students who have taken no high school chemistry should take CHM 113 and 116.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

³ Engineering students may not use aerospace studies (AES) or military science (MIS) courses to satisfy HU or SB requirements. See page 196.

⁴ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

⁵ Must be an earth science or life science course; if physics or chemistry, the course must be of a more advanced level than CHM 114 or 116 or PHY 131.

Manufacturing Engineering

Manufacturing engineering is the field of engineering that focuses on the design, implementation, and optimization of manufacturing functions and operations. Competing in a worldwide environment leads to the need for a world-class manufacturing operation. Integration of all manufacturing entities, whether physical or informational, is a task for the manufacturing engineer. Automation decisions, their economic consequences, and the role of total quality control and management are some of the functions of the manufacturing engineer.

Manufacturing engineers are key role players in all manufacturing organizations; for example, electronic, aerospace, and automotive are just three categories of manufacturing. The ability for any manufacturing operation to compete just in the United States, let alone worldwide, requires that the manufacturing segment of the operation be efficient, cost effective, and produce products that are defect free. The manufacturing engineer is instrumental in how well the organization will compete through determination of the correct manufacturing processes and equipment, the best work flow possible, and efficient total quality control and statistical process control innovations. Recent reports have shown that the U.S. semiconductor and automotive manufacturing operations have regained their preeminent positions in the world. The role for the manufacturing engineer can only grow in these two industries as well as in all the other industries that make up this important segment of the economy. Salary potential is very competitive with all other engineering fields.

The following courses are required for the manufacturing engineering option:

ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	3
ECE 394	ST: Introduction to Manufacturing Engineering ...	3
IEE 205	Microcomputer Applications in Industrial Engineering <i>N3</i>	3
IEE 300	Economic Analysis for Engineers	3
IEE 374	Quality Control <i>N2</i>	3

IEE 394	ST: Introduction to Manufacturing Processes	4
IEE 431	Engineering Administration	3
IEE 461	Integrated Production Control	3
IEE 463	Computer-Aided Manufacturing and Control N3	3
IEE 498	PS: Manufacturing Design Project	3
MAE 406	CAD/CAM Applications in MAE	4
	Technical electives*	12
	Total	47

* Technical electives must meet ABET requirements of engineering science and engineering design.

INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING (IEE)

IEE 205 Microcomputer Applications in Industrial Engineering. (3) F, S
 Concepts related to development of operational capability in the use of microcomputer hardware, software, and networking as related to industrial engineering applications. Prerequisite: ECE 100. *General Studies: N3.*

IEE 300 Economic Analysis for Engineers. (3) F, S
 Economic evaluation of alternatives for engineering decisions, emphasizing the time value of money. Prerequisites: ECE 100; MAT 270.

IEE 305 Information Systems Engineering. (3) F
 Emphasis on systems analysis, design and implementation of information systems using fourth generation languages and alternative data base structures. Prerequisite: IEE 205. *General Studies: N3.*

IEE 367 Methods Engineering and Facilities Design. (4) F
 Analyzing and designing work systems for productivity, including time and motion studies, human factors, material handling, facility layout and location. Lecture, lab. Prerequisites: IEE 205, 300.

IEE 374 Quality Control. (3) F
 Control charting and other statistical process control techniques. Organization and managerial aspects of quality assurance, plus acceptance sampling plans. Prerequisite: ECE 380. *General Studies: N2.*

IEE 431 Engineering Administration. (3) F
 Introducing quantitative and qualitative approaches to management functions, engineering administration, organizational analysis, decision making, and communication. Prerequisite: senior standing.

IEE 437 Human Factors Engineering. (3) F
 Study of the human psychological and physiological factors that underlie the design of equipment and the interaction between people and machines.

IEE 461 Integrated Production Control. (3) F
 Production control techniques for the planning, analysis, control, and evaluation of operating systems. Time series forecasting, network planning, scheduling, and control. Prerequisites: ECE 380; IEE 205.

IEE 463 Computer-Aided Manufacturing and Control. (3) F, S
 Computer control in manufacturing, CIM, NC, logic controllers, group technology, process planning and robotics. Prerequisite: "C" programming capability. *General Studies: N3.*

IEE 464 Concurrent Engineering. (3) N
 Understanding and analysis of complex design issues, including product attributes, manufacturing processes and service issues. Prerequisites: ECE 100; IEE 205.

IEE 475 Introduction to Simulation. (3) F, S
 Using simulation and modeling in analysis and design of network and discrete systems with statistical aspects. Prerequisites: ECE 380; IEE 205. *General Studies: N3.*

IEE 476 Operations Research Techniques/Applications. (4) F, S
 Linear programming, network optimization, Markov processes, queuing models, emphasizing model building for solving industrial system problems. Prerequisites: ECE 380; MAT 242. *General Studies: N2.*

IEE 490 Project in Design and Development. (3) F, S
 Individual or team capstone project in creative design and synthesis. Prerequisite: senior standing.

IEE 505 Applications Engineering. (3) F
 Develop working knowledge of application systems development tools needed for computer integrated enterprise. Includes techniques for application generation in fourth and fifth generation software environments. Topics include client server network systems, decision support systems, and transaction systems in distributed environment.

IEE 511 Analysis of Decision Processes. (3) S
 Methods of making decisions in complex environments and statistical decision theory; effects of risk, uncertainty, and strategy on engineering and managerial decisions. Prerequisite: ECE 380.

IEE 520 Ergonomics Design. (3) S
 Human physiological and psychological factors in the design of work environments and in the employment of people in man-machine systems. Open-shop lab assignments in addition to class work. Prerequisite: IEE 437 or 547.

IEE 530 Enterprise Modeling. (3) S
 Focus on social, economic, and technical models of the enterprise with emphasis on the management of technological resources. Included are organization, econometric, financial, and large-scale mathematical models.

IEE 531 Topics in Engineering Administration. (3) S 2000
 Consideration given to philosophical, psychological, political, and social implications of administrative decisions. Prerequisite: IEE 532 or instructor approval.

IEE 532 Management of Technology. (3) F
 Topics include designing a technical strategy; technological forecasting; interfacing marketing engineering and manufacturing; designing and managing innovation systems; creativity; application of basic management principles to technology management. Prerequisite: IEE 431 or 541 or instructor approval.

IEE 533 Scheduling and Network Analysis Models. (3) S 2000
 Application of scheduling and sequencing algorithms, deterministic and stochastic network analysis, and flow algorithms. Prerequisites: ECE 380; IEE 476 (or 546).

IEE 541 Engineering Administration. (3) F
 Introducing quantitative and qualitative approaches to management functions, engineering administration, organizational analysis, decision making, and communication. IEE 431 students ineligible.

IEE 543 Computer-Aided Manufacturing and Control. (3) S
 Computer control in manufacturing, CIM, NC, logic controllers, group technology, process planning and robotics. IEE 463 students ineligible. Prerequisite: "C" programming capability.

IEE 544 Concurrent Engineering. (3) N
 Understanding and analysis of complex design issues, including product attributes, manufacturing processes and service issues. IEE 464 students ineligible. Prerequisites: ECE 100; IEE 205.

IEE 545 Discrete Event Simulation. (3) F, S
 Modeling and analysis of stochastic systems using queuing theory and simulation. Statistical aspects of systems and analysis of output measures. Prerequisites: IEE 475 (or equivalent); instructor approval.

IEE 546 Operations Research Techniques/Applications. (4) F, S
 Linear programming, network optimization, Markov processes, queuing models, emphasizing model building for solving industrial system problems. IEE 476 students ineligible. Prerequisites: ECE 380 (or equivalent); IEE 205; instructor approval.

IEE 547 Human Factors Engineering. (3) F
 Study of people at work; designing for human performance effectiveness and productivity. Considerations of human physiological and psychological factors. Open only to students without previous credit for IEE 437.

IEE 552 Strategic Technological Planning. (3) S
 Study of concept of strategy, strategy formulation process, and strategic planning methodologies with emphasis on engineering design and manufacturing strategy, complemented with case studies. An analytical executive planning decision support system is presented and used throughout course. Pre- or corequisite: IEE 545 or 566 or 567 or 574 or 575.

IEE 560 Database Concepts for Industrial Management Systems. (3) S
 Application of object oriented database technology concepts to manufacturing and enterprise systems.

IEE 561 Production Systems. (3) F, S
 Enabling theory for production control systems including: class item discounting, costing, factory physics, factory variability, inventory control, JIT, lot sizing, and sequencing. Prerequisites: ASE 485 (or 500 or ECE 380) and IEE 461 and 475 and 546 (or equivalents) and MAT 242.

IEE 562 Computer-Aided Manufacturing (CAM) Tools. (3) F

Current topics in automation, distributed control, control code generation, control logic validation, CAM integration, CAD/CAM data structures, planning for control systems. Topics vary by semester. Prerequisite: IEE 463 or 543 or equivalent.

IEE 563 Systems Analysis for Distributed Systems. (3) S

Analysis and design of distributed groupware applications for manufacturing and enterprise systems. Prerequisite: ECE 380.

IEE 564 Planning for Computer-Integrated Manufacturing. (3) F

Theory and use of IDEF methodology in planning for flexible manufacturing, robotics, and real-time control. Simulation concepts applied to computer-integrated manufacturing planning. Prerequisite: IEE 463 or 543.

IEE 565 Computer-Integrated Manufacturing Research. (3) S

Determination and evaluation of research areas in computer-integrated manufacturing, including real-time software, manufacturing information systems, flexible and integrated manufacturing systems, robotics, and computer graphics. Prerequisite: IEE 564.

IEE 566 Simulation in Computer-Integrated Manufacturing Planning. (3) F

Use of simulation in computer-integrated manufacturing planning related to flexible, integrated, and robotics manufacturing systems. Use of computer graphics combined with simulation analysis for CIM decision support. Prerequisite: IEE 545.

IEE 567 System Simulation. (3) S

Use of simulation in the analysis and design of systems involving continuous and discrete processes; simulation languages; statistical aspects of simulation. Prerequisite: IEE 545.

IEE 569 Advanced Statistical Methods. (3) F 1998

Application of statistical inference procedures, based on ranks, to engineering problems. Efficient alternatives to classical statistical inference constrained by normality assumptions. Prerequisite: ASE 485 or 500.

IEE 570 Advanced Quality Control. (3) S

Economic-based acceptance sampling, multi-attribute acceptance sampling, narrow limit gauging in inspector error and attributes acceptance sampling, principles of quality management, and selected topics from current literature. Prerequisite: ASE 485 or 500 or equivalent.

IEE 571 Quality Management. (3) F

Total quality concepts, quality strategies, quality and competitive position, quality costs, vendor relations, the quality manual, and quality in the services. Prerequisite: IEE 431 or 541.

IEE 572 Design of Engineering Experiments. (3) F, S

Analysis of variance and experimental design. Topics include general design methodology, incomplete blocks, confounding, fractional replication, and response surface methodology. Prerequisite: ASE 485 or 500.

IEE 573 Reliability Engineering. (3) S

Nature of reliability, time to failure densities, series/parallel/standby systems, complex system reliability, Bayesian reliability, and sequential reliability tests. Prerequisite: ECE 380.

IEE 574 Applied Deterministic Operations Research Models. (3) F, S

Formulation, solution, analysis, and application of deterministic models in operations research, including those of linear programming, integer programming, and nonlinear programming. Prerequisite: IEE 476 or 546.

IEE 575 Applied Stochastic Operations Research Models. (3) S

Application of stochastic models, including inventory theory, queuing theory, Markov processes, stochastic programming, and renewal theory. Prerequisite: ASE 485 or 500.

IEE 577 Decision and Expert Systems Methodology. (3) F

Systems approach to the analysis, design, and implementation of decision support systems. Emphasis on development of databases, model bases dialogs, and systems architecture as well as systems effectiveness. Introduction to expert systems as decision aid included. Term project required. Prerequisite: IEE 205 or equivalent.

IEE 578 Regression Analysis. (3) F

A course in regression model building oriented toward engineers/physical scientists. Topics include linear regression, diagnostics biased and robust fitting, nonlinear regression. Prerequisite: ASE 485 or 500.

IEE 579 Time Series Analysis and Forecasting. (3) F 1999

Forecasting time series by the Box-Jenkins and exponential smoothing techniques; existing digital computer programs are utilized to augment the theory. Prerequisites: ASE 485 (or 500); IEE 461.

IEE 582 Response Surfaces and Process Optimization. (3) S

An introduction to response surface method and its applications. Topics include steepest ascent, canonical analysis, designs, and optimality criteria. Prerequisite: IEE 572.

IEE 672 Advanced Topics in Experimental Design. (3) S 2000

Engineering applications of factorial and fractional factorial designs with randomization restrictions, analysis techniques in parameter comparison, missing data, unbalanced designs. Prerequisite: IEE 572 or instructor approval.

IEE 677 Regression and Linear Models. (3) S 1999

General linear models, applications, theory, including least squares, maximum likelihood estimation, properties of estimators, likelihood ratio tests and computational procedures. Prerequisite: IEE 578 or instructor approval.

IEE 679 Time Series Analysis and Control. (3) F 1998

Identification, estimation, diagnostic checking techniques for ARIMA models, transfer functions, multiple time series models for feedback and feedforward control schemes. Prerequisite: IEE 579 or instructor approval.

IEE 681 Reliability, Availability, and Serviceability. (3) F 1998

Organizing hardware and software, integrity and fault-tolerant design, maintenance design and strategy, Markov models, fault-free analysis, and military standards. Prerequisite: ECE 380.

Department of Mechanical and Aerospace Engineering

Don L. Boyer

Chair

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PROFESSORS

BICKFORD, BOYER,
CHATTOPADHYAY, DAVIDSON,
EVANS, FERNANDO, HIRLEMAN,
JANKOWSKI, KRAJCINOVIC,
LAANANEN, LIU, PECK, REED, ROY,
SARIC, SHAH, SIERADZKI, SO,
TSENG, WIE, YAO

ASSOCIATE PROFESSORS

CHEN, KOURIS, KUO, MIGNOLET,
RANKIN, SQUIRES, WELLS

ASSISTANT PROFESSORS

LEE, McNEILL, PHELAN, PUIG-SUARI

The Department of Mechanical and Aerospace Engineering is the administrative home for two undergraduate majors: Aerospace Engineering and Mechanical Engineering.

Both majors build on the broad exposure to the engineering, chemical, and physical sciences and the mathematics embodied in the General Studies and engineering core courses required of all engineering students.

The Aerospace Engineering major provides students an education in technological areas critical to the design and development of aerospace vehicles and systems. Aerospace Engineering graduates are typically employed at government laboratories (e.g., NASA) and in a wide range of aerospace and mechanical industries. The Mechanical Engineering major is perhaps one of the most broadly applicable programs in engineering, providing education for a wide variety of employment opportunities.

The two majors, discussed in more detail below, can serve as entry points to immediate professional employment or to graduate study. The emphasis in all fields is on the development of fundamental knowledge that will have long-lasting utility in our rapidly changing technical society.

DEGREE REQUIREMENTS

All degree programs in the department require that students attain a minimum GPA of 2.00 in the engineering core and in the major and take a minimum of 50 upper-division semester hours in order to be eligible for graduation. Also, the department may require additional or remedial course work for those students who have demonstrated a trend toward academic difficulties.

GRADUATION REQUIREMENTS

In addition to fulfilling school and major requirements, majors must satisfy all university graduation requirements. See pages 79–83.

COURSE REQUIREMENTS

General Studies

See pages 196–197 for General Studies, school, and engineering core course requirements.

Engineering Core Options

Among the options listed on pages 195–196 as part of the engineering core requirements, students in the Department of Mechanical and Aerospace Engineering are required to take the following:

ECE 100	Introduction to Engineering Design <i>N3</i>	4
ECE 210	Engineering Mechanics I: Statics	3
ECE 300	Intermediate Engineering Design <i>L1</i>	3
ECE 301	Electrical Networks I	4
ECE 312	Engineering Mechanics II: Dynamics	3
ECE 313	Introduction to Deformable Solids	3
ECE 340	Thermodynamics	3
ECE 350	Structure and Properties of Materials	3
Total	.....	26

AEROSPACE ENGINEERING—B.S.E.

The goal of the Aerospace Engineering program is to provide students with an education in technological areas critical to the design and development of aerospace vehicles and systems. The program emphasizes aeronautical engineering with topics in required courses covering aerodynamics, aerospace materials, aerospace structures, propul-

sion, flight mechanics, aircraft performance, and stability and control. Astronautic topics such as orbital mechanics, attitude dynamics, spacecraft control, and rocket propulsion are also covered in required courses.

Design is integrated throughout the curriculum beginning with ECE 100 Introduction to Engineering Design and followed later by ECE 300 Intermediate Engineering Design, both of which focus on basic design theory as well as professional practice. These required courses are followed by topic-specific design content in aerospace engineering courses in the junior and senior years. The senior capstone design course integrates design and analysis topics from the earlier courses and completes the required design sequence. This sequence includes a minimum of 20 semester hours of required design. In addition, many of the aerospace technical electives have design content.

Laboratory experience is provided in the areas of aerodynamics, aerospace structures, and vibrations. Laboratory facilities include four major wind tunnels, an integrated mechanical-testing laboratory, a controls laboratory, and a vibrations laboratory.

Aerospace Engineering Major

Aerospace Engineering students are required to take the following two courses in addition to those required for the major:

MAT 242	Linear Algebra	2
PHY 361	Introductory Modern Physics	3

The Aerospace Engineering major consists of the following courses:

ECE 384	Numerical Analysis for Engineers I	2
ECE 386	Partial Differential Equations for Engineers	2
EEE 350	Random Signal Analysis	3
MAE 317	Dynamic Systems and Control	3
MAE 361	Aerodynamics I	3
MAE 413	Aircraft Performance, Stability, and Control	3
MAE 415	Vibration Analysis	4
MAE 425	Aerospace Structures	4
MAE 460	Gas Dynamics	3
MAE 462	Space Vehicle Dynamics and Control	3
MAE 463	Propulsion	3
MAE 464	Aerospace Laboratory	3

MAE 468	Aerospace Systems Design <i>L2</i>	3
MAE 498	PS: Principles of Aerospace Design	3
Area of emphasis (technical electives)		6
Total	.....	48

Aerospace Engineering Areas of Emphasis

To further the design experience, all Aerospace Engineering students must choose at least one technical elective from the following list of courses:

MAE 426	Design of Aerospace Structures	3
MAE 461	Aerodynamics II	3
MAE 465	Rocket Propulsion	3
MAE 466	Rotary Wing Aerodynamics and Performance	3
MAE 467	Aircraft Performance	3
MAE 469	Projects in Astronautics and Aeronautics	3

The remaining technical elective(s) may be selected from among any of the courses listed in the following course tables or from courses listed under the Mechanical Engineering areas of emphasis. The courses are grouped so that the student may select an elective package of closely related courses. A student may, with prior approval of the advisor and department, select a general area and a corresponding set of courses not listed that would support a career objective not covered by the following categories:

Aerodynamics. Select from these courses:

MAE 372	Fluid Mechanics	3
MAE 434	Internal Combustion Engines	3
MAE 435	Turbomachinery	3
MAE 461	Aerodynamics II	3
MAE 463	Propulsion	3
MAE 466	Rotary Wing Aerodynamics and Performance	3
MAE 471	Computational Fluid Dynamics	3
MAE 490	Projects in Design and Development <i>L2</i>	3
MAT 421	Applied Computational Methods <i>N3</i>	3

Aerospace Materials. Select from these courses:

MAE 455	Polymers and Composites	3
MSE 355	Introduction to Materials Science and Engineering	3
MSE 420	Physical Metallurgy	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MSE 440	Mechanical Properties of Solids	3
MSE 441	Analysis of Material Failures	3
MSE 450	X-ray and Electron Diffraction	3
MSE 471	Introduction to Ceramics	3

Aerospace Structures. Select from these courses:

MAE 404	Finite Elements in Engineering	3
MAE 426	Design of Aerospace Structures	3
MAE 455	Polymers and Composites	3
MAE 490	Projects in Design and Development L2	3

Computer Methods. Select from these courses:

ASE 485	Engineering Statistics N2	3
CSE 310	Data Structures and Algorithms II	3
CSE 422	Microprocessor System Design II	4
CSE 428	Computer-Aided Processes	3
IEE 463	Computer-Aided Manufacturing and Control N3	3
IEE 464	Concurrent Engineering	3
IEE 475	Introduction to Simulation N3	3
MAE 404	Finite Elements in Engineering	3
MAE 406	CAD/CAM Applications in MAE	4
MAE 471	Computational Fluid Dynamics	3
MAE 541	CAD Tools for Engineers	3
MAT 421	Applied Computational Methods N3	3
MAT 423	Numerical Analysis I N3	3
MAT 425	Numerical Analysis II N3	3

Design. Select from these courses:

MAE 341	Mechanism Analysis and Design	3
MAE 404	Finite Elements in Engineering	3
MAE 406	CAD/CAM Applications in MAE	4
MAE 426	Design of Aerospace Structures	3
MAE 435	Turbomachinery	3
MAE 442	Mechanical Systems Design	3
MAE 446	Thermal Systems Design	3
MAE 455	Polymers and Composites	3
MAE 466	Rotary Wing Aerodynamics and Performance	3
MAE 467	Aircraft Performance	3
MAE 490	Projects in Design and Development L2	3
MSE 440	Mechanical Properties of Solids	3
MSE 441	Analysis of Material Failures	3

Mechanical. Any courses listed under Mechanical Engineering Areas of Emphasis may be selected.

Propulsion. Select from these courses:

MAE 382	Thermodynamics	3
MAE 388	Heat Transfer	3
MAE 434	Internal Combustion Engines	3
MAE 435	Turbomachinery	3
MAE 436	Combustion	3
MAE 461	Aerodynamics II	3
MAE 465	Rocket Propulsion	3
MAE 466	Rotary Wing Aerodynamics and Performance	3
MAE 471	Computational Fluid Dynamics	3
MAE 490	Projects in Design and Development L2	3

System Dynamics and Control. Select from these courses:

CSE 428	Computer-Aided Processes	3
EEE 480	Feedback Systems	4
EEE 482	Introduction to State Space Methods	3
MAE 417	Control System Design	3
MAE 447	Robotics and Its Influence on Design	3
MAE 469	Projects in Astronautics or Aeronautics	3
MAE 490	Projects in Design and Development L2	3

Typical Four-Year Sequence

The first two years are usually devoted to the General Studies and engineering core requirements. Thus, the degree programs in the department share essentially the same course schedule for that period of time. A typical schedule is given below:

Aerospace Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM 114	General Chemistry for Engineers S1/S2	4
ECE 100	Introduction to Engineering Design N3	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I N1	4
Total		15

Second Semester

ENG 102	First-Year Composition	3
MAT 242	Linear Algebra	2
MAT 271	Calculus with Analytic Geometry II	4

PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
HU, SB, and awareness area course ²		3
Total		16

Second Year

First Semester

ECE 210	Engineering Mechanics I: Statics	3
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ³	3
PHY 132	University Physics Laboratory II S1/S2 ³	1
ECE 350	Structure and Properties of Materials	3
Total		17

Second Semester

ECE 301	Electrical Networks I	4
ECE 312	Engineering Mechanics II: Dynamics	3
ECE 313	Introduction to Deformable Solids	3
ECE 340	Thermodynamics	3
ECE 384	Numerical Analysis for Engineers I	2
ECE 386	Partial Differential Equations for Engineers	2
Total		17

Third Year

First Semester

ECE 300	Intermediate Engineering Design L1	3
MAE 317	Dynamic Systems and Control	3
MAE 361	Aerodynamics I	3
MAE 425	Aerospace Structures	4
HU, SB, and awareness area course ²		3
Total		16

Second Semester

EEE 350	Random Signal Analysis	3
MAE 413	Aircraft Performance, Stability, and Control	3
MAE 460	Gas Dynamics	3
MAE 498	PS: Principles of Aerospace Design	3
HU, SB, and awareness area course ²		3
Total		15

Fourth Year

First Semester

PHY 361	Introductory Modern Physics	3
MAE 415	Vibration Analysis	4
MAE 462	Space Vehicle Dynamics and Control	3

MAE 463 Propulsion	3
Required design technical elective	3
Total	16
Second Semester	
MAE 464 Aerospace Laboratory	3
MAE 468 Aerospace Systems Design L2	3
Technical electives	3
HU, SB, and awareness area courses ²	7
Total	16

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Engineering students may not use aerospace studies (AES) or military science (MIS) courses to satisfy HU or SB requirements. See page 196.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

**MECHANICAL ENGINEERING—
B.S.E.**

Mechanical engineering is a creative discipline that draws upon a number of basic sciences to design the devices, machines, processes, and systems that involve mechanical work and its conversion from and into other forms. It includes: the conversion of thermal, chemical, and nuclear energy into mechanical energy through various engines and power plants; the transport of energy via devices like heat exchangers, pipelines, gears, and linkages; the use of energy to perform a variety of tasks for the benefit of society, such as in transportation vehicles of all types, manufacturing tools and equipment, and household appliances. Furthermore, since all manufactured products must be constructed of solid materials and because most products contain parts that transmit forces, mechanical engineering is involved in the structural integrity and materials selection for almost every product on the market.

Mechanical engineers are employed in virtually every kind of industry. They are involved with seeking new knowledge through research, with doing creative design and development, and with the construction, control, management, and sales of the devices and systems needed by society. Therefore, a major strength of a mechanical engineering education is the flexibility

it provides in future employment opportunities for its graduates.

The undergraduate curriculum includes the study of: the principles governing the use of energy; the principles of design, instruments and control devices; and the application of these studies to the creative solution of practical, modern problems.

Design is integrated throughout the curriculum, beginning with ECE 100 Introduction to Engineering Design and followed later by ECE 300 Intermediate Engineering Design, both of which focus on basic design theory as well as professional practice. These required courses are followed by topic specific design content in mechanical engineering courses in the junior and senior years. The senior capstone design course combines the design topics from the earlier courses and completes the required design sequence. In addition, many of the mechanical technical electives have design content.

Laboratory experience is provided in the areas of thermofluid systems, mechanics of materials, and controls. Laboratory facilities include thermal systems, and integrated mechanical-testing laboratory, a controls laboratory, and a manufacturing laboratory.

Mechanical Engineering Major

Mechanical Engineering students are required to select the following supplemental courses:

ECE 384 Numerical Analysis for Engineers I	2
ECE 386 Partial Differential Equations for Engineers	2
EEE 350 Random Signal Analysis	3
MAT 242 Elementary Linear Algebra	2
PHY 361 Introductory Modern Physics	3

The Mechanical Engineering major requires the following departmental courses:

MAE 317 Dynamic Systems and Control	3
MAE 318 Dynamic Systems and Control Laboratory	1
MAE 371 Fluid Mechanics	3
MAE 388 Heat Transfer	3
MAE 422 Mechanics of Materials	4
MAE 441 Principles of Design	3
MAE 443 Engineering Design	3

MAE 490 Projects in Design and Development L2	3
MAE 491 Experimental Mechanical Engineering	3
Area of emphasis (technical electives)	15
Total	53

Areas of Emphasis

Technical electives may be selected from among any of the following courses or from courses listed under the Aerospace Engineering areas of emphasis. The courses are grouped to assist a student in assembling an elective package of closely related courses. Students preferring a broader technical background may choose courses from different areas. With prior approval of the advisor and department, a student may select a general area and a corresponding set of courses not listed that would support a career objective not covered by the following categories:

Aerospace. Any courses listed under Aerospace Engineering areas of emphasis may be selected.

Biomechanical. Select from these courses:

BME 411 Biomedical Engineering I	3
BME 412 Biomedical Engineering II	3
BME 416 Biomechanics	3
BME 419 Biocontrol Systems	3
EEE 302 Electrical Networks II	3
EEE 434 Quantum Mechanics for Engineers	3

Computer Methods. Select from these courses:

ASE 485 Engineering Statistics N2	3
CSE 310 Data Structures and Algorithms II	3
CSE 422 Microprocessor System Design II	4
CSE 428 Computer-Aided Processes ...	3
IEE 463 Computer-Aided Manufacturing and Control N3	3
IEE 464 Concurrent Engineering	3
IEE 475 Introduction to Simulation N3	3
MAE 404 Finite Elements in Engineering	3
MAE 406 CAD/CAM Applications in MAE	4
MAE 471 Computational Fluid Dynamics	3
MAE 541 CAD Tools for Engineers	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MAT 421	Applied Computational Methods <i>N3</i>	3
MAT 423	Numerical Analysis I <i>N3</i>	3
MAT 425	Numerical Analysis II <i>N3</i>	3

Control and Dynamic Systems. Select from these courses:

CSE 428	Computer-Aided Processes ...	3
EEE 360	Energy Conversion and Transport	4
IEE 463	Computer-Aided Manufacturing and Control <i>N3</i>	3
MAE 413	Aircraft Performance, Stability, and Control	3
MAE 417	Control System Design	3
MAE 462	Space Vehicle Dynamics and Control	3
MAE 467	Aircraft Performance	3

Design. Select from these courses:

MAE 341	Mechanism Analysis and Design	3
MAE 351	Manufacturing Processes	3
MAE 404	Finite Elements in Engineering	3
MAE 406	CAD/CAM Applications in MAE	4
MAE 413	Aircraft Performance, Stability, and Control	3
MAE 417	Control System Design	3
MAE 434	Internal Combustion Engines	3
MAE 435	Turbomachinery	3
MAE 442	Mechanical Systems Design ..	3
MAE 446	Thermal Systems Design	3
MAE 447	Robotics and Its Influence on Design	3
MAE 462	Space Vehicle Dynamics and Control	3
MAE 467	Aircraft Performance	3

Energy Systems. Select from these courses:

EEE 360	Energy Conversion and Transport	4
MAE 372	Fluid Mechanics	3
MAE 382	Thermodynamics	3
MAE 434	Internal Combustion Engines	3
MAE 435	Turbomachinery	3
MAE 436	Combustion	3
MAE 446	Thermal Systems Design	3

Engineering Mechanics. Select from these courses:

MAE 341	Mechanism Analysis and Design	3
MAE 402	Introduction to Continuum Mechanics	3
MAE 404	Finite Elements in Engineering	3

MAE 413	Aircraft Performance, Stability, and Control	3
MAE 415	Vibration Analysis	4
MAE 426	Design of Aerospace Structures	3
MAE 442	Mechanical Systems Design ..	3
MAE 460	Gas Dynamics	3
MAE 461	Aerodynamics II	3
MAE 471	Computational Fluid Dynamics	3
MAT 421	Applied Computational Methods <i>N3</i>	3
MAT 423	Numerical Analysis I <i>N3</i>	3
MSE 440	Mechanical Properties of Solids	3

Manufacturing. Select from these courses:

CSE 428	Computer-Aided Processes ...	3
IEE 300	Economic Analysis for Engineers	3
IEE 374	Quality Control <i>N2</i>	3
IEE 461	Integrated Production Control	3
IEE 463	Computer-Aided Manufacturing and Control <i>N3</i>	3
MAE 341	Mechanism Analysis and Design	3
MAE 351	Manufacturing Processes	3
MAE 404	Finite Elements in Engineering	3
MAE 442	Mechanical Systems Design ..	3
MAE 447	Robotics and Its Influence on Design	3
MAE 455	Polymers and Composites	3
MSE 355	Introduction to Materials Science and Engineering	3
MSE 420	Physical Metallurgy	3
MSE 431	Corrosion and Corrosion Control	3
MSE 440	Mechanical Properties of Solids	3

Stress Analysis, Failure Prevention, and Materials. Select from these courses:

MAE 341	Mechanism Analysis and Design	3
MAE 404	Finite Elements in Engineering	3
MAE 426	Design of Aerospace Structures	3
MAE 447	Robotics and Its Influence on Design	3
MAE 455	Polymers and Composites	3
MSE 355	Introduction to Materials Science and Engineering	3
MSE 420	Physical Metallurgy	3
MSE 431	Corrosion and Corrosion Control	3
MSE 440	Mechanical Properties of Solids	3
MSE 450	X-ray and Electron Diffraction	3

Thermosciences. Select from these courses:

MAE 372	Fluid Mechanics	3
MAE 382	Thermodynamics	3
MAE 433	Air Conditioning and Refrigeration	3
MAE 434	Internal Combustion Engines	3
MAE 435	Turbomachinery	3
MAE 436	Combustion	3
MAE 446	Thermal Systems Design	3
MAE 460	Gas Dynamics	3
MAE 463	Propulsion	3
MAE 471	Computational Fluid Dynamics	3

Mechanical Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM 114	General Chemistry for Engineers <i>S1/S2</i>	4
	or CHM 116 General Chemistry <i>S1/S2</i> (4)	
ECE 100	Introduction to Engineering Design <i>N3</i>	4
ENG 101	First-Year Composition	3
MAT 270	Calculus with Analytic Geometry I <i>N1</i>	4
Total	.....	15

Second Semester

ENG 102	First-Year Composition	3
MAT 242	Linear Algebra	2
MAT 271	Calculus with Analytic Geometry II	4
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ¹	3
PHY 122	University Physics Laboratory I <i>S1/S2</i> ¹	1
HU, SB, and awareness area course ²	.....	3
Total	.....	16

Second Year

First Semester

ECE 210	Engineering Mechanics I: Statics	3
ECE 350	Structure and Properties of Materials	3
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ³	3
PHY 132	University Physics Laboratory II <i>S1/S2</i> ³	1
Total	.....	17

Second Semester

ECE 301	Electrical Networks I	4
ECE 312	Engineering Mechanics II: Dynamics	3
ECE 313	Introduction to Deformable Solids	3
ECE 340	Thermodynamics	3
ECE 386	Partial Differential Equations for Engineers	2
Total		15

Third Year

First Semester

ECE 300	Intermediate Engineering Design L1	3
MAE 317	Dynamic Systems and Control	3
MAE 318	Dynamic Systems and Control Laboratory	1
MAE 371	Fluid Mechanics	3
MAE 422	Mechanics of Materials	4
HU, SB, and awareness area course ²		3
Total		17

Second Semester

ECE 384	Numerical Analysis for Engineers I	2
EEE 350	Random Signal Analysis	3
MAE 388	Heat Transfer	3
MAE 441	Principles of Design	3
HU, SB, and awareness area course ²		3
Technical elective		3
Total		17

Fourth Year

First Semester

MAE 491	Experimental Mechanical Engineering	3
PHY 361	Introductory Modern Physics	3
HU, SB, and awareness area course(s) ²		4
Technical electives		6
Total		16

Second Semester

MAE 443	Engineering Design	3
MAE 490	Projects in Design and Development L2	3
HU, SB, and awareness area course ²		3
Technical electives		6
Total		15

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Engineering students may not use aerospace studies (AES) or military science (MIS) courses to satisfy HU or SB requirements. See page 196.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

MECHANICAL AND AEROSPACE ENGINEERING (MAE)

MAE 317 Dynamic Systems and Control. (3) F, S

Modeling and representations of dynamic physical systems, including transfer functions, block diagrams, and state equations. Transient response. Principles of feedback control and linear system analysis, including root locus and frequency response. Prerequisite: ECE 312. Corequisite for Mechanical Engineering majors only: MAE 318. Pre- or corequisite: ECE 386.

MAE 318 Dynamic Systems and Control Lab. (1) F, S

Series of labs designed to illustrate concepts presented in MAE 317. Lab. Corequisite for Mechanical Engineering majors only: MAE 317.

MAE 341 Mechanism Analysis and Design. (3) A

Positions, velocities, and accelerations of machine parts; cams, gears, flexible connectors, and rolling contact; introduction to synthesis. Prerequisite: ECE 312.

MAE 351 Manufacturing Processes. (3) S

Automation and assembly systems; forming and machining processes; machining and forming labs; materials and manufacturing properties; tool and equipment designs. Lecture, lab. Prerequisites: ECE 313, 350.

MAE 361 Aerodynamics I. (3) A

Fluid statics, conservation principles, stream function, velocity potential, vorticity, inviscid flow, Kutta-Joukowski, thin-airfoil theory, and panel methods. Prerequisites: ECE 312, 340.

MAE 371 Fluid Mechanics. (3) F, S

Introductory concepts of fluid motions; fluid statics; control volume forms of basic principles; viscous internal flows. Prerequisites: ECE 312, 340.

MAE 372 Fluid Mechanics. (3) A

Application of basic principles of fluid mechanics to problems in viscous and compressible flow. Prerequisites: ECE 384, 386; MAE 361 (or 371).

MAE 382 Thermodynamics. (3) A

Applied thermodynamics; gas mixtures, psychrometrics, property relationships, power and refrigeration cycles, and reactive systems. Prerequisite: ECE 340.

MAE 388 Heat Transfer. (3) F, S

Steady and unsteady heat conduction, including numerical solutions; thermal boundary layer concepts and applications to free and forced convection. Thermal radiation concepts. Prerequisite: MAE 361 or 371.

MAE 402 Introduction to Continuum Mechanics. (3) A

Application of the principles of continuum mechanics to such fields as flow-in porous media, biomechanics, electromagnetic continua, and magneto-fluid mechanics. Prerequisites: ECE 313; MAE 361 (or 371); MAT 242 (or 342).

MAE 404 Finite Elements in Engineering. (3) A

Introduction to ideas and methodology of finite element analysis. Applications to solid mechanics, heat transfer, fluid mechanics, and vibrations. Prerequisites: ECE 313; MAT 242 (or 342).

MAE 406 CAD/CAM Applications in MAE. (4) A

Solution of engineering problems with the aid of state-of-the-art software tools in solid modeling, engineering analysis, and manufacturing; selection of modeling parameters; reliability tests on software. 3 hours lecture, 3 hours lab. Prerequisites: MAE 441; instructor approval.

MAE 413 Aircraft Performance, Stability, and Control. (3) S

Aircraft performance, cruise, climbing and turning flights, energy maneuverability, 6 DOF equations for aircraft, aerodynamic stability derivatives, flight stability/control. Prerequisites: MAE 317, 361.

MAE 415 Vibration Analysis. (4) F, S

Free and forced response of single and multiple degree of freedom systems, continuous systems; applications in mechanical and aerospace systems numerical methods. Lecture, lab. Prerequisites: ECE 312; MAE 422 (or 425); MAT 242 (or 342).

MAE 417 Control System Design. (3) A

Tools and methods of control system design and compensation, including simulation, response optimization, frequency domain techniques, state variable feedback, and sensitivity analysis. Introduction to nonlinear and discrete time systems. Prerequisite: MAE 317.

MAE 422 Mechanics of Materials. (4) F, S

Failure theories, energy methods, finite element methods, plates, torsion of noncircular members, unsymmetrical bending, shear center, and beam column. Lecture, lab. Prerequisites: ECE 313; MAT 242 (or 342). Pre- or corequisite: ECE 386.

MAE 425 Aerospace Structures. (4) A

Stability, energy methods, finite element methods, torsion, unsymmetrical bending and torsion of multicelled structures, design of aerospace structures. Lecture, lab. Prerequisites: ECE 313; MAT 242 (or 342).

MAE 426 Design of Aerospace Structures. (3) A

Flight vehicle loads, design of semi-monocoque structures, local buckling and crippling, fatigue, aerospace materials, composites, joints, and finite element applications. Prerequisites: MAE 361, 425.

MAE 433 Air Conditioning and Refrigeration. (3) A

Air conditioning processes; environmental control; heating and cooling loads; psychrometry; refrigeration cycles. Prerequisite: MAE 388 or MET 432 or instructor approval.

MAE 434 Internal Combustion Engines. (3) A

Performance characteristics, combustion, carburetion and fuel-injection, and the cooling and control of internal combustion engines. Computer modeling. Lab. Prerequisite: MAE 388.

MAE 435 Turbomachinery. (3) A

Design and performance of turbomachines, including steam, gas and hydraulic turbines, centrifugal pumps, compressors, fans, and blowers. Pre- or corequisite: MAE 361 or 371.

MAE 436 Combustion. (3) A

Thermochemical and reaction rate processes; combustion of gaseous and condensed-phase fuels. Applications to propulsion and heating systems. Pollutant formation. Prerequisite: MAE 388.

MAE 441 Principles of Design. (3) F, S

Conceptual and embodiment design of mechanical elements; form synthesis; material selection, failure modes, manufacturability tolerances, common mechanisms, and machine elements. Lecture, lab (project). Prerequisites: ECE 300, 350. Pre- or corequisite: MAE 422 or 425.

MAE 442 Mechanical Systems Design. (3) A

Application of design principles and techniques to the synthesis, modeling, and optimization of mechanical, electromechanical, and hydraulic systems. Prerequisites: MAE 422 (or 425), 441.

MAE 443 Engineering Design. (3) F, S

Group projects to design engineering components and systems. Problem definition ideation, modeling, and analysis; decision making and documentation activities emphasized. 6 hours lab. Prerequisite: MAE 441.

MAE 446 Thermal Systems Design. (3) A

Application of engineering principles and techniques to the modeling and analysis of thermal systems and components. Optimization techniques are presented and their use demonstrated. Prerequisite: ECE 300; MAE 388.

MAE 447 Robotics and Its Influence on Design. (3) A

Robot applications, configurations, singular positions, and work space; modes of control; vision; programming exercises; design of parts for assembly. Prerequisite: MAE 317.

MAE 455 Polymers and Composites. (3) F

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems. Cross-listed as MSE 470. Prerequisite: ECE 350.

MAE 460 Gas Dynamics. (3) A

Compressible flow at subsonic and supersonic speeds; duct flow; normal and oblique shocks, perturbation theory, and wind tunnel design. Prerequisites: ECE 386; MAE 361 (or 371).

MAE 461 Aerodynamics II. (3) A

Transonic/hypersonic flows, wing theory, Navier-Stokes, laminar/turbulent shear flows, pressure drop in tubes, separation, drag, viscous/inviscid interaction, and wing design. Prerequisite: MAE 460.

MAE 462 Space Vehicle Dynamics and Control. (3) F

Attitude dynamics and control, launch vehicles, orbital mechanics, orbital transfer/rendezvous, space mission design, space structures, spacecraft control systems design. Prerequisite: MAE 317.

MAE 463 Propulsion. (3) A

Fundamentals of gas-turbine engines and design of components. Principles and design of rocket propulsion and alternative devices. Lecture, design projects. Prerequisite: ECE 386. Pre- or corequisite: MAE 361 (or 371).

MAE 464 Aerospace Laboratory. (3) F, S

Aerodynamic flow parameters; flow over airfoils and bodies of revolution; flow visualization; computer-aided data acquisition and processing; boundary layer theory. 1 hour lecture, 4 hours lab. Prerequisites: ECE 386; MAE 361, 460.

MAE 465 Rocket Propulsion. (3) A

Rocket flight performance; nozzle design; combustion of liquid and solid propellants; component design; advanced propulsion systems; interplanetary missions; testing. Prerequisite: MAE 361 or 371.

MAE 466 Rotary Wing Aerodynamics and Performance. (3) A

Introduction to helicopter and propeller analysis techniques. Momentum, blade-element, and vortex methods. Hover and forward flight. Ground effect, autorotation, and compressibility effects. Prerequisites: ECE 386 and MAE 361 or instructor approval.

MAE 467 Aircraft Performance. (3) A

Integration of aerodynamic and propulsive forces into aircraft performance design. Estimation of drag parameters for design. Engine, airfoil selection. Conceptual design methodology. Lecture, design projects. Prerequisite: MAE 361 or 371. Pre- or corequisite: MAE 441.

MAE 468 Aerospace Systems Design. (3) F, S

Group projects related to aerospace vehicle design, working from mission definition and continuing through preliminary design. Prerequisites: MAE 361, 413, 463. *General Studies: L2.*

MAE 469 Projects in Astronautics or Aeronautics. (3) F, S

Various multidisciplinary team projects available each semester. Projects include design of high-speed rotocraft autonomous vehicles, liquid-fueled rockets, micro-aerial vehicles, satellites. Prerequisite: instructor approval.

MAE 471 Computational Fluid Dynamics. (3) A

Numerical solutions for selected problems in fluid mechanics. Prerequisites: ECE 384; MAE 361 (or 371).

MAE 490 Projects in Design and Development. (3) F, S

Capstone projects in fundamental or applied aspects of engineering. Prerequisites: MAE 441, 491. *General Studies: L2.*

MAE 491 Experimental Mechanical Engineering. (3) F, S

Experimental and analytical studies of phenomena and performance of fluid flow, heat transfer, thermodynamics, refrigeration, and mechanical power systems. 6 hours lab. Prerequisites: EEE 350; MAE 388.

MAE 498 Pro-Seminar. (1–3) N

Special topics for advanced students. Application of the engineering disciplines to design and analysis of modern technical devices and systems. Prerequisite: instructor approval.

MAE 504 Laser Diagnostics. (3) S

Fundamentals of optics and the interaction of light with matter. Laser sources, laser spectroscopy, velocimetry, particle sizing, and surface characterization.

MAE 505 Perturbation Methods in Mechanics. (3) N

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKB method.

MAE 506 Advanced System Modeling, Dynamics, and Control. (3) S

Lumped-parameter modeling of physical systems with examples. State variable representations and dynamic response. Introduction to modern control. Prerequisite: ASE 582 or MAT 442.

MAE 507 Optimal Control. (3) F

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as EEE 587. Prerequisite: EEE 482 or MAE 506.

MAE 509 Robust Multivariable Control. (3) S

Characterization of uncertainty in feedback systems, robustness analysis, synthesis techniques, multivariable Nyquist criteria, computer-aided analysis and design. Prerequisites: MAE 417, 506.

MAE 510 Dynamics and Vibrations. (3) F

Lagrange's and Hamilton's equations, rigid body dynamics, gyroscopic motion, and small oscillation theory.

MAE 511 Acoustics. (3) F

Principles underlying the generation, transmission, and reception of acoustic waves. Applications to noise control, architectural acoustics, random vibrations, and acoustic fatigue.

MAE 512 Random Vibrations. (3) S

Review of probability theory, random processes, stationarity, power spectrum, white noise process, random response of single and multiple DOF systems, and Markov processes simulation. Prerequisite: MAE 510 or instructor approval.

MAE 515 Structural Dynamics. (3) S

Free vibration and forced response of discrete and continuous systems, exact and approximate methods of solution, finite element modeling, and computational techniques. Prerequisite: MAE 510 or instructor approval.

MAE 517 Nonlinear Oscillations. (3) F

Existence, stability, and bifurcation of solutions of nonlinear dynamical systems. Methods of analysis of regular and chaotic responses. Prerequisite: MAE 510 or instructor approval.

MAE 518 Dynamics of Rotor-Bearing Systems. (3) S

Natural whirl frequency, critical speed, and response analysis of rigid and flexible rotor systems. Bearing influence and representation. Stability analysis. Methods of balancing.

MAE 520 Solid Mechanics. (3) F

Introduction to tensors: kinematics, kinetics, and constitutive assumptions leading to elastic, plastic, and viscoelastic behavior. Applications.

MAE 521 Structural Optimization. (3) S

Linear and nonlinear programming. Problem formulation. Constrained and unconstrained optimization. Sensitivity analysis. Approximate techniques. FEM-based optimal design of mechanical and aerospace structures. Cross-listed as CEE 533. Prerequisite: instructor approval.

MAE 522 Variational Principles of Mechanics. (3) S

Virtual work, stationary, and complementary potential energies. Hamilton's principle. Application of these and direct methods to vibrations, elasticity, and stability. Prerequisite: MAE 520 or equivalent.

MAE 523 Theory of Plates and Shells. (3) F
Linear and nonlinear theories of plates. Membrane and bending theories of shells. Shells of revolution. Prerequisite: MAE 520.

MAE 524 Theory of Elasticity. (3) S
Formulation and solution of 2- and 3-dimensional boundary value problems. Prerequisite: MAE 520.

MAE 527 Finite Element Methods in Engineering Science. (3) F
Discretization, interpolation, elemental matrices, assembly, and computer implementation. Application to solid and fluid mechanics, heat transfer, and time dependent problems. Prerequisite: ASE 582.

MAE 536 Combustion. (3) N
Thermodynamics; chemical kinetics of combustion. Explosion and ignition theories. Reactive gas dynamics. Structure, propagation, and stability of flames. Experimental methods. Prerequisite: MAE 436 or instructor approval.

MAE 540 Advances in Engineering Design Theory. (3) F
Survey of research in engineering design process, artifact and design, knowledge, formal and informal logic, heuristic and numerical searches, theory of structure and complexity. Prerequisite: graduate standing.

MAE 541 CAD Tools for Engineers. (3) F
Elements of computer techniques required to develop CAD software. Data structures, including lists, trees, and graphs. Computer graphics, including 2- and 3-dimensional algorithms and user interface techniques.

MAE 542 Geometric Modeling in CAD/CAM. (3) S
Geometric and solid modeling, curve and surface design, CAD database architectures, and integration of solid modeling into engineering processes. Prerequisite: MAE 541 or instructor approval.

MAE 544 Mechanical Design and Failure Prevention. (3) F
Modes of mechanical failure; application of principles of elasticity and plasticity in multi-axial state of stress to design synthesis; failure theories; fatigue; creep; impact. Prerequisite: MAE 443.

MAE 546 CAD/CAM Applications in MAE. (4) F
Solution of engineering problems with the aid of state-of-the-art software tools in solid modeling, engineering analysis; and manufacturing; selection of modeling parameters; reliability tests on software. Open only to students without previous credit for MAE 406. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval.

MAE 547 Mechanical Design and Control of Robots. (3) N
Homogeneous transformations, 3-dimensional kinematics, geometry of motion, forward and inverse kinematics, workspace and motion trajectories, dynamics, control, and static forces.

MAE 548 Mechanism Synthesis and Analysis. (3) S

Algebraic and graphical methods for exact and approximate synthesis of cam, gear, and linkage mechanisms; design optimization; methods of planar motion analysis; characteristics of plane motion; spatial kinematics.

MAE 557 Mechanics of Composite Materials. (3) S
Analysis of composite materials and applications. Micromechanical and macromechanical behavior. Classical lamination theory developed with investigation of bending-extension coupling.

MAE 560 Propulsion Systems. (3) N
Design of air-breathing gas turbine engines for aircraft propulsion; mission analysis; cycle analysis; engine sizing; component design.

MAE 561 Computational Fluid Dynamics. (3) S
Finite-difference and finite-volume techniques for solving the subsonic, transonic, and supersonic flow equations. The method of characteristics. Numerical grid-generation techniques. Prerequisite: MAE 571 or instructor approval.

MAE 563 Unsteady Aerodynamics. (3) S
Unsteady incompressible and compressible flow. Wings and bodies in oscillatory and transient motions. Kernel function approach and panel methods. Aeroelastic applications. Prerequisites: MAE 460 (or 461), 562.

MAE 564 Advanced Aerodynamics. (3) F
Perturbation method. Linearized subsonic and supersonic flows. Thin wing/slender body theories. Lifting surface theory. Panel method computation. Prerequisite: MAE 460 or 461.

MAE 566 Rotary-Wing Aerodynamics. (3) F
Introduction to helicopter and propeller analysis techniques. Momentum, blade-element, and vortex methods. Hover and forward flight. Ground effect, autorotation, and compressibility effects. Prerequisite: MAE 361.

MAE 571 Fluid Mechanics. (3) F
Basic kinematic, dynamic, and thermodynamic equations of the fluid continuum and their application to basic fluid models.

MAE 572 Inviscid Fluid Flow. (3) S
Mechanics of fluids for flows in which the effects of viscosity may be ignored. Potential flow theory, waves, and inviscid compressible flows. Prerequisite: MAE 571.

MAE 573 Viscous Fluid Flow. (3) F
Mechanics of fluids for flows in which the effects of viscosity are significant. Exact and approximate solutions of the Navier-Stokes system, laminar flow at low and high Reynolds number. Prerequisite: MAE 571.

MAE 575 Turbulent Shear Flows. (3) F
Homogeneous, isotropic, and wall turbulence. Experimental results. Introduction to turbulent flow calculations. Prerequisite: MAE 571.

MAE 577 Turbulent Flow Modeling. (3) S
Reynolds equations and their closure. Modeling of simple and complex turbulent flows, calculations of internal and external flows, and application to engineering problems. Prerequisite: MAE 571.

MAE 581 Thermodynamics. (3) F
Basic concepts and laws of classical equilibrium thermodynamics; applications to engineering systems. Introduction to statistical thermodynamics.

MAE 582 Statistical Thermodynamics. (3) A
Kinetic and quantum theory. Statistical mechanics; ensemble theory. Structure and thermodynamics of noninteracting and interacting particles. Boltzmann integro-differential equation. Prerequisite: graduate standing.

MAE 585 Conduction Heat Transfer. (3) F
Basic equations and concepts of conduction heat transfer. Mathematical formulation and solution (analytical and numerical) of steady and unsteady, one- and multidimensional heat conduction and phase change problems. Prerequisites: ECE 386; MAE 388.

MAE 586 Convection Heat Transfer. (3) S
Basic concepts and governing equations. Analysis of laminar and turbulent heat transfer for internal and external flows. Natural and mixed convection. Prerequisite: MAE 388.

MAE 587 Radiation Heat Transfer. (3) F
Advanced concepts and solution methodologies for radiation heat transfer, including exchange of thermal radiation between surfaces, radiation in absorbing, emitting, and scattering media and radiation combined with conduction and convection. Prerequisite: MAE 388.

MAE 588 Two-Phase Flows and Boiling Heat Transfer. (3) S
Pool and flow boiling heat transfer, condensation heat transfer, various models of vapor-liquid mixture flows, gas-solid mixture flows, and experimental measurement techniques.

MAE 589 Heat Transfer. (3) F
Basic concepts; physical and mathematical models for heat transfer. Applications to conductive, convective, radiative, and combined mode heat transfer. Prerequisite: MAE 388.

MAE 594 Graduate Research Conference. (1) F, S
Topics in contemporary research. Required every semester of all departmental graduate students registered for 9 or more semester hours. Not for degree credit.

MAE 598 Special Topics. (1–3) F, S
Special topics courses, including the following, which are regularly offered, are open to qualified students:

- Advanced Spacecraft Control
- Aeroelasticity
- Aerospace Vehicle Guidance and Control
- Boundary Layer Stability
- Hydrodynamic Stability
- Plasticity
- Polymers and Composites

Programs in Engineering Special Studies

Daniel F. Jankowski
Director

The programs leading to the B.S.E. degree in Engineering Special Studies are administered by the Dean of the College of Engineering and Applied Sciences.

PURPOSE

The major of Engineering Special Studies accommodates students whose educational objectives require more intensity of concentration on a particular subject or more curricular flexibility within an engineering discipline than the traditional departmental majors generally permit. The major is a School of Engineering program. Unlike the departmental major areas, however, there is not a separate faculty. The faculty teaching and advising in these programs are from the various departments within the School of Engineering.

For many students, engineering studies form the basis of preparation for professional engineering work where proficiency in the application of science and the physical and social technologies is brought to bear on problems of a large scope. The necessary breadth that these students seek often is not obtainable in traditional engineering fields. Rather, specially designed programs of course work that merge the required principles and approaches drawn from all fields of engineering and other pertinent disciplines are desired.

The B.S.E. degree in Engineering Special Studies is designed primarily for students intending to pursue engineering careers at a professional level in industry or graduate studies.

ENGINEERING SPECIAL STUDIES—B.S.E.

Manufacturing Engineering. This program option is offered by the Department of Industrial and Management

Systems Engineering. See pages 228–229 for program requirements.

Premedical Engineering. In the past decade, the interrelation between engineering and medicine has become vigorous and exciting. Our rapidly expanding technology dictates that engineering will continue to become increasingly involved in all branches of medicine. As this develops, so will the need for physicians trained in the engineering sciences—medical men and women with a knowledge of computer technology, transport phenomena, biomechanics, bioelectric phenomena, operations research, and cybernetics. This option is of special interest to students desiring entry into a medical college and whose medical interests lie in research, aerospace and undersea medicine, artificial organs, prostheses, biomedical engineering, or biophysics. Since both engineering and medicine have as their goal the well-being of humans, this program is compatible with any field of medical endeavor.

Academic Requirements. The following courses are required in the premedical engineering option and have been selected to meet all university and school requirements. *Note:* In order to fulfill medical school admission requirements, BIO 182 General Biology is also required in addition to the degree requirements and is best taken in summer session before the Medical College Admission Test (MCAT).

First-Year Composition

ENG 101, 102	First Year Composition	6
	or 105 Advanced First-Year Composition (3) or ENG 107, 108 English for Foreign Students (6)	–
Total		6

General Studies/School Requirements

<i>Humanities and Fine Arts/Social and Behavioral Sciences</i>		
ECN 111	Macroeconomic Principles SB ¹	3
	or ECN 112 Microeconomic Principles (3) SB ¹	
HU, SB, and awareness area courses ²		13
Total		16

Literacy and Critical Inquiry

Natural Sciences

PHY 121	University Physics I: Mechanics S1/S2 ³	3
PHY 122	University Physics Laboratory I S1/S2 ³	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ⁴	3
PHY 132	University Physics Laboratory II S1/S2 ⁴	1
Total		8

Numeracy/Mathematics

ECE 100	Introduction to Engineering Design N3	4
MAT 242	Elementary Linear Algebra ... 2 or ECE 384 Numerical Analysis for Engineers I (2) or ECE 386 Partial Differential Equations for Engineers (2)	2
MAT 270	Calculus with Analytic Geometry I NI	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
Total		21
General Studies/school requirements total		58

Engineering Core

ECE 210	Engineering Mechanics I: Statics	3
ECE 300	Intermediate Engineering Design L1	3
ECE 301	Electrical Networks I	4
ECE 334	Electronic Devices and Instrumentation	4
ECE 340	Thermodynamics	3
ECE 350	Structure and Properties of Materials	3
Total		20

Engineering Special Studies Program Major—Premedical Engineering Option

BIO 181	General Biology S1/S2	4
BME 201	Introduction to Bioengineering L1	3
BME 318	Biomaterials	3
BME 331	Biomedical Engineering Transport I: Fluids	3
BME 334	Bioengineering Heat and Mass Transfer	3
BME 413	Biomedical Instrumentation L2	3
BME 416	Biomechanics	3
BME 417	Biomedical Engineering Capstone Design I	3
BME 423	Biomedical Instrumentation Laboratory L2	1

BME 435	Physiology for Engineers	..... 4
BME 470	Microcomputer Applications in Bioengineering	..... 4
BME 490	Biomedical Engineering Capstone Design II	..... 4
CHM 113	General Chemistry <i>S1/S2</i>	..... 4
CHM 116	General Chemistry <i>S1/S2</i>	..... 4
CHM 331	General Organic Chemistry	... 3
CHM 332	General Organic Chemistry	... 3
CHM 335	General Organic Chemistry Laboratory	..... 1
CHM 336	General Organic Chemistry Laboratory	..... 1
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	..... 3
	Technical elective	..... 1
Total		..... 58

PHY 132	University Physics Laboratory II <i>S1/S2</i> ²	..... 1
Total		..... 18

Second Semester

CHM 331	General Organic Chemistry	... 3
CHM 335	General Organic Chemistry Laboratory	..... 1
ECE 301	Electrical Networks I	..... 4
ECE 350	Structure and Properties of Materials	..... 3
ECN 111	Macroeconomic Principles <i>SB</i> or ECN 112 Microeconomic Principles <i>SB</i> (3)	..... 3
MAT 274	Elementary Differential Equations	..... 3
Total		..... 17

Third Year

First Semester

BME 331	Biomedical Engineering Transport I: Fluids	..... 3
BME 435	Physiology for Engineers	..... 4
CHM 332	General Organic Chemistry	... 3
ECE 300	Intermediate Engineering Design <i>L1</i>	..... 3
ECE 340	Thermodynamics	..... 3
Total		..... 16

Second Semester

BME 318	Biomaterials	..... 3
BME 334	Bioengineering Heat and Mass Transfer	..... 3
CHM 336	General Organic Chemistry Laboratory	..... 1
ECE 334	Electronic Devices and Instrumentation	..... 4
MAT 242	Elementary Linear Algebra <i>N1</i> or ECE 384 Numerical Analysis for Engineers I (2) or ECE 386 Partial Differential Equations for Engineers (2)	..... 2

HU, SB, and awareness area course(s) ³	..... 4
Total	..... 17

Fourth Year

First Semester

BME 413	Biomedical Instrumentation <i>L2</i>	..... 3
BME 416	Biomechanics	..... 3
BME 417	Biomedical Engineering Capstone Design I	..... 3
BME 423	Biomedical Instrumentation Laboratory <i>L2</i>	..... 1
HU, SB, and awareness area courses ³	..... 6	
Total		..... 16

Second Semester

BME 470	Microcomputer Applications in Bioengineering	..... 4
BME 490	Biomedical Engineering Capstone Design II	..... 3
ECE 380	Probability and Statistics for Engineering Problem Solving <i>N2</i>	..... 3
HU, SB, and awareness area course ³	..... 3	
Technical elective	..... 1	
Total		..... 14
Degree requirements total		..... 128

¹ ECN 111 or ECN 112 must be included to fulfill the HU and SB requirements.

² Engineering students may not use aerospace studies (AES) or military science (MIS) courses to fulfill HU and SB requirements. See page 196.

³ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

⁴ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Premedical Engineering Program of Study Typical Four-Year Sequence First Year

First Semester

CHM 113	General Chemistry <i>S1/S2</i>	..... 4
ECE 100	Introduction to Engineering Design <i>N3</i>	..... 4
ENG 101	First-Year Composition	..... 3
MAT 270	Calculus with Analytic Geometry I <i>N1</i>	..... 4
Total		..... 15

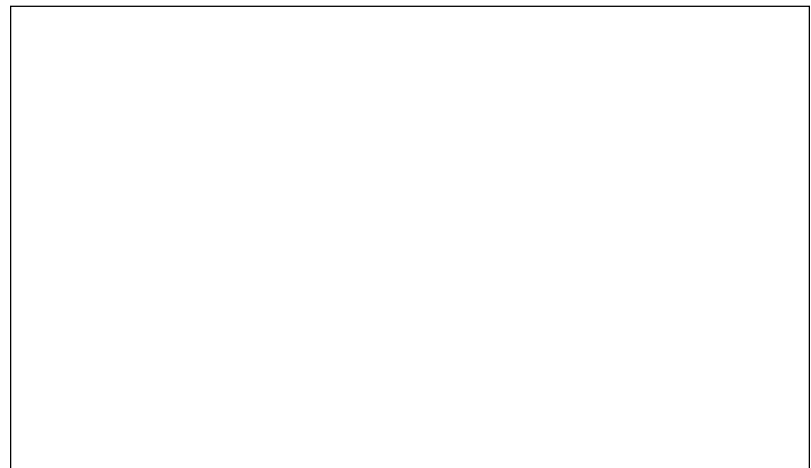
Second Semester

CHM 116	General Chemistry <i>S1/S2</i>	..... 4
ENG 102	First-Year Composition	..... 3
MAT 271	Calculus with Analytic Geometry II	..... 4
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ¹	..... 3
PHY 122	University Physics Laboratory I <i>S1/S2</i> ¹	..... 1
Total		..... 15

Second Year

First Semester

BIO 181	General Biology <i>S1/S2</i>	..... 4
BME 201	Introduction to Bioengineering <i>L1</i>	..... 3
ECE 210	Engineering Mechanics I: Statics	..... 3
MAT 272	Calculus with Analytic Geometry III	..... 4
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ²	..... 3



Sara Gerke, a student in Environmental Civil Engineering, works with a gas chromatograph in the Environmental Engineering Laboratory.

Ken Sweat photo

College of Extended Education

Bette F. DeGraw, D.P.A.
Dean

PURPOSE

The College of Extended Education was created in 1990 for the purpose of extending the resources of ASU throughout Maricopa County, the state, and the region. The College of Extended Education oversees ASU's Extended Campus and forms partnerships with other ASU colleges in order to meet the instructional and informational needs of a diverse community.

For the most current information, visit the college's Web site at www.asu.edu/xed.

ASU EXTENDED CAMPUS

The ASU Extended Campus goes beyond the boundary of ASU's three physical campuses to provide access to academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; plus innovative delivery technologies including television, the Internet, CD-ROM, and independent learning. The Extended Campus also offers a variety of professional continuing education and community outreach programs.

DEGREE PROGRAMS

ASU offers several degree programs through the ASU Extended Campus. Convenient times and locations as well as today's innovative technologies make it easier for working adults and other nontraditional students to earn a degree. The College of Extended Education facilitates the delivery of these programs. All courses and degrees are offered through the respective university academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and in the *Schedule of Classes*.

College of Architecture and Environmental Design. The faculty in the School of Planning and Landscape Architecture in the College of Architecture and Environmental Design offer the Bachelor of Science in Design degree with a major in Housing and Urban Development primarily at the ASU Downtown Center, although some courses may be available at other locations and via cable television. See the fall and spring issues of the *Extended Campus Catalogs* for complete scheduling information. For information

about this program, call 602/965-7167 or write

SCHOOL OF PLANNING AND
LANDSCAPE ARCHITECTURE
ARIZONA STATE UNIVERSITY
PO Box 872005
TEMPE AZ 85287-2005

College of Business. The Technology M.B.A. is an evening program designed specifically for technology professionals. The degree program is offered at the ASU Research Park. Cases, applications, and examples emphasize technology, global competition, and rapid organizational change. Call the College of Business at 602/965-3332 for detailed information about this degree program.

College of Education. Three education degrees—the Bachelor of Arts in Education (B.A.E.) degree in Elementary Education and two Master of Education (M.Ed.) degrees—are available through the Off-Campus Degree Program. These degree programs are targeted to specific audiences and are not open to the general public. To learn more about these education degrees, call 602/965-1644.

College of Public Programs. The College of Public Programs offers a Master of Public Administration (M.P.A.) degree. This interdisciplinary program is designed to provide professional training for careers in public administration and management. Opportunities for completing course work leading to an M.P.A. are offered during evening hours at the ASU Main Campus and the ASU Downtown Center. For more information about this program, call 602/965-3926 or write

DR DICKINSON MCGAW
SCHOOL OF PUBLIC AFFAIRS
ARIZONA STATE UNIVERSITY
PO Box 870603
TEMPE AZ 85287-0603

School of Social Work. The School of Social Work, in cooperation with the College of Extended Education, offers a Bachelor of Social Work (B.S.W.) degree in Tucson. This program is grant-funded for a five-year period and offers a part-time curriculum designed to increase the number of trained child welfare social workers in the rural areas of Arizona. For more information, call Martha Marsden at 520/884-5507, extension 19.

Technology-Delivered Degree Program

The faculty in the Department of Electrical Engineering offer the Master of Science in Engineering via interactive television. This degree program meets the needs of the part-time student who is working full time in industry. Ten graduate courses are required; six should constitute a major, two courses a minor, and two courses should be taken outside the Department of Electrical Engineering. After completing the required hours of course work, students in this program must pass a comprehensive examination covering topics in the major. Using the department's three-year schedule of courses, students are able to complete course requirements over the interactive television system. For more information, call 602/965-3590.

On-Campus Evening Degree Programs

College of Liberal Arts and Sciences. The College of Liberal Arts and Sciences offers six evening degree programs: the B.A. degree in English, History, Political Science, and Sociology, and B.A. and B.S. degrees in Psychology. For more information about these programs, call 602/965-3986 and request "degree programs."

College of Public Programs. The faculty in the Department of Communication in the College of Public Programs offers B.A. and B.S. degrees in Communication through the College of Extended Education's Evening Degree Program. For more information, call 602/965-5095.

CERTIFICATE PROGRAMS

Certificate programs provide opportunities for those seeking to advance their careers, to begin a new career, to reenter the workplace, or to simply develop new knowledge. A practical choice for career development, certificate programs are recognized by employers as evidence of professional skill or accomplishment.

Gerontology Certificate Program

The Certificate in Gerontology, offered by the Graduate College, is available to graduate students enrolled in master's or doctoral degrees in disciplines such as Communication, Exercise Science, Nursing, Psychology, Social Work, and Sociology. Unclassified

graduate students may pursue the certificate. This program consists of 24 credit hours evenly divided between required and elective course work.

The Gerontology Program has an affiliated faculty of over 60 members who are based in 22 different departments throughout the university. Students can work on independent study or participate with faculty in their aging-related research.

The certificate is designed for the person who wants to know more about the aging process. Increased longevity means that by the year 2040 there could be more than 30 million Americans over the age of 85. For more information, call 602/965-3225 (ASU Main) or 602/543-6600 (ASU West).

Nonprofit Management Certificate Program

The Nonprofit Management Institute is offered by the College of Extended Education and the United Way. This program is designed to enhance the management skills of those who serve nonprofit human services groups, hospitals, government agencies, churches, private schools, art organizations, environmental groups, and others in the nonprofit sector.

Individuals can receive a Certificate in Nonprofit Management along with 13 Continuing Education Units (CEUs) after completing 130 hours of the program. The individual class option permits participants to enroll in one or more classes on a per-class basis. Additional full- and half-day workshops are also provided to help those in the nonprofit sector achieve excellence in managing nonprofit organizations. For more information, call 602/965-3046.

Post-Master's Family Nurse Practitioner Certificate Program

In keeping with the demand for more primary health care providers, ASU offers this program to master's (in Nursing) prepared nurses with commensurate interests and experience. The 31-semester-hour program is one year in length and begins in June. The curriculum is approved by the Arizona State Board of Nursing; Arizona State University, College of Nursing Curriculum Committee, and faculty; and Arizona State University's Graduate College and meets educational requirements for national certification examinations. Classes and practica are offered at various locations throughout the metropoli-

tan area, including ASU Main, ASU Downtown Center, and multiple clinical sites. Classes are scheduled during the days, evenings, and weekends. With only 10 student positions available per year, admission to the program is expected to be very competitive. For more information, call the College of Nursing's Student Services Office at 602/965-2987.

COLLEGE UNITS BY PROGRAM AREA

Degree Programs and Credit Courses

The College of Extended Education facilitates the delivery of several degree programs and credit courses. All courses and degrees are offered through the respective university academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and in the *Schedule of Classes*.

Instructional Programs. As a convenience to students, courses are conducted off campus in locations throughout the state and on campus in the evening.

Credits earned off campus are recorded on a student's permanent record in the same manner as those earned on campus, and both are equivalent in all academic considerations. All academic standards of the university, including policies related to admission and registration, apply to off-campus courses. It is the responsibility of the student to be aware of all applicable policies before registering. It is the responsibility of each dean to determine what courses to offer off campus and to make faculty assignments.

The registration fees and tuition for off-campus courses are the same as for those offered on campus. (See resident and nonresident rates in the current *Schedule of Classes*.) Before the 21st calendar day of each semester, any combination of on-campus and off-campus resident credit courses resulting in a combined registration of seven or more semester hours requires that the student pay full-time, resident registration fees or full-time nonresident registration fees and tuition. Off-campus credit courses and programs that commence on or after the 21st calendar day of the start of each semester require full-time and part-time students to pay registration fees and tuition separate

from (but in addition to) those courses starting before the 21st calendar day of the semester.

ASU offers several degree programs through the ASU Extended Campus. Convenient times and locations as well as today's innovative technologies make it easier for working adults and other nontraditional students to earn a degree. Instructional Programs and the College of Liberal Arts and Sciences collaborate to offer several degrees in the on-campus evening degree program. For details, see "Degree Programs" on pages 240–241.

For more information about Instructional Programs, call 602/965–9797.

Distance Learning Technology. Distance Learning Technology uses a variety of technologies, including Instructional Television Fixed Service (ITFS), cable television, public television, satellite, microwave, videotape, CD-ROM, the Internet, and independent learning to deliver courses to ASU students at a variety of locations. Distance Learning Technology makes it possible for many people to access and share educational resources locally, regionally, nationally, and internationally through a variety of electronic technologies and distribution systems. In addition to distance learning courses, other products and services are available including teleconferencing and video production.

Many students are unable to attend class on campus due to schedule or commuting difficulties and prefer to participate in distance learning courses at convenient locations such as the work site or home. ASU's distance learning course schedule consists of approximately 120 courses offered by various ASU colleges each semester, and these courses are available for credit at a variety of remote locations, including students' homes. Students participating in televised courses from the work site or home can interact with faculty and the class on campus while class is in session via teleconferencing technology. Videotapes of most courses are available through University Libraries Video Resources. Other student support services are available to assist off-campus students.

Cable/Public Television. ASU offers credit courses that require students to view televised class sessions and complete work assignments at home. Exams usually are held on campus.

Courses are available throughout the Phoenix area via KAET Channel 8, Cox Communications, Insight Cable, Cable America, People's Choice Television, or other cable providers. ASU's televised courses are also available in the university residence halls.

Interactive Instructional Television Program (IITP). Students employed by companies participating in the IITP may take courses for credit at the work site. A daily courier service circulates course materials between faculty on campus and their students at remote sites. Exams typically are held at the work site. Each company has an on-site coordinator to assist with registration, to provide information, and to proctor exams. A Master of Science in Engineering degree with an emphasis in electrical engineering is available through the IITP. More information about the televised Master of Science in Engineering degree is available from the College of Engineering and Applied Sciences at 602/965–3506.

Interactive Television (Public Sites). Certain sites are open to the public. Students can participate in most televised courses at locations such as ASU West, ASU East, ASU Downtown Center, select community college campuses, Cactus Shadows High School, and the Gila River Indian Community. Each public site has an on-site coordinator to assist with registration, to provide information, and to proctor exams.

Internet Courses. Several departments on campus are offering Internet courses through the Extended Campus, allowing students to participate from any location in the world. Through the World Wide Web, students can access lectures, participate in class assignments, interact with the instructor, collaborate with other students, and earn ASU credit at times and locations that are convenient. Students register for Internet courses through the normal university admissions/registration process. Certain computer hardware/software may be required for Internet courses. Further information is available from Distance Learning Technology at 602/965–6738.

CD-ROM Courses. An increasing number of departments are offering courses via CD-ROM. These courses allow students to participate in course materials and complete assignments from the location most convenient to them. Certain computer hardware/software is required

for CD-ROM courses. Students typically register for these courses through Distance Learning Technology.

Independent Learning. These courses allow students to pursue ASU credit and to fulfill degree requirements or to enhance occupational, professional, and intellectual skills. Independent Learning courses are appropriate for students who are seeking flexibility in progressing through university courses. Any individual with a high school diploma or GED may enroll; however, enrollment in Independent Learning is not the same as admission to ASU. For ASU degree-seeking students, enrollment in these courses requires advisor's and dean's approval. Generally, ASU students may take one course at a time—other students can participate in two. A maximum of 60 semester hours earned by independent learning and/or by comprehensive examination may be applied toward the baccalaureate degree at ASU. Independent Learning courses are not applicable toward graduate credit, and pass/fail options are not available. Students have up to one year to complete courses. Further information regarding registration, lesson formats, submission of assignments, correspondence with instructors and other course details are available in a catalog from the Independent Learning office at 602/965–6563.

Professional and Continuing Education

Professional and Continuing Education activities focus on professional and personal development as well as life-long learning. Programs are planned and developed to complement the missions of the college and the university. These programs can be customized and transported to reach numerous target populations and levels of need.

Professional Programs and Institutes. Professional Programs and Institutes develops and offers high quality continuing education programs designed to meet the educational needs of various professions, the community, and public and private organizations. These ongoing programs are intended to improve professional competence and address current issues and trends, and are offered to adult learners in collaboration with ASU colleges, other educational providers, professional associations, and public and private orga-

nizations. For more information, call 602/965-3046.

Computer Training Programs. Computer Training Programs is the oldest provider of professional computer software and hardware training in the state. Computer Training Programs offers microcomputing training classes in the latest versions of software and courseware as well as a full range of short, streamlined courses in progressive levels. Development of programs for specialized markets, such as executives, small business owners, retirees and youth, is ongoing. Classes are offered at the ASU Downtown Center, and in the ASU Sun Cities and Mesa, as well as in many work sites. For more information, call 602/965-9200.

Lifelong Learning Programs. Lifelong Learning Programs provides an informative experience that enriches lives. All programs are open to the public and adults of any age or educational background can learn in an informal noncompetitive environment. Programs in the Sun Cities area are geared toward the retirement communities and include a wide variety of courses from approximately 30 disciplines. These programs are in the process of expansion to the East Valley and throughout Maricopa County. For an international educational travel experience, ASU and TravelLearn partner to provide programs to 15 exciting destinations including Costa Rica, Indonesia, and Kenya. For more information about Lifelong Learning Programs, call 602/727-5264.

Global and Community Outreach

American English and Culture Program. The American English and Culture Program features an intensive course of study designed for adult international students who want to become proficient in English as a second language for academic, professional, or personal reasons. Applicants must be at least 18 years of age and must have a high school diploma or its equivalent. All conditions of the U.S. Immigration and Naturalization laws pertaining to full-time study in the United States must be met by all applicants. Students are required to take an English placement test before the beginning of classes. Certificates of achievement are awarded on completion of the course.

Admission to the program does not constitute regular admission to ASU.

Beginning, intermediate, and advanced courses provide instruction in listening, reading, speaking, structure, and writing. Academic advising and orientation to Arizona and the United States are integral parts of the program.

Program-wide social activities each term include a major field trip, a picnic, a cultural activity, visits to museums, historical sites, or musical presentations.

Advanced level students may be permitted to enroll concurrently in up to two ASU credit classes with the approval of the director. Several special classes are offered through the AECF. Classes in conversation, speech improvement, and the Test of English as a Foreign Language (TOEFL) are offered during alternate terms.

The fall and spring semesters are divided into two eight-week cycles. Students may enroll for one or more cycles. An eight-week summer session of study is also offered. Inquiries concerning admission requirements, enrollment, and fee schedules should be sent to

AMERICAN ENGLISH AND
CULTURE PROGRAM
DEPARTMENT 4
ARIZONA STATE UNIVERSITY
PO Box 873106
TEMPE AZ 85287-2376

For more information, call 602/965-2376.

Extended Campus Programs. Extended Campus Programs was established in response to the rapidly expanding demand for educational services in Maricopa County and throughout Arizona. Analyzing community needs for course offerings, workshops and seminars, the unit oversees the planning, organizing, and staffing necessary to satisfy these educational needs.

A primary goal of this unit is to ensure that qualified students have access to effective, appropriate university programs. Extended Campus Programs focuses on developing and maintaining education, business, government, professional, and community linkages in the furtherance of the university's and college's missions.

The major components of Extended Campus Programs are the classes and events at the ASU Downtown Center

and emerging programs in the East Valley, Scottsdale, and Ahwatukee. For more information, call 602/965-3046.

ASU Downtown Center. The ASU Downtown Center, located at the Phoenix Mercado, is specifically designed to extend ASU into the central Phoenix community, to help address urban challenges, to serve local and state government of Arizona, and to enhance public policy-making capacity.

The center provides instruction and community outreach, carries out applied research, and promotes economic and cultural development. Graduate and upper-division courses of interest to government, business, and the professional community are offered. Interactive instructional television courses in engineering, business, liberal arts, and nonlaboratory sciences are also offered.

The ASU Downtown Center also serves as a meeting and conference site. It offers attractive rates, accommodations for small or large groups, beverage and food service, professional equipment, and secure, limited parking. The Downtown Center staff offers a wide range of services in meeting planning. The center is available for use by outside organizations, subject to the limits of university policies and procedures. For more information, call the facility coordinator at 602/965-3046, or write to

ASU DOWNTOWN CENTER
502 E MONROE ST
PHOENIX AZ 85004-2337

ASU faculty, staff, and students may take advantage of computer lab facilities at the ASU Downtown Center. Equipped with IBM personal computers and Macintosh computers, the laboratory has access to VAX, FOCUS, WYLBUR, the libraries, electronic mail, and more. A lab assistant is also available.

Students at the ASU Downtown Center have access to ASU library information and resources through the Computer Lab. Students may order library books and return them; in addition, access to the library's online catalog is available. Lab hours vary each semester. For more information, call 602/965-3046.

Several College of Extended Education programs and partnerships are located at the Downtown Center.

Professional and Continuing Education. Professional and Continuing Education is part of the Extended Campus and is a unit of the College of Extended Education. This brings the resources of ASU to many who may not be pursuing a traditional degree and are seeking professional and personal enrichment. Three program areas are offered: Computer Training, Professional Programs and Institutes and Lifelong Learning. See pages 242–243 for a description.

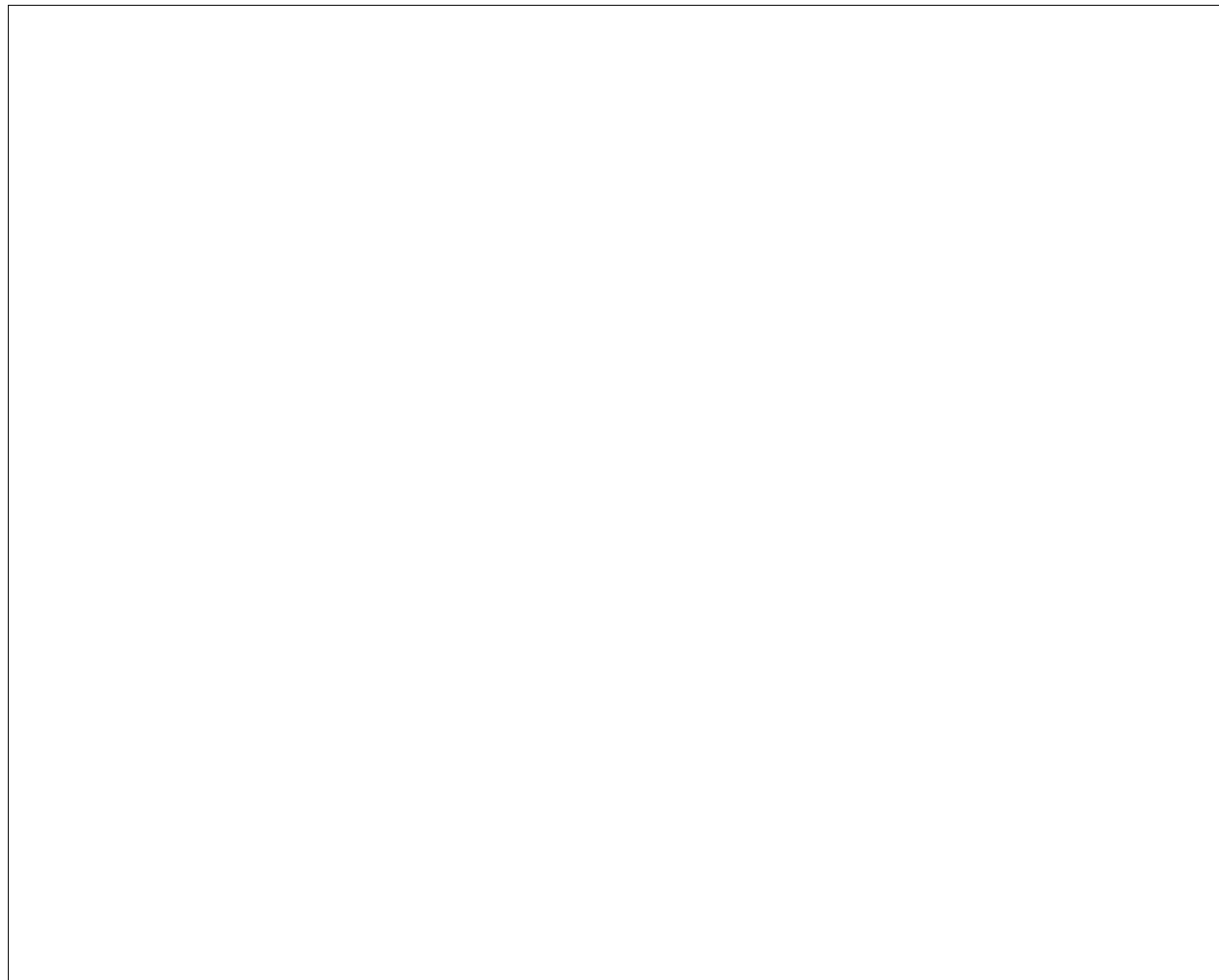
Joint Urban Design Program. The Joint Urban Design Program, located in the ASU Downtown Center, is a partnership between the ASU colleges of Architecture and Environmental Design and Extended Education. The program directs institutional and public resources toward developing an understanding of issues that affect the urban quality of Phoenix. For more information, call 602/965–3046.

Urban Data Center. The Urban Data Center, a partnership with the College of Public Programs, serves as a resource for analysis and implementation of public policy in metropolitan Phoenix. The center works closely with ASU researchers and organizations such as the Joint Urban Design Program, the Morrison Institute for Public Policy, University Libraries, local government, state agencies, and other independent organizations to build a comprehensive database on policy issues for urban planners and community leaders. For more information, call 602/965–3046.

Advanced Public Executive Program. The Advanced Public Executive Program of the ASU College of Public Programs is housed at the ASU Downtown Center. This program is designed to provide public managers and admin-

istrators with analytical approaches and skills through short courses and seminars to help mobilize ideas, people, and resources in support of public programs. For more information, call 602/965–3046.

Office of Youth Preparation and Project PRIME. The office of Youth Preparation and Project PRIME (Project to Improve Minority Education) are housed at the Downtown Center with evaluation support services located at the Hispanic Research Center. The programs are designed to increase the pool of college-eligible minority students, who have historically been underrepresented in higher education, by providing instructional and support services to seventh- through twelfth-grade students and their families at targeted Arizona schools. For more information, call 602/965–8510.



College of Fine Arts

J. Robert Wills, Ph.D.
Dean

PURPOSE

The College of Fine Arts provides both preprofessional and professional education in the arts disciplines and an opportunity for nonmajors to become culturally literate through participation and involvement in the creative and performing arts.

The college, through its programs in art, dance, music, and theatre, reflects a wide range of challenges facing the artist and scholar in the 20th century. The arts, as an integral part of the curriculum, offer the student a rewarding educational experience balanced and strengthened by studies in related fine arts areas, the humanities, social sciences, and the sciences.

In addition to professional curricula offered in each department and school, the college provides courses designed to meet the specific educational needs of students pursuing majors in other colleges throughout the university. The cultural life of the university community is further enriched by study opportunities offered at off-campus sites. The College of Fine Arts also offers community audiences many hours of cultural enjoyment through myriad concerts, art exhibitions, music and dance concerts, dramatic productions, operas, lectures, and seminars.

ORGANIZATION

The college houses the School of Art, the Department of Dance, the School of Music, and the Department of Theatre. An average of 2,000 students per semester enroll as majors in various degree programs offered through these units. The college also includes the University Art Museum and the Institute for Studies in the Arts.

ADMISSION

Students meeting the university requirements for admission may matriculate in the College of Fine Arts. Separate admission procedures and approvals are required for some programs within the college. Students must contact specific departments or schools for details.

Transfer of Community College

Credits. The university standards for evaluation of transfer credit are listed on pages 63–64. Transfer students are encouraged to contact their department or school or the Office of Student Services (GHALL 127) to ensure a smooth

transition to the College of Fine Arts. Credits transferred from any accredited junior or community college may be accepted up to a maximum of 64 semester hours. A community college student planning to transfer at the end of his or her first or second year should plan to take community college courses that meet the requirements of the ASU curriculum selected. Students attending Arizona community colleges are permitted to follow the degree requirements specified in the ASU *General Catalog* in effect at the time they began their community college work, providing their college attendance has been continuous.

Courses transferred from community colleges are not accepted as upper-division credit at ASU. Arizona students are urged to refer to the *Arizona Higher Education Course Equivalency Guide* for transferability of specific courses from Arizona community colleges. Copies of the guide are available in counselors' offices. In choosing courses at a community college, students should be aware that a minimum of 45 hours of work taken at the university must be upper-division credits. While attending a community college, it is suggested that students select courses similar to ASU General Studies lower-division courses in the major field.

General Transfer Credit. Direct transfer of courses from other accredited institutions to the College of Fine Arts are subject to (1) the existence of parallel and equal courses in the college's curriculum and (2) departmental or school evaluation of studio courses with respect to performance standards. Every candidate for the bachelor's degree must earn a minimum of 30 semester hours in resident credit at ASU. Transfer students enrolled in the College of Fine Arts must complete a minimum of 15 semester hours of resident credit in the major as approved by the faculty.

ADVISING

Advising is handled as a decentralized activity within the college. To offer personalized attention, each academic unit establishes its own graduation advising procedures. Students are encouraged to make appointments through the central office of their department or school.

College of Fine Arts Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Art Concentrations: art history, photographic studies, studio art	B.A.	School of Art
Art Concentrations: art education, ceramics, drawing, fibers, intermedia, metals, painting, photography, printmaking, sculpture	B.F.A.	School of Art
Dance Concentrations: choreography, dance education, dance studies, performance	B.F.A.	Department of Dance
Music	B.A.	School of Music
Music Education ¹ Concentrations: choral-general, instrumental, string	B.M.	School of Music
Music Therapy ¹	B.M.	School of Music
Performance Concentrations: guitar, jazz, keyboard, music theatre, orchestral instrument, piano accompanying, voice	B.M.	School of Music
Theatre Emphases: acting, design/technical theatre, directing/stage management, history/theory and criticism	B.A.	Department of Theatre
Theatre Concentration: theatre education	B.F.A.	Department of Theatre
Theory and Composition Concentrations: composition, theory	B.M.	School of Music
Graduate Degrees		
Art Concentrations: art education, art history	M.A.	School of Art
Art Concentrations: ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	M.F.A.	School of Art
Composition	M.M.	School of Music
Creative Writing	M.F.A. ²	Creative Writing Committee
Dance	M.F.A.	Department of Dance
Music Concentrations: ethnomusicology, music history and literature, music theory	M.A.	School of Music
Music Education Concentrations: choral music, general music, instrumental music	M.M.	School of Music
Music Concentrations: choral music; composition; general music; instrumental music; solo performance (instrumental, keyboard, voice)	D.M.A.	School of Music
Performance Concentrations: music theatre musical direction; music theatre performance; performance pedagogy; piano accompanying; solo performance (instrumental, keyboard, voice)	M.M.	School of Music

¹ This major requires more than 120 semester hours to complete.

² This program is administered by the Graduate College. See "Graduate College," pages 282–292. Playwriting is an option for students in this program offered by the faculty in the Department of Theatre. Fiction, nonfiction, poetry, and screenwriting are also options in this program offered by the faculty in the Department of English.

Major	Degree	Administered by
Theatre	M.A.	Department of Theatre
Theatre Concentrations: acting, scenography, theatre for youth	M.F.A.	Department of Theatre
Theatre Concentration: theatre for youth	Ph.D.	Department of Theatre

Baccalaureate Degrees

The three baccalaureate degrees differ in curricula with respect to the amount of specialization permitted in the major field. The B.A. degree provides a broad, scholarly, humanistic program, while the other two programs place greater emphasis upon the major field. The university General Studies curriculum plays an integral role within the educational mission of the university and as such constitutes an important component of all undergraduate degrees in the College of Fine Arts. See pages 84–87 for university General Studies requirements.

In cooperation with the College of Education, a K–12 endorsement for teacher certification is available in the disciplines of art, dance, music, and theatre for students preparing for a teaching career in the public schools. Students should, with the advice and counsel of their arts education advisors, fulfill the requirements for the appropriate area of specialization under the Bachelor of Fine Arts or Bachelor of Music degrees. In addition, a student wishing to be admitted to the Professional Teacher Preparation Program (PTPP) in the College of Education (leading to teaching certification) must consult with an advisor from the Office of Student Affairs in the College of Education before making application for the PTPP. Students must have completed 56 hours with a minimum GPA of 2.50 and also have submitted scores from either the Pre-Professional Skills Test (PPST) or the ACT. Further details on admission requirements and procedures for the PTPP can be found on page 167.

Minors

The College of Fine Arts provides an opportunity for students majoring in other disciplines to sustain their interest in the arts through a structured program of required courses and electives leading to a minor. The minor is not in-

tended as a substitute for professional work in the arts, but as a complement to various liberal arts and preprofessional curricula.

Minors are offered in Art History, Dance, Music, and Theatre. The total number of semester hours required for a minor ranges from 18 to 22. Students should contact the relevant academic unit for specific requirements and guidelines regarding the minor.

Graduate Degrees

Master's programs range from 30 to 60 semester hours, depending upon the degree chosen. Doctoral programs vary in scope and curricula. See the *Graduate Catalog* for specific requirements for the M.A., M.F.A., M.M., D.M.A., Ed.D., and Ph.D. degrees.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 semester hours of approved course work in General Studies, as described on pages 84–108. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. General Studies courses are listed on pages 87–108 following the section on “General Studies,” in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

Courses in the major or in a related field area may not be used to satisfy both the major and core area portions of the General Studies requirement. Concurrent listings in the literacy areas, numeracy (computer applications) areas, and awareness areas are an exception. Students are encouraged to consult with an academic advisor to ensure

that they comply with all necessary requirements.

COLLEGE DEGREE REQUIREMENTS

College of Fine Arts degree requirements supplement the General Studies requirement. Descriptions of additional required courses follow. Students are encouraged to consult with an academic advisor to ensure that they comply with all necessary requirements.

Fine arts majors must take at least six semester hours of fine arts course work in areas outside of the major school or department. These courses may be in art, dance, music, or theatre. A student may concurrently fulfill this requirement and the humanities and fine arts portion of the General Studies requirement by selecting approved courses as indicated in the *Schedule of Classes*. This requirement may also be met by taking *any* College of Fine Arts course outside of the student's major.

All B.A. degrees require the equivalent of 16 semester hours in one foreign language except for the B.A. degrees in Theatre and Art with a concentration in studio art. Foreign language study is strongly recommended but not required for these degree programs. Course work may be selected in any language and must follow the sequence of language courses 101, 102, 201, and 202. This requirement may be fulfilled at the secondary school level or by examination. If acquired in secondary school, two years of instruction in one foreign language is considered the equivalent of one year of college instruction. Transfer students are placed in language study at the level above completed work.

Candidates for the B.M. degree in Performance with a concentration in piano accompanying or voice and in Theory and Composition with a concentration in theory have specific foreign language requirements, which are

stated with each of the degree requirements (pages 267–269). There is no foreign language requirement for other concentrations of the B.F.A. or B.M. degrees.

MAJOR REQUIREMENTS

The minimum requirement for a baccalaureate degree is the completion of 120 semester hours with a minimum cumulative GPA of 2.00. Of these 120 semester hours, at least 45 must be selected from upper-division courses.

Several professional programs within the College of Fine Arts require additional semester hours for graduation and a higher cumulative GPA of their majors. To be acceptable as degree credit, all course work in the major discipline must show an earned grade of “C” (2.00) or higher.

In addition to the general information given below, consult the school and departmental sections that follow for specific degree requirements.

Bachelor of Arts (B.A.) Degree. The B.A. degree requires 45–60 semester hours for the major. Depending on the major, 18 to 24 hours must be selected from upper-division (300- or 400-level) courses. The semester-hour requirements in the major are distributed between a field of specialization (30 to 53 hours) and one or more related fields (an additional 15 hours). The exact content of the major is selected by a student in consultation with an advisor under rules and regulations of the department or school concerned. Auditions and/or interviews are required for admission to the B.A. in Theatre with emphasis degree program. Consult the Department of Theatre for specific information.

Bachelor of Fine Arts (B.F.A.) Degree. The B.F.A. degree requires 52 to 79 semester hours for the major. At least 30 of these hours, depending on the major, must be selected from upper-division (300- or 400-level) courses. The curriculum for the major is designed as preprofessional study in art, dance, or theatre education. Auditions and/or interviews are required for admission to the B.F.A. degree programs in Dance and Theatre. Consult these departments for specific information.

Bachelor of Music (B.M.) Degree. The B.M. degree requires 79 semester hours for the major. The required num-

ber of upper-division (300- or 400-level) courses is dependent upon the area of specialization. The curriculum for the major is designed to provide a broad yet concentrated preparation with a choice of specialization among the areas of choral-general music, instrumental music, jazz, music performance, music theatre, music therapy, piano accompanying, and theory-composition. An entering undergraduate music student, regardless of the area of specialization, must perform an entrance audition in his or her primary performing medium (voice or instrument).

ACADEMIC STANDARDS

The terms of disqualification, reinstatement, and appeals are consistent with those set forth by the university on pages 77–78 of this catalog, except for degree programs in Theatre. For all emphases in the B.A. degree in Theatre, a student must have a minimum GPA of 2.50 in the major and an overall GPA of 2.00 to enroll in upper-division courses and to remain in good standing. For the B.F.A. degree in Theatre with a concentration in theatre education, a student must have a minimum GPA of 3.00 in the major to enroll in upper-division courses and to remain in good standing. In addition, a student disqualified in any program is normally not eligible for reinstatement for two semesters.

SPECIAL PROGRAMS

Working closely with faculty, visiting scholars, and artists-in-residence, students in all fields of the College of Fine Arts participate in dynamic, innovative programs. Students receive a great deal of individual attention to their creative work and artistic development.

The School of Art is one of the largest programs of its kind in the country and offers students a wide range of specialties in media, art history, and art education. The faculty are nationally recognized and provide excellent instruction in a curriculum with many different educational opportunities. Some of the unique offerings are bookmaking and papermaking, digital, film, neon, and video animation, and foundry. In addition, internships are available in galleries and museums throughout the Phoenix area. The Children’s Art Workshop is an on-campus program taught by students in art educa-

tion for school-age children in the metropolitan area. Northlight Gallery, a teaching gallery, hosts exhibitions organized and curated by students. Visiting artists and guest lecturers enrich the basic curriculum. Graduates of the School of Art have been accepted to top graduate schools and many are in leadership positions in art, education, and industry.

Recognized as one of the top programs in the country, the Department of Dance emphasizes the choreography, performance, and theory of modern dance. Nationally prominent faculty and visiting artists create repertory for dance majors and for the Dance Arizona Repertory Theatre (DART), a student touring outreach company. An ambitious performance program offers several concerts to the public each year with additional works created and performed by graduate and undergraduate students. Students work closely with renowned artists and companies who visit the campus annually and with researchers in the areas of dance science, dance in relation to technology, dance music composition, labanotation, sound, and video production. ASU students and faculty have consistently taken top honors at the regional and national festivals of the American College Dance Festival Association.

Performers, teachers, conductors, composers, and scholars recognized both nationally and internationally make up the faculty of the School of Music. Students have the opportunity to participate in comprehensive degree programs that provide for wide and divergent opportunities in performance and course work. Student performing organizations are recognized as being some of the finest in the nation, and ASU students regularly compete successfully in national competitions. The broad scope of degree options allows students excellent choices in gaining depth and breadth in the musical field.

The Department of Theatre has inaugurated a redesigned B.A. degree program that allows a 54-hour emphasis in acting, design/technical theatre, directing/stage management, or history/theory and criticism. A strong feature of the new B.A. degree program is the broad liberal arts education, which cultivates in the student the ability to understand human behavior and values in societies of the past and present, an essential element in the creation of and response to theatre. Students interested

in theatre education enroll in a B.F.A. degree program designed to allow work in both the Department of Theatre and the College of Education. Special strengths of the department include internationally acclaimed programs in theatre education and theatre for youth; an outstanding playwriting area that infuses each specialization with new script work; multiethnic courses and programs in acting and directing; an acting program that allows work with nationally acclaimed directors and acting coaches; and a nationally recognized scenography area that provides for further specialization in costume, lighting, or scene design as well as theatre technology.

Production is at the core of ASU theatre and the quality of the faculty, student body, and facilities often attracts professionals to ASU. The department recently premiered productions by three Pulitzer prize-winning playwrights. Annually, the *Genesis New Plays Project* (which has student actors, designers, and playwrights working with professional actors, directors, and playwrights to discuss new scripts in a workshop) is coproduced with the state's League of Resident Theatres (LORT) company, the Arizona Theatre Company. Four to six subscription series plays are produced in the 500-seat Galvin Theatre and the smaller Lyceum Theatre. An additional eight to 14 student-directed shows are presented as part of the scholarship series. The theatre for youth area, with ASU Public Events, cosponsors an International Youth Arts Festival that brings many multitalented artists and thousands of students to campus.

Theatre for youth artists, students, and scholars are attracted to ASU by the opportunities to work on national K-12 theatre curricula and research projects, theatre tours to area schools, and opportunities to teach on and off campus. The Child Drama Special Collection in Hayden Library, which includes rare books, plays, and personal and national association archives, is the most complete and extensive collection of its kind in the English-speaking world and also contributes to the international recognition of the theatre for youth faculty.

Since theatre is a collaborative art form, students at the undergraduate

level are required to learn and participate in all phases of theatre, specializing in an area of their choosing. In the theatre education and theatre for youth programs, both undergraduate and graduate students are challenged to excel in every aspect of theatrical training. Students are offered acting, directing, and other production opportunities for main-stage, studio, and touring shows, as well as research and teaching possibilities on and off campus. Students in the B.A. and M.F.A. scenography programs are actively involved in all aspects of design and technology for main-stage and studio productions and have received regional and national awards for their work. A new M.F.A. degree in Theatre with a concentration in acting is based on a conservatory model in which students have intensive training in voice, movement and acting with classical, contemporary, and new scripts, augmented by study in theatre history, theory, and criticism.

A faculty playwright works closely with both undergraduate and graduate directing students to create and showcase original scripts from students and faculty. An interdisciplinary M.F.A. degree in Creative Writing encourages graduate students to work closely with writers of drama, fiction, and poetry and with directors and producers from the Departments of English and Theatre. Faculty in the Departments of Theatre and English offer students a unique opportunity to tailor a course of study to fit individual needs, talents, and goals.

GENERAL INFORMATION

Undergraduate Credit for Graduate Courses. To enable interested students to benefit as much as possible from their undergraduate studies, the Graduate College and the College of Fine Arts extend to seniors with a GPA of at least 2.50 the privilege of taking 500-level graduate courses for undergraduate credit. Application for admission to a graduate course for undergraduate credit must be completed in advance of the regular registration period. The application must be approved by the instructor of the class, the student's advisor, the chair or director of the department or school, and the dean of the college in which the course is offered.

Preprofessional Programs. Students preparing for admission to professional graduate schools should obtain information regarding admission requirements by writing directly to the schools in which they are interested.

School of Art

Julie F. Codell
Director
 (ART 102) 602/965-3468
www.asu.edu/cfa/art

PROFESSORS

ALQUIST, BATES, BRITTON,
 CODELL, ECKERT, ERICKSON,
 FAHLMAN, FRONSKE, GASOWSKI,
 GILLINGWATER, JAY, KAIDA,
 LOVELESS, MAGENTA, MEISSINGER,
 PILE, PIMENTEL, RISSEUW,
 SCHMIDT, SHARER, STOKROCKI,
 STULER, SWEENEY, TAYLOR,
 WEISER, WHITE, YOUNG

ASSOCIATE PROFESSORS

COCKE, COLLINS, de MATTIES,
 DUNCAN, GULLY, HAJICEK, JENKINS,
 KLETT, KRONENGOLD, MAXWELL,
 PITTSLEY, SCHLEIF, SCHOEIBEL,
 SCHUTTE, SEGURA, SERWINT,
 UMBERGER, VERSTEGEN

ASSISTANT PROFESSORS

McIVER, PESSLER, WOLFFTHAL

LECTURER

HOKIN

All students registering in a School of Art degree program enroll through the College of Fine Arts. Each degree program and area of specialization has its own check sheet, which describes the particulars of course sequence and special requirements. Check sheets are available in the School of Art Undergraduate Advising office.

BACHELOR OF ARTS DEGREE

The faculty in the School of Art offer three concentrations for students in the B.A. degree in Art program: art history, photographic studies, and studio art. These concentrations are intended to give the student a broadly based general education in the field with some specialized work at the upper-division level.

MAJOR REQUIREMENTS

The major in Art consists of 45 to 48 semester hours, depending on the concentration, and includes the requirements listed below for each concentration. B.A. programs are especially suited for pursuing interdisciplinary studies or a minor in another discipline. All courses in the major must be completed with a “C” or higher.

GRADUATION REQUIREMENTS

In addition to fulfilling the major requirements, students must meet all university graduation requirements and college degree requirements. See pages 79–83 for university graduation requirements and pages 247–248 for college degree requirements.

Art History

Related Subject Field. Select three courses (nine semester hours) from those with the prefix APH, ARA, ARE or from the following:

ART 111	Drawing I	3
ART 112	Two-Dimensional Design	3
ART 113	Color	3
ART 115	Three-Dimensional Design	3
ART 201	Photography I	3
ART 260	Ceramics for Nonmajors	3
ART 274	Wood I	3
ART 294	Special Topics	3

Also required is an approved upper-division elective. Six semester hours of ART courses are recommended.

Specialization. The following courses make up the specialization:

ARS 101	Art of the Western World I <i>HU, H</i>	3
ARS 102	Art of the Western World II <i>HU, H</i>	3
ARS 480	Research Methods <i>L2</i>	3
ARS 498	PS: Art History	3
Total		12

Also required is at least one course from each of the following areas: ancient, baroque, medieval, modern, non-Western, and renaissance art.

This concentration consists of a minimum of 45 semester hours as approved by the student’s advisor. It requires 33 semester hours of art history courses and 12 semester hours in re-

lated fields. At least 18 of the 45 semester hours must be upper-division credit. Satisfactory completion of ARS 480 Research Methods is required before the senior year. Demonstrated proficiency in at least one foreign language is required, equivalent to the level obtained through the completion of two years of study at the college level. For specific courses, see “Department of Languages and Literatures,” pages 348–360. (ASL is not acceptable for Art History majors).

Art History Minor

The School of Art offers a minor in Art History consisting of 18 semester hours of course work, including 12 upper-division electives. A minimum grade of “C” is required of all classes in the minor and for those pursuing a minor, a minimum GPA of 2.00 is required. Courses may not be double counted in a major and the minor, and a minimum of 12 hours of resident credit at ASU Main is required. A “Minor Approval Form” must be submitted.

Required Courses. Select two of the following four required courses:

ARS 101	Art of the Western World I <i>HU, H</i>	3
ARS 102	Art of the Western World II <i>HU, H</i>	3
ARS 201	Art of Asia	3
ARS 202	Art of Africa, Oceania, and the Americas	3

Elective Courses. Students pursuing an art history minor will select four three-semester-hour upper-division courses. A seminar is strongly recommended for those considering graduate study. Students need to be aware of necessary lower-division prerequisites for all upper-division courses.

Studio Art

Core Curriculum. The following courses make up the core curriculum:

ARS 101	Art of the Western World I <i>HU, H</i>	3
ARS 102	Art of the Western World II <i>HU, H</i>	3
ART 111	Drawing I	3
ART 112	Two-Dimensional Design	3
ART 113	Color	3
ART 115	Three-Dimensional Design	3
Total		18

Specialization. Eighteen semester hours of ART courses, including 12 upper-division semester hours are required. Courses in area of specialization must have a focus.

Art History. Nine semester hours of ARS courses are required, which must include three semester hours of non-Western art. At least six semester hours must be upper-division ARS courses.

Photographic Studies

Art History. The following art history courses are required:

ARS 101	Art of the Western World I <i>HU, H</i>	3
ARS 102	Art of the Western World II <i>HU, H</i>	3
ARS 350	19th-Century Photography <i>HU</i>	3
ARS 351	20th-Century Photography <i>HU</i>	3
ARS 454	Research and Writing in Photography	3
ARS 458	Critical Theories in the Visual Arts <i>HU</i>	3
ARS 494	ST: History of Photography	3
ARS elective (modern art)		3
Total		24

Photography. The following photography courses are required:

ARA 202	Introduction to Photo Aesthetics	3
ARA 494	ST: Advanced Photo Aesthetics	3
ART 201	Photography I	3
ART 301	Photography II	3
ART 304	Advanced Photography	3
ART 409	Photographic Exhibition	3
ART 494	ST: 19th-Century Photo Processes	3
Total		21

This concentration consists of 48 semester hours as approved by the student’s advisor. Demonstrated proficiency in at least one foreign language is required, equivalent to the level obtained through the completion of two years of study at the college level. For specific courses, see “Department of Languages and Literatures,” pages 348–360.

BACHELOR OF FINE ARTS DEGREE

Art

The major in Art consists of 75 semester hours, with a concentration in one area selected on the basis of the student’s interests. The following concentrations are available to the student: art education, ceramics, drawing, fibers, intermedia, metals, painting, photography, printmaking, and sculpture.

Core Curriculum. All students in this degree program follow the same core curriculum in art for the first two semesters:

ARS 101	Art of the Western World I <i>HU, H</i>	3
ARS 102	Art of the Western World II <i>HU, H</i>	3
ART 111	Drawing I	3
ART 112	Two-Dimensional Design	3
ART 113	Color	3
ART 115	Three-Dimensional Design	3
Total		18

At least 30 upper-division semester hours must be earned within the major, with a minimum of 12 semester hours within the concentration.

All course work counted in the major must be completed with a “C” or higher. The specific requirements for each concentration are recommended by the faculty advisors of the area and are listed on School of Art check sheets.

Courses from other departments, when approved by the advisor and the School of Art, may be applied to the major if deemed appropriate to the student’s program of study. Art courses that do not have the same title and description as ASU catalog courses must have the approval of the School of Art standards committee.

GRADUATION REQUIREMENTS

In addition to fulfilling the major requirements, students must meet all university graduation requirements and college degree requirements. See pages 79–83 for university graduation requirements and pages 247–248 for college degree requirements.

Art Education

Core Curriculum. See above for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ARE 450	Studio Art: Art History I	3
ARE 460	Disciplines of Art Education	3
ARE 470	Art Criticism: Aesthetics	3
ARE 482	Studio Art: Art History II	3
ARE 486	Art Education: Strategies and Applications	3
ARE 494	Special Topics	3
ARE 496	Methods and Assessment of Learning in Art	3
Total		21

Area of Proficiency. Twenty-one semester hours are required with a minimum of 15 semester hours in a specific area of studio or art history with at least 12 upper-division semester hours.

Art History. Six semester hours of ARS upper-division electives are required with one course in art during the 20th century.

Additional Requirements. The following courses are additional requirements:

ART 201	Photography I	3
ART 223	Painting I	3
ART 231	Sculpture I	3
	or ART 261 Ceramic Survey (3)	
	or ART 272 Jewelry I (3)	
	or ART 274 Wood I (3)	
	or ART 276 Fibers I (3)	
Total		9

The concentration in art education consists of 75 semester hours with 21 semester hours in art education and 21 semester hours in an art proficiency approved by an art education advisor.

The art proficiency courses must include a minimum of 15 semester hours in a specific area of studio art or art history. Twelve of these semester hours must be upper-division credits. The art proficiency can be in art history, ceramics, drawing, fibers, intermedia, metals, painting, photography, printmaking, or sculpture. Teaching experience is provided in the Children’s Art Workshop, which is an on-campus program based in studio and art history for children ages five to 15. Participation in the workshop is part of the requirements for ARE 486 Art Education: Strategies and Applications. ARE 486 meets the state certification requirements for the elementary methods class, and ARE 496 Methods and As-

essment of Learning in Art meets the requirements for the secondary methods class in the subject area. Both of these courses have prerequisites.

A student pursuing a B.F.A. degree in Art with a concentration in art education may also choose to become certified for teaching art K–12. If certification is elected while pursuing the art education undergraduate degree, additional semester hours are required in the College of Education. Students must make special application to the professional education program in the College of Education three months before the beginning of the junior year. To be considered for admission to the professional program, students must have successfully completed the Pre-Professional Skills Test (PPST) or the ACT during the sophomore year. In addition, as part of the certification process, students must meet the U.S. and Arizona constitution requirement. Certification may also be pursued after receiving an undergraduate degree in art through the postbaccalaureate program in the College of Education. Interested students should contact an advisor in the College of Education and in art education for admission requirements to the postbaccalaureate program. Art education courses for this program are as follows:

ARE 450	Studio Art: Art History I	3
ARE 482	Studio Art: Art History II	3
ARE 486	Art Education: Strategies and Applications	3
ARE 496	Methods and Assessment of Learning in Art	3
Total		12

The B.F.A. degree in Art with a concentration in art education and the postbaccalaureate program for certification in art have special art education application procedures. This procedure is separate from, and in addition to, the admission requirements of ASU. Acceptance is based on a 2.50 GPA, completion of foundations courses (ART 111, 112, 113, and 115), completion of 12 semester hours of art history courses (ARS 101 and 102 and two upper-division courses), and a “B” or higher in ARE 450 and 460. In addition, undergraduate and postbaccalaureate students seeking K–12 certification should check requirements and deadlines for admission to the College of Education professional program.

Student teaching in art education occurs only in the spring semester. To be accepted into student teaching, a student must be recommended in writing by the art education faculty and must have completed all art education classes except for ARE 496, which should be taken concurrently with student teaching. Students who are not recommended may complete the B.F.A. degree in Art with a concentration in art education without certification or may reapply after meeting deficiencies in knowledge and skills related to the teaching of art.

Ceramics

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 360	Ceramic Throwing	3
ART 364	Ceramic Handbuilding I	3
ART 365	Ceramic Handbuilding II	3
ART 460	Ceramic Clay	3
ART 463	Ceramic Glaze	3
ART 466	Special Problems in Ceramics	6
Total		27

Art History. Six semester hours of upper-division ARS, including three semester hours of a 20th-century elective and three semester hours of non-Western art are required.

Additional Requirements. One of the following four courses is required:

ART 211	Drawing II	3
ART 214	Life Drawing I	3
ART 227	Watercolor I	3
ART 443	Intermedia	3

Two of the following three courses (six semester hours) are required:

ART 272	Jewelry	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Fifteen semester hours of ARA, ARE, ARS, and ART courses are required.

Drawing

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 211	Drawing II	3
ART 214	Life Drawing I	3
ART 223	Painting I	3
ART 227	Watercolor I	3
ART 311	Drawing III	3
ART 314	Life Drawing II	3
ART 315	Life Drawing III	3
ART 494	Drawing/Painting	3
Total		24

Also required are six semester hours of ART 411 and/or 414 and three semester hours in printmaking.

Art History. Three semester hours of non-Western art are required as well as six semester hours of upper-division ARS courses.

Additional Requirements. Two of the following six courses (six semester hours) are required:

ART 201	Photography I	3
ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Nine semester hours of ARA, ARE, ARS, or ART courses are required.

Fibers

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 276	Fibers I	3
ART 376	Fibers: Loom Techniques	3
ART 377	Surface Design	3
ART 476	Fibers: Multiple Harness Weaving	6
ART 477	Printed Textiles	6
Total		21

History. Six semester hours of upper-division ARS courses are required, including a 20th-century elective.

Additional Requirements. Three of the following six courses (nine hours) are required:

ART 201	Photography I	3
ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 354	Screen Printing I	3

Art Electives. Twenty-one semester hours of ARA, ARE, ARS, and ART courses are required.

Intermedia

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 439	Mixed Media	3
ART 440	New Media Concepts	3
ART 443	Intermedia	3
Total		9

Two of the following five courses (six semester hours) are required:

ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 276	Fibers I	3

Two of the following nine courses (six semester hours) are required:

ART 201	Photography I	3
ART 211	Drawing II	3
ART 214	Life Drawing I	3
ART 223	Painting I	3
ART 227	Watercolor I	3
ART 351	Intaglio I	3
ART 352	Lithography I	3
ART 354	Screen Printing I	3
ART 355	Photo Process for Printmaker I	3

Two of the following three courses (six semester hours) are required:

ART 439	Mixed Media	3
ART 440	New Media Concepts	3
ART 442	Folk/Outsider Art	3
ART 443	Intermedia	3
ART 444	Computer Art I N3	3
ART 446	Computer Art II N3	3
ART 448	Computer Animation I	3
ART 449	Computer Animation II	3
ART 494	ST: (Intermedia elective)	3

Art History. Three semester hours of non-Western ARS 438 Art of the 20th Century I and 439 Art of the 20th Century II are required.

Art Electives. Twenty-one semester hours of ARA, ARE, ARS, and ART courses are required.

Admission to upper-division computer graphics courses is by portfolio only. Application dates are September 15 to October 15 for spring enrollment and February 15 to March 15 for fall enrollment.

Metals

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 272	Jewelry I	3
ART 372	Jewelry II	3
ART 373	Metalworking I	3
ART 472	Advanced Jewelry	6
ART 473	Advanced Metalworking	6
ART 494	ST: Metals	3
Total		24

Art History. Six semester hours of upper-division ARS courses are required, including a 20th-century elective.

Additional Requirements. Three of the following six courses (nine semester hours) are required:

ART 201	Photography I	3
ART 223	Painting I	3
ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Eighteen semester hours of ARA, ARE, ARS, and ART courses are required.

Painting

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 211	Drawing II	3
ART 214	Life Drawing I	3
ART 223	Painting I	3
ART 227	Watercolor I	3
ART 311	Drawing III	3
ART 314	Life Drawing II	3
ART 323	Painting II	3
ART 324	Painting III	3
	or ART 327 Watercolor II (3)	
ART 325	Figure Painting	3
ART 423	Advanced Painting	3
	or ART 427 Advanced Watercolor (3)	
Total		30

One of the following five courses (three semester hours) is required:

ART 327	Watercolor II	3
ART 411	Advanced Drawing	3

ART 423	Advanced Painting	3
ART 425	Advanced Figure Painting	3
ART 494	ST: Drawing/Painting	3

Art History. Nine semester hours of ARS courses are required and must include three semester hours of non-Western art. At least six semester hours must be upper-division ARS courses.

Additional Requirements. Two of the following six courses (six semester hours) are required:

ART 201	Photography I	3
ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Nine semester hours of ARA, ARE, ARS, and ART courses are required.

Photography

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ARA 202	Introduction to Photo Aesthetics	3
ART 201	Photography I	3
ART 301	Photography II	3
ART 304	Advanced Photography	3
Total		12

Three of the following nine courses (nine semester hours) are required:

ART 305	Color Photography I	3
ART 401	Nonsilver Photography	3
ART 403	Senior Photographic Projects	3
ART 404	Portraiture Photography	3
ART 405	Advanced Color Photography	3
ART 406	Photo Techniques	3
ART 407	View Camera	3
ART 409	Photographic Exhibition	3
ART 494	ST: Photo	3

Art History. ARS 350 and 351 are required, as well as six semester hours of additional ARS courses, including a non-Western elective.

Additional Requirements. The following courses are additional requirements:

ART 211	Drawing II	3
ART 214	Life Drawing I	3
ART 223	Painting I	3
ART 227	Watercolor I	3
ART 443	Intermedia	3
Total		15

One of the following five courses (three hours) is required:

ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Eighteen semester hours of ARA, ARE, ARS, and ART courses are required.

Printmaking

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 211	Drawing II	3
	or ART 214 Life Drawing I (3)	
ART 351	Intaglio I	3
ART 352	Lithography I	3
ART 354	Screen Printing I	3
Total		12

Three of the following 10 courses (nine semester hours) are required:

ART 352	Lithography I	3
ART 355	Photo Process for Printmaking I	3
ART 451	Advanced Intaglio	3
ART 452	Advanced Lithography	3
ART 454	Advanced Screen Printing	3
ART 455	Advanced Photo Processes for Printmaking	3
ART 456	Fine Printing and Bookmaking I	3
ART 457	Fine Printing and Bookmaking II	3
ART 458	Papermaking	3
ART 459	Monoprinting	3

Two of the following five courses (six semester hours) are required:

ART 214	Life Drawing I	3
ART 311	Drawing III	3
ART 314	Life Drawing II	3
ART 315	Life Drawing III	3
ART 411	Advanced Drawing	3

Art History. Six semester hours of upper-division ARS courses are required.

Additional Requirements. Two of the following eight courses (six semester hours) are required:

ART 201	Photography I	3
ART 223	Painting I	3
ART 227	Watercolor I	3
ART 231	Sculpture I	3
ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 274	Wood I	3
ART 276	Fibers I	3

Art Electives. Eighteen semester hours of ARA, ARE, ARS, and ART courses are required.

Sculpture

Core Curriculum. See page 251 for the courses that make up the core curriculum.

Specialization. The following courses make up the specialization:

ART 223	Painting I	3
ART 231	Sculpture I	3
ART 274	Wood I	3
ART 331	Sculpture II	3
ART 332	Sculpture III	3
ART 431	Special Problems in Sculpture	3
Total		18

Five of the following nine courses (15 semester hours) are required (note that all are repeatable except ART 333):

ART 333	Foundry Casting Methods	3
ART 374	Wood II	3
ART 431	Special Problems in Sculpture	3
ART 432	Neon Sculpture	3
ART 436	Architectural Sculpture	3
ART 437	Film Animation	3
ART 438	Experimental Systems in Sculpture	3
ART 474	Advanced Wood	3
ART 494	Special Topics	3

Art History. Six semester hours of upper-division ARS courses are required.

Additional Requirements. The following courses are required:

ART 261	Ceramic Survey	3
ART 272	Jewelry I	3
ART 276	Fibers I	3
Total		9

Art Electives. Fifteen semester hours of ARA, ARE, ARS, and ART courses are required.

GRADUATE PROGRAMS

The faculty in the School of Art offer programs leading to the M.A. degree in Art, with a concentration in art education or art history, and the Master of Fine Arts degree with a concentration in ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, or sculpture. In cooperation with the College of Education, the Doctor of Education degree is offered with a concentration in art education. Consult the *Graduate Catalog* for requirements for all graduate degrees.

ART AUXILIARY (ARA)

ARA 202 Introduction to Photo Aesthetics. (3) F, S

Slide lecture course in understanding photography as a fine art form.

ARA 303 Art Appreciation and Human Development. (3) F

Foundations of art for children and young adults. Emphasis on learning, development, and understanding art in historical and cultural contexts. 3 hours lecture, discussion. Prerequisites: ENG 101, 102; junior standing. *General Studies: HU*.

ARA 460 Gallery Exhibitions. (3) F, S

Practical experience in all phases of department gallery operations and preparation of gallery publications. May be repeated for credit. Prerequisite: instructor approval.

ARA 488 Understanding Art. (3) F, S

Understanding art as an emergent cultural phenomenon with an emphasis on a critical examination of conceptual issues in art. Writing required. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: L2/HU*.

ART EDUCATION (ARE)

ARE 301 Studio Art and Human Development. (3) A

The study of human development in studio art from early childhood to adult years.

ARE 450 Studio Art: Art History I. (3) A

Art traditions before the 20th century as a basis for studio and art history instruction. 2 hours lecture, 2 hours studio. Pre- or corequisite: ARE 460.

ARE 460 Disciplines of Art Education. (3) A

Explorations in art education's disciplines, history, and people's artmaking development at diverse age levels and abilities. Lecture, discussion. Prerequisites: ARS 101 and 102 and ART 113 and 115 or instructor approval.

ARE 470 Art Criticism: Aesthetics. (3) F

Traditions of aesthetics and art criticism; conceptual issues in contemporary art; education in the visual arts. 2 hours lecture, 2 hours studio. Prerequisite: ARE 460 or instructor approval.

ARE 482 Studio Art: Art History II. (3) S

Art traditions of the 20th century as a basis for studio and art history instruction. 2 hours lecture, 2 hours studio. Must be taken before enrollment in ARE 486. Students are recommended to take ARE 470 concurrently. Prerequisite: ARE 450.

ARE 486 Art Education: Strategies and Applications. (3) F

The implementation and evaluation of art instruction for K-12 population. Includes teaching of Saturday classes in the Children's Art Workshop. Prerequisite: ARE 482.

ARE 496 Methods and Assessment of Learning in Art. (3) S

Individual or group research on the assessment of art learning incorporating theory and practice. Prerequisites: ARE 470 and 486 or instructor approval.

ARE 510 Art Education Colloquium. (3) F

Historical foundations of art education and faculty presentation of positions regarding teaching and research related to the visual arts. Must be taken in the first 6 hours of study.

ARE 520 Issues in Teaching Art History. (3) A

Critical examination of issues concerning teaching art history to different populations of students. Historical and philosophical foundations and emphasis on developing inquiry into historical and cultural contexts of art. Recommended to be taken before ARE 525.

ARE 525 Research on Teaching Art History. (3) A

Review of empirical and historical research, research methods, learning theory, and assessment of learning in art history. Pilot studies on the effects of instruction upon learning. Recommended to be taken after ARE 520.

ARE 530 Issues in Teaching Studio Art. (3) A

Critical examination of issues concerning teaching multicultural art to different populations of students. Historical and philosophical foundations reviewed. Recommended to be taken before ARE 535. Lecture, discussion.

ARE 535 Research on Teaching Studio Art. (3) A

Review of empirical and historical research methods, learning theory, and assessment of learning in studio art, including developmental studies and their limitations. Pilot studies on the effects of instruction upon learning. Recommended to be taken after ARE 530.

ARE 540 Teaching Art in Cultural Contexts. (3) A

Relationship of multicultural perspectives to teaching/learning art criticism, aesthetics, studio art, and art history.

ARE 610 Issues and Trends in Art Education. (3) N

Doctoral-level investigation of historical and contemporary issues related to teaching and research in art education.

ARE 611 Curriculum Development in Art Education. (3) N

Doctoral-level inquiry into the philosophical, psychological, and sociological foundations of curriculum development.

ART HISTORY (ARS)

ARS 100 Introduction to Art. (3) F, S, SS

Development of understanding and enjoyment of art and its relationship to everyday life through the study of painting, sculpture, architecture, and design. May not be taken for credit by student who has completed ARS 300, nor used as art history credit by Art majors. *General Studies: HU*.

ARS 101 Art of the Western World I. (3) F, S, SS
History of Western art from the Paleolithic period through the Middle Ages. *General Studies:* HU, H.

ARS 102 Art of the Western World II. (3) F, S, SS
History of Western art from the Renaissance to the present. *General Studies:* HU, H.

ARS 201 Art of Asia. (3) A
History of the art of the Asian cultures, with emphasis on China, Japan, and India. Meets non-Western art history requirement. *General Studies:* HU, H.

ARS 202 Art of Africa, Oceania, and the Americas. (3) A
History of art of Africa, Oceania, and the New World. Meets non-Western art history requirement. *General Studies:* HU, H.

ARS 300 Introduction to Art. (3) F, S
Course content same as ARS 100 but requires a higher level of accomplishment and comprehension. May not be taken for credit by student who has completed ARS 100 nor used as art history credit by Art majors. *General Studies:* HU.

ARS 302 Art of Africa, Oceania, and the Americas. (3) A
History of art of Africa, Oceania, and the New World. Meets non-Western art history requirements. Not open to students who have taken ARS 202. Prerequisites: ARS 101, 102. *General Studies:* HU, H.

ARS 310 The Renaissance in Tuscany. (3) SS
Course taught in Florence, Italy. History of arts in Tuscany with focus on city of Florence from 14th through 16th centuries. Lecture, tours. Completion of ARS 101 and 102 suggested.

ARS 340 Art in America. (3) A
American art from colonial times through the Second World War. Not available to students who have had ARS 444, 542, or 543. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 350 19th-Century Photography. (3) A
History of photography from the medium's prehistory to 1914: personalities, processes, images, and ideas. *General Studies:* HU.

ARS 351 20th-Century Photography. (3) A
Personalities, processes, images, and ideas in photography from 1914 to present. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 384 Art History Internships. (3) A
Institutionally based practicum within an art museum or professional visual arts organization. Internship.

ARS 400 History of Printmaking. (3) A
History of the print as an art form and its relation to other modes and forms of artistic expression. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 402 Art of Ancient Egypt. (3) N
Aesthetic, philosophical, and cultural basis of Egyptian art from pre-Dynastic period through New Kingdom. Emphasis on sculpture and architectural monuments. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 404 Greek Art. (3) A
History of art, architecture of Aegean civilizations (Cycladic, Minoan, Mycenaean) and of Greece to end of Hellenistic period. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 406 Roman Art. (3) A
Art and architecture of Etruria, the Roman Republic, and the Roman Empire. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 410 Early Christian and Byzantine Art. (3) A
Art and architecture of the early church and the Byzantine Empire from the 4th to the 15th century. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 412 Early Medieval Art. (3) N
Painting, sculpture, architecture, and the minor arts from Migration, Carolingian, and Ottonian periods considered within religious, social, and economic contexts. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 414 Romanesque Art. (3) A
Sculpture, painting, architecture, and minor arts in western Europe, ca. 1030–1200, considered within religious, economic, and social contexts. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 416 Gothic Art. (3) A
Painting, sculpture, and architecture in western Europe during the Gothic period. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 417 Late Gothic Art in Central Europe. (3) N
Sculpture, painting, and architecture of the late-Gothic style (ca. 1350–1525), considered within religious, social, economic, and political contexts. Prerequisites: ARS 101 and 102 or instructor approval.

ARS 418 Renaissance Art in Northern Europe. (3) A
Graphics, painting, sculpture, and architecture ca. 1450–1550. Reformation themes and Renaissance style considered within religious, political, social, and economic contexts. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 420 Early Renaissance Art in Italy. (3) N
Painting, sculpture, and architecture in Italy from 1300 to 1500. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 422 Italian High Renaissance Art and Mannerism. (3) A
History of Italian art during the 16th century, including the achievements and influence of Leonardo da Vinci, Raphael, and Michelangelo. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 424 Italian Baroque Art. (3) A
Italian painting, sculpture, and architecture of the 17th century. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 426 Art of the 17th Century in Northern Europe. (3) A
Baroque painting, sculpture, and architecture in Flanders, the Netherlands, France, and England. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 428 Art of the 18th Century. (3) A
History of painting, sculpture, architecture, graphic arts, and the decorative arts from 1700 to the French Revolution (1789). Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 430 Art of Spain and Its Colonies. (3) A
Architecture, painting, and sculpture from 1500 to 1800. Colonial focus on central Mexico and the American Southwest. Prerequisite: ARS 102 or instructor approval. *General Studies:* HU, H.

ARS 432 From David to Daumier: European Art 1780–1860. (3) F
Critical study of the visual arts in Europe from eve of French Revolution to the Paris World's Fair of 1855. Neoclassicism, Realism, and Romanticism. Cross-listed as HUM 494. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 434 From Courbet to Cézanne: History of European Art 1860–WWI. (3) S
Aesthetic, political, and social forces affecting the visual arts in the late 19th century. Concentration on Cubism, Expressionism, Impressionism, and Post-Impressionism. Cross-listed as HUM 494. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 436 Art at the Turn-of-the-Century: 1885–1914. (3) F
History of European avant-garde movements. Concentration on post impressionism, symbolism, expressionism, and cubism. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 438 Art of the 20th Century I. (3) A
Developments and directions in art between 1900 and World War II. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU, H.

ARS 439 Art of the 20th Century II. (3) A
Art since World War II, with consideration of new concepts and experimentation with media and modes of presentation. Prerequisites: ARS 101 and 102 and 438 or instructor approval. *General Studies:* HU, H.

ARS 442 Critical Issues in American Painting I. (3) A
Explores themes and social issues in American art with a critical study of American painting from the 18th century to 1850. Lecture, discussion. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 443 Critical Issues in American Painting II. (3) A
Explores themes and social issues in American art with a critical study of American painting from 1850 to 1900. Lecture, discussion. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies:* HU.

ARS 444 Modern American Art, 1900–1945. (3) A

American painting, sculpture, photography, and architecture 1900–1945. Covers major monuments, including the Eight, modernism, Precisionism, Regionalism, and the WPA. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU, H.*

ARS 453 Issues in Contemporary Photography. (3) A

A discussion seminar identifying, defining, and researching the issues and ideas that influence the appearance and criticism of contemporary images. Seminars, lectures, presentations, papers. Prerequisites: ARS 350, 351.

ARS 454 Research and Writing in Photography. (3) A

Principles and practice of research and writing in the history and criticism of photography. Papers required. Prerequisites: ARS 450 and 451 or instructor approval; ENG 101 and 102 or equivalents.

ARS 457 History of Art Criticism. (3) N

Theories of criticism of the visual arts from late 18th century to present. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: H.*

ARS 458 Critical Theories in the Visual Arts. (3) N

Examines current critical theories through their application to all visual arts. May include new historicism, Marxism, deconstruction, post-structuralism, semiotics, Lacanian psychoanalysis, feminism, postmodernism. Lecture, discussion, student presentations. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU.*

ARS 459 Writing Art Criticism. (3) N

Traditional and contemporary approaches to the criticism of art. Students will write critical essays. The latter half of the semester will stress the criticism of contemporary art in various media. Prerequisite: ARS 458 or instructor approval.

ARS 462 Precolumbian Art I. (3) A

Architecture, sculpture, ceramics, painting, and other arts of Mesoamerica before European contact. Satisfies non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU, H.*

ARS 463 Precolumbian Art II. (3) A

Architecture, sculpture, ceramics, textiles, and other art of South America before European contact with focus on the Central Andes. Satisfies non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU, H.*

ARS 465 Native North American Art. (3) A

Native American art forms of the United States and Canada from prehistoric times to the present. Prerequisites: ARS 101 and 102 or instructor approval. Meets non-Western art history requirement. *General Studies: HU, H.*

ARS 466 Native American Art of the Southwest. (3) A

American Indian art in the southwestern states from its origins to the present day. Meets non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU, C, H.*

ARS 468 Art of the Arctic and Northwest Coast. (3) N

Art associated with ceremony, shamanism, and daily life in the Arctic and on the Northwest Coast. Meets non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU.*

ARS 469 Mexican Art. (3) A

Art of Mexico and related Central American cultures from the prehistoric to the contemporary schools. Meets non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU, H.*

ARS 472 Art of China. (3) A

Study of major forms in Chinese art: ritual bronze, sculpture, ceramic, calligraphy, painting, and architecture. Satisfies non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU.*

ARS 473 Art of Japan. (3) A

Japanese art from the Joman period to the present. Satisfies non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU.*

ARS 475 Chinese Painting. (3) A

From Ku K'ai-chin to Ch'i Pai-shih. Major artists, styles, and movements in Chinese painting. Satisfies non-Western art history requirement. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: HU.*

ARS 480 Research Methods. (3) F, S

Methodology and resource material for art historical research. Techniques of scholarly and critical writing and evaluation of bibliographic sources. Prerequisites: ARS 101 and 102 or instructor approval. *General Studies: L2.*

ARS 485 Women in the Visual Arts. (3) S

Historical study of art by women in various media; related social, political, educational issues; representation of women in art. Lecture, discussion. Prerequisite: ARS 101 or 102 or instructor approval. *General Studies: L2.*

ARS 498 Pro-Seminar. (3–6) A

Undergraduate seminar in topics selected from the following. Problems or criticism in:

- (a) American Art
- (b) American Indian Art
- (c) Ancient Art
- (d) Baroque Art
- (e) Chinese Art
- (f) Medieval Art
- (g) Modern Art
- (h) Photographic History
- (i) Pre-Columbian Art
- (j) Renaissance Art

Prerequisite: instructor approval.

ARS 501 Methodologies and Art History.

(3) F

The history of the discipline and an exploration of various methodologies, critical theory, and bibliographies used by art historians. Seminar.

ARS 502 Critical Studies in Egyptian Art.

(3) N

Egyptian art from pre-Dynastic to New Kingdom periods. Focus on aesthetic, philosophical, and cultural context. Research paper and readings required.

ARS 504 Critical Approaches to Greek Art.

(3) A

Art and architecture of Aegean civilizations (Cycladic, Minoan, Mycenaean) and of Greece to end of Hellenistic period. Research paper and readings required.

ARS 506 Critical Studies in Roman Art. (3) A

Art and architecture of Etruria, the Roman Republic, and the Roman Empire. Research paper and/or supplemental readings required.

ARS 514 Critical Approaches to Romanesque Art. (3) N

Sculpture, painting, architecture, and the minor arts in western Europe, ca. 1030–1200, considered within religious, economic, and social contexts. Research paper required.

ARS 516 Critical Approaches to Gothic Art. (3) N

Architecture, sculpture, painting, and the minor arts in western Europe, ca. 1150–1350, considered within religious, social, and economic contexts. Research paper required.

ARS 517 Critical Approaches to Late Gothic Art. (3) N

Art of the late-Gothic style (ca. 1350–1525) considered within religious, social, economic, and political contexts. Research or reading project required.

ARS 522 Sixteenth Century Italian Art. (3) A

Critical study of painting, sculpture, and architecture in 16th century Italy in its religious and historical context.

ARS 528 Eighteenth Century Art in Europe. (3) A

Critical study of European art from the late Baroque to the early years of Neoclassicism.

ARS 530 Art of Spain and New Spain. (3) A

Critical study of architecture, painting, and sculpture from 1500 to 1800. Lecture, conference.

ARS 532 Art, Politics, and Patronage 1770–1850. (3) F

Critical analyses of political events in Europe. Issues of patronage, art as propaganda examined. Impact of war and revolution on visual arts.

ARS 534 Studies in Modern European Art, 1850–1914. (3) A

Critical study of visual arts using primary source material from mid-19th century to WWI within philosophical, socio/economic contexts. Lecture, tutorial. Prerequisite: instructor approval.

ARS 542 Critical Issues in American Painting I. (3) A

Explores themes and social issues in American art with a critical study of American painting from the 18th century to 1850. Lecture, discussion. Prerequisites: ARS 101, 102.

ARS 543 Critical Issues in American Painting II. (3) A

Explores themes and social issues in American art with a critical study of American painting from 1850 to 1900. Lecture, lab. Prerequisite: instructor approval.

ARS 544 American Modernism and Realism, 1900–1945. (3) A

Critical study of the social, political, and artistic changes in American art during the first half of the twentieth century. Prerequisites: ARS 101 and 102 or 340.

ARS 562 Art of Ancient Mesoamerica. (3) F

Critical study of art and architecture of Mexico and Maya area before Spanish contact. Lecture, conference.

ARS 565 Native Art of North America. (3) A

A critical examination of Native American art within culture, prehistory to the present. Prerequisites: ARS 101 and 102 or instructor approval.

ARS 574 Studies in Japanese Art. (3) A
A critical examination of the nature and history of Japanese art, its rich heritage and its indebtedness to foreign sources. Lecture, discussion. Prerequisites: ARS 101 and 102 or instructor approval.

ARS 575 Approaches to Chinese Painting. (3) F
A critical history of Chinese painting from Eastern Chou to 1911. Emphasis on masters, regional developments, and conceptual underpinnings. Lecture, discussion. Prerequisites: ARS 101 and 102 or instructor approval.

ARS 591 Seminar. (3–6) A
Graduate seminar in topics selected from the following. Problems or criticism in:
(a) American Art
(b) American Indian Art
(c) Ancient Art
(d) Baroque Art
(e) Chinese Art
(f) Medieval Art
(g) Modern Art
(h) Photographic History
(i) Pre-Columbian Art
(j) Renaissance Art
Prerequisite: instructor approval.

STUDIO CORE CURRICULUM (ART)

ART 111 Drawing I. (3) F, S, SS
Fundamental, technical, and perceptual skills using common drawing media and their application to pictorial organization. 6 hours a week.

ART 112 Two-Dimensional Design. (3) F, S, SS
Fundamentals of pictorial design. 6 hours a week.

ART 113 Color. (3) F, S, SS
Principles of color theory as related to the visual arts. 6 hours a week. Prerequisites: ART 111, 112.

ART 115 Three-Dimensional Design. (3) F, S, SS
Fundamentals of 3D form. 6 hours a week. Prerequisites: ART 111, 112.

DRAWING (ART)

ART 211 Drawing II. (3) F, S, SS
Continued development of technical and perceptual skills. Emphasis on materials and pictorial content. 6 hours a week. Prerequisites: ART 113, 115.

ART 214 Life Drawing I. (3) F, S, SS
Development of skill and expressiveness in drawing the basic form, construction, and gesture from the human figure. 6 hours a week. Prerequisites: ART 113, 115.

ART 311 Drawing III. (3) F, S
Emphasis on composition, exploration of drawing media. 6 hours a week. Prerequisites: ART 211, 214; instructor approval.

ART 314 Life Drawing II. (3) F, S
Drawing from the model with greater reference to structural, graphic, and compositional concerns. 6 hours a week. Prerequisite: ART 214 or instructor approval.

ART 315 Life Drawing III. (3) F, S
The human figure as the subject for drawing. Emphasis on conceptual alternatives and management of materials. 6 hours a week. Prerequisite: ART 314 or instructor approval.

ART 411 Advanced Drawing. (3) F, S
Visual and intellectual concepts through problem solving and independent study. Emphasis on the individual creative statement. 6 hours a week. May be repeated for credit. Prerequisites: ART 311; instructor approval.

ART 414 Advanced Life Drawing. (3) F, S
Various media and techniques on an advanced level. The human figure as an expressive vehicle in various contexts. 6 hours a week. May be repeated for credit. Prerequisite: ART 315 or instructor approval.

ART 415 Art Anatomy. (4) N
Study of human anatomical structures as applied to the practice of figure oriented art. 3 hours lecture, 5 hours studio a week. Prerequisite: ART 214.

PAINTING (ART)

ART 223 Painting I. (3) F, S, SS
Fundamental concepts and materials of traditional and experimental painting media. Emphasis on preparation of painting supports, composition, and color. 6 hours a week. Prerequisites: ART 113, 115.

ART 227 Watercolor I. (3) F, S
Fundamental concepts, materials, and techniques of watercolor. Emphasis on problem solving, basic skills, composition, and color. 6 hours a week. Prerequisites: ART 113, 115.

ART 323 Painting II. (3) F, S
Development of competency in skills and expression. Assigned problems involve light, space, color, form, and content. 6 hours a week. Prerequisite: ART 223 or instructor approval.

ART 324 Painting III. (3) F, S
Continuation of ART 323. 6 hours a week. Prerequisite: ART 323 or instructor approval.

ART 325 Figure Painting. (3) F, S
The human figure clothed and nude as the subject for painting in selected media. 6 hours a week. Prerequisites: ART 314, 323.

ART 327 Watercolor II. (3) A
Explorations of personal expression in watercolor. Continued development of watercolor skills using traditional and experimental materials and techniques. 6 hours a week. Prerequisite: ART 227.

ART 423 Advanced Painting. (3) F, S
Continuation of ART 324. 6 hours a week. May be repeated for credit. Prerequisite: ART 324.

ART 425 Advanced Figure Painting. (3) F, S
Continuation of ART 325. 6 hours a week. May be repeated for credit. Prerequisites: ART 315, 324, 325.

ART 427 Advanced Watercolor. (3) F, S
Continuation of ART 327. More advanced formal, conceptual, and technical problems in contemporary watercolor. 6 hours a week. May be repeated for credit. Prerequisite: ART 327.

INTERMEDIA (ART)

ART 439 Mixed Media. (3) F, S
Exploring visual effects by combining traditional and nontraditional methods, techniques, and concepts. 6 hours a week. May be repeated for credit. Studio. Prerequisites: ART 113 and 115 and 6 hours additional studio requirements or instructor approval.

ART 440 New Media Concepts. (3) F, S
Continued experiments with new media and interdisciplinary concerns in art. 6 hours a week. May be repeated for credit. Prerequisite: ART 340. Corequisite: ART 441.

ART 441 Video Art. (1) F, S
Utilizing video and audio equipment essential to the production of broadcast quality video art. 2 hours a week. May be repeated for credit. Corequisite: ART 440.

ART 442 Folk/Outsider Art. (3) F
Exploration of ideas, attitudes, and art of contemporary "self-taught," "visionary," and "outsider" artists. Research and studio practice. Lecture, studio. Prerequisite: ART 115 or instructor approval.

ART 443 Intermedia. (3) F, S
Experimental, conceptual, and interdisciplinary studio art with emphasis on new media and technologies. 6 hours a week. May be repeated once for credit. Prerequisite: ART 340 or instructor approval.

ART 444 Computer Art I. (3) F, S
A study of PC hardware and software for creating art. Emphasis on computer graphics history, hardware/software configurations, DOS, principles of 2- and 3-dimensional graphics. 2 hours lecture, 2 hours studio. Prerequisites: ART 111, 112 (or equivalent); instructor approval. *General Studies: N3.*

ART 446 Computer Art II. (3) A
Three-dimensional modeling, lighting, surface attributes, and special effects for art applications. Emphasis on explicit commands. Studio. Prerequisite: ART 444 or instructor approval. *General Studies: N3.*

ART 448 Computer Animation I. (3) F, S
Principles and applications of 3D animation for art and design using DOS- and MAC-based systems. Lecture, discussion, studio. Prerequisites: ART 113 and 115 or instructor approval.

ART 449 Computer Animation II. (3) F, S
Advanced principles and applications of 3D animation for art and design. Emphasis on lighting, surfaces, and camera motion. Studio. Prerequisite: ART 448 or instructor approval.

ART 450 Computer Animation III. (3) F, S
Special effects using 2D and 3D static and time-based imagery for the creation of illusions related to an artistic theme. Studio. Prerequisite: ART 449 or instructor approval.

ART 530 Two-Dimensional and Three-Dimensional Computer Art. (3) A
Integration of 2D and 3D computer imaging for art. Emphasis upon new directions for computer imaging which accounts for media characteristics. Studio.

ART 540 Advanced Computer Art. (3) A
Study of motion for 3D models, light sources, and surface effects. Course assumes students have a comprehension of complex modeling, mapping, and lighting. Studio. Prerequisite: ART 446 or instructor approval.

PHOTOGRAPHY (ART)

- ART 201 Photography I.** (3) F, S
Development of skills and techniques of black and white photography. Emphasis on camera work and darkroom procedures. 2 hours lecture, 3 hours lab.
- ART 301 Photography II.** (3) F, S
Photography as an art medium with additional exploration into personal photographic aesthetics. 6 hours a week. Prerequisites: ART 113 and 115 and 201 or instructor approval.
- ART 304 Advanced Photography.** (3) F, S
Interpretation and manipulation of light as a tool in the performance of expressive photography. 6 hours a week. Prerequisite: ART 301 or instructor approval.
- ART 305 Color Photography I.** (3) F, S
Application of color transparencies and prints to photographic art. 6 hours a week. Prerequisite: ART 304 or instructor approval.
- ART 401 Nonsilver Photography.** (3) F, S
Recognition of the inherent characteristics of nonsilver processes and their use in communicating ideas. 6 hours a week. May be repeated for credit. Prerequisite: ART 304 or instructor approval.
- ART 403 Senior Photographic Projects.** (3) F, S
Technical and philosophical refinement of personal aesthetic with various photographic media. 6 hours a week. May be repeated for credit. Prerequisite: ART 304 or instructor approval.
- ART 404 Portraiture Photography.** (3) F, S
Photographing people. Critical discussions and slide lectures on issues in portraiture. 6 hours a week. May be repeated for credit. Prerequisite: ART 304 or instructor approval.
- ART 405 Advanced Color Photography.** (3) F, S
Intensive use of subtractive color process in photographic printing. 6 hours a week. May be repeated for credit. Prerequisite: ART 305 or instructor approval.
- ART 406 Photo Techniques.** (3) F, S
Camera and darkroom techniques with emphasis on creative control of the black and white print. 6 hours a week. Prerequisite: ART 301 or instructor approval.
- ART 407 View Camera.** (3) F, S
View camera and darkroom techniques. Studio, lab. Prerequisite: ART 301 or instructor approval.
- ART 408 Digital Photographic Images.** (3) F, S
Scanning, manipulation, refinement, and compositing of photographic images in the computer. Lab, studio. Prerequisite: ART 201.
- ART 409 Photographic Exhibition.** (3) A
Care of photographic prints, print presentation, and exhibition. Practical experience in gallery operations. 6 hours a week. May be repeated for credit. Prerequisite: ART 304 or instructor approval.

PRINTMAKING (ART)

- ART 351 Intaglio I.** (3) F, S
Introduction to contemporary and traditional developmental techniques for black and white prints. 6 hours a week. Prerequisite: instructor approval.
- ART 352 Lithography I.** (3) F, S
Monochromatic and color planographic printmaking utilizing stone and aluminum plate processes. 6 hours a week. Prerequisite: ART 113 or instructor approval.
- ART 354 Screen Printing I.** (3) F, S
Introduction to paper, direct, and photographic stencil techniques. 6 hours a week. Prerequisite: ART 113.
- ART 355 Photo Process for Printmaking I.** (3) F
Introduction to photographic principles and skills for photomechanical printmaking processes, including photosilkscreen, photolitho, and photoetching. 6 hours a week. Prerequisite: ART 201 or equivalent.
- ART 451 Advanced Intaglio.** (3) F, S
Various contemporary and traditional methods of printing to achieve color prints. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 452 Advanced Lithography.** (3) F, S
Continuation of ART 352. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 454 Advanced Screen Printing.** (3) A
Continuation of ART 354. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 455 Advanced Photo Processes for Printmaking.** (3) A
A continued study of photomechanical techniques and applications to printmaking or photographic processes. Prerequisite: ART 355 or instructor approval.
- ART 456 Fine Printing and Bookmaking I.** (3) A
Letterpress printing and typography as fine art. Study of history, alphabets, mechanics of hand typesetting, presswork, and various forms of printed matter. Prerequisite: instructor approval.
- ART 457 Fine Printing and Bookmaking II.** (3) A
Continuation of ART 456. Bookbinding, book design and printing, advanced typography, theory, and presswork. May be repeated for credit. Prerequisites: ART 456; instructor approval.
- ART 458 Papermaking.** (3) F, S
History, theory, demonstrations, sheet forming, collage treatments, and 3-dimensional approaches. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 459 Monoprinting.** (3) F, S
The nonmultiple printed image using a variety of technical approaches. 6 hours a week. May be repeated for credit. Prerequisites: ART 311, 323 (or any 300-level printmaking class); instructor approval.
- ART 551 Intaglio Projects.** (3) F, S
The materials and methods of Intaglio as a matrix for exploring various contemporary issues. Specifically structured to accommodate the graduate level drawing with no printmaking background. Studio.

SCULPTURE (ART)

- ART 231 Sculpture I.** (3) F, S, SS
Exploration of sculptural forms through concepts related to basic materials. Focus on studio production, safety, aesthetic criticism, and history of sculpture. 6 hours a week. Prerequisites: ART 113 and 115 or instructor approval.
- ART 274 Wood I.** (3) F, S
Fundamental woodworking techniques to produce creative functional 3-dimensional objects. 6 hours a week.
- ART 331 Sculpture II.** (3) F, S
Continuation of ART 231 with an emphasis on metal fabrication as an expressive sculptural process. Techniques in welding, cutting and bending of metals and their aesthetics. 6 hours a week. Prerequisite: ART 231 or instructor approval.
- ART 332 Sculpture III.** (3) F, S
Explorations in diverse media with a focus on mold making processes. Development of the sculpture portfolio. 6 hours a week. Prerequisite: ART 331 or instructor approval.
- ART 333 Foundry Casting Methods.** (3) F, S
The fine art and techniques of metal casting: mold making, foundry safety, finishing techniques, application of patinas, and history of casting. 6 hours a week. May be repeated for credit. Prerequisite: ART 332 or instructor approval.
- ART 374 Wood II.** (3) F, S
Individual and directed problems in wood related to the production of unique functional art objects. 6 hours a week. Prerequisites: ART 113 and 115 and 274 or instructor approval.
- ART 431 Special Problems in Sculpture.** (3) F, S
Development of a personal approach to sculpture, emphasis on form, individual problems, and related color technology. Professional practices and presentation. 6 hours a week. May be repeated for credit. Prerequisites: ART 332; instructor approval.
- ART 432 Neon Sculpture.** (3) F
Techniques for creating neon in an art context. Glass tube bending and fabrication. Construction of artworks utilizing light generating gasses. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 436 Architectural Sculpture.** (3) N
Sculptural concepts as related to architecture and other man-made environments. Scale drawing, models, and relief sculpture. 6 hours a week. May be repeated for credit. Prerequisite: ART 332 or instructor approval.
- ART 437 Film Animation.** (3) F
Production of short 16mm films that feature articulated sculptural objects, models, dolls, puppets, and graphics through the use of single frame filming techniques. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.
- ART 438 Experimental Systems in Sculpture.** (3) S
Simple electrical and mechanical systems that can be utilized in the context of studio art and installations. Active production of studio artworks required. 6 hours a week. May be repeated for credit. Prerequisite: instructor approval.

ART 474 Advanced Wood. (3) F, S
Extended experience and advanced techniques in the use of wood to create functional works of art. 6 hours a week. May be repeated for credit. Prerequisites: ART 374; instructor approval.

CERAMICS

ART 260 Ceramics for Nonmajors. (3) F, S, SS
Handbuilding methods, wheel throwing, glaze and decorative processes, Raku, and stoneware firings. 6 hours a week.

ART 261 Ceramic Survey. (3) F, S, SS
Handforming methods, throwing on the wheel, decorative processes, and glaze application. 6 hours a week. Prerequisites: ART 112, 115.

ART 360 Ceramic Throwing. (3) F, S
Design analysis and production of functional pottery. Emphasis on throwing techniques, surface enrichment, and glaze application. 6 hours a week. May be repeated once for credit. Prerequisite: ART 261.

ART 364 Ceramic Handbuilding I. (3) F
Search for form using handbuilding techniques. Kiln firing and related problems. Prerequisite: ART 261.

ART 365 Ceramic Handbuilding II. (3) S
Continuation of ART 364 with an additional focus on large-scale works, surface treatments, and glaze decoration with related kiln firing applications. Prerequisite: ART 364 or instructor approval.

ART 460 Ceramic Clay. (3) S
Research into various clay body formulations, local natural materials, slip glazes, and engobes. Lecture, lab, studio. Prerequisites: ART 360 and 364 or instructor approval.

ART 463 Ceramic Glaze. (3) F
Glaze calculation and formulation using various glaze colors and surfaces. Lecture, lab, studio. Prerequisite: ART 460 or instructor approval.

ART 466 Special Problems in Ceramics. (3) F, S, SS
Emphasis on personal expression within structure of seminars, critiques, and studio work. Professional methods of presentation/documentation of work. 6 hours a week. May be repeated for credit. Prerequisite: ART 364 or instructor approval.

FIBERS (ART)

ART 276 Fibers I. (3) F, S
Exploration of various materials and basic techniques in the structural use of fibers and surface design on fabric. 6 hours a week. Prerequisites: ART 113 and 115 or instructor approval.

ART 376 Fibers: Loom Techniques. (3) A
Investigation of loom techniques and computer pattern design. 6 hours a week. Prerequisite: ART 113 or 115 or instructor approval.

ART 377 Surface Design. (3) F, S
Surface design on fabric through the application of dyes and pigments. Techniques include painting, printing, airbrushing, and the cyanotype process. Prerequisite: ART 276 or instructor approval.

ART 476 Fibers: Multiple Harness Weaving. (3) F, S
Advanced loom techniques and computer pattern design. Emphasis on individual design and loom application. Prerequisite: ART 113 or 115 or 376 or instructor approval.

ART 477 Printed Textiles. (3) A
Techniques for screen printing on fabric exploring pattern as a compositional element. Various stencil methods including photographic processes. Studio. May be repeated for credit. Prerequisite: ART 377 or instructor approval.

METALS (ART)

ART 272 Jewelry I. (3) F, S
Emphasis on fabrication in jewelry making. Basic techniques of cutting and piercing, forging and soldering, and forming. 6 hours a week. Prerequisite: freshman or sophomore or junior standing.

ART 372 Jewelry II. (3) F, S
Fabricated approach to jewelry making. Techniques in stone setting and surface embellishment. 6 hours a week. Prerequisites: ART 113 and 115 and 272 or instructor approval.

ART 373 Metalworking I. (3) A
Compression, die, and stretch forming as applied to hollow form construction. Hot and cold forging techniques as applied to smithing. 6 hours a week. Prerequisites: ART 113 and 115 and 272 or instructor approval.

ART 472 Advanced Jewelry. (3) F, S
Jewelry making with emphasis on developing personal statements and craftsmanship. 6 hours a week. May be repeated for credit. Prerequisites: ART 372; instructor approval.

ART 473 Advanced Metalworking. (3) A
Forging and forming techniques in individualized directions. 6 hours a week. May be repeated for credit. Prerequisites: ART 373; instructor approval.

SPECIAL STUDIO ART (ART)

ART 621 Studio Problems. (3) F, S, SS
Advanced study in the following areas:

- (a) Ceramics
- (b) Drawing
- (c) Fiber Art
- (d) Metals
- (e) Painting
- (f) Photography
- (g) Printmaking
- (h) Sculpture
- (i) Studio Art
- (j) Wood

6 hours a week each section. May be repeated for credit. Prerequisite: instructor approval.

ART 680 Practicum: M.F.A. Exhibition. (1–15) F, S, SS
Studio work in preparation for required M.F.A. exhibition. Public exhibit to be approved by the student's supervisory committee and accompanied by a final oral examination. Photographic documentation and written statement of problem. Prerequisite: approval of the student's supervisory committee.

Department of Dance

Claudia Murphey
Chair
(PEBE 107A) 602/965–5029
www.asu.edu/cfa/dance

PROFESSORS

JONES, KEUTER, LESSARD,
LUDWIG, MURPHEY

ASSOCIATE PROFESSORS

KAPLAN, MATT, MOONEY

ASSISTANT PROFESSORS

JACKSON, PARK, VISSICARO

ACADEMIC PROFESSIONAL

MITCHELL

For advising purposes, all students registering in a Dance degree program enroll through the College of Fine Arts. Each degree program and area of specialization has its own check sheet that describes the particulars of course sequence and special requirements. These check sheets are available in the Department of Dance office.

Placement Examinations. All students who enroll in dance major technique courses are required to take part in a placement audition to determine their levels of technical proficiency in modern dance and ballet. Official dates for auditions are set for the orientation periods that precede the fall and spring semesters of each academic year. Transfer students who have completed music theory for dance, dance production, or choreography courses at another institution are also required to take placement examinations in these areas before enrolling in intermediate or advanced levels of course work.

BACHELOR OF FINE ARTS DEGREE

Dance

The faculty in the Department of Dance in the College of Fine Arts offer a Bachelor of Fine Arts degree at the undergraduate level with emphases in four areas of concentration: choreography, dance education, dance studies, and performance. All new Dance majors are admitted into the preprofessional program. Students audition or

petition for admission into one of the Bachelor of Fine Arts dance concentrations after three semesters of study. Transfers may request admission into the B.F.A. degree after one semester in residence. Further details may be obtained from the Department of Dance.

Graduation Requirements. In addition to fulfilling the major requirements, students must meet all university graduation requirements and college degree requirements. At least 45 semester hours, must be upper-division courses. See pages 79–83 for university graduation requirements and pages 247–248 for college degree requirements.

Core Curriculum. The Dance major consists of a minimum of 54 semester hours in the dance core. All courses in the major must be completed with a grade of “C” or higher. First-semester students in the preprofessional program should take the following courses:

DAN 134	Technique and Theory of Modern Dance	3
DAN 135	Technique and Theory of Ballet	2
ENG 101	First-Year Composition	3
	Dance elective	1
	General Studies courses	6
	Total	15

The following courses make up the core curriculum:

Technique. Twenty-six semester hours in ballet and modern technique are required.

Performance. Two upper-division courses are required.

Theory. The following dance theory courses are required:

DAH 100	Introduction to Dance <i>HU</i>	3
DAN 221	Rhythmic Theory for Dance I	2
DAN 222	Rhythmic Theory for Dance II	2
DAN 340	Dance Kinesiology	4
	Total	11

Choreography. The following courses are required:

DAN 264	Improvisational Structures	3
DAN 265	Approaches to Choreography	3
	Total	6

History. Choose two from the following three courses:

DAH 201	Cross-Cultural Dance Perspectives <i>HU, G</i>	3
DAH 401	Dance History I	3
DAH 402	Dance History II	3

Production. Choose one of the following two courses:

DAN 210	Dance Production I	3
DAN 211	Dance Production II	3

Dance Concentration Curriculum. Each concentration in the dance curriculum—choreography, dance education, dance studies, and performance—is composed of 25 semester hours.

Choreography

Core Curriculum. See above for the courses that make up the core curriculum.

Specialization. The following courses are required for the choreography specialization:

DAN 228	Dance Notation I	3
DAN 321	Music Literature for Dance ...	3
DAN 364	Choreography and Accompaniment	3
DAN 365	Advanced Choreography	2
DAN 480	Senior Performance in Dance	4
	Total	15

Production. Choose one of the following two courses:

DAN 210	Dance Production I	3
DAN 211	Dance Production II	3

Additional requirements are listed on the check sheet available from the Department of Dance.

Dance Education

Core Curriculum. See above for the courses that make up the core curriculum.

Specialization. The following courses are required for the dance education specialization:

DAN 321	Music Literature for Dance ...	3
DAN 359	Dance Education Theory	3
DAN 364	Choreography and Accompaniment	3
DAN 365	Advanced Choreography	2
DAN 480	Senior Performance in Dance	4
	Total	15

Production. Choose one of the following two courses:

DAN 210	Dance Production I	3
DAN 211	Dance Production II	3

Dance Methods. Choose two of the following three courses:

DAN 350	Methods of Teaching Modern Dance in Secondary Education	3
DAN 351	Methods of Teaching Ballet	3
DAN 357	Children’s Dance	3

Additional requirements are listed on the check sheet available from the Department of Dance.

Dance Studies

Core Curriculum. See above for the courses that make up the core curriculum.

Specialization. The following courses are required for the dance studies specialization:

DAH 495	Dance Research Sources	2
DAH 496	Senior Thesis Project	2
	Total	4

Twenty additional hours approved by an advisor must be taken in no more than two related fields. Additional requirements are listed on the check sheet available from the Department of Dance.

Performance

Core Curriculum. See above for the courses that make up the core curriculum.

Specialization. The following courses are required for the performance specialization:

DAN 321	Music Literature for Dance ...	3
DAN 380	Performance Studies Practicum	2
DAN 480	Senior Performance in Dance	4
THP 101	Introduction to the Art of Acting	3
	Total	12

Production. Choose one of the following two courses:

DAN 210	Dance Production I	3
DAN 211	Dance Production II	3

Performance. Choose from the following three courses (6 semester hours are required):

DAN 371	Dance Theatre Performance/Production	1–3
DAN 471	Dance Arizona Repertory Theatre	6
DAN 494	Concert Dance	2

Additional requirements are listed on the check sheet available from the Department of Dance.

A student pursuing the B.F.A. degree in Dance Education may also choose to become certified to teach dance (K–12) in Arizona public schools. Students should apply to the College of Education in the middle of the sophomore year. To be considered for admission to the teacher certification program, students must complete an admission portfolio specified by the College of Education, which may include completion of the Pre-Professional Skills Test (PPST). Students should be advised that at least 20 additional semester hours are required to complete certification requirements. For more information, consult the dance education advisor and College of Education Office of Student Affairs.

MINOR

The department offers a minor in Dance consisting of 18 semester hours of course work, including 12 upper-division hours. A minimum grade of “C” is required in all courses. Dance minor requirements include:

Performance or choreography	3
Technique	6
Theory	6
Electives	3

Interested students should contact the Department of Dance for specific requirements and admission procedures.

GRADUATE PROGRAM

A total of 60 semester hours of graduate credit is required: 30 hours of dance studio; 12 hours of dance theory; nine hours of electives; and nine hours of individual project (choreography, performance, or other approved project). In addition to the studio concentrations in choreography and performance, specialized areas of emphasis are available within the 60-semester-hour program. In consultation with the

Graduate Director specific interests, needs, and abilities establish a Program of Study that directs course work in alternative directions.

DANCE HISTORY (DAH)

DAH 100 Introduction to Dance. (3) F, S
Orientation to the field of dance focusing on history, styles, cultural, and theatrical aspects of the art form. *General Studies: HU.*

DAH 190 Introduction to the Dance Profession. (1) F
Orientation to the dance profession introducing career options and university/department resources. Designed for Dance majors.

DAH 201 Cross-Cultural Dance Perspectives. (3) F, S
Explores the role of dance in various cultures around the world. *General Studies: HU, G.*

DAH 300 Focus on Dance. (3) F, S, SS
Specialized study of cultural and theatrical aspects of dance, such as social dance forms, specific genres or historical periods. May be repeated for credit. Lecture, studio. May not be taken for credit by student who has completed DAH 100. *General Studies: HU.*

DAH 301 Philosophy and Criticism of Dance. (3) F, S
Philosophical issues in dance and dance criticism, with emphasis on written analysis and interpretation. Prerequisite: 1 semester of First-Year Composition. *General Studies: L2/HU.*

DAH 401 Dance History I. (3) F
Cultural and theatrical development of dance from prehistory through the 19th-century Romantic period, including the early history of ballet. *General Studies: HU.*

DAH 402 Dance History II. (3) S
Cultural and theatrical development of dance from 19th-century Romantic period through Contemporary times. Includes ballet, modern, and musical theatre dance. *General Studies: HU.*

DAH 495 Dance Research Sources. (2) F
The investigation of various resources and methods for conducting research in dance. Seminar. Prerequisite: instructor approval.

DAH 496 Senior Thesis Project. (2) S
A culminating research project which integrates dance and a related field of interest. Prerequisite: DAH 495.

DAH 501 Philosophy of Dance. (3) S
Analysis of traditional and contemporary theories of dance with regard to issues of expression, form, and meaning.

DAH 502 Cultural Concepts of Dance. (3) S
Examines the close connection between culture, dance, and movement through writings in cultural theory, dance ethnology, and philosophy.

DANCE (DAN)

DAN 130 Dance. (1) F, S, SS
Ballet, improvisation, jazz, modern, west African, Afro-Caribbean, Ballet Folklorico, Flamenco, Latin, ballroom, folk, Tai Chi. May be repeated for credit.

DAN 134 Technique and Theory of Modern Dance. (3) F, S
Elementary concepts of modern dance technique. Development of movement quality and performance skills. 6 hours weekly. May be repeated for credit. Placement audition required. Prerequisite: Dance major.

DAN 135 Technique and Theory of Ballet. (2) F, S
Elementary ballet technique with emphasis on alignment, control, and development of the feet with proper awareness of style and phrasing. 4 hours weekly. May be repeated for credit. Placement auditions required.

DAN 164 Improvisation. (1) F, S
Improvisation techniques employing the basic elements of space, time, and energy. Studio.

DAN 171 Dance Production Lab: Costume. (0) F, S
Participation in concert dance production in the area of costuming. Required of all Dance majors. Lab.

DAN 172 Dance Production Lab: Technical Theatre. (0) F, S

Participation in concert dance production in the area of technical theatre. Required of all Dance majors. Lab.

DAN 173 Dance Production Lab: Management. (0) F, S
Participation in concert dance production in the area of production management. Required of all Dance majors. Lab.

DAN 210 Dance Production I. (3) F
Theory and practice of lighting, scenery, sound, and stage management for dance production. Labs cover all areas of production. Lecture, lab.

DAN 211 Dance Production II. (3) S
Theory and practice of arts management and costume design for dance production. Labs cover all areas of production. Lecture, lab.

DAN 221 Rhythmic Theory for Dance I. (2) F
Elements of music, music structures, and their relationship to dance. Emphasis on rhythmic analysis and dance accompaniment.

DAN 222 Rhythmic Theory for Dance II. (2) S
Continuation of DAN 221 with an emphasis on small group/movement projects in relation to musical time and structure. CD-ROM work included. Prerequisite: DAN 221 or proficiency exam.

DAN 228 Dance Notation I. (3) F, S
Survey of systems of dance notation. Introduction to effort-shape analysis of movement. Emphasis on learning elementary labanotation. Lecture, studio. Prerequisites: DAN 121; MUS 100.

DAN 230 Dance. (1) F, S
Intermediate levels. Continuation of DAN 130. 2.5 hours a week. May be repeated for credit.

DAN 234 Technique and Theory of Modern Dance. (3) F, S
Intermediate concepts of modern dance technique. Development of movement quality and performance skills. 6 hours weekly. May be repeated for credit. Placement audition required. Prerequisite: Dance major.

DAN 235 Technique and Theory of Ballet.

(2) F, S

The advanced study of elementary ballet technique through the traditional exercises, with proper awareness of style and phrasing. 4 hours weekly. May be repeated for credit. Placement audition required.

DAN 237 Beginning Pointe. (1) F, S

The study of elementary pointe technique through the traditional exercises. 2 hours weekly. May be repeated for credit. Prerequisites: basic ballet training; instructor approval.

DAN 264 Improvisational Structures. (3) F, S

Introduction to basic improvisational and choreographic principles with emphasis on current media and technology, group structures, and movement invention. Lecture, studio.

DAN 265 Approaches to Choreography. (3) S

Intermediate application of basic choreographic principles with emphasis on improvisation, form, content, and evaluative skills. Lecture, studio. Prerequisite: DAN 264.

DAN 321 Music Literature for Dance. (3) F, S

Historical survey of music and compositional elements relative to dance. Emphasis on analysis of choreography from a musical standpoint. CD-ROM lab. Lecture, lab. Prerequisites: DAN 221 and 222 or instructor approval. Pre- or corequisite: MUS 340.

DAN 328 Dance Notation II. (2) S

Intermediate study of labanotation. Emphasis on score reading. Prerequisite: DAN 327 or equivalent.

DAN 330 Dance. (1) F, S

Advanced levels. Continuation of DAN 230. 2 hours weekly. May be repeated for credit.

DAN 334 Technique and Theory of Modern Dance. (3) F, S

Advanced concepts of modern dance technique. Development of movement quality and performance skills. 6 hours weekly. May be repeated for credit. Placement audition required.

DAN 335 Technique and Theory of Ballet.

(2) F, S

Intermediate ballet technique with emphasis on strength, dynamics, rhythmic impulses, and transitions with awareness of proper style and phrasing. 4 hours weekly. May be repeated for credit. Placement audition required.

DAN 337 Intermediate Pointe. (1) F, S

Study of intermediate and advanced pointe technique through the traditional exercises. 2 hours weekly. May be repeated for credit. Prerequisite: DAN 237 or instructor approval.

DAN 340 Dance Kinesiology. (4) S

Kinesiological principles applied to dance technique, including analysis of muscular patterns in dance movement and the pathomechanics of dance injury. Prerequisite: BIO 201 or instructor approval.

DAN 342 Ideokinesis. (2) F

A study of posture using the visualization of image/goals to facilitate improved alignment and movement efficiency. May be repeated for credit. Lecture, studio.

DAN 350 Methods of Teaching Modern Dance in Secondary Education. (3) F

Analysis and acquisition of teaching materials for the technique, improvisation, and choreography of modern dance. Lecture, studio. Pre- or corequisite: DAN 359.

DAN 351 Methods of Teaching Ballet. (3) S

Analysis and acquisition of teaching techniques and materials for ballet, jazz, and multicultural dance forms. Lecture, studio. Pre- or corequisite: DAN 359.

DAN 357 Children's Dance. (3) S

Theory and practice of teaching creative dance to children. Designed for Dance majors and related curricula, but open to all students.

DAN 359 Dance Education Theory. (3) F

Application of principles of motivation, learning, and evaluation to the teaching of dance. Pre- or corequisite: DAN 334 or equivalent.

DAN 364 Choreography and Accompaniment. (3) F

Experience in the use of traditional and non-traditional musical structures as a basis for choreographic projects. Lecture, studio. Prerequisite: DAN 321.

DAN 365 Advanced Choreography. (2) S

Investigation and practice of contemporary styles of choreography. Studio. Prerequisites: DAN 264 and 265 or equivalents.

DAN 371 Dance Theatre Performance/Production. (1–3) F, S

Performance or technical theatre work in designated dance productions. 3 hours a week per semester hour. May be repeated for credit. Prerequisite: instructor approval.

DAN 380 Performance Studies Practicum.

(2) F, S

Projects include dances reconstructed from labanotation and faculty, guest artist, or student-created performance events. Studio, lab.

DAN 423 Dance, Computers, and Multimedia. (3) F, S

Introduction to desktop multimedia as it relates to dance creation, education, production, and research. Lecture, lab.

DAN 434 Technique and Theory of Modern Dance. (3) F, S

Preparation in the performance and comprehension of professional level modern dance technique. 6 hours weekly. May be repeated for credit. Placement audition required.

DAN 435 Technique and Theory of Ballet.

(2) F, S

The study of professional advanced ballet technique with emphasis on preparation for performance. 4 hours weekly. May be repeated for credit. Placement audition required.

DAN 471 Dance Arizona Repertory Theatre.

(3) F, S

Professional modern dance company experience and community outreach. Opportunity to work with faculty, guest performers, and choreographers. Lecture, studio.

DAN 480 Senior Performance in Dance. (2) F

Original choreography for group performance with analysis and critique of problems encountered in production. Must be repeated for a total of 4 credits. Prerequisites: DAN 364, 365.

DAN 510 Dance Stagecraft and Production.

(1–3) F, S

Theory of costuming, lighting, makeup, scenery, and sound as related to dance performance. May be repeated once for credit. Lecture, studio. Prerequisite: DAN 211 or equivalent.

DAN 521 Sound Lab I. (1) F

Introduction to tape recording, sound mixing, audio tape editing for dance choreographers. Lecture, lab. Prerequisite: instructor approval.

DAN 522 Sound Lab II. (1) S

Continuation of DAN 521. Emphasis on development of audio compositions for choreographic projects. Lecture, lab. Prerequisite: DAN 521.

DAN 523 Dance, Computers, and Multimedia. (3) F, S

Introduction to desktop multimedia as it relates to dance creation, production, education, and research. Lecture, lab.

DAN 534 Technique and Theory of Modern Dance. (2) F, S

Preparation in the performance and comprehension of professional-level modern dance for first-year graduate students. 6 hours weekly. May be repeated for credit. Placement audition required.

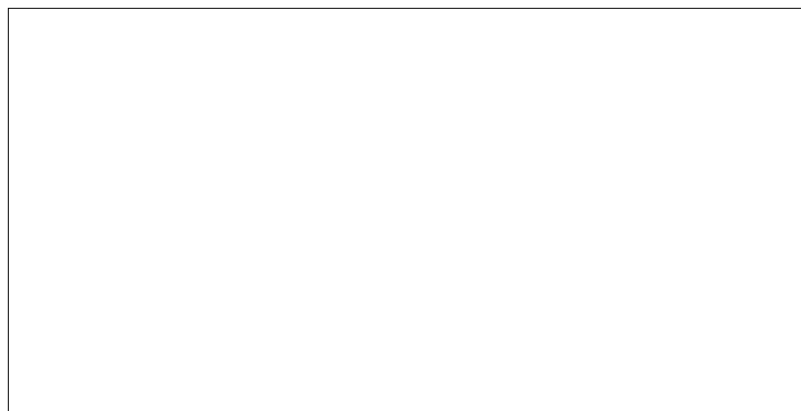
DAN 535 Technique and Theory of Ballet.

(1) F, S

Graduate study of ballet technique. May be repeated for credit. Placement audition required. Studio.

DAN 542 Ideokinesis. (2) F

A theoretical examination of ideokinetic methods of facilitating postural change and movement efficiency.



“An Evening of Dance” performed by College of Fine Arts students who participate in the Main Stage Series.

Tim Trumble photo

DAN 550 Graduate Dance Pedagogy: Modern. (3) S

Overview of the role of modern dance technique and theory in the university curriculum including current pedagogical theory, diversity, gender. May follow or precede internship in practical teaching.

DAN 551 Graduate Dance Pedagogy: Ballet. (3) F

Advanced analysis of teaching techniques for ballet. Prerequisite: instructor approval.

DAN 561 Choreographer/Composer Workshop. (1–3) N

Analysis of, experimentation with, and practice in working with composers of music for choreography. Open to experienced choreographers and composers. Lecture, studio. Prerequisite: instructor approval.

DAN 564 Solo and Group Choreography I. (3) F

Original choreography created for solo and group performance. Studio. Prerequisites: DAN 364 and 365 or equivalent.

DAN 565 Solo and Group Choreography II. (3) S

Continuation of DAN 564. Studio. Prerequisite: DAN 564.

DAN 571 Dance Theatre. (1–3) F, S

Performance in specially choreographed dance productions. May be repeated for credit. Prerequisite: instructor approval.

DAN 580 Performance Studies Practicum. (2) F, S

Projects include dances reconstructed from labanotation and from, student-, faculty-, or guest artist-created performance events. Studio, lab.

DAN 591 Seminar. (0–3) F, S

Seminar focusing on enrichment topics, production aspects of thesis projects, teaching concerns, special lectures, films, or critiques.

DAN 634 Technique and Theory of Modern Dance. (2) F, S

Preparation in the performance and comprehension of professional-level modern dance for second-year graduate students. 6 hours weekly. May be repeated for credit. Placement audition required.

DAN 640 Advanced Problems in Analysis of Dance Technique. (3) S

Theories and principles of human anatomy, kinesiology, and the psychology of learning applied to analysis of dance movement. Prerequisites: DAN 340 and 342 or instructor approval.

DAN 664 Choreography Workshop. (1–3) F

Choreographic study in a seminar context with faculty and guest artists. Studio. May be repeated for credit. Prerequisites: DAN 564, 565.

DAN 671 Dance Arizona Repertory Theatre. (3) F, S

Professional modern dance company experience and community outreach. Opportunity to work with choreographers, faculty, and guest performers. Lecture, studio.

DAN 693 M.F.A. Project. (1–9) F, S, SS

Preparation for required M.F.A. project approved by the student's supervisory committee. Work is followed by a final oral examination and documentation appropriate to the project. Prerequisite: committee approval.

School of Music

Toni-Marie Montgomery

Director

(MUSIC 185) 602/965–3371

www.asu.edu/cfa/music

REGENTS' PROFESSORS

HICKMAN, PAGANO

PROFESSORS

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ASSISTANT PROFESSORS

BRYAN, BUSH, LYMAN, McLIN

The School of Music is a member of the National Association of Schools of Music, and the requirements for entrance and graduation set forth in this catalog are in accordance with the published regulations of the association. The following statement of basic musicianship is endorsed by the School of Music:

All musicians, whether performers, composers, scholars, or teachers, share common professional needs. Every musician must to some extent be a performer, a listener, a historian, a composer, a theorist, and a teacher. For this reason, certain subject matter areas and learning processes are common to all baccalaureate degrees in music.

Basic musicianship is developed in studies which prepare the student to function in a variety of musical roles which are supportive of his/her major concentration. All undergraduate curricula, therefore, provide the following:

1. A conceptual understanding of such musical properties as *sound, rhythm, melody, harmony, texture and form* and opportunities for developing a comprehensive grasp of their interrelationships as they form the cognitive-affective basis for listening, composing and performing.
2. Repeated opportunities for enacting in a variety of ways the roles of listener (analysis), performer (interpretation), composer (creation), scholar (research), and teacher.
3. A repertory for study that embraces all cultures and historical periods.

All students registering in a School of Music major program enroll through the College of Fine Arts.

Audition/Admission Requirements.

All students who enroll in an undergraduate music degree program are required to pass an entrance audition in their primary performing medium (instrument or voice) before being admitted to the School of Music. Audition forms and specific audition requirements for each instrument or voice may be obtained upon request by writing to the School of Music. Official dates for these auditions are set for each academic year. Students may request to audition on other dates if necessary or may send a tape recording if distance prohibits coming to the campus.

Admission to the composition concentration is subject to the approval of the composition faculty based upon an evaluation of the student's compositions and/or interview.

Diagnostic Examinations. Entering students, including *all* transfer students, must also take a diagnostic examination in piano during orientation week of their first semester on campus, regardless of previous piano course work completed. These transfer students are required to reach a minimum level of achievement indicated on the Piano Placement Exam.

Continuation in the composition program is subject to review in the sophomore or junior year.

All Music Education majors, including transfer and postbaccalaureate students, must perform an additional audition before being admitted to the teacher education program. Normally, this audition occurs during the sophomore year.

All students majoring in Music Therapy must pass MUE 211 Music in Recreation and a music therapy faculty review and screening interview before being passed into upper-division study.

BACHELOR OF ARTS DEGREE

The Bachelor of Arts degree requires a minimum of 120 hours for graduation.

MAJOR REQUIREMENTS

The Music major consists of 50 semester hours and includes the requirements listed below for each area of concentration.

GRADUATION REQUIREMENTS

In addition to fulfilling the major requirements, students must meet all university graduation requirements and college degree requirements. See pages 79–83 for university graduation requirements and pages 247–248 for college degree requirements.

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint	2
	or MTC 321 Tonal Counterpoint (2)	
MTC 327	Form and Analysis I	3
MTC 422	Musical Acoustics	3
Total	.....	20

Music History. Three semester hours of MHL 341 Music History and three semester hours of MHL 342 Music History are required. Nine elective upper-division hours in music history and/or theory are required.

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction or 311 Studio Instruction are required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

The remaining semester hours in music are selected by the student in consultation with an advisor. Areas of study may include ethnomusicology, music education, music history, music theory, and performance. At least 23 semester hours, 12 in the field of specialization, must be in the upper division. Students must select sufficient elective courses to complete the 120 hours required for graduation excluding Music Education (125 semester hours) and Music Therapy (129 semester hours).

BACHELOR OF MUSIC DEGREE

All Bachelor of Music degree programs require 120 semester hours for graduation excluding Music Education (125 semester hours) and Music Therapy (129 semester hours). The B.M. curriculum offers majors in Performance, Theory and Composition, Music Education, and Music Therapy.

MAJOR REQUIREMENTS

The curricula for the Music Education and Music Therapy degrees require more than 120 semester hours. A student wishing to complete these programs in four years is required to take more than 15 semester hours per semester or to attend summer sessions.

The music curriculum for the remaining B.M. degrees listed consists of 79 semester hours. The requirements for each major are listed below. In addition, the Music Education major provides certification to students interested in teaching in the public schools.

GRADUATION REQUIREMENTS

In addition to fulfilling the major requirements, students must meet all university graduation requirements and college degree requirements. See pages 79–83 for university graduation requirements and pages 247–248 for college degree requirements.

Music Education Major, Choral-General Concentration

This degree program may include a teaching minor in instrumental music.

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3

MTC 223	Music Theory: 20th Century	3
MTC 327	Form and Analysis I	3
Total	.....	15

Music History. The following music history courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total	.....	6

Conducting. The following conducting courses are required:

MUP 209	Beginning Choral Conducting	1
MUP 339	Choral Conducting	2
Total	.....	3

Music Education. The following music education courses are required:

MUE 110	Introduction to Music Education	1
MUE 313	Elementary Music Methods ...	3
MUE 315	General Music in the Secondary Schools	2
MUE 480	Choral Methods	3
Total	.....	9

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction and eight semester hours of MUP 311 Studio Instruction are required to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 Solo Performance completes the requirement.

Minor Performing Medium. A proficiency equal to six semesters of study in keyboard or voice (whichever is not the major performing medium) is required. Students wishing to extend their proficiency beyond this level may continue to study in MUP 321 Studio Instruction.

Ensemble. Eight different semesters of participation, including at least six semesters of MUP 352 Concert Choir and/or MUP 353 University Choir, four of which must be at ASU, are required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Music Education Major, Instrumental Concentration

It is strongly recommended that this degree program include courses in choral music or courses in jazz education.

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 327	Form and Analysis I	3
Total		15

Music History. The following music history courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Conducting. The following conducting courses are required:

MUP 210	Beginning Instrumental Conducting	1
MUP 340	Instrumental Conducting	2
Total		3

Music Education. The following music education courses are required:

MUE 110	Introduction to Music Education	1
MUE 315	General Music in the Secondary Schools	2
MUE 317	Educational Methods for Violin and Viola	1
MUE 318	Educational Methods for Cello and String Bass	1
MUE 327	Educational Methods for Trumpet and Horn	1
MUE 328	Educational Methods for Trombone, Euphonium, and Tuba	1
MUE 336	Educational Methods for Percussion	1
MUE 337	Educational Methods for Flute, Clarinet, and Saxophone	1
MUE 338	Educational Methods for Double Reed Instruments	1
MUE 481	Instrumental Practicum/ Methods	5
MUE 482	Instrumental Practicum/ Methods	5
Total		20

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction and eight semester hours of MUP 311 Studio Instruction are required to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 Solo Performance completes the requirement.

Ensemble. Eight different semesters of participation in an ensemble are required, four of which must be at ASU. For wind and percussion players, two of the four ASU semesters must be in marching band. String players must have a minimum of six semesters of MUP 345 Symphony Orchestra. Wind and percussion players must have a minimum of six semesters of MUP 361 Marching and Concert Bands.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

**Music Education Major,
String Concentration**

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 327	Form and Analysis I	3
Total		15

Music History. Three semester hours of MHL 341 Music History and three semester hours of MHL 342 Music History are required.

Conducting. The following conducting courses are required:

MUP 210	Beginning Instrumental Conducting	1
MUP 340	Instrumental Conducting	2
Total		3

Music Education. The following music education courses are required:

MUE 110	Introduction to Music Education	1
MUE 315	General Music in the Secondary Schools	2
MUE 317	Educational Methods for Violin and Viola	1
	or MUE 318 Educational Methods for Cello and String Bass (1)	
MUE 335	Educational Methods for Guitar	1

MUE 336	Educational Methods for Percussion	1
MUE 482	Instrumental Practicum/ Methods	5
MUE 485	String Practicum/Methods	2
Total		13

Also required are MUP 121 Studio Instruction for three semester hours in a stringed instrument in the area other than the major instrument, MUP 121 for one semester hour in a third stringed instrument, and MUP 121 for one semester hour in a fourth stringed instrument.

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction and eight semester hours of MUP 311 Studio Instruction are required to obtain a proficiency level necessary to meet the graduation recital requirement. MUP 495 Solo Performance completes the requirement.

Ensemble. Eight different semesters of participation in an ensemble are required, four of which must be at ASU. Six semesters of MUP 345 Symphony Orchestra or equivalent are required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Recommended Elective. MUE 313 Elementary Music Methods.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

**Performance Major,
Guitar Concentration**

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2
MTC 327	Form and Analysis I	3
Total		17

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 87–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Music History. Three semester hours of MHL 341 Music History and three semester hours of MHL 342 Music History are required.

Repertoire and Pedagogy. Two semester hours of MUP 451 Repertoire and two semester hours of MUP 481 Performance Pedagogy and Materials are required.

Conducting. MUP 210 Beginning Instrumental Conducting is required.

Major Performing Medium. Sixteen semester hours of MUP 127 Studio Instruction and 16 semester hours of MUP 327 Studio Instruction are required to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495 Solo Performance) and a full recital (MUP 496 Solo Performance) are required.

Ensemble. Eight semester hours of ensemble are required within a minimum of six different semesters. Four of the eight semester hours must be MUP 379 Chamber Music Ensemble: Guitar.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Additional Requirements. MHL 447 Music Since 1900 may be used to satisfy the General Studies L2 requirement.

Performance Major, Jazz Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 315	Modern Arranging	2
MTC 316	Modern Arranging	2
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2

MTC 327	Form and Analysis I	3
MTC 440	Jazz Theory and Eartraining	2
MTC 441	Jazz Composition	2
Total		25

Music History. The following music history courses are required:

MHL 341, 342	Music History	6
MHL 352	The Evolution of Jazz <i>H</i>	3
Total		9

Conducting. MUP 210 Beginning Instrumental Conducting is required.

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction and eight semester hours of MUP 311 Studio Instruction are required to obtain a proficiency level necessary to meet the graduation recital requirements. Two half recitals (MUP 495 Solo Performance) are required, with one in the jazz idiom.

Improvisation. The following courses are required:

MUP 141	Jazz Fundamentals	1
MUP 142	Jazz Fundamentals	1
MUP 217	Improvisation Workshop	2
MUP 218	Improvisation Workshop	2
MUP 417	Advanced Improvisation	2
MUP 418	Advanced Improvisation	2
Total		10

Workshops. The following courses are required:

MUP 319	Recording Studio Techniques	2
MUP 320	MIDI Workshop	2
Total		4

Ensemble. Eight semesters of ensemble are required, including six semesters of MUP 379 Chamber Music Ensembles and two semesters of MUP 386 Stage Band.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Performance Major, Keyboard Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2
MTC 327	Form and Analysis I	3
MTC 425	Studies in 20th-Century Theory or MTC 428 Form and Analysis II (3)	3
Total		20

Music History. The following music history courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Repertoire and Pedagogy. The following courses are required:

MUP 451	Repertoire	2
MUP 481	Performance Pedagogy and Materials or MUP 482 Piano Pedagogy II (2)	2
Total		4

Conducting. One of the following two courses is required:

MUP 209	Beginning Choral Conducting	1
MUP 210	Beginning Instrumental Conducting	1

Harpsichord. One semester hour of harpsichord is required.

Major Performing Medium. Sixteen semester hours of MUP 127 Studio Instruction and 16 semester hours of MUP 327 Studio Instruction are required to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495 Solo Performance) and a full recital (MUP 496 Solo Performance) are required.

Ensemble. Eight semester hours of ensemble within a minimum of six different semesters are required, including two semesters of accompanying and two semesters of chamber music.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Additional Requirements. MHL 447 Music Since 1900 may be used to satisfy the General Studies L2 requirement.

Performance Major, Music Theatre Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 327	Form and Analysis I	3
Total		15

Music History. The following music history courses are required:

MHL 341, 342	Music History	6
MHL electives		6
Total		12

Conducting. One of the following two courses is required:

MUP 209	Beginning Choral Conducting	1
MUP 210	Beginning Instrumental Conducting	1

Major Performing Medium. Eight semester hours of MUP 111 Studio Instruction and eight semester hours of MUP 311 Studio Instruction are required to attain a proficiency level necessary to meet the graduation requirement of a public performance of two roles, one of which must be of major proportion.

Ensemble. Five semesters of MUP 370 Music Theatre: Techniques, three semesters of MUP 371 Music Theatre: Workshops, and eight semesters of MUP 373 Music Theatre: Performance are required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Additional Requirements. Six semester hours each in theatre and dance are required. MHL 447 Music Since 1900 should be used to satisfy the General Studies L2 requirement.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Performance Major, Orchestral Instrument Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2
MTC 327	Form and Analysis I	3
MTC 425	Studies in 20th-Century Theory	3
Total		20

Music History. The following courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Repertoire and Pedagogy. One of the following two courses is required:

MUP 451	Repertoire	2
MUP 481	Performance Pedagogy and Materials	2

Conducting. The following courses are required:

MUP 210	Beginning Instrumental Conducting	1
MUP 340	Instrumental Conducting	2
Total		3

Major Performing Medium. Sixteen semester hours of MUP 127 Studio Instruction and 16 semester hours of MUP 327 Studio Instruction are required to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495 Solo Performance) and a full recital (MUP 496 Solo Performance) are required.

Ensemble. Eight semester hours of large ensembles within a minimum of six different semesters are required plus four semester hours of small ensembles within a minimum of four different semesters.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Additional Requirements. MHL 447 Music Since 1900 may be used to satisfy the General Studies L2 requirement.

Performance Major, Piano Accompanying Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2
MTC 327	Form and Analysis I	3
MTC 428	Form and Analysis II	3
Total		20

Music History. The following courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Diction and Repertoire. The following courses are required:

MUP 250	Diction for Singers	2
MUP 451	Repertoire	2
MUP 453	Song Literature	2
MUP 454	Song Literature	2
Total		8

Conducting. One of the following two courses is required:

MUP 209	Beginning Choral Conducting	1
MUP 210	Beginning Instrumental Conducting	1

Major Performing Medium. The following courses are required:

MUP 127	Studio Instruction	16
MUP 311	Studio Instruction	8
MUP 337	Studio Instruction: Piano Accompanying	8
Total		32

In addition, each student accompanies two half recitals (MUP 495 Solo Performance), one for a singer and one for an instrumentalist, during his or her junior year. (A half solo recital may be substituted for either of the above.) During the senior year, the student accompanies two full recitals (MUP 496 Solo Performance), one vocal and one instrumental.

Ensemble. Two semesters of MUP 379 Chamber Music Ensembles, one semester of MUP 379 Chamber Music Ensembles (piano), one semester of MUP 487 Piano Accompanying, four semesters of MUP 388 Piano Accompanying, and two semesters of ensemble elective (minimum of six different semesters) are required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Language. Eight semester hours of one foreign language (French, Italian, or German) are required.

Additional Requirements. MHL 447 Music Since 1900 should be used to satisfy the General Studies L2 requirement.

Performance Major, Voice Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint or MTC 321 Tonal Counterpoint (2)	2
MTC 327	Form and Analysis I	3
MTC 425	Studies in 20th-Century Theory	3
Total		20

Music History. The following music history courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Repertoire and Pedagogy. Two semester hours of MUP 451 Repertoire and two semester hours of MUP 481 Performance Pedagogy and Materials are required.

Also required are two semester hours selected from MUP 453 Song Literature or 454 Song Literature or a repeated enrollment of MUP 451 Repertoire.

Diction. Three semester hours of MUP 250 Diction for Singers is required in Italian, German, and French.

Conducting. MUP 209 Beginning Choral Conducting is required.

Major Performing Medium. Sixteen semester hours of MUP 127 Studio Instruction and 16 semester hours of MUP 327 Studio Instruction are required to attain a proficiency level necessary to meet the graduation recital requirements. A half recital (MUP 495 Solo Performance) and a full recital (MUP 496 Solo Performance) are required.

Ensemble. Four different semesters of large vocal ensembles are required plus five semester hours of ensembles within five different semesters to be selected from large and/or small ensembles.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Additional Requirements. Sixteen semester hours are required in more than one foreign language, chosen from French, German, and Italian. A student may elect one year of one language and either one or two semesters of the other(s), chosen in conference with the advisor.

MHL 447 Music Since 1900 should be used to satisfy the General Studies L2 requirement.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Music Therapy Major

Students are eligible to apply for the Certification Exam offered by the Certification Board for Music Therapists upon completion of the requirements for graduation.

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 327	Form and Analysis I	3
MTC 422	Musical Acoustics	3
Total		18

Music History. The following music history courses are required:

MHL 341	Music History	3
MHL 342	Music History	3
Total		6

Conducting. One of the following two courses is required:

MUP 209	Beginning Choral Conducting	1
MUP 210	Beginning Instrumental Conducting	1

Music Education. The following music education courses are required:

MUE 211	Music in Recreation	2
MUE 313	Elementary Music Methods	3
MUE 335	Educational Methods for Guitar	1
MUE 336	Educational Methods for Percussion	1
MUE 389	Repertoire for Music Therapy	3
Total		10

Music Therapy. The following music therapy courses are required:

MUE 161	Introduction to Music Therapy	2
MUE 261	Music Therapy as a Behavioral Science	2
MUE 361	Music Therapy Theory and Practice in Psychopathology	3
MUE 362	Music Therapy Techniques	3
MUE 381	Music Therapy Research L2	3
MUE 384	Therapy Preclinical I	1
MUE 385	Therapy Preclinical II	1
MUE 386	Therapy Preclinical III	1
MUE 387	Therapy Preclinical IV	1
MUE 388	Therapy Preclinical V (elective)	1

MUE 441	Psychology of Music	3
MUE 475	Group Process and Music Therapy	1
MUE 476	Internship in Music Therapy	1
Total		23

Major Performing Medium. Six to eight semesters are required in the major performing medium, which must include at least two semester hours of MUP 311 Studio Instruction.

Voice. Two semesters of study in voice are required.

Ensembles. Six semesters of ensemble participation are required with at least four semesters in large groups.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Additional Requirements.

Four semesters of dance (DAN only)		4
BIO 201	Human Anatomy and Physiology I S2	3
PGS 101	Introduction to Psychology SB	3
PGS 466	Abnormal Psychology SB	3
PSY 230	Introduction to Statistics N2 or STP 226 Elements of Statistics N2 (3)	3
SOC 101	Introduction to Sociology SB	3
Total		19

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Theory and Composition Major, Theory Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint	2
MTC 321	Tonal Counterpoint	2
MTC 323	Composition	2-3
MTC 327	Form and Analysis I	3
MTC 422	Musical Acoustics	3

MTC 425	Studies in 20th-Century Theory	3
MTC 428	Form and Analysis II	3
MTC 496	Theory Project	3
Total		33-34

Also required are 10 semester hours of electives in MTC courses at the 300 level or above, to be chosen in consultation with advisor.

Music History. Three semester hours of MHL 341 Music History and three semester hours of MHL 342 Music History are required.

Also required are three upper-division elective semester hours in music history, not to include MHL 447 Music Since 1900.

Conducting. Choose between the two combinations of courses: MUP 209 Beginning Choral Conducting and MUP 339 Choral Conducting or MUP 210 Beginning Instrumental Conducting and MUP 340 Instrumental Conducting.

Applied Music. Twelve semester hours of study in applied music are required, eight of which must be in MUP 111 Studio Instruction.

Ensemble. Eight semesters of participation in an ensemble are required.

Final Project. MTC 496 Theory Project is required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Language. The equivalent of 16 semester hours in one foreign language is required. The choice of language is subject to approval of advisor.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Additional Requirements. MHL 447 Music Since 1900 should be used to satisfy the General Studies L2 requirement.

Theory and Composition Major, Composition Concentration

Music Theory. The following music theory courses are required:

MTC 125	Basic Music Theory	3
MTC 221	Music Theory: 18th Century	3
MTC 222	Music Theory: 19th Century	3
MTC 223	Music Theory: 20th Century	3
MTC 320	Modal Counterpoint	2
MTC 321	Tonal Counterpoint	2
MTC 327	Form and Analysis I	3
MTC 422	Musical Acoustics	3
MTC 425	Studies in 20th-Century Theory	3
MTC 428	Form and Analysis II	3
MTC 429	Canon and Fugue	2
MTC 430	20th Century Counterpoint	2
MTC 432	Instrumentation	2
MTC 433	Orchestration	2
Total		36

Four semesters of MTC 323 Composition are also required, of which at least three must be taken at ASU.

Music History. Three semester hours of MHL 341 Music History and three semester hours of MHL 342 Music History are required.

Also required are three upper-division elective semester hours in music history, not to include MHL 447 Music Since 1900.

Conducting. Choose between the two combinations of courses: MUP 209 Beginning Choral Conducting and MUP 339 Choral Conducting or MUP 210 Beginning Instrumental Conducting and MUP 340 Instrumental Conducting.

Applied Music. Twelve semester hours of study in applied music are required, eight of which must be in MUP 111 Studio Instruction.

Ensemble. Eight semesters of participation in an ensemble are required.

Final Project. MTC 495 Final Project is required.

Recital Attendance. Six semesters of MUP 100 Concert Attendance are required.

Placement Examination. Four semesters of class piano (MUP 131, 132, 231, 232), unless waived by a diagnostic examination at the time of entrance, are required.

Additional Requirements. MHL 447 Music Since 1900 should be used to satisfy the General Studies L2 requirement.

GRADUATE PROGRAMS

The faculty in the School of Music offer graduate programs leading to the following degrees: Master of Arts, Master of Music, and Doctor of Musical Arts. Refer to the "Graduate Degrees" portion of the "College of Fine Arts Degrees, Majors, and Concentrations" table, pages 246–247 for a list of majors and concentration. The Doctor of Education degree in Secondary Education with a concentration in music education is also offered in cooperation with the College of Education. A document on graduate degree programs in music may be obtained by writing to the School of Music. Consult the *Graduate Catalog* for information on all graduate degrees.

MUSIC HISTORY/LITERATURE (MHL)

MHL 142 Music Listening. (1) N

Aural perception of a variety of music traditions, genres, forms, and techniques. Prerequisite: Music major.

MHL 201 MacLiteracy for Musicians. (3) F, S, SS

Instruction in basic Macintosh computer literacy, including generic applications and music-specific programs with hands-on experience. Lecture, lab. *General Studies: N3.*

MHL 341 Music History. (3) F, S

Western music from the Greeks to the present day. Need not be taken in sequence with MHL 342. Prerequisite: MTC 221.

MHL 342 Music History. (3) F, S

See MHL 341. Prerequisite: MTC 221.

MHL 344 Music in World Cultures. (3) F, S

Examination of the relations among music, dance, theatre, religion, and social status in Asia, Africa, Oceania, Europe, and the United States. *General Studies: HU, G.*

MHL 352 The Evolution of Jazz. (3) F 1998

Origin, development, and styles of jazz music and its exponents. Prerequisite: MTC 223. *General Studies: H.*

MHL 438 Music in the Classic Era. (3) F 1998

Development of the classic style of the 18th century; major works of Haydn, Mozart, and Beethoven. Prerequisites: MHL 341, 342; MTC 327. *General Studies: H.*

MHL 439 Music in the 19th Century. (3) F 1999

European art music after Beethoven. Prerequisites: MHL 341, 342; MTC 327. *General Studies: L2, H.*

MHL 441 Music of the Baroque Era. (3) F 1999

Works of major composers and stylistic tendencies of the period. Prerequisites: MHL 341, 342; MTC 327. *General Studies: L2.*

MHL 447 Music Since 1900. (3) F, SS

Survey of the works by major composers and stylistic trends. Prerequisites: MHL 341, 342; MTC 327. *General Studies: L2.*

MHL 456 History of Opera. (3) S 1999

The development of opera from its creation c. 1600 to present. Emphasis placed on major stylistic developments and representative works. Prerequisites: MHL 341, 342; MTC 222.

MHL 466 North American Indian Music. (3) S 1999

Various styles of Indian music in the United States, Canada, and Mexico. Open to Music majors and nonmajors. *General Studies: L2/HU, C.*

MHL 532 Music Bibliography. (3) F

Major historical and analytical writings; systematic and historical collections of music. Reading knowledge of a foreign language recommended.

MHL 535 Medieval Music. (3) S 1999

Music of Europe in the Middle Ages, Gregorian chant, religious, and secular monophony and polyphony to 1400.

MHL 536 Music of the Renaissance. (3) S 2000

Music in Europe, with emphasis on stylistic concepts and changes, c. 1400–1580.

MHL 544 World Music I. (3) F 1999

Music of traditional and folk cultures of Africa, Europe, and the Americas.

MHL 545 World Music II. (3) F 1998

Traditional, folk, and art music of the Pacific, Near East, and Asia.

MHL 547 Topics in American Music. (3) N

Selected topics in the history of music. Composers working in the Americas with emphasis upon music since 1900.

MHL 557 Topics in Symphonic Literature. (3) S 2000

An examination of the evolution of the symphony and symphonic poem from the early classic era through the 19th century, with emphasis on the analysis of selected works.

MHL 566 Area Studies in Ethnomusicology. (3) S 2000

Study of the music of a particular culture, country, or area (e.g., music of Mexico, Latin America, China, Africa). May be repeated for credit.

MHL 568 Introduction to Ethnomusicology. (3) F 1999

Introduction to the theory and methodology of the discipline, including bibliography, fieldwork, transcription, analysis, and organology.

MHL 575 History of Choral Music. (3) F

Major choral works.

MHL 644 Notation of Polyphonic Music. (3) S 2000

Music notation from the 15th through 17th centuries, including problems of transcription into modern notation.

MUSIC THEORY AND COMPOSITION (MTC)

MTC 125 Basic Music Theory. (3) F, S

For music majors. Designed to develop aural and notational skills. Meets daily.

MTC 221 Music Theory: 18th Century. (3) F, S

Music from the 18th century with a view toward developing students' abilities to analyze, theorize, perform, and create examples within the style. Development of related aural, visual, and keyboard skills. Prerequisite: MTC 125.

MTC 222 Music Theory: 19th Century. (3) F, S

Musical compositions chosen from the late 18th and 19th centuries. Harmonic progressions, melodic construction, and rhythmic developments; development of related aural, visual, and keyboard skills. Prerequisite: MTC 221.

MTC 223 Music Theory: 20th Century. (3) F, S

Representative 20th-century compositions with particular emphasis on those elements of melodic, harmonic, and rhythmic treatment which break with past conventions. Development of related aural, visual, and keyboard skills. Prerequisite: MTC 222.

MTC 315 Modern Arranging. (2) F

Techniques in arranging for the contemporary jazz, radio, television, and studio orchestra. Prerequisite: MTC 223.

MTC 316 Modern Arranging. (2) S

Continuation of MTC 315. Prerequisite: MTC 315.

MTC 320 Modal Counterpoint. (2) F

Counterpoint based on 16th-century vocal polyphonic style. Prerequisite: MTC 221.

MTC 321 Tonal Counterpoint. (2) S

Counterpoint based on 18th-century polyphonic style. Prerequisite: MTC 221.

MTC 323 Composition. (2–3) F, S

Writing music compositions, with emphasis on basic techniques and smaller structures. May be repeated for credit. Prerequisite: instructor approval.

MTC 327 Form and Analysis I. (3) F, S

Organizing elements in the most important contrapuntal and homophonic musical forms from the Renaissance through the 19th century. Prerequisite: MTC 222.

MTC 422 Musical Acoustics. (3) F

Properties of sound and tone. Harmonic series, instruments, the ear, auditorium acoustics, and the reproduction of sound. A thorough knowledge of musical notation, intervals, scales, and harmony, or 2 years of music theory is assumed.

MTC 425 Studies in 20th-Century Theory. (3) F

Continued development of analytical techniques and aural skill, with an examination of theoretical systems applicable to 20th-century music. Prerequisite: MTC 223.

MTC 428 Form and Analysis II. (3) S

Organizing principles of the large forms of musical composition in the 19th and 20th centuries. Prerequisite: MTC 327.

MTC 429 Canon and Fugue. (2) F 1999

Writing of canons and fugues in tonal style. Prerequisite: MTC 321.

MTC 430 20th-Century Counterpoint. (2) S 2000

Counterpoint studies utilizing 20th-century idioms. Prerequisite: MTC 223.

MTC 432 Instrumentation. (2) F 1998

Study of the characteristics and performance techniques of individual orchestral instruments. Prerequisite: MTC 223.

MTC 433 Orchestration. (2) S 1999

Theoretical and practical study of scoring music for orchestra. Prerequisite: MTC 432.

MTC 436 Electronic Studio Techniques I.

(2) F

Principles of analog electronic music systems and their application in the composition of electronic music. A thorough knowledge of music notation and intervals is assumed.

MTC 437 Electronic Studio Techniques II.

(2) S

Principles of digital electronic music systems and their applications in the composition of electronic music. Prerequisite: MTC 436.

MTC 440 Jazz Theory and Ear Training. (2) F

Advanced study of jazz harmonic systems. Daily oral drills. Prerequisite: MTC 223.

MTC 441 Jazz Composition. (2) F

Creative writing in the smaller forms and in the idiom of jazz. Prerequisite: MTC 321.

MTC 495 Final Project. (0) F, S

A half recital of compositions or approval of a large scale composition or a research paper.

MTC 496 Theory Project. (3) F, S, SS

Supervised individual writing project dealing with music theory.

MTC 516 Baroque Music. (3) S 2000

Detailed analysis of selected examples from the Baroque period.

MTC 519 Late 19th-/Early 20th-Century Music. (3) F 1999

Detailed analysis of selected examples of music from the late 19th and early 20th centuries.

MTC 520 Analytical Techniques. (3) S, SS Analytical techniques systematically applied to music. Concentration on structural and compositional procedures.

MTC 523 Advanced Composition. (2–3) F, S Advanced music composition, including complex techniques and larger structure. May be repeated for credit. Prerequisite: instructor approval.

MTC 525 Pedagogy of Theory. (3) F 1998

Practices and principles of teaching music theory. Emphasizes most desirable and practical offerings possible. Comparative studies of existing practices.

MTC 527 History of Music Theory. (3) F, S

Theory from Pythagoras to the 16th century. Need not be taken in sequence with MTC 528.

MTC 528 History of Music Theory. (3) F, S

Theory from the 17th century to the present. Need not be taken in sequence with MTC 527.

MTC 555 Computer Music Notation. (2) N

Instruction in preparing score and parts of music compositions using various music-notation software packages. Credit cannot be applied toward the graduate theory requirement. Lecture, lab. Prerequisite: instructor approval.

MTC 647 Directions in New Music. (3) N

Studies in contemporary idioms and aesthetics drawn from recent works of visiting composers; involves analytical discourse, critical writing, and applied concepts in composition. Lecture, discussion, exercise. Prerequisite: instructor approval.

MTC 723 Advanced Composition. (3) F, S Special problems in writing in complex forms and textures. May be repeated for credit. Studio.

MTC 755 Music Composition Technology.

(3) N

Advanced study in digital sampling, synthesis, sequencing, computer-generated sound, and computer/performer interfaces. May be repeated for credit. Lecture, lab. Prerequisites: MTC 436 and 437 or equivalents.

MUSIC EDUCATION (MUE)**MUE 110 Introduction to Music Education.**

(1) S

Overview of music education. Orientation to student characteristics, teacher roles, and foundations of philosophy and history. School observations required.

MUE 161 Introduction to Music Therapy. (2) F

Overview of the profession of music therapy and its applications in mental health, rehabilitation, and special education.

MUE 211 Music in Recreation. (2) F

Materials, methods, and organizational structures appropriate for recreational music.

MUE 261 Music Therapy as a Behavioral Science. (2) F

Orientation to preclinical experience with an emphasis on observation skills, assessment, goal setting, and professional ethics. Required off-campus observations. Prerequisite: MUE 161.

MUE 310 Music in Early Childhood Education. (3) S

Identifying and understanding musical needs of young children. Methods and materials for program development for classroom teachers.

MUE 311 Music for the Classroom Teacher.

(3) F, S

Development of the classroom music program in the elementary school. No previous music experience or course work required. Prerequisite: non-Music major or minor.

MUE 313 Elementary Music Methods. (3) F

Methods of instruction, planning, and presentation of appropriate contents in music. For music educators and music therapists. Prerequisite: Music major.

MUE 315 General Music in the Secondary Schools. (2) F, S

Curriculum, student characteristics, and teaching strategies for general music. Prerequisite: Music major.

MUE 317 Educational Methods for Violin and Viola. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 318 Educational Methods for Cello and String Bass. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 327 Educational Methods for Trumpet and Horn. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 328 Educational Methods for Trombone, Euphonium, and Tuba. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 335 Educational Methods for Guitar.

(1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 336 Educational Methods for Percussion. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 337 Educational Methods for Flute, Clarinet, and Saxophone. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 338 Educational Methods for Double Reed Instruments. (1) F, S

Teaching and playing skills for music teachers. 3 hours per week.

MUE 361 Music Therapy Theory and Practice in Psychopathology. (3) F

Influence of music on behavior; principles and practices of music therapy and psychiatric clients. Prerequisites: MUE 211, 261; Music Therapy major.

MUE 362 Music Therapy Techniques. (3) S

Organization, administration, and use of music in rehabilitation with various client populations. Prerequisites: MUE 361; Music Therapy major.

MUE 381 Music Therapy Research. (3) S

Statistics and research design appropriate for investigations in music therapy. *General Studies: L2.*

MUE 384 Therapy Preclinical I. (1) F, S

Paired students will provide music therapy for small groups at a community agency for mentally retarded, geriatric, or physically disabled clients for a minimum of 10 clock hours. Prerequisites: MUE 211, 261.

MUE 385 Therapy Preclinical II. (1) F, S

Individual placement in ASU Music Therapy Clinic.

MUE 386 Therapy Preclinical III. (1) F, S

See MUE 385.

MUE 387 Therapy Preclinical IV. (1) F, S

Individual clinical work in a community mental health facility.

MUE 388 Therapy Preclinical V. (1) F, S

See MUE 387.

MUE 389 Repertoire for Music Therapy. (3) S

Music skills repertoire for music therapy, including units on brass, strings, woodwinds, electronic instruments, computer music, and improvisation techniques. Lab. Prerequisites: MUE 211; Music Therapy major.

MUE 441 Psychology of Music. (3) S

Psychological and physiological aspects of music emphasizing musical behavior, function, perception, and learning. Prerequisites: junior standing; Music Therapy major (or instructor approval).

MUE 475 Group Process and Music Therapy. (1) F

Principles of group process, verbal counseling, professional writing, as related to music therapy practice. Prerequisites: MUE 362; Music Therapy major.

MUE 476 Internship in Music Therapy. (1) F, S

A full-time, 6-month, off-campus residency in an approved clinical institution.

MUE 480 Choral Methods. (3) S

Methods of instruction, organization, and presentation of appropriate content in choral music classes. Prerequisite: Secondary Education major.

MUE 481 Instrumental Practicum/Methods. (5) F

Instrumental music as a means of developing music skills, understandings, and attitudes in elementary and secondary school students. Prerequisite: Secondary Education major.

MUE 482 Instrumental Practicum/Methods. (5) S

See MUE 481. Prerequisites: MUE 481 (or 485); Secondary Education major.

MUE 485 String Practicum/Methods. (2) F

For students preparing to administer a string program and teach strings at the elementary level. Lecture, lab.

MUE 548 Introduction to Research in Music Education. (3) F, SS

Survey of research methods and literature in music education. Focus on interpretation and evaluation.

MUE 549 Foundations of Music Education. (3) A

A treatment of historical perspectives, philosophy-aesthetics identified with music education, and learning theories applied to music teaching/learning. Basic research and writing skills appropriate to graduate studies in music education.

MUE 550 Studies in Music Curricula. (3) A
Scope and sequence of musical experiences. Development of criteria for the evaluation of music curricula.

MUE 551 Advanced Studies in Elementary School Music. (3) A

For experienced teachers; organization and content of the general music classes in kindergarten and the first 6 grades of elementary school. Emphasis on teaching music reading and ear training to young children.

MUE 552 General Music, Music Theory, and Music History Classes in the Junior and Senior High School. (3) A

Organization and content of school music classes which are not performance oriented.

MUE 553 Contemporary Elementary Music. (3) N

Identification and development of materials and techniques for teaching special units of music study to elementary (K-8) children.

MUE 564 Instrumental Music, Advanced Rehearsal Techniques. (3) A

An in-depth analysis of instrumental techniques in preparation for a thorough discussion of band tuning problems and solutions. Discussion of productive conducting and rehearsal techniques for school music teachers.

MUE 566 Instrumental Literature for Schools. (3) A

Comprehensive study and analysis of all types of instrumental music.

MUE 568 Choral Music, Advanced Rehearsal Techniques. (3) A

Musical and vocal techniques necessary for presentation of choral literature. Analysis and experimentation with psychological, acoustical, and other problems of rehearsal and performance.

MUE 570 Choral Literature for Schools. (3) A

Comprehensive study and analysis of choral music for the high school with special emphasis on octavo literature.

MUE 579 Psychology of Music. (3) A

The nature of musicality and its evaluation. A review of recent research.

MUE 585 Vocal Acoustics and Production. (3) A

An in-depth approach to the psychological/physiological workings of the vocal mechanism.

MUE 733 Contemporary Issues and Research in Music Education. (3) A

Emphasis upon recent research relating to music instruction at all levels; current and historical issues in choral, general, and instrumental music.

MUE 744 Higher Education Instruction. (3) A

Philosophical and psychological principles of college/university teaching. Patterns of music teacher education and a projection of course outlines.

MUE 755 Philosophy and Aesthetics in Music Education. (3) SS

Philosophy and aesthetics as they influence curriculum content and teaching procedures.

MUSIC PERFORMANCE (MUP)**MUP 100 Concert Attendance.** (0) F, S

Required of all music majors for 6 semesters in each degree program, with a minimum of 4 convocations attended each semester.

MUP 111 Studio Instruction. (2) F, S

For majors in Music degree program. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1 hour plus studio class weekly. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 121 Studio Instruction. (1) F, S, SS

For secondary or minor instrument instruction and nonmajors in the university. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1/2 hour per week. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 127 Studio Instruction. (4) F, S

For Performance majors in Bachelor of and Master of Music degree programs only. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1 hour plus studio class weekly. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 130 Beginning Group Piano. (1) F, S

Provides a basic introduction to playing piano through music reading, chords, rhythmic, and written activities. Prerequisite: non-Music major.

MUP 131 Class Piano. (1) F, S

A four-semester sequence (with MUP 132, 231, and 232) designed for those with little or no piano experience. Emphasis on keyboard technique, sight reading, simple accompaniments, and improvisation. 2 hours per week. May not be taken for audit. Prerequisite: Music major.

MUP 132 Class Piano. (1) S

See MUP 131.

MUP 133 Class Voice. (1) F, S

A four-semester sequence (MUP 134, 233, and 234) open to all students. 2 hours per week. May not be taken for audit.

MUP 134 Class Voice. (1) F, S

See MUP 133. Prerequisite: MUP 133 or instructor approval.

MUP 141 Jazz Fundamentals. (1) F

Principles, methods, and theory of jazz performance, especially designed for the small jazz ensemble. 2 hours per week.

MUP 142 Jazz Fundamentals. (1) S

Continuation of MUP 141. 2 hours per week.

MUP 209 Beginning Choral Conducting. (1) F, S

Essentials of choral conducting techniques. 2 hours per week.

MUP 210 Beginning Instrumental Conducting. (1) S

Essentials of instrumental conducting techniques. 2 hours per week.

MUP 217 Improvisation Workshop. (2) F, S

Emphasis on basic jazz literature, chord symbol reading, melodic patterns, ear training, melodic concepts, and analysis of improvised solos. Must be taken in sequence with MUP 218. May not be taken for audit. Prerequisites: MTC 125; MUP 111 (1 semester).

MUP 218 Improvisation Workshop. (2) F, S
Continuation of MUP 217. Prerequisite: MUP 217.

MUP 231 Class Piano. (1) F

See MUP 131.

MUP 232 Class Piano. (1) S

See MUP 131.

MUP 233 Class Voice. (1) F, S

See MUP 133. Prerequisite: MUP 134 or instructor approval.

MUP 234 Class Voice. (1) F, S

See MUP 133. Prerequisite: MUP 233 or instructor approval.

MUP 235 Jazz Piano. (1) F

A 2-semester sequence (with MUP 236) designed for jazz keyboard experience. Emphasis is on chord symbol reading, simple improvisation, and voicing. 2 hours per week. Prerequisite: MUP 132.

MUP 236 Jazz Piano. (1) S

See MUP 235. Prerequisite: MUP 132.

MUP 250 Diction for Singers. (1) F, S

Use of phonetics in the study of song and opera literature. Language emphasis differs each semester. May be repeated for credit.

MUP 301 Advanced Class Piano. (1) F

Required for Choral-General music majors. Open to other music majors who have completed MUP 232. Emphasis on accompaniments, ensemble playing, score reading, advanced harmonizations, repertoire, technique, and improvisation. 2 hours per week. May not be taken for audit. Prerequisites: MUP 232 (or proficiency); placement examination.

MUP 302 Advanced Class Piano. (1) S
Required for Choral-General majors. Open to other music majors who have completed MUP 301. A sequential continuation of MUP 301 skills that include both group and studio instruction. 2 hours per week. May not be taken for audit. Prerequisites: MUP 301 (or proficiency); placement examination.

MUP 311 Studio Instruction. (2) F, S
See MUP 111.

MUP 319 Recording Studio Techniques. (2) S
Study of both analog and digital recording methods. Lab time on recording console and tape machines is included. Lab.

MUP 320 MIDI Workshop. (2) F
Presentation of hardware and software applications for sequencing and music printing. Lab.

MUP 321 Studio Instruction. (1) F, S, S
See MUP 121.

MUP 327 Studio Instruction. (4) F, S
See MUP 127.

MUP 337 Studio Instruction: Piano Accompanying. (2) S
Lessons for Performance majors with a concentration in piano accompanying only. Repertoire to be selected from vocal and instrumental literature. 1 hour lesson per week. May be repeated for credit. Prerequisite: placement examination.

MUP 339 Choral Conducting. (2) F, S
Elements of choral conducting technique and interpretation. 3 hours per week. Prerequisite: MUP 209.

MUP 340 Instrumental Conducting. (2) F
Fundamentals of score reading and interpretation of instrumental music. 3 hours per week. Prerequisite: MUP 210.

MUP 344 Chamber Orchestra. (1) F, S
Important masterpieces from all periods of music are performed throughout the year. Membership by audition. May be repeated for credit.

MUP 345 Symphony Orchestra. (1) F, S
Open to all students who can qualify on the basis of auditions with the director. Over a 4-year period, the student is introduced to the masterpieces of symphony orchestra literature. 3 times per week. May be repeated for credit.

MUP 350 Choral Union. (1) F, S
Open to all students in the university and to interested singers in the community by audition. Preparation and performance of the larger choral works. 2 hours per week. May be repeated for credit.

MUP 352 Concert Choir. (1) F, S
4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 353 University Choir. (1) F, S
4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 355 Men's Chorus. (1) F, S
Open to all male students in the university who can qualify on the basis of auditions. Rehearsal and performance of music for male voices. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 357 Women's Chorus. (1) F, S
2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 361 Marching and Concert Bands. (1) F, S
Open to all students who can qualify on the basis of auditions with the director. Staging of formations and drills for football games and other events (fall); masterpieces of symphonic band literature (spring). Meets daily. May be repeated for credit.

MUP 370 Music Theatre: Techniques. (1) F, S
Exercises and improvisations for the singer/actor emphasizing body awareness, basic music theater performance skills, and freedom of the vocal and breath mechanisms. Section 1 (Movement for Singers); Section 2 (Expression); Section 3 (Interpretation); Section 4 (Advanced Expression); Section 5 (Advanced Interpretation). Sections 2 through 5 must be taken in sequence. Each section: 3 hours per week. May be repeated for credit.

MUP 371 Music Theatre: Workshops. (1) F, S
Development of specific skills for musical-dramatic interpretation. Section 1 (Aria Preparation); Section 2 (Broadway I); Section 3 (Broadway II). Each section: 1 hour lecture, demonstration, 1 lab per week. May be repeated for credit.

MUP 372 Music Theatre: Orchestras. (1) F, S
Open to all students who can qualify on the basis of auditions with the instructor. Participation in Lyric Opera Theatre productions. Section 1 (Orchestra); Section 2 (Chamber Orchestra); Section 3 (Chamber Ensemble). May be repeated for credit. Prerequisite: instructor approval.

MUP 373 Music Theatre: Performance. (1) F, S
Open to all students who can qualify on the basis of auditions with the instructor. Participation in Lyric Opera Theatre productions. Section 1 (Principal Roles); Section 2 (Chorus). May be repeated for credit. Prerequisite: instructor approval.

MUP 374 Music Theatre: Production. (1) F, S
Participation in Lyric Opera Theatre productions. Section 1 (Vocal Performance); Section 2 (Technical Music Theatre); Section 3 (Problems in Production) to be taken concurrently with MUP 373, Section 2. May be repeated for credit.

MUP 379 Chamber Music Ensembles. (1) F, S
Brass, guitar, keyboard, mixed, percussion, string, vocal, and woodwinds ensembles. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 382 Collegium Musicum. (1) F, S
Singers and instrumentalists specializing in the performance of early and unusual music. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 383 New Music Ensemble. (1) F, S
Rehearsal and performance of music written in the last 20 years. May be repeated for credit. Prerequisite: instructor approval.

MUP 384 Brass Choir. (1) F, S
Specializing in public performance of music written for brass instruments. 3 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 385 Percussion Ensemble. (1) F, S
Rehearsal and performance of standard and original repertoire for the percussion ensemble and related instruments. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 386 Stage Band. (1) F, S
Rehearsal and performance of literature for the stage band. 4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 387 Ethnomusicology Ensembles. (1) F, S
Performance learning experience for the music of various cultures of the world. May be repeated for credit. Prerequisite: knowledge of instrument or instructor approval.

MUP 388 Piano Accompanying. (1) F, S
Accompanying majors (others at the discretion of instructor). Piano accompaniments found in vocal and instrumental literature; discussion of styles and performance practices; experience in public performance. 2 hours per week. May be repeated for credit.

MUP 417 Advanced Improvisation. (2) F, S
Emphasis on analysis and performance of advanced jazz literature; composition in contemporary styles. Must be taken in sequence with MUP 418. May not be taken for audit. Prerequisite: MUP 218.

MUP 418 Advanced Improvisation. (2) F, S
Continuation of MUP 417. Prerequisite: MUP 417.

MUP 440 Keyboard Harmony. (1) F
Performance-oriented class emphasizing chord progressions, harmonization, figured bass realization, stylistic improvisation, transposition, open score reading, and sight reading. Prerequisite: Performance major with a concentration in keyboard or instructor approval.

MUP 451 Repertoire. (2) F, S
Literature available for performance in all performing media. May be repeated for credit. Prerequisite: junior standing in major performance field.

MUP 453 Song Literature. (2) A
American, Russian, Spanish, Scandinavian, and contemporary song.

MUP 454 Song Literature. (2) A
Early Italian, English, German, and French art song.

MUP 481 Performance Pedagogy and Materials. (2) N
Principles and methods of performance techniques for each performance field. May be repeated for credit. Prerequisite: senior standing or instructor approval.

MUP 482 Piano Pedagogy II. (2) N
Continuation of MUP 481 (Piano). Problems and techniques of teaching intermediate to advanced piano students. Prerequisites: junior standing as piano major; instructor approval.

MUP 487 Piano Accompanying. (1) F

Keyboard majors. Piano accompaniments found in vocal and instrumental literature; discussion of styles and performance practices; experience in public performance. 2 hours per week. May be repeated for credit. May not be taken for audit.

MUP 495 Solo Performance. (0) F, S

For candidates of a Bachelor of Music degree in Performance in which 1/2 recital is a graduation requirement.

MUP 496 Solo Performance. (0) F, S

For candidates of a Bachelor of Music degree in Performance in which a full recital is a graduation requirement. Prerequisite: MUP 495.

MUP 507 Group Piano Practicum. (2) F

Curricula, materials, and teaching techniques for group teaching at the university and community college levels. Observation/supervised teaching in group piano.

MUP 508 Studio Observation. (1) F, S

Weekly observation of studio teaching by various piano faculty. Paper as final requirement. Prerequisite: M.M. performance/pedagogy piano student.

MUP 511 Studio Instruction. (2) F, S

For majors in Music degree program. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1 hour plus studio class weekly. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 521 Studio Instruction. (1) F, S, SS

For secondary or minor instrument instruction and nonmajors in the university. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1/2 hour per week. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 527 Studio Instruction. (2 or 4) F, S

For Performance majors in Master of Music degree program only. Bassoon, cello, clarinet, contrabass, cornet, euphonium, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice. Minimum contact of 1/2 hour per week. May be repeated for credit. May not be taken for audit. Prerequisites: placement examination and audition.

MUP 540 Advanced Conducting. (3) F

Score preparation and conducting techniques for instrumental music. Concentration on study of historical styles. Required of D.M.A. students in Instrumental Music.

MUP 541 The Art Song. (3) N

Solo song from its beginning to the present day.

MUP 544 Chamber Orchestra. (1) F, S

Important masterpieces from all periods of music will be performed throughout the year. May be repeated for credit. Prerequisite: instructor approval.

MUP 545 Symphony Orchestra. (1) F, S

Open on the basis of audition with the director. Masterpieces of symphony orchestra literature. Three times per week. May be repeated for credit.

MUP 550 Choral Union. (1) F, S

Open to all students in the university and to interested singers in the community by audition. Preparation and performance of the larger choral works. 2 hours per week. May be repeated for credit.

MUP 551 Repertoire. (2) N

Literature available for performance in all performing media. May be repeated for credit.

MUP 552 Concert Choir. (1) F, S

4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 553 University Choir. (1) F, S

4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 555 Men's Chorus. (1) F, S

Open to male students in the university who can qualify on the basis of audition. Rehearsal and performance of music for male voices. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 557 Women's Chorus. (1) F, S

2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 561 Marching and Concert Bands. (1) F, S

Open by audition only. Staging of formations and drills for football games and other events (fall); masterpieces of symphonic band literature (spring). Meets daily. May be repeated for credit.

MUP 570 Music Theatre: Techniques. (1) F, S

Exercises and improvisations for the singing actor emphasizing body awareness, isolations, and freedom of the vocal and breath mechanisms. Section 1 (Interpretation); Section 2 (Expression); Section 3 (Movement for Singers). Each Section: 3 hours per week. May be repeated for credit.

MUP 571 Music Theatre: Workshops. (1) F, S

Development of specific skills for the musical-dramatic interpretation. Section 1 (Role Preparation); Section 2 (Styles); Section 3 (Opera Scenes); Section 4 (Musical Comedy); Section 5 (Revue Ensembles). Each section: 1 hour lecture, demonstration, 1 lab per week. May be repeated for credit.

MUP 572 Music Theatre: Orchestras. (1) F, S

Open to all students who can qualify on the basis of auditions with the instructor. Participation in Lyric Opera Theatre productions. Section 1 (Orchestra); Section 2 (Chamber Orchestra); Section 3 (Chamber Ensemble). May be repeated for credit. Prerequisite: instructor approval.

MUP 573 Music Theatre: Performance. (1) F, S

Open to all students who can qualify on the basis of auditions with the instructor. Participation in Lyric Opera Theatre productions. Section 1 (Principal Roles); Section 2 (Chorus). May be repeated for credit. Prerequisite: instructor approval.

MUP 574 Music Theatre: Production. (1) F, S

Participation in Lyric Opera Theatre productions. Section 1 (Vocal Performance); Section 2 (Technical Music Theatre); Section 3 (Problems in Production) to be taken concurrently with MUP 373, Section 2. May be repeated for credit.

MUP 579 Chamber Music Ensembles. (1) F, S

String, brass, woodwind, percussion, keyboard, vocal, and mixed ensembles. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 581 Performance Pedagogy and Materials. (2) N

Principles and methods of performance techniques for each performance field. May be repeated for credit.

MUP 582 Collegium Musicum. (1) F, S

Singers and instrumentalists specializing in the performance of early and unusual music. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 583 New Music Ensemble. (1) F, S

Rehearsal and performance of music written in the last 20 years. May be repeated for credit. Prerequisite: instructor approval.

MUP 584 Brass Choir. (1) F, S

Public performance of music written for brass instruments. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 585 Percussion Ensemble. (1) F, S

Rehearsal and performance of standard and original repertoire for the percussion ensemble and related instruments. 2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 586 Stage Band. (1) F, S

Rehearsal and performance of literature for the stage band. 4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 587 Ethnomusicology Ensembles. (1) F, S

Performance learning experience for the music of various cultures of the world. May be repeated for credit. Prerequisite: knowledge of instrument or instructor approval.

MUP 588 Piano Accompanying. (1) F, S

Performance majors with a concentration in piano accompanying (others at the discretion of the instructor). Piano accompaniments found in vocal and instrumental literature; discussion of styles and performance practices; experience in public performance. 2 hours per week. May be repeated for credit.

MUP 595 Solo Performance. (1) F, S

For Master of Music candidates in applied music only. May be full recital, major operatic role, solo performance with orchestra, ensemble, or lecture recital.

MUP 596 Solo Performance. (1) F, S

See MUP 595.

MUP 727 Studio Instruction. (2 or 4) F, S

For D.M.A. candidates only. Minimum contact of 1 hour per week. May be repeated for credit.

MUP 796 Solo Performance. (1–5) F, S
For D.M.A. candidates only. May be repeated for credit.

MUSIC (MUS)

MUS 100 Fundamentals of Music Notation. (3) F, S, SS
Provides non-Music majors with sufficient symbol literacy to begin work in the field of musical learning. Credit not applicable toward any Music degree.

MUS 340 Survey of Music History. (3) F, S, SS
Major composers, compositions, and periods in the history of music. Credit not applicable toward any Music degree. *General Studies: HU, H.*

MUS 347 Jazz in America. (3) F, S, SS
Current practices employed by contemporary jazz musicians; the historical development of jazz techniques. Credit not applicable toward any Music degree. *General Studies: HU.*

MUS 353 Survey of Afro-American Music. (3) A
Afro-American music traced from its origins in Africa to the present with emphasis on spiritual, blues, jazz, gospel, and classical styles. Credit not applicable toward any Music degree. *General Studies: HU.*

MUS 354 Popular Music. (3) A
Emphasis on historical, cultural, and performance patterns in a variety of popular idioms such as, but not limited to, rock, folk, jazz, and Afro-American music. May be repeated for credit. Credit not applicable toward any Music degree. *General Studies: HU.*

MUS 355 Survey of American Music. (3) F, S, SS
Growth and development of American music. Credit not applicable toward any Music degree. *General Studies: HU, H.*

MUS 356 Survey of the Musical Theatre. (3) A
Music's place in the theatre, viewed in terms of historical importance and relative function. Credit not applicable toward any Music degree. *General Studies: HU.*

MUS 363 Survey of Russian Music. (3) F 1999
Examines music and musical life in Russia and the Soviet Union from the Middle Ages to the present. Lecture, discussion. Credit not applicable toward any Music degree.

Department of Theatre

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www.asu.edu/cfa/theatre

PROFESSORS

BARKER, BARTZ, BEDARD, ECKARD,
KNAPP, MASON, SALDAÑA,
THOMSON, J. WILLS

ASSOCIATE PROFESSORS

ACKER, EDWARDS, ENGEL,
HOLLOWAY, RISKE, SAKREN, VINING

ASSISTANT PROFESSORS

REYES, THOMSEN

FINE ARTS SPECIALIST

SCHNEIDER

SENIOR LECTURERS

HILL, B. WILLS

LECTURER

IRVINE

The Department of Theatre is a member of the National Association of Schools of Theatre, and the requirements set forth in this catalog are in accordance with the published regulations of the association. For advising purposes, all students registering in a Theatre degree program enroll through the College of Fine Arts. Special advising check sheets, providing complete information regarding requirements and suggested electives, are available in the Department of Theatre office for each degree program and area of concentration.

PRE-BACHELOR OF ARTS THEATRE PROGRAM

Freshman and sophomores who meet university and departmental standards are admitted to the Pre-Bachelor of Arts Theatre program. Students are required to submit a letter of intent stating area of interest before being admitted to the Pre-B.A. Theater program.

Students must receive a grade of “C” or higher in all major courses and a 2.50 cumulative GPA during their first semester to continue in the pre-B.A. Theater program. Students failing to meet these requirements will have one semester of departmental probation to receive a “C” or higher in major courses and raise their cumulative GPA to 2.50. Students failing to meet the above requirements by the end of the first year (two semesters) will be asked to seek advisement regarding other majors.

MAJOR REQUIREMENTS

The major in Theatre consists of 54 semester hours. Specific requirements are listed below for each area of concentration. The following core of courses is required of all B.A. degree candidates:

THE	220	Principles of Dramatic Analysis <i>LI</i>	3
THE	225	Orientation to Theatre	1
THE	320	History of the Theatre I <i>HU, H</i>	3
THE	321	History of the Theatre II <i>HU, H</i>	3
THE	322	History of the Theatre III <i>HU, H</i>	3
THP	102	Beginning Acting	3
THP	200	Theatre Workshop	1
THP	213	Introduction to Technical Theatre	3
THP	301	Theatre Production	2
		(one semester hour in two different production options)	
THP	315	Fundamentals of Directing	3
Total		.....	25

Two of the following three courses (six semester hours) are required:

THP	330	Introduction to Costuming	3
THP	340	Scene Design	3
THP	345	Lighting Design	3

Within the major (including related-area studies considered part of the major), only courses with a grade of “C” or higher may be applied toward graduation.

Stan Weightman and Joel Maurice do battle in the Department of Theatre's production of “Les Liaisons Dangereuses.” ASU Department of Theatre photo

Before the junior year, students are evaluated on an audition, portfolio review, or written critical/historical essay, depending on the area of interest. Based on this evaluation, students may enter an emphasis area or remain in the general B.A. degree program.

Students may be accepted in an emphasis chosen from the following: acting, design/technical theatre, directing/stage management, and history/theory and criticism.

Additional elective courses in General Studies and theatre are selected with an advisor to meet the total 120 semester hours required for the degree.

B.A. DEGREE

Students who wish to be considered for an emphasis are required to interview, submit a portfolio, or audition in order to be admitted. The interview or audition is conducted during the semester that students reach 55 semester hours and upon completion of the required core of lower-division theatre courses. See the section on each emphasis for a list of specific courses.

Students who transfer 55 semester hours or more are required to audition or interview before or during their first semester to be admitted to the B.A. degree in Theatre program in one of the areas of emphasis. Students may be admitted on a provisional basis to an area of emphasis for one semester, at which time they must audition or interview again. Admission and retention in all theatre areas of emphasis require a 2.50 GPA in theatre courses and a 2.00 cumulative GPA.

Electives. After satisfying all other requirements, remaining electives to total a minimum of 54 semester hours may be chosen with advisor approval from the list of approved General Studies courses or any courses in the College of Fine Arts. Lower-division courses in a foreign language may also be used as electives. See pages 247–248 for approved areas of study and the distribution of semester hours as required by the College of Fine Arts.

Areas of Emphasis. The requirements for each area of emphasis follow.

Acting

Admission is by audition at the end of the sophomore year and with the completion of the following required theatre performance courses in addition to the core:

THP	272	Introduction to Stage Movement	3
THP	277	Introduction to Stage Speech	3
THP	285	Acting: Beginning Scene Study	3
		or THP 207 Introduction to Acting: The Creative Imagination (3)	
THP	370	Intermediate Voice and Movement for the Stage	2
THP	377	Stage Speech	2
THP	385	Acting: Intermediate Scene Study	3
THP	472	Advanced Movement for the Stage	3
THP	477	Advanced Voice for the Stage	3
THP	485	Acting: Advanced Classical Scene Study	3
Total			25

In addition, students intending to audition for the acting emphasis are strongly encouraged to take THP 113 Techniques of Theatrical Makeup (three semester hours).

Students admitted to the acting emphasis are required to audition for designated subscription series productions.

Design/Technical Theatre

Students are admitted to the design/technical theatre emphasis after the submission of a portfolio at the end of the sophomore year and with the completion of the following required theatre core courses:

THE	220	Principles of Dramatic Analysis <i>L1</i>	3
THE	225	Orientation to Theatre	1
THP	101	Introduction to the Art of Acting	3
		or THP 102 Beginning Acting (3)	
THP	213	Introduction to Technical Theatre	3
Total			10

One of the following courses, which must be the course not selected as part of the core, is required:

THP	330	Introduction to Costuming	3
THP	340	Scene Design	3
THP	345	Lighting Design	3

Three additional semester hours of THP 301 Theatre Production (one hour each in carpentry, stitching, and electronics) are required as well as THP 401 Theatre Practicum (two semester hours) and THP 442 Drawing.

Also required are 14 semester hours selected from the following courses:

THE	430	History of Costume: Western Tradition	3
THP	317	Stage Management	3
THP	331	Costume Construction	3
THP	350	Sound Design	3
THP	401	Theatre Practicum	1–3
THP	406	Scenography	3
THP	430	Costume Design	3
THP	431	Advanced Costume Construction	3
THP	435	Advanced Technical Theatre	3
THP	440	Advanced Scene Design	3
THP	441	Scene Painting	3
THP	444	Drafting for the Stage	3
THP	445	Advanced Lighting Design	3
THP	494	Special Topics	1–4
THP	498	Pro-Seminar	1–6

Assignments on ASU Theatre productions in various technical and design support areas provide practical training. Students who demonstrate consistent interest and abilities are typically awarded a final design or technical direction project of a fully mounted Lyceum production.

Directing/Stage Management

Students are admitted to the directing and stage management emphasis after having an interview, receiving a grade of “B” or higher in THP 315 Fundamentals of Directing (or its equivalent), and completing the following required lower-division theatre core courses:

THE	220	Principles of Dramatic Analysis <i>L1</i>	3
THE	225	Orientation to Theatre	1
THP	102	Beginning Acting	3
THP	213	Introduction to Technical Theatre	3
Total			10

The following courses are also required:

THP	285	Acting: Beginning Scene Study	3
THP	317	Stage Management	3
THP	419	Preproduction Workshop: Director/Designer Collaboration	3
Total			9

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 87–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Also required is the introductory design course not selected as part of the theatre core: THP 330 Introduction to Costuming, or THP 340 Scene Design, or THP 345 Lighting Design.

In addition, 12 semester hours selected with advisor approval from the following courses are required:

THE 424	Trends in Theatre for Youth	3
THP 272	Introduction to Stage Movement	3
THP 277	Introduction to Stage Speech	3
THP 301	Theatre Production	1-4
THP 385	Acting: Intermediate Scene Study	2
THP 401	Theatre Production	1-3
THP 414	Directing: The Production Concept	2
THP 415	Directing the Actor	3
THP 450	Theatre Organization and Management	3
THP 484	Internship	1-4
THP 498	Pro-Seminar (Directing, Stage Management, Theatre in Education, Theatre for Youth Tour)	1-6

Exceptional students may be admitted to the directing and stage management emphasis on a provisional basis if they have not taken THP 315 Fundamentals of Directing (or its equivalent). Special application to the department is required.

In addition to the above emphasis area courses, advisor approval is required for General Studies and elective courses. Students are encouraged to apply for directing/stage management assignments in the scholarship series.

History/Theory and Criticism

Students are admitted to the history/theory and criticism emphasis after having an interview, submitting a written critical or historical essay at the end of the sophomore year, and completing the following required lower-division theatre core courses:

THE 220	Principles of Dramatic Analysis <i>LI</i>	3
THE 225	Orientation to Theatre	1
THP 102	Beginning Acting	3
THP 213	Introduction to Technical Theatre	3
Total	.....	10

Two of the following three courses are required:

THE 420	History of the American Theatre <i>HU, H</i>	3
THE 421	History of the English Theatre <i>L2/HU</i>	3

THE 425	History of Asian Theatre <i>L2/HU</i>	3
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Also required are six semester hours of upper-division dramatic literature in theatre, English, or a foreign language and three semester hours of playwriting (THP 294 Special Topics or 460 Playwrights Workshop). Six semester hours selected from the following courses are required:

ENG 360	History of Film <i>HU</i>	4
ENG 361	Silent Film <i>HU</i>	4
ENG 362	Sound Film Genres <i>HU</i>	4
THE 401	Focus on Multiethnic Film <i>HU, C</i>	3
THP 414	Directing: The Production Concept	2
THP 415	Directing the Actor	3
THP 419	Preproduction Workshop: Director/Designer Collaboration	3

THP 498 Senior Project is also required.

GRADUATION REQUIREMENTS

In addition to fulfilling the major requirements, students must meet all university graduation requirements. See pages 79-83.

BACHELOR OF FINE ARTS DEGREE

Theatre Education

For students seeking secondary school certification by the State of Arizona, the B.F.A. degree offers a teacher certification track. This track certifies a teacher for the instruction of theatre to students in grades 7-12 (and an endorsement for K-12 "dramatic arts") in the Arizona public schools. Although the B.F.A. theatre education student is officially enrolled in the College of Fine Arts, all professional education courses and recommendation for certification are provided by the College of Education Professional Teacher Preparation Program (PTPP).

A minor teaching field of 24 to 30 semester hours in such areas as English or communication is not required for the degree but is highly recommended. The minor teaching field's department specifies which courses can be applied toward the minor teaching field. The Arizona Department of Education mandates the minimum number of semester hours required for major areas, approved areas, and endorsements in certification.

The following theatre courses are required:

THE 220	Principles of Dramatic Analysis <i>LI</i>	3
THE 225	Orientation to Theatre	1
THE 320	History of the Theatre <i>HU, H</i>	3
THE 321	History of the Theatre <i>HU, H</i>	3
THP 102	Beginning Acting	3
THP 185	Acting: Beginning Scene Study	3
THP 213	Introduction to Technical Theatre	3
THP 272	Introduction to Stage Movement	3
THP 277	Introduction to Stage Speech	3
THP 301	Theatre Production	2
THP 315	Fundamentals of Directing	3
THP 330	Introduction to Costuming	3
THP 345	Lighting Design	3
THP 414	Directing: The Production Concept	2
Total	.....	38

The following theatre education courses are required for the theatre education concentration:

THE 325	Play Reading	1
THE 480	Methods of Teaching Theatre	4
THP 311	Improvisation with Youth	3
THP 411	Methods of Teaching Drama	3
THP 481	Secondary School Play Production	3
Total	.....	14

Students are strongly encouraged to voluntarily enroll in additional course work in the practice in the art of theatre. Recommended courses include:

THE 322	History of Theatre <i>HU, H</i>	3
THP 113	Techniques of Theatrical Makeup	3
THP 340	Scene Design	3
THP 415	Directing the Actor	3

The PTPP, in cooperation with the theatre education coordinator, establishes professional education course work.

Application and Admission. After being formally accepted into the Department of Theatre, a student must meet with the theatre education coordinator to discuss application procedures for the B.F.A. degree in Theatre with a concentration in theatre education.

Acceptance into the program is by interview only. The student must meet with the theatre education faculty to discuss career goals and interests in teaching. The student should also provide a letter of intent and at least two letters of recommendation from ASU

Department of Theatre faculty or other former teachers or employers. If distance prohibits coming to campus, the student may be admitted into the program upon submission of three letters of recommendation and a letter of interest to the theatre education faculty.

Application is normally made at the beginning of the sophomore year; applications for early admission of ASU freshmen are accepted toward the end of the second semester of full-time study. Strict deadlines are set for application to the PTPP. Students who express an interest in the theatre education concentration are advised to apply no later than the beginning of the sophomore year. The student is also required to meet admission standards mandated by the PTPP and the Arizona Department of Education for teacher certification (see page 167).

Although the Department of Theatre may admit a student into the program, the College of Education may reject a student's application for admission into the PTPP, thus removing a student from the B.F.A. degree program. Appeal and reapplication procedures are established by the PTPP.

For retention in the program, a GPA of 3.00 in the major and an overall GPA of 2.50 are required. Retention standards established by the PTPP must also be maintained for students in the teacher certification track.

DEPARTMENTAL MINOR

The department offers a minor in Theatre consisting of 22 semester hours of course work. The following courses are required:

THE	100	Introduction to Theatre	HU	.....	3
THP	101	Introduction to the Art of Acting	.....	3	
THP	213	Introduction to Technical Theatre	.....	3	
THP	301	Theatre Production	.....	1	
Total	.....				10

Two of the following three courses are also required:

THE	320	History of the Theatre I	HU, H	.....	3
THE	321	History of the Theatre II	HU, H	.....	3
THE	322	History of the Theatre III	HU, H	.....	3

Also required are two three-hour courses in the same area of emphasis. Contact the department for area options and course requirements.

Courses ordinarily limited to majors only are available to minors on a second-priority basis; that is, minors may not preregister for these courses, but are allowed to register after all majors' needs have been met. All prerequisites for the minor courses must be met (see course listings).

Departmental Academic Specialization

Elementary Education. Students pursuing the Bachelor of Arts in Education degree in Elementary Education may select theatre as an academic specialization, consisting of 18 semester hours from the following courses:

THE	100	Introduction to Theatre	HU	... 3
THE	424	Trends in Theatre for Youth	.....	3
THP	101	Introduction to the Art of Acting	.....	3
THP	213	Introduction to Technical Theatre	.....	3
THP	311	Improvisation with Youth	.....	3
THP	312	Puppetry with Children	.....	3
THP	315	Fundamentals of Directing	....	3
THP	330	Introduction to Costuming	.....	3

THP 411 Methods of Teaching Drama (3) is required.

Secondary Education. Students pursuing the B.A. in Education degree in Secondary Education may select theatre as a second teaching field. The second teaching field consists of 30 semester hours including the following courses:

THE	220	Principles of Dramatic Analysis	L1	.....	3
THE	325	Play Reading	.....	1	
THE	480	Methods of Teaching Theatre	.....	4	
THP	101	Introduction to the Art of Acting	.....	3	
THP	213	Introduction to Technical Theatre	.....	3	
THP	301	Theatre Production	.....	1	
THP	311	Improvisation with Youth	....	3	
THP	315	Fundamentals of Directing	....	3	
THP	481	Secondary School Play Production	.....	3	
Total	.....				24

Two of the following three courses are also required:

THP	330	Introduction to Costuming	.....	3
THP	345	Lighting Design	.....	3
THP	411	Methods of Teaching Drama	.....	3

GRADUATE PROGRAMS

The faculty in the Department of Theatre offer programs leading to the M.A. degree in Theatre; the Master of Fine Arts degree in Theatre with concentrations in acting, scenography, and theatre for youth; the Ph.D. degree in Theatre with a concentration in theatre for youth; and, in conjunction with the Department of English, an interdisciplinary Master of Fine Arts degree in Creative Writing (playwriting option). Consult the *Graduate Catalog* for details.

THEATRE (THE)

THE 100 Introduction to Theatre. (3) F, S, SS
Elements and principles of the theatre. Lecture, discussion. Prerequisite: nonmajor. *General Studies: HU.*

THE 220 Principles of Dramatic Analysis. (3) F, S
Analysis, evaluation, and interpretation of dramatic literature for theatrical production. Selected readings of classic, contemporary, and modern plays. Prerequisites: ENG 101 (or 105); Theatre major. *General Studies: L1.*

THE 225 Orientation to Theatre. (1) F
Orientation to university and department resources and procedures. Career planning and guidance. Attendance and written responses to theatre productions. Required for B.A. Theatre majors. Prerequisite: Theatre major.

THE 300 Film: The Creative Process. (3) F, S, SS
Elements of the theatrical film: cinematography, sound, editing, directing, acting, scriptwriting, producing, and criticism. 3 hours lecture, 2 hours lab. *General Studies: HU.*

THE 320 History of the Theatre I. (3) F
Traces major developments in theatre production and dramatic literature from its beginning to the mid-17th century. Lecture, student presentations. *General Studies: HU, H.*

THE 321 History of the Theatre II. (3) S
Traces major developments in theatre production and dramatic literature from the mid-17th century to the end of the 19th century. Lecture, student presentations. *General Studies: HU, H.*

THE 322 History of the Theatre III. (3) F
Traces major developments in theatre production and dramatic literature in the 20th century. Cooperative learning. *General Studies: HU, H.*

THE 325 Play Reading. (1) F, S
Assigned independent readings in plays for high school production. Prerequisite: theatre education concentration or instructor approval.

THE 400 Focus on Film. (3) N

Specialized study of prominent film artists, techniques, and genres. Emphasis is on the creative process. May be repeated for credit. Prerequisite: ENG 101 or 105.

THE 401 Focus on Multiethnic Film. (3) F, S, SS

Specialized study of major ethnic films and prominent film artists. Emphasis is on the creative process. Lecture, film viewing, papers. Prerequisite: ENG 101. *General Studies: HU, C.*

THE 420 History of the American Theatre. (3) F

History of the plays, artists, and events in the development of American theatre from colonial to modern times. *General Studies: HU, H.*

THE 421 History of the English Theatre. (3) S

History of the artists, events, and plays in the development of English theatre from medieval times to the present. Lecture, group and independent work. *General Studies: L2/HU.*

THE 424 Trends in Theatre for Youth. (3) N

A survey of the history, literature, and contemporary practices in theatre for youth.

THE 425 History of Asian Theatre. (3) N

History and production techniques of theatre forms in India, China, and Japan. Prerequisite: 6 hours of theatre history or instructor approval. *General Studies: L2/HU.*

THE 430 History of Costume: Western Tradition. (3) N

Study of major costume styles throughout history of Western civilization and how these fashions reflected society. Exploration of how styles can be used by theatrical costumers.

THE 431 History of Costume: Non-Western Tradition. (3) N

Study of major costume styles of India, Asia, Eastern Europe, and the Middle East and how these fashions reflected society. Exploration of how styles can be used by theatrical costumers.

THE 480 Methods of Teaching Theatre. (4) F

Application of materials, techniques, and theories for theatre with ninth- through twelfth-grade students. Emphasis on curriculum development and praxis. Prerequisite: theatre education concentration or instructor approval.

THE 500 Research Methods. (1–3) F

Introduction to graduate study in theatre.

THE 504 Studies in Dramatic Theory and Criticism. (3) F

Dramatic theory, criticism, and aesthetics from the classical period to the 19th century. Related readings in dramatic literature. Prerequisite: Theatre major.

THE 505 Studies in Dramatic Theory and Criticism. (3) S

Dramatic theory, criticism, and aesthetics from the 19th century to the present. Related readings in dramatic literature. Prerequisite: Theatre major.

THE 510 Studies in Literature. (1) F, S

Assigned individual reading programs in standard sources and masterpieces in theatre literature. Topics may be selected from the following:

- Acting–Directing
- Criticism
- Design–Technical
- History

May be repeated for credit in different sections.

THE 520 Theatre History and Literature I. (3) F

A survey of historiographical issues, historical periods, and theatre literature, through the 17th century.

THE 521 Theatre History and Literature II. (3) S

A survey of historiographical issues, historical periods, and theatre literature, from the 17th century to present.

THE 524 Advanced Studies in Theatre for Youth. (3) F

An in-depth study of the history, literature, and contemporary practice of theatre for youth. Prerequisite: instructor approval.

THE 591 Seminar. (3) A

Selected topics in child drama, community theatre, and theatre history. Prerequisite: written instructor approval.

THE 700 Advanced Research Methods. (3) F

Critical review of research, development, and design of research in theatre and theatre for youth.

THE 791 Seminar. (3) N

Selected topics offered on a revolving basis. May be repeated for credit when topic changes.

THEATRE PERFORMANCE AND PRODUCTION (THP)

THP 101 Introduction to the Art of Acting. (3) F, S, SS

Improvisations, terminology, exercises, and projects in acting. Prerequisite: nonmajor.

THP 102 Beginning Acting. (3) F, S

Actor awareness (personal and group), internal acting techniques, scene study with partners, monologue preparation. Studio. Prerequisite: Theatre major. Corequisite: THP 113

THP 113 Techniques of Theatrical Makeup. (3) F, S

Techniques of theatrical makeup: age, corrective, masks, and special effects. 1 hour lecture, 2 hours lab. Lab fee required.

THP 200 Theatre Workshop. (1) F, S

Attendance and/or participation at a variety of demonstrations, guest lectures, performances, and workshops. May be repeated for credit. Prerequisite: Theatre major.

THP 207 Introduction to Acting: The Creative Imagination. (3) F

Development of the actor as an artist, introducing the use of the creative imagination through sensory experience as led by Stanislavski. Studio. Prerequisite: instructor approval. Prerequisites with a grade of “C” or higher: THE 220; THP 102.

THP 208 Introduction to Acting: Doing the Action. (3) S

Continuation of the inner process, applying the techniques of Meisner to discover the creativity in the spontaneous experience. Studio. Prerequisite: instructor approval. Prerequisite with a grade of “B” or higher: THP 207.

THP 213 Introduction to Technical Theatre. (3) F, S

Procedures of technical theatre production and demonstration. Topics include design and construction of scenery, lighting, and properties. 2 hours lecture, 3 hours lab.

THP 272 Introduction to Stage Movement. (3) F, S

Movement vocabulary and physical training in relaxation, alignment, conditioning, rhythm, and poise. Prerequisite: THP 101 or 102 or concurrent registration in THP 102 or instructor approval.

THP 277 Introduction to Stage Speech. (3) F, S

Exercises and techniques to free the voice and improve projection. Prerequisites: THP 101 (or 102) and 272 or instructor approval. Prerequisite with a grade of “C” or higher: THE 220.

THP 285 Acting: Beginning Scene Study. (3) F, S

Character analysis, rehearsal, and performance of modern plays with emphasis on realistic acting styles. Special sections for majors. Prerequisites with a grade of “C” or higher: THE 220 and THP 102 or instructor approval.

THP 301 Theatre Production. (1–4) F, S, SS

Participation in university theatre productions. May be repeated for credit. Prerequisite: written instructor approval.

THP 307 Acting: The Inner Process. (3) F

An advanced class for individualized work on concentration, personalization, self-awareness, visualization, substitution, creating inner and outer characters. Exercises, monologues, and scenes. Prerequisite: acting emphasis or instructor approval.

THP 308 Multiethnic Workshop. (3) F, S

Project-oriented workshop; provides the ethnic student and others the opportunity to develop and present works originating from America’s ethnic cultures. Lecture, lab.

THP 311 Improvisation with Youth. (3) F, S

Basic materials, techniques, and theories for facilitating improvisational drama with children and youth. Not open to freshmen.

THP 312 Puppetry with Children. (3) F, S

Construction and manipulation of puppets; practice in performance skills. Emphasis on educational and recreational uses of puppetry by and with children. Lab fee required. Prerequisite: junior standing or above required.

THP 315 Fundamentals of Directing. (3) F, S

Basic tools of the director: casting, floor plans, blocking, rehearsing. Director’s approach to text and articulation of ideas emphasized. Prerequisites: THP 101 (or 102) and 213 or instructor approval. Prerequisite with a grade of “C” or higher: THE 220.

THP 317 Stage Management. (3) F

Readings in stage management and participation as a stage manager in a university theatre production. Prerequisite: written instructor approval. Prerequisite with a grade of “C” or higher: THE 220.

THP 330 Introduction to Costuming. (3) F, S

Costume construction, survey of costume history, and basic principles of costume design. Costume design project and laboratory experience in construction of costumes. 3 hours lecture, 2 hours lab. Prerequisite with a grade of “C” or higher: THE 220.

THP 331 Costume Construction. (3) N

Uses of materials and techniques for stage costumes with actual construction of period apparel. Prerequisite: THP 330 or instructor approval.

THP 340 Scene Design. (3) F, S

Studio projects in designing realistic scenery for the contemporary proscenium stage. Prerequisite: THP 213 or instructor approval. Prerequisite with a grade of "C" or higher: THE 220.

THP 345 Lighting Design. (3) F, S

Principles and theory of stage lighting design, including design process and execution, equipment, and light plots. Lecture, lab. Prerequisite: THP 213 or instructor approval. Prerequisite with a grade of "C" or higher: THE 220.

THP 350 Sound Design. (3) F

Introduction to the equipment, process, and recording techniques used in sound design for the theatre. Lecture, studio. Prerequisite with a grade of "C" or higher: THE 220.

THP 370 Intermediate Voice and Movement for the Stage. (2) F

Concentration on developing strong and expressive vocal and physical instruments for the stage. Prerequisites: THP 272 and 277 acting emphasis or instructor approval. Prerequisite with a grade of "C" or higher: THE 220.

THP 377 Stage Speech. (2) S

Introduction of phonetic alphabet and standard speech and diction. 2 hours per week. Prerequisites: THP 370 and acting emphasis or instructor approval.

THP 385 Acting: Intermediate Scene Study. (2) S

Script analysis and performance of modern classics. Prerequisites: THP 370 and acting emphasis or instructor approval. Corequisite: THP 377.

THP 401 Theatre Practicum. (1–3) F, S, SS

Performance and production assignments for advanced students of acting, technical production, stage and business management, and design. May be repeated for credit. Prerequisite: instructor approval.

THP 406 Scenography. (3) N

The process of production collaboration. Taught in conjunction with THP 419. Prerequisites: THP 330 and 340 and 345 or instructor approval.

THP 411 Methods of Teaching Drama. (3) F

Application of materials, techniques, and theories with grades K–8 youth. Regular participation with children. Prerequisite: THP 311 or instructor approval.

THP 414 Directing: The Production Concept. (2) A

Play analysis, development, and implementation of the director's concept. Studio. Prerequisites: THP 315; instructor approval.

THP 415 Directing the Actor. (3) A

Practical applications of directing for the stage. Rehearsal and presentation of scenes and short plays. Prerequisites: THP 414; instructor approval.

THP 419 Preproduction Workshop: Director/Designer Collaboration. (3) A

Study and practice of the collaborative process necessary for developing a production concept. Various styles (realism, nonrealism, theatre for youth). Taught in conjunction with THP 406/506; cannot be enrolled concurrently with THP 406 or 506. Prerequisite: THP 415 or written instructor approval.

THP 430 Costume Design. (3) N

Principles of costume design, with projects in both modern and period styles. Prerequisite: THP 330.

THP 431 Advanced Costume Construction. (3) A

Specialized training in costume construction problems and crafts with projects in tailoring, millinery, and period accessories. Prerequisites: THP 330 and 331 or instructor approval.

THP 435 Advanced Technical Theatre. (3) A

Selection of materials, drafting of working drawings, tool operation, and construction techniques. 2 hours lecture, 2 hours lab. Prerequisites: THP 340 and 345 or instructor approval.

THP 440 Advanced Scene Design. (3) A

Advanced studio projects in designing scenery for a variety of stage forms. Prerequisite: THP 340 or instructor approval.

THP 441 Scene Painting. (3) N

Studio projects in painting stage scenery. Prerequisite: THP 340 or instructor approval.

THP 442 Drawing. (3) N

Techniques in drawing and rendering for scenic, costume, and lighting design. Prerequisite: instructor approval.

THP 444 Drafting for the Stage. (3) N

Fundamentals of and practice in graphic techniques for the stage. Introduction to computer-aided design for the stage. 2 hours lecture, 3 hours studio. Prerequisites: THP 213; instructor approval.

THP 445 Advanced Lighting Design. (3) N

Specialized techniques in stage lighting. Advanced application of design process, graphic techniques of design presentation, and use of qualities of light. Lecture, class workshops. Prerequisite: THP 345 or instructor approval.

THP 450 Theatre Organization and Management. (3) N

Box office, house management procedures, production budgeting, and publicity. Prerequisite with a grade of "C" or higher: THE 220.

THP 460 Playwrights Workshop. (3) F, S

Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. May be repeated for credit. Studio, lecture. Prerequisite: written instructor approval.

THP 461 Scripts-in-Progress. (3) F, S

Studio work with the instructor, centered on revisions of original plays. Preparing the script for productions, and rewriting while in production. May be repeated for credit. Studio. Prerequisite: THP 460 or written instructor approval.

THP 472 Advanced Movement for the Stage. (3) F

Movement techniques for the classical and nonrealistic theatre; stage combat and special skills. Prerequisites: THP 385 and acting emphasis or instructor approval.

THP 477 Advanced Voice for the Stage. (3) F

Exercises to develop vocal flexibility and power; mastery of elevated American diction and language skills applied to classical and nonrealistic drama; stage dialects. Prerequisites: THP 385 and acting emphasis or instructor approval.

THP 481 Secondary School Play Production. (3) F

Methods of directing, designing, and coordinating play production experiences at the secondary school level. Off-campus practicum. Prerequisites: THP 315 and theatre education concentration or instructor approval.

THP 485 Acting: Advanced Classical Scene Study. (3) S

Rehearsal and performance of period, classical, and nonrealistic plays. Emphasis on delivery of poetic language. Prerequisites: THP 385 and acting emphasis or instructor approval.

THP 486 The Meisner Approach to Acting. (3) A

Improvisations and exercises developed by Sanford Meisner applied to scene work from selected texts. Studio. Prerequisite: introductory acting classes.

THP 488 Audition Techniques. (3) A

Techniques and preparation for stage, commercial, and TV/film auditions utilizing monologues, cold readings, and personal style. Studio. Prerequisite: introductory acting classes.

THP 487 Acting for TV and Film. (3) A

Professional television and film acting techniques, terminology, and on-camera experience. Prerequisites: THP 101 (or 102), 110; junior standing.

THP 489 Actor Career Development. (3) A

Familiarization with the business of acting: self-promotional tools and techniques, marketing strategies, finances, interview skills, and actor unions. Studio. Prerequisite: introductory acting classes.

THP 494 Special Topics. (1–4) A

Topics may be selected from the following:

- (a) Advanced Acting Techniques
- (b) Advanced Scene Painting
- (c) Advanced Stage Management
- (d) Curriculum and Supervision of Theatre in the School K–12
- (e) Properties and Dressings Design and Construction
- (f) Puppetry in Performance
- (g) Storytelling
- (h) Technical Theatre III
- (i) Video and Industrial Scene Design

THP 498 Pro-Seminar. (1–6) A

Topics may be selected from the following:

- (a) Directing
- (b) Projects:
 - Costume Design
 - Lighting Design
 - Properties Design
 - Scenery Design
 - Technical Direction
- (c) Stage Management
- (d) Theatre for Youth Tour
- (e) Theatre in Education

Prerequisite: written instructor approval.

THP 501 Acting: Personalization I. (8) F

Fundamentals: activation, articulation-ear training, neutral masks, physical-vocal dynamics. Scene study, contemporary realistic ensemble performance projects. Collaboration with playwrights. Studio. Prerequisite: admission to M.F.A. Acting program or instructor approval.

THP 502 Acting: Personalization II. (8) S Fundamentals for actor as creative artist. Scene study, poetic period, and style ensemble performance projects. Collaboration with directors, playwright. Studio. Prerequisite: THP 501 or instructor approval.

THP 503 Acting: Transformation I. (8) F Fundamentals plus character and transformation, character masks-voices, dialects, extravagant language. Comedy of manners, new scripts scene study, ensemble performance projects. Studio. Prerequisite: THP 502 or instructor approval.

THP 504 Acting: Transformation II. (8) S Fundamentals including combat, scansion, poetic language, acting style. Scene study, ensemble performance projects focused on Shakespeare, new scripts. Studio. Prerequisite: THP 503 or instructor approval.

THP 506 Scenography. (3) N The process of production collaboration. Taught in conjunction with THP 419. Prerequisite: theatre graduate standing or instructor approval.

THP 508 Multiethnic Workshop. (3) F, S Advanced workshop for development and presentation of works originating out of American ethnic cultures. Lecture, lab.

THP 509 Singing for Actors. (1) F, S Introduction of the basics of singing technique. Breath control, resonance, articulation, exploration, and expansion of singing range. May be repeated for credit. Studio. Prerequisite: admission to M.F.A. Acting program or instructor approval.

THP 511 Improvisation with Youth Workshop. (3) S Theories and techniques of drama with various populations of youth. Emphasis on how research informs practice. Practicum included. Prerequisites: THP 411 or graduate standing and instructor approval.

THP 512 Puppetry Workshop. (3) F, S Survey of puppetry in education, puppetry as an art form in design and performance. Lab fee required. Prerequisite: graduate standing or instructor approval.

THP 515 Problems in Directing. (3) S Analysis of common directing problems. Topics include: creating the ensemble, conceptual unity, metaphor, nonliteral strategies, and organizational responsibilities of the director. Prerequisite: instructor approval.

THP 517 Stage Management Practicum. (3) F Readings and research in stage management and participation as a stage manager in a University Theatre production. Prerequisite: written instructor approval.

THP 519 Directing: Works in Progress. (3) F Advanced projects in directing concentrating on a collaborative process between director, playwright, actors, and designers. Focus is primarily on new scripts or adaptations of literature. May be repeated for credit. Studio, on-site practicum. Prerequisites: graduate standing; written instructor approval.

THP 530 Advanced Costume Design. (3) N Advanced studio projects in costume design for a variety of production forms. Prerequisite: instructor approval.

THP 540 Scene Design Applications. (3) N Conceptual and practical application of the design process including graphic and sculptural projects. Practical design problems investigated in laboratory. Lab fee. Prerequisite: instructor approval.

THP 545 Lighting Design Applications. (3) N Advanced studio projects in stage lighting design. Prerequisite: instructor approval.

THP 560 Playwright's Workshop. (3) F, S Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. Maybe repeated for credit. Studio. Prerequisite: written instructor approval.

THP 561 Scripts in Progress. (3) F, S Studio work with the instructor centered on revisions of original plays. Preparing the script for productions and rewriting while in production. May be repeated for credit. Studio. Prerequisite: THP 560 or written instructor approval.

THP 562 Literary Management Workshop. (3) F Advanced literary management for the contemporary theater, including trends in new play development, festivals and productions throughout the United States. Participation in Arizona Playwriting Competition. Prerequisite: THP 560 or instructor approval.

THP 584 Internship. (1–3) A Field research and on-site training in theatre for youth, community theatre, and production techniques. Prerequisite: written instructor approval.

THP 593 Applied Projects. (1–12) A Prerequisite: instructor approval.

THP 594 Conference and Workshop in Child Drama. (3) A Prerequisite: instructor approval.

THP 598 Special Topics. (1–4) A Topics may be selected from the following:

- (a) Acting
 - (b) College Teaching:
 - Acting
 - Dramatic Analysis
 - Improvisation with Youth
 - Movement
 - Puppetry
 - Voice
 - (c) Directing
 - (d) Works in Progress:
 - Actor
 - Playwright.
- Lecture and studio.

THP 611 Improvisation with Youth Seminar. (3) A Examination of current research, theory, and practices in drama with youth. Development and execution of research projects. Prerequisite: instructor approval.

THP 618 Directing Practicum. (3) A Practical experience in directing and producing an entire play or musical for young audiences. Prerequisite: instructor approval.

THP 649 Design Studio. (3) F, S Projects include design of scenery, costume, lighting, or sound for laboratory or mainstage productions. May be repeated for credit. Prerequisite: instructor approval.

THP 684 Internship. (3–6) F, S, SS Field research in acting, improvisation with youth, theatre for youth, puppetry, and scenography. Prerequisite: instructor approval.

THP 691 Seminar: Scenography. (3) N Examination of and research into modern concepts and practices of scenography. Prerequisite: instructor approval.

THP 693 Applied Project. (1–12) F, S, SS Final projects for M.F.A. Theatre candidates in acting, scenography, and theatre for youth. Prerequisite: instructor approval.

One creative solution for blocking the sun while enjoying an event near Hayden Lawn.

Pat Shannahan photo

Graduate College

Bianca L. Bernstein, Ph.D.
Dean

Through the faculty, the ASU Graduate College offers programs to meet the educational needs of those who already hold bachelor's degrees. While many students prepare for careers in research, the professions, and the arts, others work for personal enrichment. Both part-time and full-time students are enrolled in 90 master's and 46 doctoral majors encompassing hundreds of concentrations and specialties. Other students explore new areas of interest or prepare for career advancements quite apart from formal degree programs.

The size, strength, and diversity of the graduate community reflect the university's commitment to high quality education. As a major center for graduate education, ASU supports cultural and intellectual activity as well as research in a broad range of arts and sciences and professional disciplines; in addition, the university conducts research addressing Arizona's social, cultural, and economic growth and development.

GRADUATE DEGREES AND MAJORS

The Graduate College enrolls students in programs leading to both professional and research-oriented advanced degrees. The Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees are awarded to students completing programs that culminate in research. The Ph.D. degree is the highest university award, conferred on candidates who have proved their ability as scholars and original researchers.

Professional graduate programs emphasize training that leads to professional practice. In these degree programs, students develop a mastery of a comprehensive body of knowledge and the ability to organize and carry out significant investigations in their professional field. Professional degrees usually are named Master of (professional field) and Doctor of (professional field), although some M.A. and M.S. degree programs have professional tracks. The professional doctoral degree is the highest university award to candidates completing academic preparation for professional practice. Professional degrees offered through the Graduate College are as follows:

Master of Accountancy
Master of Architecture
Master of Business Administration
Master of Computer Science
Master of Counseling
Master of Education
Master of Environmental Planning
Master of Fine Arts
Master of Health Services Administration
Master of Mass Communication
Master of Music
Master of Natural Science
Master of Public Administration
Master of Science in Design
Master of Science in Engineering
Master of Social Work
Master of Taxation
Master of Teaching English as a Second Language
Master of Technology
Doctor of Education
Doctor of Musical Arts
Doctor of Public Administration

Faculty members offering a specific graduate degree program may be members of a single academic unit (such as a department, school, or college), or they may form an interdisciplinary committee consisting of faculty from various academic units. The Graduate College awards degrees upon the recommendation of the faculty offering the graduate degree programs. For the lists of graduate degrees offered at ASU Main and ASU East, see pages 290–292. For ASU West graduate degree programs, see the *ASU West Catalog*.

Interdisciplinary Study

Although most graduate programs are administered by academic units, a diverse group of interdisciplinary programs falls directly under the supervision of the Graduate College. Many majors are in fields that are still emerging as recognized academic disciplines and, therefore, do not customarily form the academic basis for departments. Other fields of study are inherently interdisciplinary and do not fit well with conventional disciplines around which departments are formed. Curricula must reflect intrinsically broad disciplinary affinities, and faculty must be drawn from more than one department.

The Graduate College oversees nine interdisciplinary/intercollegiate graduate programs and has joint responsibility with the College of Education for another. These include the following:

Creative Writing (M.F.A.)
 Curriculum and Instruction (Ph.D.)
 (jointly administered with the
 College of Education)
 Exercise Science (Ph.D.)
 Gerontology (Certificate)
 Justice Studies (Ph.D.)
 Public Administration (D.P.A.)
 Science and Engineering of
 Materials (Ph.D.)
 Speech and Hearing Science (Ph.D.)
 Statistics (M.S.)
 Transportation Systems (Certificate)

Other interdisciplinary degree programs include Communication, Ph.D. (administered by the College of Public Programs), and Humanities, M.A., and Molecular and Cellular Biology, M.S., Ph.D. (both administered by the College of Liberal Arts and Sciences).

Each of these programs uses resources and faculty from more than one discipline. The programs promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. The programs allow students to pursue degrees that are intellectually coherent but that bring to-

gether diverse strengths of the university. See the "Interdisciplinary Graduate Programs (Degrees, Majors, Concentrations, and Certificate) Overseen by the Graduate College" table on this page.

Creative Writing (M.F.A.)

The interdisciplinary Master of Fine Arts degree program with a major in Creative Writing (options include fiction, nonfiction, playwriting, poetry, and screenwriting) is administered by the Creative Writing Committee. This studio/academic program involves the research, creative activity, and teaching interests of faculty of the Departments of English and Theatre to provide students with the opportunity to tailor a course of study to fit individual needs, talents, and goals. Students work under the direction of faculty who are practicing, published writers. For more information, see the *Graduate Catalog*.

Curriculum and Instruction (Ph.D.)

The interdisciplinary Doctor of Philosophy degree program with a major in Curriculum and Instruction is admin-

istered by the Interdisciplinary Committee on Curriculum and Instruction and overseen jointly by the Graduate College and the College of Education. Areas of concentration are available in curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, music education, physical education, reading education, science education, and special education. For more information, see the *Graduate Catalog*.

Exercise Science (Ph.D.)

The interdisciplinary Doctor of Philosophy degree program with a major in Exercise Science is administered by the Committee on Exercise Science. This individualized interdisciplinary degree integrates graduate courses from a variety of academic units to provide a sound foundation for research leading to a dissertation with concentrations in biomechanics, motor behavior/sport psychology, or physiology of exercise. For more information, see the *Graduate Catalog*.

Interdisciplinary Graduate Programs (Degrees, Majors, Concentrations, and Certificates) Overseen by the Graduate College

Major	Degree	Administered by
Creative Writing Curriculum and Instruction Concentrations: curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, music education, physical education, reading education, science education, special education	M.F.A. Ph.D.	Creative Writing Committee Interdisciplinary Committee on Curriculum and Instruction
Exercise Science Concentrations: biomechanics, motor behavior/sport psychology, physiology of exercise	Ph.D.	Committee on Exercise Science
Gerontology Justice Studies Concentrations: criminal and juvenile justice; dispute resolution; law, justice and minority populations; law, policy, and evaluation; women, law, and justice	Certificate Ph.D.	Committee on Gerontology Committee on Law and Social Sciences
Public Administration Science and Engineering of Materials Concentrations: solid-state device materials design, high-resolution nanostructure analysis	D.P.A. Ph.D.	Committee on Public Administration Committee on Science and Engineering of Materials
Speech and Hearing Science Concentrations: developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Ph.D.	Committee on Speech and Hearing Science
Statistics Transportation Systems	M.S. Certificate	Committee on Statistics Committee on Transportation Systems

Gerontology

An interdisciplinary, 24-semester-hour Certificate in Gerontology, administered by the Committee on Gerontology, may be earned by graduate students who wish to study the biological, psychological, sociological, and policy-related aspects of aging and the economic, health, and social concerns of older people. Students enrolled in the certificate program may simultaneously pursue a major in an academic unit offering a graduate degree or may enter the program as nondegree graduate students. The Certificate in Gerontology provides a broad academic foundation for students who wish to apply the knowledge and skills acquired in their major to a variety of aging-related pursuits. For more information, see the *Graduate Catalog*.

For information on the undergraduate minor in Gerontology, see page 110, "Gerontology."

GERONTOLOGY (GRN)

GRN 494 Undergraduate Special Topics. (3) F, S

GRN 498 Undergraduate Pro-Seminar. (3) S

GRN 499 Undergraduate Independent Study. (3) F, S, SS

GRN 580 Graduate Practicum. (3) F, S

GRN 590 Graduate Reading and Conference. (3) F, S, SS

GRN 591 Graduate Seminar. (3) F, S

Justice Studies (Ph.D.)

The interdisciplinary Doctor of Philosophy degree program with a major in Justice Studies is administered by the Committee on Law and Social Sciences. The degree program integrates historical, legal, and philosophical approaches with social science training. Areas of concentration include criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; and women, law, and justice. For more information, see the *Graduate Catalog*.

Public Administration (D.P.A.)

The interdisciplinary Doctor of Public Administration degree program is administered by the Committee on Public Administration. The purpose of the degree is to prepare skilled professional public administrators for positions in the public sector and for university teaching. Ethics, modes of decision making, policy analysis, problem-solving skills in budgeting, program evaluation, public personnel management, theoretical assumptions, and value as-

essments are some of the areas of study available. For more information, see the *Graduate Catalog*.

Science and Engineering of Materials (Ph.D.)

The interdisciplinary Doctor of Philosophy degree program with a major in Science and Engineering of Materials is administered by the Committee on Science and Engineering of Materials. Areas of concentration are available in solid-state device materials design and high-resolution nanostructure analysis. Emphasis is placed on the applications of chemical thermodynamics, the mechanics of solids, quantum mechanics and transport theory for investigation of the relationships between microstructure and properties of solids, and the dependence of microstructures on processing. For more information, see the *Graduate Catalog*.

SCIENCE AND ENGINEERING OF MATERIALS (SEM)

See the *Graduate Catalog* for the SEM courses.

Speech and Hearing Science (Ph.D.)

The interdisciplinary Doctor of Philosophy degree program with a major administered by the Committee on Speech and Hearing Science. Areas of concentration are available in developmental neurolinguistic disorders, neuroauditory processes, and neurogerontologic communication disorders. The purpose of the program is to prepare scholars for careers of basic and applied research in academia or in health care delivery environments. The unifying theme of the program is the influence of aging and changes in neurologic condition on human communication and its disorders. For more information, see the *Graduate Catalog*.

Statistics (M.S.)

The interdisciplinary Master of Science degree program with a major in Statistics is administered by the Committee on Statistics. The program involves faculty and resources from the School of Accountancy and Information Management and the Department of Mathematics. Areas of emphasis include applied statistics, mathematical statistics, statistical computing, statistical modeling, and statistical sampling and survey research. For more information, see the *Graduate Catalog*.

Transportation Systems

The interdisciplinary Certificate in Transportation Systems program is administered by the Committee on Transportation Systems. The objective of this program is to enable existing ASU graduate students and transportation professionals with advanced degrees to examine transportation-related issues from a variety of perspectives and in the context of different travel modes. For more information, see the *Graduate Catalog*.

ADMISSION TO THE GRADUATE COLLEGE

ASU is one university with three campuses that are accredited by the North Central Association, a regional accrediting body, and by the professional accrediting agencies.

Applications can be submitted for admission as a nondegree student or degree-seeking student at ASU Main or ASU East. For admission to ASU West, refer to the *ASU West Catalog*. Application for admission to a specific academic program must be reviewed by the desired campus and program. For more information, call or write

For ASU Main

GRADUATE COLLEGE ADMISSIONS
OFFICE

ARIZONA STATE UNIVERSITY MAIN
PO Box 871003

TEMPE AZ 85287-1003
602/965-6113

www.asu.edu/graduate

asugrad@asuvm.inre.asu.edu

For ASU East

ARIZONA STATE UNIVERSITY EAST
6001 S POWER ROAD

MESA AZ 85206
602/727-3278

www.asu.edu/east

Eligibility

Anyone who holds a bachelor's (or equivalent) or graduate degree from a college or university of recognized standing is eligible to apply for admission to the Graduate College. Remedies for undergraduate deficiencies may be assigned if the undergraduate degree is based on credits not accepted by ASU, such as life experience or noncredit workshops and seminars.

Graduate College Requirements

Generally, an applicant must have a GPA of 3.00 (4.00 = A) or the equivalent in the last two years of work leading to the bachelor's degree. A student

who enters a graduate degree program is expected to have undergraduate educational experiences, including general education studies, that are similar to those required for the baccalaureate degree at ASU.

Requirements of the Academic Unit

Academic units (such as departments or colleges) may have admission requirements in addition to those of the Graduate College. Many graduate programs require scores from a national admissions test such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or the Miller Analogies Test (MAT). Some programs require the submission of a portfolio, letters of recommendation, or a statement of goals. Applicants should contact the academic unit regarding specific admission and application requirements.

Submission of an Application

U.S. citizens and permanent residents should submit the following items:

1. application;
2. application fee;
3. a transcript from every college and university in which the applicant was previously enrolled;
4. appropriate test score reports (e.g., GRE, GMAT); and
5. Arizona Residency Form if the applicant is a resident of Arizona.

If all materials are not available, what is available ought to be submitted with the application and fee. The rest of the materials should be submitted as soon as possible. If an academic unit has a specific deadline, the applicant must submit all required application materials to the Admissions Office *in advance of the deadline* to allow processing.

To facilitate the application process, ASU accepts personal photocopies of transcripts and test scores. However, before registering for classes, every student must submit *official* transcripts.

The Graduate College accepts as *official* all transcripts submitted in sealed envelopes, stamped and verified by the issuing institution *or* transcripts sent directly from another college or university. The applicant must ask Educational Testing Service to send the test results directly to the Graduate Admissions office. The process of providing

all necessary official records may take two months or longer.

Portfolios, letters of recommendation, and statements of goals should be sent directly to the academic unit.

International applicants should submit the following items:

1. application;
2. application fee;
3. a copy of all college and university academic records;
4. translation of all college and university academic records;
5. TOEFL score;
6. appropriate test score report (e.g., GRE, GMAT); and
7. Financial Guarantee form (which may be submitted at a later time).

All applicants should submit the required items *in one envelope* clearly labeled “application” to

For ASU Main

GRADUATE COLLEGE ADMISSIONS
OFFICE
ARIZONA STATE UNIVERSITY MAIN
PO BOX 871003
TEMPE AZ 85287-1003
602/965-6113
www.asu.edu/graduate
asugrad@asuvm.inre.asu.edu

For ASU East

ARIZONA STATE UNIVERSITY EAST
6001 S POWER ROAD
MESA AZ 85206-0180
602/727-3278
www.asu.edu/east

Application Fee

Each application for entry to ASU graduate programs must be accompanied by a nonrefundable application fee. The fee is \$45.00 to apply for admission to a degree program and \$15.00 to apply for nondegree studies.

For details concerning re-entry, multiple applications, and other matters relating to the application fee, see the *Graduate Catalog*.

International Applicants

Applicants who will attend the university while holding F-1 or J-1 visas must meet the regulations of the Immigration and Naturalization Services in addition to the requirements of the Graduate College and the academic units to which they apply.

International applicants are also required to submit additional materials and should follow the procedures described in the *Application for Graduate*

Admission booklet. International applicants should read this booklet carefully to become familiar with all the requirements they must meet. Applicants can also consult the ASU listings in *Peterson's Graduate Education Directory* and in the *Directory of Graduate Programs* (published by the Educational Testing Service).

Among the additional materials required of international students are scores from English language examinations. All applicants whose native language is not English must submit a score from the Test of English as a Foreign Language (TOEFL). All international applicants who do not speak English as a primary language and who wish to apply for teaching assistantships must pass an examination that certifies their skill in speaking English—either the Test of Spoken English (TSE), which may be taken in the student's home country, or the SPEAK test, which is administered at ASU. Some degree programs (e.g., Business Administration) also require TSE or SPEAK scores of all applicants whose native language is not English. For specific information about TSE requirements, contact the head of the academic unit.

As required by the U.S. Immigration and Naturalization Service, international applicants must also verify that they have the financial resources to cover their expenses during graduate study at ASU. The Graduate Admissions office provides the Financial Guarantee form to international applicants, who then must see that the form, with a verification from a bank or sponsoring organization, is completed and returned to Graduate Admissions. The I-20 and the IAP66 (documents needed to obtain a student visa) are issued only after the completed, properly verified Financial Guarantee form has arrived. International students may enroll at ASU only if they have been admitted to a degree program and therefore may not pursue nondegree studies. They must meet all appropriate immigration standards and requirements.

Applications are processed when they are received. However, international applicants should submit all materials by December or January in order to begin study the following fall semester and by August or September in order to begin study the following spring semester. An application fee of \$45.00 (in U.S. funds) must accompany the

formal application, which otherwise is not evaluated. (For details concerning multiple applications and other matters relating to the application fee, see the *Graduate Catalog*.)

All F-1 or J-1 visa students must have insurance coverage against illness and accident before being permitted to register. Insurance must be maintained throughout the student's enrollment in the university and may be obtained at the time of registration.

Upon arrival on campus, students must report to the advisor in the International Student Office.

Application Deadlines

The Graduate College does not have deadlines. Applications are processed as they are received. However, many academic units have specific and early deadlines; many units review applications once a year, usually in January or February for fall admission. Applicants are urged to contact the academic units regarding deadlines. If an academic unit has a specific deadline, the applicant must submit all required application materials to the Admissions Office *in advance of the deadline* to allow processing.

Application Procedures

When the Graduate Admissions office receives the application and supporting materials (the application, Arizona Residency Form, TOEFL [if required], application fee, and transcripts for an applicant), a file is forwarded to the academic unit. Academic units review the file and the supporting materials (such as applicable test scores, portfolios, and letters of recommendation) and, following admission policies established by the Graduate College and the faculty of the academic unit, make a recommendation (regular admission, provisional admission, or denial) to the Graduate College. All recommendations are reviewed and approved by admissions officers in the Graduate College.

If there are questions about the likelihood of a student succeeding in the designated program, the Graduate College admissions officers communicate with the academic unit, perhaps agreeing on a provisional admission or arranging for the student in question to have a special faculty advisor or an advanced graduate student assigned as a mentor. Other times they may suggest that the student take some preliminary courses as a nondegree student.

Academic units, which must indicate their willingness to admit applicants, frequently set higher standards than those established by the Graduate College. Many qualified applicants will be denied because each year only a limited number of students may be admitted.

Notice of Admission Decisions

Only the dean of the Graduate College can make formal offers of admission. The Graduate College notifies all applicants in writing of the admission decision.

All documents received by the university in connection with an application for admission become the property of ASU. If the applicant does not enroll in the university within one year, the admission documents may be destroyed.

The date (month/day/year) on the graduate dean's letter of admission is the actual date of admission. If the student is enrolled in courses on the admission date, those courses—if applicable—may be considered part of a program of study. Courses taken the semester before this date are nondegree hours.

Admission Classifications

Regular Admission. Applicants who fulfill all requirements for admission and are acceptable to both the academic unit and the Graduate College are granted regular admission.

Regular Admission with Deficiencies. A student whose grades and test scores are at an acceptable level but who does not have the undergraduate background expected by the academic unit and the university may be required to complete courses to remedy deficiencies. The letter of admission specifies the deficiencies that must be completed before the student is awarded a graduate degree. Deficiency courses may not be applied toward the minimum semester hours required for the degree program.

Provisional Admission. A student who does not meet minimum academic standards but has counterbalancing evidence to suggest the potential for success may be admitted on a provisional basis. Provisional admission provides an academic unit with more evidence on which to base its decision. Normally, the academic unit reviews the student's status following completion of 12 semester hours of approved graduate study. At that time, the aca-

demic unit recommends to the Graduate College a change in status to either regular admission or withdrawal from the program. When students have completed their provisional requirements, they should check with their advisors to make sure that the change of status has been recommended.

A provisional student may also be assigned deficiencies.

Nondegree Admission. A student not interested in earning a degree or not yet ready to apply to a particular degree program may enroll as a nondegree student. The application process is streamlined, does not require submission of transcripts or test scores, and can be completed during a single visit to the Graduate Admissions office. This process may also be completed by mail. A maximum of nine hours taken while in this category at ASU may be applied toward a master's degree if appropriate for the student's program of study.

The six-year maximum time limit applies to nondegree semester hours appearing on a master's program of study. In addition, because of limited class size and resources, certain academic units may limit the enrollment of nondegree students.

Recognition of a Degree

Recognition of a degree is acknowledgment that the program leading to the degree is equivalent to a program offered by ASU or is an acceptable program for the proposed graduate major at ASU. A student who enters a graduate degree program is expected to have undergraduate educational experiences, including general education studies, that are appropriate for the program.

Definition of a Unit of Credit

See page 72.

GRADUATE COLLEGE PROCEDURES

Change in Graduate Degree Program

A change from one graduate degree program to another requires a new application to the Graduate College. The usual admission procedures are followed. For details on matters relating to the application fee, see the *Graduate Catalog*.

Re-entry to the Graduate College

Any former graduate student who has not been in attendance at the university for one or more semesters must

submit an application for re-entry to the Graduate College. The application should be submitted at least one month before the beginning of the semester in which the student plans to re-enter. For details on re-entry and other matters relating to the application fee, see the *Graduate Catalog*.

Determination of Catalog Requirements

The *Graduate Catalog* is published annually. Requirements for an academic unit or college, campus, or the university as a whole, may change and are often upgraded.

In determining graduation requirements, a student may use only one edition of the Graduate Catalog.

A student graduates under the curriculum, course requirements, and regulations for graduation in effect at the time of admission to a degree program at the university. A student may choose to graduate under any subsequent catalog issued.

Some changes in policies and procedures affect all students regardless of the catalog used by the student. These policies and procedures may appear in the catalog or in other university publications.

Registration

See pages 71–72.

Audit Enrollment

Graduate students may register as auditors in one or more courses with the approval of the supervisory committee chair and the consent of the instructor involved. The student must be registered properly and pay the fees for the course. An audited course is counted in the student's maximum course load. It does not count for students who must take a minimum number of credits, e.g., teaching assistants or students receiving financial assistance. The mark of "X" is recorded for completion of an audited course, unless the instructor determines that the student's participation or attendance has been inadequate, in which case a "W" may be recorded.

Enrollment Verification

General guidelines on page 72 are used only to verify enrollment for the purpose of loan deferments and eligibility. The registrar is responsible for such verifications.

Course Withdrawal

During the first four weeks of a semester, a student may withdraw with a mark of "W." From the fifth week to the end of the 10th week of a semester, a student may withdraw with a mark of "W" only from courses in which the instructor certifies the student is passing at the time of withdrawal.

The *Schedule of Classes* lists the procedures for withdrawal. Failure to withdraw officially from a course results in a grade of "E," which is used in the computation of the GPA.

An instructor may withdraw a student from a class for disruptive classroom behavior with a mark of "W" or a grade of "E." A student may appeal an instructor-initiated withdrawal to the standards committee of the college in which the course is offered. The decision of the committee is final.

Course Load

The course load is determined by the supervisory committee but is not to exceed 15 semester hours of credit during each of the two semesters, six semester hours during each five-week summer session, or nine semester hours of credit during an eight-week summer session. An audited course is counted in the student's maximum load.

All graduate assistants and associates must enroll for a minimum of six semester hours during each fall and spring semester of their appointment. The six hours cannot include audit enrollment. Enrollment in continuing registration (595, 695, or 795) does not fulfill the six-hour requirement. A half-time (50%) graduate assistant or associate working 20 clock hours per week may not register for more than 12 hours of course work each semester; a third-time (33%) assistant or associate for more than 13 hours; and a quarter-time (25%) assistant or associate for more than 15 hours.

All graduate students doing research, working on theses or dissertations, taking comprehensive or final examinations, or using university facilities or faculty time must be registered for a minimum of one hour of credit, not audit, which appears on the program of study or which is an appropriate graduate-level course, such as continuing registration (595, 695, or 795).

For an explanation of summer session semester hour load, see page 71.

Assistantships and Commercial Services

All graduate students who are hired for class/course support or who hold assistantships or associateships *for a specific course*—including teaching assistants, research assistants, and graduate assistants—may not take or provide notes for *that* course to commercial notetaking services or students. An exception may be made by the course instructor(s) on a case-by-case basis as an authorized support service for a disabled student. This policy covers all commercial activities (e.g., notetaking or paid review sessions) that might be associated with a course for which the assistant or associate has assigned responsibilities. (Refer to the *Graduate Assistant Handbook*.)

GRADUATE COLLEGE DEGREE REQUIREMENTS

Graduate Advising

Advising is much more than technical support; it is an integral part of graduate education. Students' programs of study are generally tailored to meet individual needs, and students should seek advice from faculty or advisors as they plan their course work, examinations, and other degree requirements.

Graduate College Advising Office.

The Advising office serves prospective and enrolled students. Information is provided concerning Graduate College admissions, nondegree status, programs of study, and policies and procedures. Academic and professional advisement is available to nondegree students. Advisors assist nondegree or prospective students in contacting appropriate faculty and advisors. Students may call 602/965-3521 for an appointment or stop by the lobby of Wilson Hall.

Grading

The "Grades" table (page 73) defines grades and gives their values.

A grade of "P" (pass) in a 400-level course may not appear on a program of study. Grades on transfer work or ASU law credit are not included in computing GPAs.

Grades of "D" and "E" cannot be used to meet the requirements for a graduate degree, although they are used to compute the GPAs. A student receiving a grade of "D" or "E" must repeat the course in a regularly scheduled (not an independent study) class if it is to be

Grades

Grade	Definition	Value	Notes
A	Excellent	4.00	
B	Good	3.00	
C	Passing	2.00	
D	No graduate credit	1.00	
E	Failure	0.00	
W	Withdrawal		This grade is given whenever a student officially withdraws from a class.
I	Incomplete		
X	Audit		
Y	Satisfactory		
Z	Course in progress		This grade is usually given pending completion of courses.

included in the program of study. However, both the “D” or “E” and the new grade are used to compute the GPAs.

Graduate course work (500, 600, or 700 level courses) reported as an “I” (incomplete) must be completed within one calendar year. At the time the “I” grade is given, the student must complete the “Request for Grade of Incomplete” form. The form first serves as a record of the “I” grade and the work required to complete it. When the student has completed the work, the form then serves as a change-of-grade authorization.

If the work specified on the form is not completed within one calendar year, the “I” grade becomes part of the student’s permanent transcript. The student is not allowed to complete the course work as specified on the “Incomplete” form. The student may, however, repeat the course after the “I” has become permanent by reregistering, paying fees, and fulfilling all course requirements. The grade for the repeated course appears on the transcript but does not replace the permanent “I.”

Scholarship

To be eligible for a degree in the Graduate College, a student must achieve two GPAs of “B” (3.00) or higher. The first GPA is based on all courses numbered 500 or higher that appear on the transcript. (Courses noted as deficiencies in the original letter of admission are not included.) The second GPA is based on all courses that appear on the program of study.

The designation of honors (*summa cum laude*, *magna cum laude*, and *cum laude*) is reserved for undergraduates. The Graduate College does not use these academic distinctions.

Academic excellence is expected of students doing graduate work. Upon recommendation from the head of the academic unit, the dean of the Graduate College can withdraw a student who is not progressing satisfactorily.

A graduate student who does not enroll for three calendar years is considered withdrawn and must reapply for admission to a degree program.

Graduate Credit Courses

Courses at the 500, 600, and 700 levels are graduate credit courses. Courses at the 400 level apply to graduate degree requirements when appearing on an approved program of study. However, 400-level courses are not graduate courses by definition and cannot be certified as such for purposes of employment or transferring to other institutions.

Reserving of Course Credit by Undergraduates. See page 71.

Transfer Credit. Transfer of credit is the acceptance of credit from another institution or campus for inclusion in a program of study leading to a degree awarded by ASU. The number of hours transferred from other institutions may not exceed 20% of the total minimum semester hours required for a master’s degree unless stated otherwise for a specific degree program.

Transfer credit taken before admission to a graduate degree program at ASU is nondegree credit. Nondegree credit taken at ASU combined with nondegree credit taken at another institution may not exceed nine hours on the master’s program of study. The date (month/day/year) on the Graduate College dean’s letter of admission is the actual date of admission. If the student is enrolled in courses on the admission

date, those courses—if applicable—may be considered part of a program of study. Courses taken the semester before this date are nondegree hours. The nine-hour limit does not apply to the doctoral programs.

Transfer credits must be acceptable toward graduate degrees at the institution where the courses were completed. Certain types of graduate credits cannot be transferred to ASU, including the following:

1. credits awarded by postsecondary institutions in the United States that lack candidate status or accreditation by a regional accrediting association;
2. credits awarded by postsecondary institutions for life experience;
3. credits awarded by postsecondary institutions for courses taken at noncollegiate institutions (e.g., government agencies, corporations, and industrial firms);
4. credits awarded by postsecondary institutions for noncredit courses, workshops, and seminars offered by other postsecondary institutions as part of continuing education programs; and
5. credits given for extension courses.

Acceptable academic credits earned at other institutions that are based on a different unit of credit than the ones prescribed by the Arizona Board of Regents are subject to conversion before being transferred to ASU.

Only resident graduate courses with an “A” or “B” grade may be transferred. A course with the grade of pass, credit, or satisfactory may not be transferred.

Official transcripts of any transfer credit to be used on a program of study must be sent directly to the Graduate Admissions office from the office of the registrar at the institution where the credit was earned.

Independent Learning and Extension Courses. Independent learning and extension courses cannot be used to meet the requirements for a graduate degree.

Graduate Supervisory Committees

When the program of study is filed, upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints a graduate student’s supervisory committee, consisting of a chair and other resident fac-

ulty members. The number of members serving on this committee depends on the degree program. Academic professionals (e.g., research scientists, research engineers), nontenure-track faculty (e.g., adjunct professors, research professors), and individuals granted affiliated faculty status through established university procedures may serve as cochairs or members or extra members of thesis and dissertation committees upon approval by the Graduate College. Individuals who are recommended by an academic unit as eligible to serve as a cochair must meet the criteria established by the academic unit and be approved by the Graduate College.

Upon the recommendation of the committee chair and head of the academic unit, ASU West tenured (or tenure-track) faculty may serve as committee members for master's and doctoral committees at ASU Main. ASU West tenured (or tenure-track) faculty may serve as co-chairs for theses and dissertations at ASU Main upon the recommendation of the head of the academic unit and approval of the dean of the Graduate College. Co-chairs must meet the academic unit's criteria for chairing theses and dissertations.

Qualified individuals outside the university, upon the recommendation of the head of the academic unit and approval of the Graduate College, may serve as members of thesis and dissertation committees; however, such individuals may not serve as chairs or co-chairs (unless they have affiliated faculty status). With the approval of the academic unit and the dean of the Graduate College, former ASU faculty with students completing their degrees may continue to serve as co-chairs. At least 50 percent of the committee must be made up of faculty from ASU Main.

Foreign Language Requirements

A graduate degree program may require proficiency in a foreign language. If foreign language proficiency is required, students must demonstrate at least a reading knowledge in the area of study required by the supervisory committee and consistent with the requirements for the graduate degree program. Normally, the language is selected from French, German, Russian, or Spanish, although other languages may be recommended when there is adequate justification.

Students who are required to demonstrate proficiency in a foreign language must pass a foreign language examination specific to their particular graduate programs. The examinations are administered three times each year by the Department of Languages and Literatures, which certifies language competency. Students planning to take the examination must register in the Graduate College by the deadline. The chair of the student's supervisory committee is responsible for providing the Department of Languages and Literatures with materials from which the examination is prepared. The chair should submit or recommend relevant books and/or journals of approximately 200 pages in length in the desired foreign language.

A student may petition the Graduate College for a re-examination, but must pass the examination in no more than three attempts.

Theses and Dissertations

The master's thesis or equivalent is an introduction to research writing. All doctoral degree candidates must submit a dissertation, with the exception of the Doctor of Musical Arts with concentrations in choral music and solo performance, which requires three recitals and a research paper. The Doctor of Philosophy dissertation should be a valuable educational experience that demonstrates the candidate's mastery of research methods, theory, and tools of the discipline. The dissertation should demonstrate the candidate's ability to address a major intellectual problem and to propose meaningful questions and hypotheses. It should be a contribution to knowledge that is worthy of publication by an established press as a book or monograph or as one or more articles in a reputable journal.

For format, the Graduate College must review the final copy of the master's thesis, doctoral dissertation, and other final documents that are required to be placed in the library. Copies of the *Format Manual* are available in the Graduate College. The student is required to submit a complete copy of the thesis or dissertation for format review at least 10 working days before the oral defense (two weeks if there are no holidays during the time period). Doctoral students must submit a completed Survey of Earned Doctorates Awarded in the United States, conducted by the National Research Council.

Graduate students and their supervisory committee chairs jointly select a style guide or journal format representative of the field of study. The Graduate College allows some flexibility in the format of the manuscript, but Graduate College and library guidelines must be followed.

The student must submit two final copies of a thesis or dissertation to the ASU Bookstore for binding. Bound copies are placed in Hayden Library and University Archives. Doctoral candidates should also submit one copy of the title page, approval page, and abstract (which must not exceed 350 words). The student is responsible for the binding fees; in addition, doctoral students must pay to have their dissertations microfilmed by University Microfilms International (UMI). The fee covers the expense of having the document sent to UMI, where it is microfilmed and cataloged. Information on the dissertation appears in various publications, such as *Dissertation Abstracts International* and the annual supplement of the *Comprehensive Dissertation Index*.

Application for Graduation

Students should apply for graduation no later than the date specified in the "Graduate College Calendar," found in the *Graduate Catalog*. All fees are payable at that time. Students applying for graduation after the deadline listed in the calendar are required to pay a late fee. At the end of the semester in which they apply for graduation, students are officially notified of any degree requirements they have not yet completed. Students are requested to complete a questionnaire which serves as a graduate exit survey. Students who do not complete all degree requirements by their anticipated graduation date are required to pay a refiling fee.

Withdrawal from the University

See page 74.

A master's or doctoral degree student who does not enroll for three calendar years is considered withdrawn and must reapply for admission to a degree program.

Summer Sessions

See page 431.

Dates and Deadlines

The "Graduate College Calendar" in the current *Graduate Catalog* lists deadlines for the submission of theses

and dissertations to the Graduate College, the last day to apply for graduation, the last day to hold an oral defense of a thesis or dissertation, and the last day to submit theses and dissertations to the ASU Bookstore for binding.

Student Responsibility

It is the responsibility of the graduate student to know and observe all procedures and requirements of the Graduate College as defined in the *Graduate Catalog*, the *Schedule of Classes*, and the *Format Manual*. Students should also be informed about the requirements concerning their degree programs and any special requirements within their academic units.

The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of the indi-

vidual colleges. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities. The university and college academic integrity policies are available in the Office of the Senior Vice President and Provost.

Misconduct in Scholarly Research and Creative Activities

Students are expected to maintain the highest standards of integrity and truthfulness in scholarly research and creative activities. Misconduct in scholarly research and creative activities includes, but is not limited to, fabrication, falsification or misrepresentation of data, and plagiarism. Misconduct by any student may result in suspension or expulsion from the university and/or other sanctions as specified by the individual colleges. Policies on misconduct are available in the Office of the Senior Vice President and Provost.

Graduate College Policies and Procedures

For more detailed information on Graduate College policies and procedures, refer to the current *Graduate Catalog*.

Policies and Procedures of the Graduate Council Appeals Board

The Graduate Council Appeals Board (GCAB) acts as the appeals body for graduate students seeking redress on academic decisions regarding their graduate program. Before filing an appeal, the graduate student should discuss the situation with the associate dean of the Graduate College to explore resolution of the matter at the unit or college level.

For more detailed information on the Graduate Council appeals policies and procedures, refer to the current *Graduate Catalog*.

Graduate Degrees and Majors Offered at ASU Main and ASU East

Baccalaureate degrees and majors offered at ASU Main and ASU East are shown on pages 10–11.

Degrees, majors, and concentrations offered at ASU West are shown on page 534.

ASU MAIN

Master of Accountancy

Master of Architecture

Master of Arts

Anthropology
 Archaeology
 Bioarchaeology
 Linguistics
 Medical anthropology
 Museum studies
 Physical anthropology
 Social-cultural anthropology

Art

Art education
 Art history
 Communication
 Curriculum and Instruction¹
 Bilingual education
 Communication arts
 Early childhood education
 Elementary education
 English as a second language
 Indian education
 Mathematics education
 Multicultural education²
 Reading education
 Science education
 Secondary education
 Social studies education
 Educational Psychology¹

English

Comparative literature
 English linguistics
 Literature and language
 Rhetoric and composition

French

Comparative literature
 Language and culture
 Literature

Geography

German

Comparative literature
 Language and culture
 Literature

History

Asian history
 British history
 European history
 Latin American history
 Public history
 U.S. history
 U.S. Western history

Humanities

Learning and Instructional Technology¹

Mathematics

Music

Ethnomusicology
 Music history and literature
 Music theory

Philosophy

Political Science

American politics
 Comparative politics
 International relations
 Political theory

Religious Studies

Social and Philosophical Foundations of Education

Sociology

Spanish

Comparative literature
 Language and culture
 Linguistics
 Literature

Special Education¹

Theatre

Master of Business Administration

Master of Computer Science¹

Master of Counseling

Master of Education

Counselor Education
 Counseling and student personnel
 Curriculum and Instruction¹
 Bilingual education
 Communication arts
 Early childhood education
 Elementary education
 English as a second language
 Indian education
 Mathematics education
 Multicultural education²
 Reading education
 Science education

¹ Major offered toward more than one degree at the same level.

² Applications are not being accepted at this time.

Graduate Degrees and Majors Offered at ASU Main and ASU East (continued)

Secondary education	Microbiology	Industrial Engineering ¹
Social studies education	Physics	Information Management
Educational Administration and Supervision ¹	Plant biology	Justice Studies
Educational Media and Computers ³	Master of Physical Education	Mechanical Engineering ¹
Business education	Master of Public Administration	Microbiology
Educational Psychology ¹	Public Administration	Molecular and Cellular Biology
Higher and Postsecondary Education	Public information management	Nursing
Higher education	Public management	Adult health nursing
Learning and Instructional Technology ¹	Public policy analysis and evaluation	Community health nursing
Special Education ¹	Urban management and planning	Community mental health/psychiatric nursing
Gifted	Master of Science	Nursing administration
Mildly handicapped	Aerospace Engineering ¹	Parent-child nursing
Multiculturally exceptional	Bioengineering	Physics
Severely/multiply handicapped	Biology ³	Plant Biology ³
Master of Environmental Planning	Ecology	Ecology
Environmental Planning	Building Design	Photosynthesis
Urban planning	Computer-aided design	Recreation
Master of Fine Arts	Energy performance and climate-responsive architecture	Outdoor recreation
Art	Facilities development and management	Recreation administration
Ceramics	Chemical Engineering ¹	Social/psychological aspects of leisure
Drawing	Biomedical and clinical engineering	Tourism and commercial recreation
Fibers	Chemical process engineering	Statistics ⁴
Intermedia	Chemical reactor engineering	Master of Science in Design
Metals	Energy and materials conversion	Design
Painting	Environmental control	Graphic design
Photographic studies	Solid-state processing	Industrial design
Photography	Transport phenomena	Interior design
Printmaking	Chemistry	Master of Science in Engineering
Sculpture	Analytical chemistry	Aerospace Engineering ¹
Wood	Biochemistry	Chemical Engineering ¹
Creative Writing ⁴	Geochemistry	Biomedical and clinical engineering
Dance	Inorganic chemistry	Chemical process engineering
Theatre	Organic chemistry	Chemical reactor engineering
Acting	Physical chemistry	Energy and materials conversion
Scenography	Solid-state chemistry	Environmental control
Theatre for youth	Civil Engineering ¹	Solid-state processing
Master of Health Services Administration	Environmental/sanitary	Transport phenomena
Master of Mass Communication	Geotechnical/soil mechanics	Civil Engineering ¹
Master of Music	Structures	Environmental/sanitary
Composition	Transportation	Geotechnical/soil mechanics
Music Education	Water resources/hydraulics	Structures
Choral music	Communication Disorders	Transportation
General music	Computer Science ¹	Water resources/hydraulics
Instrumental music	Construction	Electrical Engineering ¹
Performance	Construction science	Engineering Science ¹
Music theatre musical direction	Facilities	Industrial Engineering ¹
Music theatre performance	Management	Mechanical Engineering ¹
Performance pedagogy	Economics	Master of Social Work
Piano accompanying	Electrical Engineering ¹	Master of Taxation
Solo performance (instrumental, keyboard, voice)	Engineering Science ¹	Master of Teaching English as a Second Language
Master of Natural Science	Environmental Resources	Doctor of Education
Natural Science	Exercise Science/Physical Education	Curriculum and Instruction ¹
Biology	Family Resources and Human Development	Bilingual education
Chemistry	Family studies	Communication arts
Geology	General family resources and human development	Curriculum studies
Mathematics	Geology	Early childhood education
		Elementary education
		English as a second language
		Indian education

¹ Major offered toward more than one degree at the same level.

² Applications are not being accepted at this time.

³ Major with formalized concentration(s); other areas of study are available.

⁴ Students apply to this degree program through the Graduate College.

Graduate Degrees and Majors Offered at ASU Main and ASU East (continued)

Mathematics education	Communication	Learning and Instructional Technology
Multicultural education ²	Communicative development	Instructional technology
Reading education	Intercultural communication	Learning
Science education	Organizational communication	Mathematics
Secondary education	Computer Science	Mechanical Engineering
Social studies education	Counseling Psychology	Microbiology
Educational Administration and	Curriculum and Instruction ^{1, 5}	Molecular and Cellular Biology
Supervision	Curriculum studies	Physics
Higher and Postsecondary Education	Early childhood education	Plant Biology ³
Higher education	Educational media and computers	Ecology
Doctor of Musical Arts	Elementary education	Photosynthesis
Music	English education	Political Science
Choral music	Exercise and wellness education	American politics
Composition	Music education	Comparative politics
General music	Physical education	International relations
Instrumental music	Reading education	Political theory
Solo performance (instrumental, keyboard, voice)	Science education	Psychology
Doctor of Philosophy	Special education	Behavioral neuroscience
Aerospace Engineering	Economics	Clinical psychology
Anthropology	Educational Leadership and Policy Studies	Cognitive/behavioral systems
Archaeology	Educational Psychology	Developmental psychology
Physical anthropology	Lifespan developmental psychology	Environmental psychology
Social-cultural anthropology	Measurement, statistics, and methodological studies	Social psychology
Bioengineering	School psychology	Science and Engineering of Materials
Biology ³	Electrical Engineering	High-resolution nanostructure analysis
Ecology	Engineering Science	Solid-state device materials design
Business Administration	English	Social Work
Accountancy	Literature	Sociology
Finance	Rhetoric/composition and linguistics	Spanish
Health services research ²	Environmental Design and Planning	Speech and Hearing Science
Information management systems	Design	Developmental neurolinguistic disorders
Management	History, theory, and criticism	Neuroauditory processes
Marketing	Planning	Neurogerontologic communication disorders
Supply chain management	Exercise Science ⁴	Theatre
Chemical Engineering	Biomechanics	Theatre for youth
Biomedical and clinical engineering	Motor behavior/sport psychology	Doctor of Public Administration⁵
Chemical process engineering	Physiology of exercise	Juris Doctor⁶
Chemical reactor engineering	Family Science ³	ASU EAST
Energy and materials conversion	Marriage and family therapy	Master of Science
Environmental control	Geography	Agribusiness
Solid-state processing	Geology	Agribusiness management and marketing
Transport phenomena	History	Food quality assurance
Chemistry	Asian history	Master of Technology
Analytical chemistry	British history	Technology
Biochemistry	European history	Aeronautical engineering technology
Geochemistry	Latin American history	Aeronautical management technology
Inorganic chemistry	U.S. history	Electronics and computer engineering technology
Organic chemistry	Industrial Engineering	Graphic communications technology
Physical chemistry	Justice Studies ³	Industrial management and supervision
Solid-state chemistry	Criminal and juvenile justice	Manufacturing engineering technology
Civil Engineering	Dispute resolution	Mechanical engineering technology
Environmental/sanitary	Law, justice, and minority population	Welding engineering technology
Geotechnical/soil mechanics	Law, policy, and evaluation	
Structures	Women, law, and justice	
Transportation		
Water resources/hydraulics		

¹ Major offered toward more than one degree at the same level.

² Applications are not being accepted at this time.

³ Major with formalized concentration(s); other areas of study are available.

⁴ Students apply to this degree program through the Graduate College.

⁵ This program is administered jointly by the College of Education and the Graduate College.

⁶ Students apply to this degree program through the College of Law, not the Graduate College.

University Honors College

Ted Humphrey, Ph.D.
Dean

MISSION

The University Honors College is a community of learners dedicated to superior undergraduate education based on the pursuit of excellence, respect for the individual, commitment to integrity, and service to society.

The Honors College offers talented, motivated students educational opportunities designed to enrich and further their personal academic and career goals. It is a portal through which academically talented students gain unique access to the university's human and physical resources. Transdisciplinary in nature, the Honors College develops curricular and other learning opportunities to meet general and disciplinary undergraduate educational objectives. The Honors College supports undergraduate research, encourages study abroad, guides students to relevant internships, mentors applicants for fellowships and scholarships, and assists students with application to graduate school.

Unique in Arizona and the Southwest, the Honors College serves students seeking degrees on all of ASU's campuses: the Main Campus in Tempe, ASU West in Glendale, and ASU East (Williams Campus) in Chandler. This allows students across the university to take advantage of the university's full resources with the assurance of consistently distinguished teaching and research and with commensurately rigorous expectations for performance.

Students from all disciplinary colleges and academic majors enroll in the University Honors College. The Colleges of Business, Liberal Arts and Sciences, Public Programs, and Nursing offer particularly strong programs. The College of Architecture and Environmental Design and the School of Social Work developed the nation's first honors curricula in their disciplines. The College of Engineering and Applied Sciences has the most complete engineering honors curriculum in the United States. Students with majors in the Colleges of Education and Fine Arts can also choose from a wide range of exciting courses, especially at the lower division.

CURRICULUM

Students seeking to graduate from the University Honors College must also graduate from a disciplinary college. The ASU honors curriculum nor-

mally allows students to finish all requirements within the 120 semester hours of credit usually required for graduation.

The first two years of the honors curriculum typically focus on General Studies. The second two years concentrate on the student's academic major and lead to graduation from both a disciplinary college and the University Honors College. Participating in this part of the curriculum allows students to complete an extended creative or research project appropriate to their academic interests to fulfill their honors thesis requirement. In conceiving and completing this project, each student works closely with a faculty mentor to identify and develop an original concept that extends and integrates the student's work in a discipline.

SPECIAL PROGRAMS

Office of National Scholarship Advisement

The Office of National Scholarship Advisement (ONSA) assists honors and other high-achieving students by identifying nationally competitive programs appropriate to each person's intellectual and career goals, nurturing these prospective applicants, and advancing their candidacy. This office, administered by the University Honors College, serves the entire ASU community. ASU students regularly earn distinction in the most rigorous and prestigious scholarship competitions. Many pursue enhanced degree programs and research projects under the auspices of Goldwater or Truman Scholarships. Still others undertake postgraduate study in the United States and abroad as Rhodes, Marshall, Fulbright, Udall, National Science Foundation, or Mellon Scholars. Many others have been recognized by a range of postgraduate awards, fellowships, and assistantships. *This office does not administer any need- or merit-based student financial assistance.* For more information on ONSA programs, call Professor William Weidemaier at 602/965-5894.

Study Abroad

University Honors College students have exclusive access to two summer study abroad programs (one in Britain, a second in Paris) and to arrangements with ASU's International Programs Office that allow for more flexible course registration and transfer arrangements:

plans that allow Honors College students to earn honors credit while overseas.

Internships/Mentorships

Upper-division students in the University Honors College may participate in special internship opportunities or mentoring by leaders—in government, industry, and the private sector—throughout metropolitan Phoenix. Applications for these programs are coordinated through Professor Janet Burke at 602/965-2359.

Cultural/Arts Programming

University Honors College students participate in a range of cultural enrichment activities which include deeply discounted tickets to selected performing arts events throughout Arizona, weekly lunches with the dean, and special access to the most important shapers of contemporary thought who visit ASU. The Honors College hosts the university's premier scholar-in-residence program, The Centennial Lecture, each year; past guests include novelist Carlos Fuentes, paleontologist Steven Jay Gould, psychologist Robert Coles, microbiologist Lynn Margulis, and intellectual historian Susan Sontag.

ADDITIONAL BENEFITS

The University Honors College and all its facilities and services are fully available to every student, regardless of where he or she lives; presently, designated honors housing exists only at ASU Main. There, McClintock Hall,

the original Scholars' Residence, offers an integrated living-learning environment; faculty and academic advisors serve the students from ground-floor offices. Classrooms, recreational and study lounges, and a computing lab compose the principal facilities of the college. Students in the honors wing of nearby Best Hall enjoy the convenience of honors classes in their residence and have faculty and other sources of academic support available on-site.

Honors students have special advisors to help them plan individualized programs of study, and they receive priority at preregistration. Honors courses in disciplinary departments are normally limited to 22 students. Honors College courses (HON) are usually limited to 18.

Students can receive transcript recognition for lower-division honors studies. Students who meet all upper-division requirements of both their disciplinary college and the University Honors College receive transcript recognition of that accomplishment, as well as special acknowledgment in the graduation ceremonies and collegiate honors convocations.

Participants in the University Honors College have diverse interests and strong records of success. Many go on to the nation's finest graduate and professional programs, including Chicago, Cornell, Harvard, Michigan, MIT, Northwestern, Stanford, UC-Berkeley, Virginia, Wisconsin, and Yale, among others. Many students have published portions of their honors theses and have

presented their work at the national and regional meetings of scientific and honors societies.

ADMISSION

All candidates for admission to the University Honors College must file an application. Only *one* of the following criteria must be met. An entering freshman is admitted if he or she

1. graduates in the top 5% of his or her high school class;
2. has a composite ACT score of 29;
3. has a combined SAT score of 1300; or
4. submits similar indications of academic achievement and aptitude.

Continuing and transfer students who have completed at least 12 semester hours of study with a cumulative GPA of at least 3.25 (4.00 = A) may apply for admission to the college.

Community college transfer students who have graduated from their institution's honors programs are eligible to apply for Regents' Transfer Scholarships. Information about this award is available through the Student Financial Assistance Office at 602/965-3355.

Students not meeting the admission requirements, but who believe they can better succeed at the university and meet the college's academic standards, may apply for provisional admission. The dean of the college reserves the right to interview each such applicant.

Application forms and additional information about the college and its activities are available by calling the college's offices at 602/965-2359 or by writing to

UNIVERSITY HONORS COLLEGE
ARIZONA STATE UNIVERSITY
PO BOX 873102
TEMPE AZ 85287-3102

RETENTION

Honors students must maintain high standards of academic performance and show progress toward completion of graduation requirements in their disciplinary majors and the Honors College. Students normally register for at least one honors course each semester. Good standing in the University Honors College requires students to maintain the following cumulative ASU GPAs (4.00 = A):

1. less than 45 semester hours, 3.25;
2. between 45 and 80 semester hours, 3.33; and
3. above 80 semester hours, 3.40.

A student with a cumulative ASU GPA below 3.25 (4.00 = A) is placed on probation and is withdrawn from the college if he or she does not make reasonable progress in raising the cumulative GPA during the following semester.

COURSES

Only courses in which a student earns at least a grade of "C" may be used to meet University Honors College requirements.

Freshmen and students entering the college with fewer than 45 semester hours of course work must take HON 171 and 172 The Human Event. This cross-disciplinary seminar acquaints them with ideas that form the foundation of a university education and emphasizes critical thinking, discussion, and writing.

Students entering the college after completing 45 semester hours must take HON 394, a junior-level seminar that introduces them to critical thinking, discussion, and writing in a topical area chosen by the instructor.

Departmental courses carrying footnote number 19 in the *Schedule of Classes* are limited to honors students and others who receive special permission from the instructor to enroll. Enrollment in these courses is limited to 22 students. Compared to their non-honors equivalents, these courses are designed to offer a richer, more complex intellectual experience appropriate to the discipline and the level of the course for all students enrolled.

Departmental courses carrying footnote number 18 in the *Schedule of Classes* allow honors students to contract with the instructor of designated nonhonors courses to earn honors credit by pursuing enrichment activities, which may include supplemental sessions with the instructor. Footnote 18 contracts must be filed during the first three weeks of class and completed during the semester in which the course is offered. Each contract form offers guidelines to aid students and faculty in developing appropriate contracts.

Course numbers listed in the *Schedule of Classes* as 298, 492 Honors Directed Study, 493 Honors Thesis, 497 Honors Colloquium, and all classes with the HON prefix are reserved for University Honors College students and always carry footnote 19. Students may receive credit for more than one of each of these courses in a given department.

Departmental courses with the number 493 are reserved for honors students completing their honors theses. A student may enroll for these courses only with the approval of the sponsoring academic department and of the faculty member who serves as the student's thesis director. Course numbers listed in the *Schedule of Classes* as 493 will fulfill the student's L2 General Studies requirement. Students may receive a maximum of six semester hours of credit for an honors thesis, including any directed study (492, 499) and/or research preparation courses directly related to the thesis project.

All courses a student takes for honors credit count toward graduation, even if the student does not graduate from the University Honors College.

HONORS TRANSCRIPT RECOGNITION

All courses used to fulfill lower-division or upper-division/graduation requirements for the University Honors College must carry earned letter grades of at least "C." A "Y" grade does not meet University Honors College requirements.

Lower Division

To receive transcript recognition for lower-division honors work, students must complete 18 semester hours of honors coursework within 60 earned semester hours with a cumulative ASU GPA greater than or equal to 3.40 (4.00 = A).

Courses *must* include HON 171 and 172 The Human Event. Courses which earn automatic honors credit, although not carrying a footnote number 19 in the *Schedule of Classes* include ENG 105 (any section), CHM 117 and 118 (any section), and MAT 290 and 291 (any section).

Students may apply upper-division honors coursework toward lower-division requirements; however, those classes may not also be used to meet University Honors College upper-division/graduation requirements.

Upper Division/Graduation from the University Honors College

To graduate from the University Honors College, students must

1. complete HON 171 and 172 The Human Event for continuing ASU or transfer students with less than 45 hours of credit; *or* HON 394 Selected Topics for continuing or transfer students with 45 or more hours of credit;
2. complete 18 additional semester hours of upper-division honors course work for an earned letter grade (of which six semester hours must be outside the academic major);
3. complete ASU graduation requirements in an academic major; and
4. earn a cumulative ASU GPA greater than or equal to 3.40 (4.00 = A).

Courses *must* include three to six semester hours of Honors Thesis. Courses *may* include graduate courses (500-level or higher).

University Honors College

Ted Humphrey
Dean
(MCL 112) 602/965-2359
www.asu.edu/honors

PROFESSOR
HUMPHREY

SENIOR LECTURERS
STANFORD, WEIDEMAIER

LECTURERS
BURKE, DALTON, FACINELLI,
RAMSEYER, SUSSER

HONORS (HON)

HON 171 The Human Event. (3) F Landmarks in the social and intellectual development of the human race, with emphasis on Western civilization. Enrollment restricted to members of the University Honors College. Consult the University Honors College for applicability to disciplinary college distribution requirements. *General Studies: L1/HU, H.*

HON 172 The Human Event. (3) S Continuation of HON 171, with emphasis on the Renaissance through the modern period. *General Studies: L1/HU, H.*

College of Law

Alan A. Matheson
Interim Dean

PURPOSE

The prime function of the College of Law is to train men and women for the practicing legal profession and related professional assignments. In addition, the college has the responsibility to contribute to the quality of justice administered in our society.

ORGANIZATION

Law Building and Law Library

The John S. Armstrong Law Building is in the central campus near other colleges of the university and Hayden Library. The Law Building provides every modern facility for legal education and has been described by experts on planning law buildings as setting a new standard in functional design.

The award-winning John J. Ross-William C. Blakley Law Library, named in memory of two prominent Phoenix attorneys, is one of the finest law libraries in the Southwest with a collection of more than 351,000 volumes and microform volume equivalents. The collection includes a broad selection of Anglo-American case reports and statutes as well as legal treatises, periodicals, encyclopedias, digests, citators, and administrative materials. The collection includes growing special collections in the areas of international law, Indian law, Mexican law, and law and technology. The library is also a selective U.S. government depository.

The library is housed in a dramatic and functional building that opened in August 1993. The building provides accessible shelving for the expanding collections and comfortable study space at carrels, tables, and lounge seating located throughout the library. The library has a 30-station computer lab as well as LEXIS and WESTLAW rooms which contain 10 stations each; 27 meeting and study rooms; a microforms facility; and a classroom.

Students also have ready access to the other campus libraries, including the Charles Trumbull Hayden Library, the Daniel E. Noble Science and Engineering Library, the Architecture and Environmental Design Library, and the Music Library. The collections of the university libraries comprise more than 3 million volumes.

Special Programs

Center for the Study of Law, Science, and Technology. The ASU

Center for the Study of Law, Science, and Technology is a multidisciplinary research center founded by the Arizona Board of Regents in 1984. The center publishes research studies, sponsors seminars and symposia, and houses visiting scholars and teachers. Through these programs, the center seeks to contribute to the formulation and improvement of law and public policy affecting science and technology and to the wise application of science and technology in the legal system.

The College of Law offers a substantial number of courses in the law, science, and technology area including bioethics, law and psychiatry, environmental law, health care law, intellectual property, land use regulation, law and evolutionary biology, law and medicine, law and social science, mass communication, natural resources law, patent law, regulatory problems in law, science and technology, and water law. Each semester, the center publishes a student guide to other less obvious courses that contain science and technology issues. In recent semesters this guide has listed courses in AIDS and the law, commercial law, employment law, law and the handicapped, antitrust, statistical proof in employment discrimination litigation, and several courses offered by other departments on campus available for registration by law students. In addition to regular course offerings, students can arrange independent studies with supervising faculty on topics of special interest to them. The center also invites guest speakers from legal or scientific fields to visit with interested law students, generally during the noon hour.

In cooperation with the American Bar Association Section on Science and Technology and under the leadership of a faculty editor, second- and third-year students edit the *Jurimetrics Journal of Law, Science and Technology*. Student editors do both editorial work on submitted articles and original writing for publication in the journal.

Indian Legal Program. In the spring of 1988, the faculty of the College of Law voted to devote substantial new resources and energy to an Indian Legal Program that would have a three-part mission: education, legal scholarship, and public service to tribal governments. The College of Law provides its students with a quality legal

education and an opportunity to gain knowledge and expertise in Indian law.

Students at the College of Law have the opportunity to participate in all phases of the Indian Legal Program and gain in-depth understanding of the legal issues affecting Indian tribes and people. Courses on Federal Indian law and seminars on advanced Indian law topics such as Tribal Court dispute resolution, economic development, American Indian cultural resources protection, and tribal environmental law are part of the curriculum. Students may also participate in externships with the local tribal courts or spend a semester in Washington, D.C., working with the Senate Select Committee on Indian Affairs. This variety of academic and work experience provides the students an outstanding legal education with a firm grounding in both the theoretical and practical aspects of Indian law.

Law Journal. The College of Law publishes a professional law review, the *Arizona State Law Journal*, edited by students of the second- and third-year classes. Membership on the law journal is determined by grade performance in the first year and, for some, by submission of written work in a writing competition. Participation on the law review is hard but rewarding work. For those eligible, the review provides one of the finest avenues for legal education thus far developed, contributing to the student's intellectual advancement, to the development of law and the legal profession, and to the stature of the College of Law.

ADMISSION

First-year students are admitted only for the fall semester. The formal requirements for admission to the College of Law are (1) an undergraduate degree from an accredited four-year college or university and (2) a score on the Law School Admission Test (LSAT), administered by Law Services, Box 2000, Newtown, Pennsylvania 18940, in centers throughout the country.

For more information regarding Admission, call 602/965-7207, or write

ADMISSIONS OFFICE
COLLEGE OF LAW
ARIZONA STATE UNIVERSITY
BOX 877906
TEMPE AZ 85287-7906

JURIS DOCTOR DEGREE

The College of Law offers a three-year program of professional studies at the graduate level leading to the degree of Juris Doctor.

For more information on the degree and courses, see the *Graduate Catalog*.

Course of Study

The program of study in the College of Law is designed for full-time students. In the first year of the three-year program, the course of study is prescribed and incorporates the time-proven techniques of legal education. This first year gives students—by the “case method,” by the “problem method,” by “moot court,” and through other techniques—an intensive exposure to the basic legal processes.

As a part of the program, first-year students are assigned to small sections. In the Legal Research and Writing program, first-year students prepare legal briefs and memoranda and receive feedback through the use of practice examinations. The program focuses on the development of writing and organizational skills necessary for success in law school and in the practice of law. The second and third years cover a wide range of courses varying in format as well as subject matter, allowing students to pursue both the basic subjects of law study and more specialized interests. By offering great freedom in the selection of subjects, the educational experience of the second and third years is in sharp contrast to the curriculum of the first year. In addition, the college offers a number of faculty-supervised clinical education programs and a program of supervised externships.

Grading

College of Law courses are graded under the following numerical scale:

Grade	Definition
90-99	Distinguished
85-89	Excellent
80-84	Very Good
75-79	Good
70-74	Satisfactory
60-69	Deficient
59	Failing

A grade of 60 or above is required to receive credit for any course.

Retention Standards. To be eligible to continue in the College of Law, students must maintain a cumulative weighted GPA of 70 or higher at the end of each semester or summer session. Any student who fails to achieve a 70 GPA in any one semester, regardless of the cumulative GPA, is automatically placed on probation. Continuation of enrollment by probationary students is upon such terms and conditions as the college may impose.

A student whose cumulative GPA falls below the required level or whose semester GPA is less than 70 in two consecutive semesters is dismissed but may apply to the Office of the Dean for readmission. The Office of the Dean refers the application to a faculty Committee on Readmission. Where the GPA deficiency is slight and evidence of extenuating circumstances is convincing, readmission may be granted on a probationary status after a review of the reasons contributing to unsatisfactory performance and a finding that there is substantial prospect for acceptable academic performance. Continuation in school thereafter may be conditioned on achieving a level of performance higher than the overall 70 GPA. Further detailed information concerning the college's retention standards can be found in the *Bulletin of the College of Law*.

Special Honors at Graduation. At the time of graduation, students who have earned academic distinction in the study of law may be awarded the designations *cum laude*, *magna cum laude*, and *summa cum laude*. The college also bestows membership in the Order of the Coif upon students in the top 10% of the class. Recipients of these awards are selected by the law faculty on the basis of academic performance.

Honor Code. The legal profession, a self-regulating association, depends on the integrity, honor, and personal morality of each member. Similarly, the integrity and value of an ASU College of Law degree depends on a reputation for fair competition. The college's *Honor Code* is intended as a measure to preserve the integrity of the school's diploma and to create an arena in which students can compete fairly and confidently. Copies of the *Honor Code* are available from the assistant dean in the college's Student Services Office.

ACCREDITATION

The college is fully accredited by the American Bar Association and is a member of the Association of American Law Schools.

INFORMATION

Further detailed information concerning the course of study, admission practices, expenses, and financial assis-

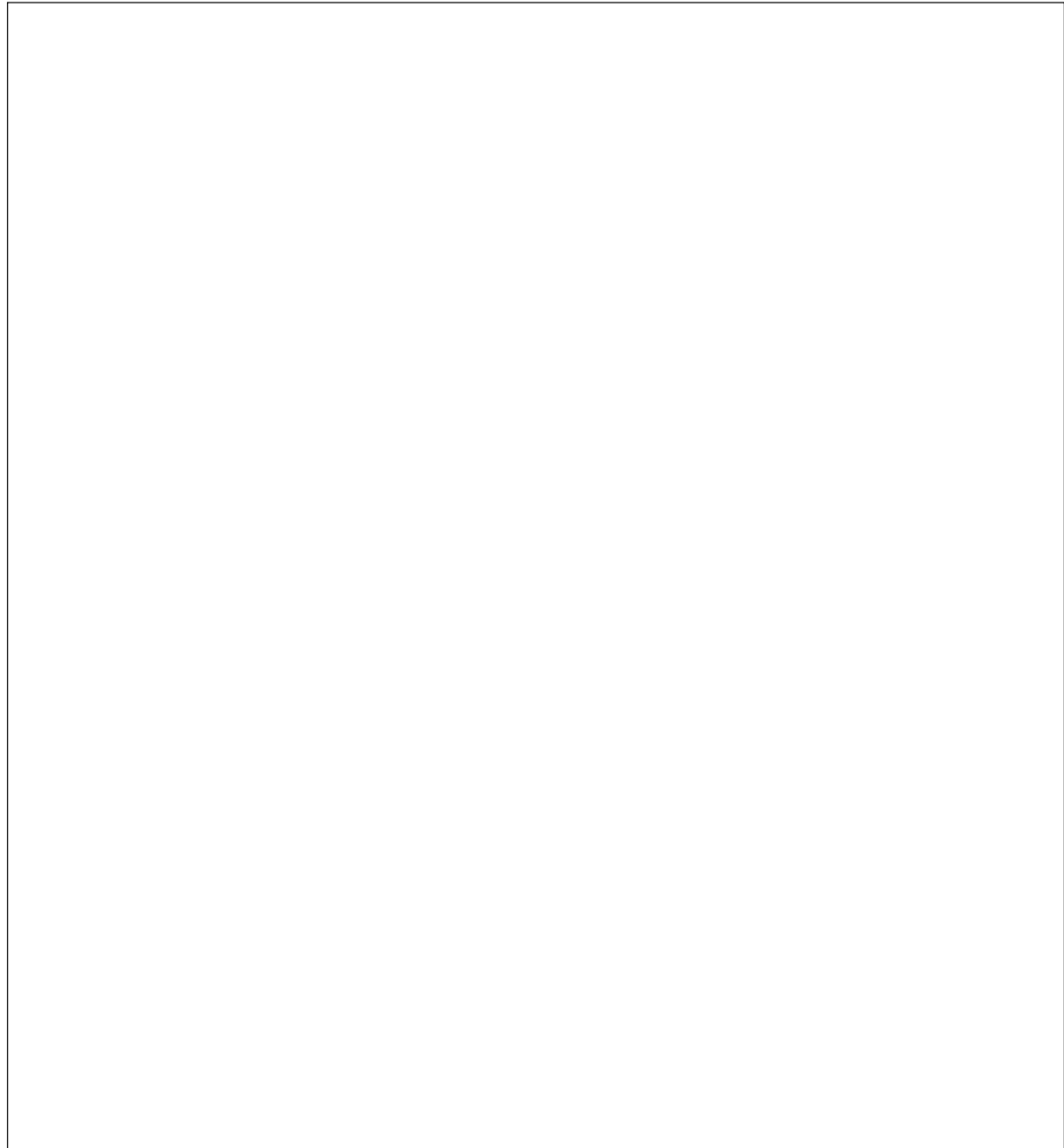
tance can be found in the *Bulletin of the College of Law*. To request the bulletin or application forms, call 602/965-7207, or write

ADMISSIONS OFFICE
COLLEGE OF LAW
ARIZONA STATE UNIVERSITY
BOX 877906
TEMPE AZ 85287-7906

For general information about the College of Law, contact Catherine Hevia at 602/965-1474 or view the college's World Wide Web page located at www.law.asu.edu.

LAW (LAW)

See the *Graduate Catalog* for the LAW courses.



College of Liberal Arts and Sciences

Gary S. Krahenbuhl, Ed.D.
Dean

PURPOSE

Like all major research universities, Arizona State University provides the means for undergraduates to acquire a liberal education, an education that broadens students' understanding in the major areas of human knowledge while providing students with in-depth knowledge in their chosen areas of focus. While the professional schools and colleges can and do provide for important dimensions of a liberal education, the central academic setting for accomplishing this basic university purpose is the College of Liberal Arts and Sciences (CLAS). The college provides a particularly rich and varied set of opportunities for students to gain the kind of liberal education that helps to prepare them for a lifetime of continued learning and application of knowledge in a diverse and ever-changing world.

As a consequence of the wide range of subjects CLAS offers in the humanities, the natural sciences and mathematics, and the social and behavioral sciences, instruction is provided in a number of core areas for undergraduate students from all of the other colleges. Students with majors in business, education, engineering, nursing, and other professional colleges rely on CLAS for basic foundation courses. CLAS also offers the majority of courses meeting the General Studies requirement.

CLAS initiated and continues to participate actively with the University Honors College. It also offers advising to undergraduates who are working out their undergraduate programs or are planning for graduate studies.

Most of the university faculty's engagement in the discovery and creation of knowledge and its dissemination occurs in CLAS. As an integral part of this activity, CLAS offers a wide range of graduate training programs leading to a master's or doctoral degree. For graduate degree application information, consult the *Graduate Catalog* and contact either the Graduate College or the academic unit in which the degree of interest would be earned, the latter in order to receive detailed information on particular degree requirements.

ORGANIZATION

CLAS consists of 23 academic departments, several interdisciplinary programs, six centers, and several research institutes and laboratories. The college offers 33 programs leading to a bache-

lor's degree, 28 programs leading to a master's degree, 20 programs leading to a doctoral degree, and interdisciplinary graduate programs in cooperation with other colleges. Undergraduate customized interdisciplinary degrees are also available in the college.

For more information, visit the college's Web site at www.asu.edu/clas.

ADMISSION

Any entering ASU student who has met the minimum university entrance requirements can be admitted to CLAS. Students with fewer than 50 earned hours of credit can, if they wish, be admitted as "no preference" students. Students with 50 or more hours must declare a major to be accepted into the college.

Any student with a cumulative GPA of at least 2.00 who is currently registered in good standing in another college at ASU and who wishes to major in a subject offered by CLAS and to follow a program of study in the major may transfer into the college. (Students wishing to transfer into the majors of Computer Science or Economics must have an ASU cumulative GPA of at least 2.50.) The student transfers by making application and being initially advised in the Office for Academic Programs, SS 111. Students admitted from other ASU colleges are under mandatory advising during the first semester and must take courses leading directly to a degree in CLAS. Failure to follow mandated advice on course selection can result in enrollment and registration problems, including cancellation and holds.

Transfer Students. The university standards for evaluation of transfer credit are listed on pages 63–64. All students who meet the university standards are admissible to CLAS, but students desiring to major in either Computer Science or Economics must have transfer GPAs of at least 2.50. Transfer students are urged to contact the relevant academic department or the Office for Academic Programs, SS 111, to ensure a smooth transition to CLAS. Students who have transferred courses from institutions other than Arizona community colleges must have their transcripts evaluated by an advisor in SS 111. Students who have attended only Arizona community colleges have evaluations performed in the department of the major.

Advising for Preprofessional Programs

Professional Field	Office Where Advisor Is Located
Dentistry ^{1, 2}	Pre-Health Professions, MCL 110B
Foreign service	Department of chosen major
Health physics	Pre-Health Professions, MCL 110B
Law	Office for Academic Programs, SS 111
Medicine ¹	Pre-Health Professions, MCL 110B
Ministry	Department of Religious Studies, LL B605
Occupational therapy ¹	Pre-Health Professions, MCL 110B
Optometry ^{1, 2}	Pre-Health Professions, MCL 110B
Osteopathy ¹	Pre-Health Professions, MCL 110B
Pharmacy ¹	Pre-Health Professions, MCL 110B
Physical therapy ¹	Pre-Health Professions, MCL 110B
Podiatry ^{1, 2}	Pre-Health Professions, MCL 110B

¹ Students preparing for a career in these areas should register in the Pre-Health Professions office, 602/965-2365.

² No school in Arizona offers a program in dentistry, optometry, or podiatry. Students interested in pursuing these professions should confer with the Pre-Health Professions advisor concerning out-of-state schools where they may complete their training.

Courses transferred from two-year (community) colleges are accepted as lower-division credit only. Students are urged to choose their community college courses carefully, in view of the fact that a minimum of 45 semester hours of work taken at the university must be upper-division credit (see page 63).

“Undecided” or “Undeclared” Majors. Students in CLAS are not required to select a major upon entering the college as freshmen or at any time thereafter until the semester in which 60 semester hours are earned. Until such “no preference” students have chosen a major, they are advised through Cross-college Advising Services, in the Undergraduate Academic Services Building. It is important to consult an academic advisor before any enrollment activity. Before or during the semester in which they earn 60 semester hours, students *must* select their major and transfer into the appropriate department.

Note: Students who wish to enter a program of study that has a rigidly structured curriculum should be aware that delay in choosing a major could result in added time and cost in the completion of requirements.

ADVISING

All students are urged to seek advising in the appropriate college unit before registration. Students must follow the calendar published in the *Schedule*

of Classes for each semester for information regarding enrollment, adding/dropping classes, and withdrawals.

Regular Advising. All students are strongly urged to seek advising in the appropriate college unit before registration.

Advising Locations. CLAS students should seek routine advising in the following locations:

Student	Advising Location
Declared majors	Department of major
No preference; no preference, prelaw	Cross-college Advising Services, Undergraduate Academic Services Building (602/965-4464)
No preference, premedical	MCL 110B (602/965-2365)

The Office for Academic Programs, located in SS 111, is the central resource center for academic information in the college. Requests from students, departmental advisors, and faculty for clarification of rules, procedures, and advising needs of the college and university should be directed to that office.

Mandatory Advising. The following categories of Liberal Arts and Sciences students *must* receive advising and *must* be cleared on the Mandatory Advising Computer System (MACS) before their classes may be scheduled:

1. students in their first semester at ASU;
2. students on probation;
3. students with less than a 2.00 cumulative GPA;
4. students who have admissions deficiencies;
5. other students with “special admissions” status; and
6. students who have been disqualified (these students are allowed to attend ASU summer sessions only and must be advised in the Office for Academic Programs, SS 111).

Students in the above mandatory advising categories should consult an advisor in the appropriate location listed in the previous section. Students with admission deficiencies are carefully monitored to ensure that they take courses that eliminate their deficiencies. Students are encouraged to check their mandatory advising status each semester before attempting registration transactions.

Advising for Preprofessional Programs. Special advising is available for students planning to enter the fields listed in the “Advising for Preprofessional Programs” table. The professional programs shown in the table are not majors in themselves; that is, there are no majors called “premedical,” “prelaw,” etc. In each program, the student must eventually select an established major in CLAS or in one of the other colleges.

DEGREES

Majors. Programs leading to the B.A. and B.S. degrees are offered by CLAS, with majors in the subjects listed in the “CLAS Degrees, Majors, and Concentrations” table, pages 301-303. Each major is administered by the academic department indicated.

Minors. Although not required for graduation, special college-approved minors are available in most departments. Check department program descriptions for details. Minors offered by departments must have at least 18 hours of designated courses, including 12 hours of upper-division work. The college requires a grade of at least “C” in all upper-division courses in the minor. Some departments have stricter requirements. A minimum of six upper-division hours in the minor must be taken in residence at ASU Main.

CLAS Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Anthropology	B.A.	Department of Anthropology
Asian Languages (Chinese/Japanese)	B.A.	Department of Languages and Literatures
Biology	B.S.	Department of Biology
Concentration: biology and society		
Chemistry	B.A.	Department of Chemistry and Biochemistry
Chemistry	B.S.	Department of Chemistry and Biochemistry
Emphasis: biochemistry		
Chicana and Chicano Studies	B.A.	Department of Chicana and Chicano Studies
Concentrations: humanities/cultural sciences, social sciences/policy		
Clinical Laboratory Sciences	B.S.	Department of Microbiology
Computer Science	B.S. ¹	Department of Computer Science and Engineering
Conservation Biology	B.S.	Department of Biology
Economics	B.A., B.S. ²	Department of Economics
English	B.A.	Department of English
Exercise Science/Physical Education	B.S.	Department of Exercise Science and Physical Education
Concentrations: exercise and wellness, exercise science, physical education		
Family Resources and Human Development	B.A. ³ , B.S.	Department of Family Resources and Human Development
Concentrations: family resources and human development in business, family studies/child development, human nutrition—dietetics		
French	B.A.	Department of Languages and Literatures
Geography	B.A., B.S.	Department of Geography
Emphases: meteorology-climatology, urban studies		
Geology	B.S.	Department of Geology
German	B.A.	Department of Languages and Literatures
History	B.A., B.S.	Department of History
Humanities	B.A.	Interdisciplinary Humanities Program
Concentrations: architecture; architecture, culture, and society; business; design; film studies; humanities/liberal arts; justice studies; planning		
Interdisciplinary Studies	B.A., B.S.	College of Liberal Arts and Sciences
Italian	B.A.	Department of Languages and Literatures
Mathematics	B.A.	Department of Mathematics
Mathematics	B.S.	Department of Mathematics
Options: applied mathematics, computational mathematics, general mathematics, pure mathematics, statistics and probability		
Microbiology	B.S.	Department of Microbiology
Philosophy	B.A.	Department of Philosophy
Physics	B.S.	Department of Physics and Astronomy
Emphasis: astronomy		
Options: I, II		
Plant Biology	B.S.	Department of Plant Biology
Concentrations: environmental science and ecology, molecular biosciences/biotechnology, urban horticulture		
Political Science	B.A., B.S.	Department of Political Science

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both CLAS and the College of Engineering and Applied Sciences. Requirements differ according to college (see pages 217 and 325). This major requires more than 120 semester hours to complete.

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the CLAS and the College of Business. Requirements differ according to college (see pages 154 and 325).

³ Students are not being accepted to this program at this time.

Major	Degree	Administered by
Psychology	B.A., B.S.	Department of Psychology
Religious Studies	B.A.	Department of Religious Studies
Russian	B.A.	Department of Languages and Literatures
Sociology	B.A.	Department of Sociology
Spanish	B.A.	Department of Languages and Literatures
Speech and Hearing Science	B.S.	Department of Speech and Hearing Science
Women's Studies	B.A., B.S.	Women's Studies Program
Graduate Degrees		
Anthropology	M.A.	Department of Anthropology
Concentrations: archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, social-cultural anthropology		
Anthropology	Ph.D.	Department of Anthropology
Concentrations: archaeology, physical anthropology, social-cultural anthropology		
Biology ⁴	M.S., Ph.D.	Department of Biology
Concentration: ecology		
Chemistry	M.S., Ph.D.	Department of Chemistry and Biochemistry
Concentrations: analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid-state chemistry		
Communication Disorders	M.S.	Department of Speech and Hearing Science
Creative Writing	M.F.A. ^{5, 6}	Creative Writing Committee
English	M.A.	Department of English
Concentrations: comparative literature, English linguistics, literature and language, rhetoric and composition		
English	Ph.D.	Department of English
Concentrations: literature, rhetoric/composition and linguistics		
Exercise Science	Ph.D. ⁵	Committee on Exercise Science
Concentrations: biomechanics, motor behavior/sport psychology, physiology of exercise		
Exercise Science/Physical Education	M.S.	Department of Exercise Science and Physical Education
Family Resources and Human Development	M.S.	Department of Family Resources and Human Development
Concentrations: family studies, general family resources and human development		
Family Science ⁴	Ph.D.	Department of Family Resources and Human Development
Concentration: marriage and family therapy		
French	M.A.	Department of Languages and Literatures
Concentrations: comparative literature, language and culture, literature		
Geography	M.A., Ph.D.	Department of Geography
Geology	M.S., Ph.D.	Department of Geology
German	M.A.	Department of Languages and Literatures
Concentrations: comparative literature, language and culture, literature		

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both CLAS and the College of Engineering and Applied Sciences. Requirements differ according to college (see pages 217 and 325). This major requires more than 120 semester hours to complete.

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the CLAS and the College of Business. Requirements differ according to college (see pages 154 and 325).

³ Students are not being accepted to this program at this time.

⁴ Major with formalized concentration(s); other areas of study are available.

⁵ This program is administered by the Graduate College. See "Graduate College," pages 282–292.

⁶ Fiction, nonfiction, poetry, and screenwriting are options for students in this program offered by the faculty in the Department of English. Playwriting is also an option in this program offered by the faculty in the Department of Theatre.

Major	Degree	Administered by
History Concentrations: Asian history, British history, European history, Latin American history, public history, U.S. history, U.S. Western history	M.A.	Department of History
History Concentrations: Asian history, British history, European history, Latin American history, U.S. history	Ph.D.	Department of History
Humanities	M.A. ⁵	Graduate Committee on Humanities
Mathematics	M.A., Ph.D.	Department of Mathematics
Microbiology	M.S., Ph.D.	Department of Microbiology
Molecular and Cellular Biology	M.S., Ph.D.	Interdisciplinary Committee on Molecular and Cellular Biology
Natural Science Concentrations: biology chemistry geology mathematics microbiology physics plant biology	M.N.S.	Department of Biology Department of Chemistry and Biochemistry Department of Geology Department of Mathematics Department of Microbiology Department of Physics and Astronomy Department of Plant Biology
Philosophy	M.A.	Department of Philosophy
Physical Education	M.P.E.	Department of Exercise Science and Physical Education
Physics	M.S., Ph.D.	Department of Physics and Astronomy
Plant Biology ⁴ Concentrations: ecology, photosynthesis	M.S., Ph.D.	Department of Plant Biology
Political Science Concentrations: American politics, comparative politics, international relations, political theory	M.A., Ph.D.	Department of Political Science
Psychology Concentrations: behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, environmental psychology, social psychology	Ph.D.	Department of Psychology
Religious Studies	M.A.	Department of Religious Studies
Science and Engineering of Materials Concentrations: high-resolution nanostructure analysis, solid-state device materials design	Ph.D. ⁵	Committee on the Science and Engineering of Materials
Sociology	M.A., Ph.D.	Department of Sociology
Spanish Concentrations: comparative literature, language and culture, linguistics, literature	M.A.	Department of Languages and Literatures
Spanish	Ph.D.	Department of Languages and Literatures
Speech and Hearing Science Concentrations: developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Ph.D. ⁵	Committee on Speech and Hearing Science
Statistics	M.S. ⁵	Committee on Statistics
Teaching English as a Second Language	M.TESL	Department of English

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both CLAS and the College of Engineering and Applied Sciences. Requirements differ according to college (see pages 217 and 325). This major requires more than 120 semester hours to complete.

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the CLAS and the College of Business. Requirements differ according to college (see pages 154 and 325).

³ Students are not being accepted to this program at this time.

⁴ Major with formalized concentration(s); other areas of study are available.

⁵ This program is administered by the Graduate College. See "Graduate College," pages 282–292.

University policies prohibit the “double-counting” of courses from the major in the minor. Specific questions concerning double-counting, as well as general questions about the approval processes for minors, should be taken up with an academic advisor in the department offering the minor or the Office for Academic Programs, SS 111.

Minors	Pages
Anthropology	311
Asian Languages (Chinese/Japanese)	350
Astronomy	373
Biology	316
Chemistry and Biochemistry	321
Chicana and Chicano Studies	324
Economics for Students Planning a Career in Law	325
English	326
Exercise Science/ Physical Education	331
Family Resources and Human Development	334
French	350
General Economics	325
Geology	341
German	350
History	343
Humanities	347
Italian	350
Mathematics	362
Microbiology	367
Philosophy	371
Physics	373
Plant Biology	378
Political Science	381
Psychology	384
Religious Studies	387
Russian	350
Sociology	390
Spanish	350
Women’s Studies	395

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For complete information, see pages 79–83.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of

35 hours of approved course work in General Studies, as described on pages 84–87. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

General Studies courses are listed on pages 87–108 in the *General Catalog* following the section on “General Studies,” in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

COLLEGE DEGREE REQUIREMENTS

CLAS degree requirements are more extensive than the General Studies requirement. Additional course work in the humanities, natural sciences and mathematics, and social and behavioral sciences is required. A well-planned program of study enables students to complete the General Studies requirement while fulfilling college degree requirements. Students are encouraged to consult with an academic advisor in planning a program to ensure that they meet all necessary requirements. It is also important to note that the college classification of the humanities, natural sciences and mathematics, and social and behavioral sciences is, in some courses, different from that used for General Studies.

To graduate from CLAS, a student must satisfy separate requirements of three kinds in addition to the General Studies requirement: *proficiency requirements* indicate a minimal level of competence in written communication, quantitative reasoning, and foreign language; *major requirements* involve concentrated course work in one field; and *distribution requirements* ensure that the student is exposed to disciplines outside the major field.

I. Proficiency Requirements. Each student is required to demonstrate proficiency in First-Year Composition, a foreign language, and mathematics.

Each student must demonstrate proficiency by completing the courses specified below with a grade of “C” or higher in each course. Courses used to meet a proficiency requirement may not ordinarily be used to satisfy the distribution requirement; the two

exceptions are specified under III.A and III.B.

A. First-Year Composition

1. ENG 101 and 102 or
2. ENG 105 or
3. ENG 107 and 108 for foreign students.

B. Foreign Language

1. completion of foreign language course work at the intermediate level (202 or equivalent; see Department of Languages and Literatures listings for these equivalencies) or
2. a foreign language course at the 300 level or above taught in the foreign language and having 202 or its equivalent as a prerequisite or
3. completion of secondary education at a school in which the language of instruction is not English or
4. completion of SHS 275 American Sign Language IV or its equivalent.

C. Mathematics

1. MAT 114 or
2. MAT 117 or
3. MAT 170 or their equivalents or
4. any higher-level MAT course.

II. Major Requirements. Each student is required to select a major from among the fields of study offered by CLAS. The requirements for completion of the major are described under departmental listings.

A. The major department may require up to 45 semester hours of course work. The minimum is 30 hours. A maximum of 15 additional hours may be required in related courses and prerequisites. No more than 60 semester hours of course work may be required to complete the major, related courses, and prerequisites. Some departments require calculus-level mathematics; up to five of these semester hours may be excluded from the 60-hour

- maximum because they satisfy the mathematics proficiency requirement. A minimum of 12 upper-division hours in the major must be taken in residence at ASU Main.
- B. No credit is granted toward fulfilling major or minor requirements in any upper-division course in that subject field unless the grade in that course is at least a "C." In CLAS, the assignment of a grade of "Y" indicates a level of performance that would have resulted in a grade of at least "C" had the normal grading scheme been used.
- C. Major fields of study are classified into the following three divisions:
1. Humanities
 - Asian Languages (Chinese/Japanese)
 - Chicana and Chicano Studies
 - English
 - French
 - German
 - Humanities
 - Italian
 - Philosophy
 - Religious Studies
 - Russian
 - Spanish
 2. Natural Sciences and Mathematics
 - Biology
 - Chemistry
 - Clinical Laboratory Sciences
 - Computer Science
 - Conservation Biology
 - Geology
 - Mathematics
 - Microbiology
 - Physics
 - Plant Biology
 3. Social and Behavioral Sciences
 - Anthropology
 - Chicana and Chicano Studies
 - Economics
 - Exercise Science/Physical Education*
 - Family Resources and Human Development*

- Geography
- History
- Political Science
- Psychology
- Sociology
- Speech and Hearing Science*
- Women's Studies*

III. Distribution Requirements. The purpose of the distribution requirement is to ensure that the student is introduced to disciplines outside the division of the major. A list of major fields and their respective divisions is given under II.C.

Unless the major field carries an asterisk in II.C, students are considered to have fulfilled the distribution requirements in the division of the major.

Students majoring in Exercise Science/Physical Education, Family Resources and Human Development, Speech and Hearing Science, and Women's Studies must satisfy distribution requirements in social and behavioral sciences as well as in the other two divisions. Students majoring in Chicana and Chicano Studies satisfy either the humanities or social and behavioral sciences distribution requirements, depending on their concentration.

Students majoring in Anthropology, Geography, and Psychology may not use ASM courses in the case of Anthropology majors, GPH courses in the case of Geography majors, or PSY courses in the case of Psychology majors to satisfy the natural sciences and mathematics requirements.

- A. Humanities (15 semester hours). Each student is required to complete five courses of at least three semester hours each. Course prefixes are identified in the following section.

At least three of the five courses must be taken in one or more of the following CLAS units: the Departments of Chicana and Chicano Studies (CSH courses only), English, Languages and Literatures, Philosophy, Religious Studies, and the Interdiscipli-

nary Humanities Program. At least two of these three courses must be at the 300 level or above.

Note: Literature or "civilization" courses (300 level or above) taught in a foreign language may be used to satisfy the humanities distribution requirement, even if they are also used to demonstrate foreign language proficiency (see I.B).

Course prefixes for the humanities distribution requirement:

1. APH (College of Architecture and Environmental Design)
2. ARS, DAH, MHL, MUS, THE (College of Fine Arts)
3. CSH (Chicana and Chicano Studies)
4. ENG (Department of English; any literature course, including ENG 200 and 218)
5. CHI, FLA, FRE, GER, GRK, HEB, IDN, ITA, JPN, LAT, POR, RUS, SPA, THA (Department of Languages and Literatures: FLA 150 or any literature or "civilization" course at the 300 level or above)
6. HUM (Interdisciplinary Humanities Program)
7. PHI, HPS (Department of Philosophy)
8. REL (Department of Religious Studies)

- B. Natural sciences and mathematics (14 semester hours)
1. Part A (eight semester hours). Two courses (either lecture courses with included laboratories or lecture courses with appropriate accompanying laboratories) to be taken in the Departments of Biology, Chemistry and Biochemistry, Geography (GPH 111 and 212 if taken with 214), Geology, Microbiology, Physics and Astronomy, or Plant Biology. Laboratories need to meet for at least 30 hours per semester. See departmental listings.

* Students majoring in this field must satisfy the distribution requirements in all three divisions.

2. Part B (six semester hours). Two courses to be taken from the Departments of Anthropology (ASM only), Biology, Chemistry and Biochemistry, Computer Science and Engineering, Geography (GPH only), Geology, Mathematics, Microbiology, Physics and Astronomy, Plant Biology, and Psychology (PSY only). See departmental listings. Students who complete Part A using courses from only one department may not use courses from that department in Part B.

Note: Only mathematics courses for which MAT 117 or a higher-level mathematics course is a prerequisite may be used to satisfy natural sciences and mathematics distribution requirements. Mathematics courses for which MAT 117 is a prerequisite may be used to satisfy distribution requirements in natural sciences and mathematics, even if they were also used to demonstrate mathematics proficiency.

- C. Social and behavioral sciences (15 semester hours). Each student is required to complete five courses of at least three semester hours each.

Courses used to fulfill the social and behavioral sciences distribution requirement must be taken from no fewer than two but no more than three departments.

At least two courses must be at the 300 level or above.

Course prefixes for the social and behavioral sciences distribution requirement:

1. ASB (Department of Anthropology)
2. CSS (Chicana and Chicano Studies)
3. ECN (Department of Economics, College of Business)
4. GCU (Department of Geography)
5. HIS (Department of History)

6. PGS (Department of Psychology)
7. POS (Department of Political Science)
8. SOC (Department of Sociology)
9. WST (Women's Studies Program, only WST 100 or 300 but not both)

IV. General Electives. Most CLAS majors can meet all of the above requirements with fewer than the 120 semester hours required for graduation. The remainder of their hours are general electives that may be selected from any of the departments of CLAS and from the offerings of the other colleges.

Program of Study. The program of study, which is required by university regulations during the semester in which an undergraduate earns the 87th hour, must be filed and approved at least two weeks before the preregistration period for the subsequent semester. Students are expected to follow the approved program of study or to receive early college approval for proposed changes to the program of study. Students should contact the Office for Academic Programs, SS 111, regarding college graduation rules and deadlines. Deadlines for filing a program of study after enrolling in the 87th hour are March 1 and October 1 of each year. Students with 87 hours must have a college-approved program of study before registering for the next semester.

MAJOR REQUIREMENTS

Credit Requirement. All candidates for graduation in the B.A. and B.S. degree curricula are required to complete at least 120 semester hours, of which at least 45 hours must consist of upper-division courses. A minimum ASU cumulative GPA of 2.00 is required for graduation.

Course Load. The normal course load is 15–16 semester hours. First-semester freshmen and entering transfer students are not permitted to register for more than 18 semester hours in the initial semester. Other students who wish to register for more than 18 hours must have a GPA of at least 3.00 and must file a petition in the Office for Academic Programs, SS 111, before registration. Any petition for an overload in excess of 21 hours must be presented to

the Standards Committee of the college.

Foreign Language Requirement.

CLAS requires knowledge of one foreign language equivalent to the completion of two years' study at the college level. For purposes of meeting this requirement, American Sign Language is considered a foreign language. For more information, see page 352.

SPECIAL CREDIT OPTIONS

Pass/Fail Grade Option. The pass/fail grade option is intended to broaden the education of Liberal Arts and Sciences undergraduates by encouraging them to take advanced courses outside their specialization. A mark of "P" contributes to the student's earned hours but does not affect the GPA. A failing grade is computed into the GPA.

Only CLAS students with at least 60 semester hours may take courses under the pass/fail option. The option may be used under the following conditions:

1. enrollment for pass/fail needs the approval of the instructor and the college;
2. enrollment under this option must be indicated during registration and may not be changed after the late registration period; and
3. a maximum of 12 hours taken for pass/fail may be counted toward graduation.

Students may not enroll under the pass/fail option in the following courses:

1. those taken to satisfy the foreign or English First-Year Composition requirements;
2. those in the student's major or minor or certificate program;
3. those counted toward or required to supplement the major;
4. those counted as 499 Independent Study;
5. those taken for honors credits; or
6. those counted toward satisfying the proficiency and distribution requirements of the college or the General Studies requirement.

The above option is not available to CLAS students for courses offered by other colleges except for courses in economics offered by the College of Business.

Audit Grade Option. A student may choose to audit a course, in which case

the student attends regularly scheduled class sessions but no credit is earned. The student should obtain the instructor's approval before registering for the course. For more information, see "Grading System," pages 72–76.

Note: This grade option may not be changed after the late registration period.

Independent Learning. Study by independent learning is not a normal part of a degree program; special circumstances must exist for a resident student to take independent learning courses. Any enrollment in such courses must have the prior approval of the college.

ACADEMIC STANDARDS

The standards for GPA and the terms of probation, disqualification, reinstatement, and appeal are identical to those of the university as set forth on pages 77–78, except that the disqualified student in CLAS is suspended for at least two regular semesters at the university. Students on probation normally have one semester in which to remove their probation. Students with cumulative GPAs of less than 2.00 who leave the university for a semester or more are not automatically readmitted. Such students, as well as all disqualified students, should contact the Office for Academic Programs, SS 111, regarding procedures and guidance for reinstatement and returning to good standing. By following recommendations and meeting established standards for summer school work or course work at other institutions, the possibility of successful reinstatement is enhanced.

Academic discipline is one of the functions of the Office for Academic Programs, SS 111. All students having academic difficulties of any kind should contact this office. Also available in this office is information on policies and procedures of the college on academic honesty, student grievances with respect to grades, and various petitions regarding college standards and graduation requirements.

Academic honesty is expected of all students in all examinations, papers, academic transactions, and records. The possible sanctions include, but are not limited to, appropriate grade penalties, loss of registration privileges, disqualification, and dismissal.

STUDENT RESPONSIBILITIES

Any student enrolling in courses offered by CLAS is expected to follow the rules and deadlines specified in the *General Catalog* and the current *Schedule of Classes*. Students are urged to meet with their departmental academic advisors before registration. Students with additional questions or problems are also urged to meet with advisors in the Office for Academic Programs, SS 111, regarding the academic rules of the college and the university.

SPECIAL PROGRAMS

University Honors College. CLAS works closely with the University Honors College, which affords qualified undergraduates opportunities for enhanced educational experiences. For a complete description of the University Honors College requirements and opportunities, see pages 293–295.

Interdisciplinary Studies. An Interdisciplinary Studies major leading to the B.A. or B.S. degree provides students of outstanding ability in the humanities, natural sciences and mathematics, and social and behavioral sciences opportunities to pursue courses of studies that cut across departmental boundaries and focus on specific topics or problem areas. Completion of 32 semester hours at ASU with a GPA of at least 3.25 and three letters of recommendation from ASU faculty members are required for admission. For more information about degree requirements, contact the Office for Academic Programs, SS 111.

Washington Semester Program. Students have a variety of opportunities for practicum and internship experiences that enable them to meld classroom learning with practical application. Among the several individual departmental programs that provide internships for majors, the Department of Political Science is the ASU sponsor of the Washington Semester Program. The program provides students a one-semester opportunity to study in Washington, D.C., through any one of several programs sponsored by the American University. The program is available to outstanding juniors or seniors and requires careful planning with an academic advisor early in the student's career. For more information,

call the Department of Political Science, 602/965–6551.

Military Officer Training. The Departments of Aerospace Studies and Military Science offer programs leading to commissions in the armed forces, but they do not offer majors or minors. For further information, see the appropriate department descriptions in this catalog.

Certificate Programs and Areas of Emphasis

Fourteen certificates are available from units in CLAS, as shown in the "Certificates" table, page 308. Areas of emphasis are also available in some of the same areas. The 14 certificate programs and areas of emphasis follow.

Asian Studies. An Asian Studies certificate is offered through the Center for Asian Studies.

Students must complete two years (20 semester hours) of an Asian language plus 30 additional hours of Asian-area studies courses selected from core Asian studies courses or courses with a significant focus on Asia chosen in consultation with the Center for Asian Studies advisor. Students whose native language is an Asian language or who have otherwise mastered an Asian language may elect to take four additional Asian studies courses in place of the elementary and intermediate language classes. Language requirements may be selected from Chinese, Indonesian, Japanese, Thai, and Vietnamese.

An East Asian Studies certificate is also available. Students must complete two years (20 semester hours) of Chinese or Japanese plus 30 additional semester hours of East Asian area studies courses; these courses must be selected from the core East Asian curriculum or must be courses with a significant focus on East Asia chosen in consultation with the Center for Asian Studies director.

Note: Students whose native language is Chinese or Japanese or who have otherwise mastered these languages may elect to take four additional East Asian studies courses in place of the elementary and intermediate language courses.

The center houses a comprehensive library and is involved in student and

Certificates

Certificate Program	Administered by
Asian Studies*	Center for Asian Studies
East Asian Studies	Center for Asian Studies
Health Physics	Pre-Health Professions Office
Jewish Studies*	Jewish Studies Committee
Latin American Studies*	Center for Latin American Studies
Medieval and Renaissance Studies	Arizona Center for Medieval and Renaissance Studies
Medieval Studies	Arizona Center for Medieval and Renaissance Studies
Museum Studies	Department of Anthropology
Renaissance Studies	Arizona Center for Medieval and Renaissance Studies
Russian and East European Studies*	Russian and East European Consortium
Scholarly Publishing	Department of History
Southeast Asian Studies	Program for Southeast Asian Studies
Translation	Department of Languages and Literatures
Women's Studies*	Women's Studies Program

* Emphases are also available in these programs.

faculty exchange programs with several Asian universities as well as serving as a liaison with various Asian organizations.

For more information, contact the Center for Asian Studies, WHALL 105, 602/965-7184.

Health Physics. The curriculum of health physics involves work in CLAS and the College of Engineering and Applied Sciences. The purpose of the concentration is to serve undergraduate students who wish to prepare themselves for careers in health physics. To qualify for professional status, a health physicist needs a B.S. degree in one of the physical or life sciences and a group of specialized courses in physics, mathematics, chemistry, engineering, and biology.

A Certificate of Concentration in Health Physics is awarded for the successful completion of a B.S. degree in a physical or life science that follows a prescribed program. Inquiries about the program should be addressed to the Pre-Health Professions Office, MCL 110B, 602/965-2365, where academic advising is available.

Jewish Studies. The Jewish studies program is designed with the following goals in mind:

1. to examine the history and culture of the Jews;
2. to provide a model for interdisciplinary teaching and research;

3. to generate and facilitate research on Judaica;
4. to provide the community with programs, courses, and research furthering the understanding of Judaica; and
5. to stand as an example of the university's commitment to a program of meaningful ethnic studies on a firm academic base.

The Certificate of Concentration in Jewish Studies may be combined with a major in any college. For information about the program, refer to the Department of History or the Department of Religious Studies or the chair of the Jewish Studies Committee listed in the current *Schedule of Classes*.

Latin American Studies. The Latin American Studies certificate program is designed to give students an understanding of culture, economies, political structures, and the history of Latin American nations. The Departments of Anthropology, Economics, Geography, History, Languages and Literatures (Spanish and Portuguese), Political Science, and the College of Business offer courses that combine to make up the interdisciplinary certificate. Students must complete 30 hours of upper-division courses from the above departments/colleges with a concentration in Latin America—15 hours in the major subject and 15 hours in other disciplines. The certificate requires Spanish

or Portuguese proficiency through the 313 level of conversation and composition. Only language courses above 313 in literature and civilization will count toward a major or interdisciplinary areas of preparation. Spanish and Portuguese courses above 313 in grammar and phonology will not count toward the major requirements.

The Center for Latin American Studies will continue to offer the area of emphasis for students who do not wish to attain a high level of language proficiency.

For more information, visit the Center for Latin American Studies at SS 213, or call 602/965-5127.

Medieval and Renaissance Studies.

An undergraduate Certificate in Medieval and Renaissance Studies is offered by the Arizona Center for Medieval and Renaissance Studies (ACMRS). In addition to the course work and examinations required in a student's major field of interest, the following minimum requirements must be fulfilled to earn the certificate:

1. six to eight semester hours of classical Latin and six to eight semester hours of Latin (classical and/or medieval) or of a vernacular language of the period (e.g., Old English, Old Norse, Old French, Renaissance Italian);
2. six to eight semester hours of course work in medieval and renaissance studies outside the major discipline;
3. three semester hours of thesis on a topic concerning the Middle Ages or Renaissance. The thesis may be used to fulfill the Honors College thesis requirement for students enrolled in the Honors College; and
4. a minimum of a "C" average in all course work leading to the certificate.

Students interested in the certificate program need to complete an application form before being accepted into the program. Applications are available by calling ACMRS at 602/965-1681.

See the *Graduate Catalog* for information about the Certificate in Medieval Studies and the Certificate in Renaissance Studies, and page 33 for information about the center.

Museum Studies. See the *Graduate Catalog* or contact the Department of Anthropology for more information.

Russian and East European Studies.

Undergraduate students may complete an interdisciplinary certificate program leading to a bachelor's degree with a major in the chosen field with an emphasis in Russian and East European studies. The requirements for the Russian and East European Studies certificate follow:

1. three years (22 hours) of Russian or another Eurasian or East European language; and
2. 30 upper-division semester hours in Russian/East European area-related course work.

At least three disciplines must be represented in the area-related course work, and at least 12 hours must be outside the Department of Languages and Literatures (i.e., non-RUS and non-FLA courses). Fulfillment of these requirements will be certified by the Russian and East European Studies Consortium and will be recognized on the transcript by a bachelor's degree with "Major in [Discipline], Emphasis in Russian and East European Studies." The purpose of this undergraduate certificate program is to encourage students majoring in a chosen discipline to develop special competency in Russian or East European language and area studies. A major in any department may elect this emphasis.

For further information, contact the program coordinator of the Russian and East European Studies Consortium at 602/965-4188.

Scholarly Publishing. See the *Graduate Catalog* for information on this certificate program.

Southeast Asian Studies. A Certificate in Southeast Asian Studies is awarded to any undergraduate student who elects an interdisciplinary focus in Southeast Asian studies while completing degree requirements in any discipline or professional program. The certificate program offers two options: (1) an area studies specialization emphasizing courses in the social sciences and humanities and requiring one year of Indonesian, Thai, or Vietnamese and (2) a language specialization requiring a two-year sequence in a Southeast Asian language and a proportional number of area studies courses.

Students wishing to study a Southeast Asian language other than those offered on campus may transfer credits earned at the Southeast Asian Studies Summer Institute, a consortium for intensive language and area studies, or at other accredited programs. Qualified students may request placement testing on other national languages of the region, administered in accordance with the national American Council of Teachers in Foreign Languages (ACTFL) guidelines.

The ASU curriculum includes

1. language instruction in Indonesian, Thai, or Vietnamese;
2. ASB/GCU/HIS/POS/REL 240 Introduction to Southeast Asia;
3. HIS 308 Modern Southeast Asian History;
4. electives in the social sciences and humanities on the history, geography, culture, politics, and religion of the region; and
5. a culminating capstone seminar in which the students share multidisciplinary approaches to the region and integrate knowledge of Southeast Asia with their respective disciplinary orientations.

Courses counting toward the Certificate in Southeast Asian Studies fulfill requirements for undergraduate majors and General Studies in the social and behavioral sciences, humanities, literacy, and global and historical awareness areas. A two-year sequence in Southeast Asian language study meets the foreign language requirement for undergraduates in CLAS.

The Program for Southeast Asian Studies is a federally funded National Resource Center for Southeast Asia. For more information, contact the Program for Southeast Asian Studies, LL C32, 602/965-4232.

Translation. See page 351 for information about the Certificate in Translation.

Women's Studies. The curriculum of women's studies involves courses from colleges throughout the university. The program is designed with the following goals in mind:

1. to examine the central issues of the quality and shape of women's lives;

2. to provide a model for interdisciplinary teaching and research;
3. to generate and facilitate research on women's experience;
4. to provide the university and the community with programs, courses, and research that acknowledge and expand the potential of women; and
5. to stand as a visible example of the university's commitment to change in the status of women.

A Certificate of Concentration in Women's Studies is awarded for the successful completion of WST 100 (or 300) and 498 and an additional 15 semester hours from the list of approved women's studies courses, only six hours of which may also be applied toward the student's major.

Inquiries about the program should be addressed to the Women's Studies Program, EC A209, 602/965-2358, where the current list of approved courses is available.

GENERAL INFORMATION

Research Centers. To expand educational horizons and to enrich the curriculum, CLAS maintains the following research centers:

Arizona Center for Medieval and Renaissance Studies
Cancer Research Institute
Center for Asian Studies
Center for Latin American Studies
Center for Meteorite Studies
Center for Solid-State Science
Center for the Study of Early Events in Photosynthesis
Hispanic Research Center

See pages 33-35 for a description of these research centers.

LIBERAL ARTS AND SCIENCES (LIA)

LIA 390 The Use of Research Libraries. (3) F, S
Interdisciplinary resources and services of libraries, particularly this university's, with emphasis on research, information literacy, and applied critical thinking skills. Lecture, discussion, site visits. *General Studies: L1.*

For more information on LIA courses, see the current *Schedule of Classes* or contact the Office for Academic Programs, SS 111, 602/965-6506.

Department of Aerospace Studies

Air Force ROTC

Col. John J. Gorman Jr.
Chair
(MAIN 340) 602/965-3181
www.asu.edu/clas/afrotc

**PROFESSOR
GORMAN**

**ASSISTANT PROFESSORS
OLSON, RIZZA, WARDEN**

PURPOSE

The Department of Aerospace Studies curriculum consists of the general military course and history for freshmen and sophomores (AES 101, 103, 201, 203) and the professional officer course for juniors and seniors (AES 301, 303, 401, 403).

General Qualifications. A man or woman entering the Air Force Reserve Officers' Training Corps (AFROTC) must be the following:

1. a citizen of the United States (non-citizens may enroll but must obtain citizenship before commissioning);
2. of sound physical condition; and
3. at least 17 years of age for scholarship appointment or admittance to the Professional Officer Course (POC).

Additionally, scholarship recipients must be able to fulfill commissioning requirements by age 27. If designated for flying training, the student must be able to complete all commissioning requirements before age 26 and a half; persons in other categories must be able to complete all commissioning requirements before age 30.

FOUR-YEAR PROGRAM (GMC AND POC)

A formal application is not required for students entering the four-year program. A student may enter the program by simply registering for one of the general military course (GMC) classes

at the same time and in the same manner as other courses. GMC students receive two semester hours for each AES 100 and 200 class completed for a total of eight semester hours. GMC students not on AFROTC scholarship incur no military obligation. Each candidate for commissioning must pass an Air Force aptitude test and a physical examination and be selected by a board of Air Force officers. If selected, the student then enrolls in the POC the last two years of the AFROTC curriculum. Students attend a four-week field training course at an Air Force base normally between the sophomore and junior years. Upon successful completion of the POC and the college requirements for a degree, the student is commissioned in the U.S. Air Force as a second lieutenant. The new officer then enters active duty or may be granted an educational delay to pursue graduate work.

TWO-YEAR PROGRAM (POC)

The basic requirement for entry into the two-year program is that the student have two academic years of college work remaining, either at the undergraduate or graduate level. Applicants seeking enrollment in the two-year program must pass an Air Force aptitude and medical examination and be selected by a board of Air Force officers. After successfully completing a six-week field training course at an Air Force base, the applicant may enroll in the professional officer course (POC) in the AFROTC program. Upon completion of the POC and the college requirements for a degree, the student is commissioned.

Qualifications. The following requirements must be met for admittance to the POC:

1. The four-year student must successfully complete the general military course and the four-week field training course.
2. The two-year applicant must complete a six-week field training course.
3. All students must pass the Air Force Officer Qualifying Test (AFOQT).
4. All students must pass the Air Force physical examination.

5. All students must maintain the minimum GPA required by the college.
6. All students must meet the physical fitness requirements.

Pay and Allowances. POC members in their junior and senior years receive \$150.00 per month for a maximum of 20 months of POC attendance. Students are also paid to attend field training. In addition, uniforms, housing, and meals are provided during field training at no cost to the student. Students are reimbursed for travel to and from field training.

Scholarships. AFROTC offers scholarships annually to outstanding young men and women on a nationwide competitive basis. Scholarships can cover college tuition for nonresident students and provide an allowance for books, fees, supplies and equipment, and a monthly tax-free allowance of \$150.00. Scholarships are available on a four-, three-, or two-year basis. To qualify for a four- or three-year scholarship, a student must be a U.S. citizen and submit an application before December 1 of the senior year in high school. Interested students should consult their high school counselors or call AFROTC at ASU for application forms to be submitted to

HQ AFROTC
MAXWELL AFB
AL 36112-6663

Students enrolled in AFROTC at ASU are eligible for a limited number of three- or two-year scholarships. Those students interested must apply through the Department of Aerospace Studies. Consideration is given to academic grades, the score achieved on the AFOQT, and physical fitness. A board of officers considers an applicant's personality, character, and leadership potential.

AEROSPACE STUDIES (AES)

AES 101 Air Force Today I. (2) F
Introduction to U.S. Air Force and AFROTC. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism.

AES 102 Leadership Lab. (0) F
Emphasis on common Air Force customs and courtesies, drill and ceremonies, health and physical fitness through group participation. Corequisite: AES 101.

AES 103 Air Force Today II. (2) S
Continuation of AES 101. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism. Prerequisite: AES 101 or department approval.

AES 104 Leadership Lab. (0) S
Continuation of AES 102 with more in-depth emphasis on learning the environment of an Air Force officer. Corequisite: AES 103.

AES 201 Air Force Way I. (2) F
Further preparation of the AFROTC candidate. Topics include: Air Force heritage and leaders, communication skills, ethics, leadership, quality Air Force, and values. Prerequisite: AES 103 or department approval.

AES 202 Leadership Lab. (0) F
Application of advanced drill and ceremonies, issuing commands, knowing flag etiquette, and developing, directing, and evaluating skills to lead others. Corequisite: AES 201.

AES 203 Air Force Way II. (2) S
Continuation of AES 201. Topics include: the Air Force mission and organization, customs and courtesies, officer opportunities, officership, and professionalism. Prerequisite: AES 201 or department approval.

AES 204 Leadership Lab. (0) S
Continuation of AES 202 with an emphasis on preparation for field training. Corequisite: AES 203.

AES 301 Air Force Leadership and Management I. (3) F
Study of communication skills, leadership and quality management fundamentals, leadership ethics, and professional knowledge required of an Air Force officer. Prerequisite: AES 203 or department approval. *General Studies: L2.*

AES 302 Leadership Lab. (0) F
Advanced leadership experiences applying leadership and management principles to motivate and enhance the performance of other cadets. Corequisite: AES 301.

AES 303 Air Force Leadership and Management II. (3) S
Continuation of AES 301. Topics include: communication skills, ethics, leadership, professional knowledge, and quality management required of an Air Force officer. Prerequisite: AES 203 or department approval. *General Studies: L2.*

AES 304 Leadership Lab. (0) S
Continuation of AES 302 with emphasis on planning the military activities of the cadet corps and applying advanced leadership methods. Corequisite: AES 303.

AES 401 Preparation for Active Duty I. (3) F
Examines advanced ethics, Air Force doctrine, national security process, and regional studies. Special topics include: civilian control of the military, military justice, and officership. Prerequisite: AES 303 or department approval. *General Studies: L2.*

AES 402 Leadership Lab. (0) F
Advanced leadership experience demonstrating learned skills in planning and controlling the military activities of the corps. Corequisite: AES 401.

AES 403 Preparation for Active Duty II. (3) S
Continuation of AES 401. Topics include: civilian control of the military, doctrine, ethics, military justice, the national security process, and officership. Prerequisite: AES 401 or department approval.

AES 404 Leadership Lab. (0) S
Continuation of AES 402 with an emphasis on preparation for transition from civilian to military life. Corequisite: AES 403.

African American Studies Program

Leonor Boulin-Johnson
Director
(AG 201) 602/965-4399

Inquires about the program should be addressed to the African American Studies Program, AG 201, 602/965-4399, where the current list of approved courses is available.

Department of Anthropology

Barbara L. Stark
Chair
(ANTH A124) 602/965-6213
www.asu.edu/clas/anthropology

REGENTS' PROFESSOR TURNER

PROFESSORS

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ASSISTANT PROFESSORS

REED, STEADMAN, WELSH

SENIOR LECTURER WINKELMAN

ANTHROPOLOGY—B.A.

The program consists of 45 semester hours, of which 36 must be in anthropology and nine in related fields to be approved by the advisor in consultation with the student. Course requirements are distributed as follows:

1. ASB 102 and ASM 101;
2. six hours, including at least one course at the 300 level or above, in each of the following subfields: ar-

chaeology, physical anthropology, and social-cultural anthropology; and

3. three hours each in linguistics, an ethnographic area course, and an archaeology or physical anthropology area course.

Three of the nine hours in related fields must be in statistics. Each student's program of study must be approved by the advisor in consultation with the student. At least 18 semester hours must be in upper-division courses. For details see the departmental brochure. See "Foreign Language Placement," page 352.

Latin American Studies Certificate or Emphasis. Students majoring in Anthropology may elect to pursue a Latin American Studies Certificate or emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 308, for more information.

Certificate in Museum Studies. See the *Graduate Catalog* or contact the Department of Anthropology for more information.

MINOR IN ANTHROPOLOGY

The Anthropology minor requires 18 semester hours. Two courses, ASB 102 and ASM 101, are required. The other 12 hours must be in the upper division and represent at least two of the three subfields of anthropology. For more information, consult the department office.

SECONDARY EDUCATION— B.A.E.

Social Studies. The major teaching field consists of 63 semester hours, of which 30 hours must be in the anthropology courses required for the B.A. degree. Of the remaining hours, two groups of 15 hours are to be taken in related social sciences. Psychology or a single natural science may be used as one of the 15-hour fields. SED 480 is taken to provide the remaining three hours.

SED 480 Special Methods of Teaching Social Studies	3
Anthropology	30
Social sciences	15
Social sciences, natural sciences, or psychology	15
Total	63

The minor teaching field consists of 24 semester hours in anthropology. Courses ASB 102 and ASM 101 and two upper-division courses in each sub-field (archaeology, physical anthropology, and social-cultural anthropology) are required.

GRADUATE PROGRAM

The faculty in the Department of Anthropology offer programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

ANTHROPOLOGY (ASB)

ASB 102 Introduction to Cultural and Social Anthropology. (3) F, S

Principles of cultural and social anthropology, with illustrative materials from a variety of cultures. The nature of culture. Social, political, and economic systems; religion, aesthetics, and language. *General Studies: SB, G.*

ASB 202 Ethnic Relations in the United States. (3) F, S

Processes of intercultural relations; systems approach to history of U.S. interethnic relations; psychocultural analysis of contemporary U.S. ethnic relations. *General Studies: C, H.*

ASB 210 Sex, Marriage, and Evolution. (3) F

Examination of the sexual nature and behavior of humans from both a biological and an anthropological point of view.

ASB 211 Women in Other Cultures. (3) N

Cross-cultural analysis of the economic, social, political, and religious factors that affect women's status in traditional and modern societies. *General Studies: G.*

ASB 222 Buried Cities and Lost Tribes: Our Human Heritage. (3) S

Archaeology through its most important discoveries: human origins, Pompeii, King Tut, the Holy Land, Southwest Indians, and methods of field archaeology. *General Studies: HU.*

ASB 231 Archaeological Field Methods. (4) S

Excavation of archaeological sites and recording and interpretation of data. Includes local field experience. 2 hours lecture, 8 hours lab. Prerequisite: ASM 101 or instructor approval. *General Studies: S2.*

ASB 240 Introduction to Southeast Asia. (3) F

An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as GCU 240/HIS 240/POS 240/REL 240. *General Studies: G.*

ASB 242 Asian American Experiences: An Anthropological Perspective. (3) F

The historical and contemporary experiences of Asian Americans in terms of the anthropological concepts of culture, ethnicity, and adaptation. *General Studies: L1, C.*

ASB 250 Anthropology Topics. (3) S

Covers five areas of anthropological inquiry. Emphasizes library research, critical analysis, and communication skills relevant to upper-division anthropology course work. Prerequisites: ASB 102; ASM 101 (or equivalent); completion of the First-Year Composition requirement. *General Studies: L1.*

ASB 302 Ethnographic Field Study in Mexico. (3) SS

Fieldwork study of cultural adaptation, Mexican culture, United States-Mexican cultural conflict, ethnographic research methods, and local culture. Lecture, discussion, field research. Pre- or corequisite: SPA 101 or equivalent. *General Studies: L1/SB, G.*

ASB 311 Principles of Social Anthropology. (3) S

Comparative analysis of domestic groups and economic and political organizations in primitive and peasant societies. *General Studies: SB.*

ASB 314 Comparative Religion. (3) F, S

Origins, elements, forms, and symbolism of religion; a comparative survey of religious beliefs and ceremonies; the place of religion in the total culture. Prerequisite: ASB 102 or instructor approval.

ASB 319 The North American Indian. (3) A

Archaeology, ethnology, and linguistic relationship of the Indians of North America. Does not include Middle America. Prerequisite: ASB 102 or instructor approval.

ASB 320 Indians of Arizona. (3) F

The traditional cultures and the development and nature of contemporary political, economic, and educational conditions among Arizona Indians.

ASB 321 Indians of the Southwest. (3) S

Cultures of the contemporary Indians of the Southwestern United States and their historic antecedents. Prerequisite: ASB 102 or instructor approval. *General Studies: L2/SB, C, H.*

ASB 322 Indians of Mesoamerica. (3) S

Historic tribes and folk cultures. Prerequisite: ASB 102 or instructor approval. *General Studies: SB, G.*

ASB 323 Indians of Latin America. (3) F

Indigenous cultures of the Amazon, the Andean region, Central America, and southern Mexico. Lecture, discussion. Prerequisite: ASB 102 or instructor approval. *General Studies: SB, G.*

ASB 324 Peoples of the Pacific. (3) N

Peoples and cultures of Oceania focusing particularly on societies of Melanesia, Micronesia, and Polynesia. Prerequisite: ASB 102 or instructor approval. *General Studies: G.*

ASB 325 Peoples of Southeast Asia. (3) F

A cultural-ecological perspective on the peoples of mainland and insular Southeast Asia. Subsistence modes, social organization, and the impact of modernization. Prerequisite: ASB 102 or instructor approval. *General Studies: G.*

ASB 326 Human Impacts on Ancient Environments. (3) S

A world survey of successful and unsuccessful ancient societies and their impacts on the environment. *General Studies: SB, H.*

ASB 330 Principles of Archaeology. (3) F, S
Methods and theories for reconstructing and explaining the lifeways of prehistoric peoples. Prerequisite: 3 hours of archaeology. *General Studies: SB.*

ASB 333 New World Prehistory. (3) F

The variety of archaeological patterns encountered in the Western Hemisphere. Covers the period from the appearance of humans in the New World to European contact; covers the area from Alaska to Tierra del Fuego. Prerequisite: completion of the First-Year Composition requirement. Pre- or corequisite: 1 upper-division ASU course. *General Studies: L2/SB.*

ASB 335 Prehistory of the Southwest. (3) F, S

Anthropological understandings of major cultural processes and events in the prehistory of the American Southwest using evidence from archaeology. *General Studies: SB, C, H.*

ASB 337 Pre-Hispanic Civilization of Middle America. (3) S

Preconquest cultures and civilizations of Mexico. The Aztecs, Mayas, and their predecessors. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASB 338 Archaeology of North America. (3) N

Origin, spread, and development of the prehistoric Indians of North America up to the historic tribes. Does not include the Southwest. Prerequisite: ASM 101 or instructor approval.

ASB 350 Anthropology and Art. (3) A

Art forms of people in relationship to their social and cultural setting. Prerequisite: ASB 102 or instructor approval.

ASB 351 Psychological Anthropology. (3) S

Approaches to the interrelations between the personality system and the sociocultural environment. Prerequisite: ASB 102 or instructor approval. *General Studies: SB.*

ASB 353 Death and Dying in Cross-Cultural Perspective. (4) F

Humanistic and scientific study of aging, sickness, dying, death, funerals, and grief and their philosophy and ecology in non-Western and Western cultures. 3 hours lecture, 1 hour discussion. *General Studies: HU/SB, G.*

ASB 355 Shamanism, Healing and Consciousness. (3) S

World views, practices, and roles of shamans and traditional and contemporary healers; explanatory biopsychological models of consciousness. *General Studies: HU/SB.*

ASB 361 Old World Prehistory I. (3) F

Biosocial evolution in the Pleistocene, emphasizing technological achievements and the relationship between technology and environment in western Europe, sub-Saharan Africa. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASB 362 Old World Prehistory II. (3) S

Transition from hunting and collecting societies to domestication economies; establishment of settled village life, emphasizing the Near East, Egypt, Southwest Europe. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASB 383 Linguistic Theory: Phonetics and Phonology. (4) F

Basic articulatory phonetics and contemporary theories of the sound system of language. 3 hours lecture, 1 hour lab. *General Studies: SB.*

ASB 400 Cultural Factors in International Business. (3) S

Anthropological perspectives on international business relations; applied principles of cross-cultural communication and management; regional approaches to culture and business. Cross-listed as IBS 400. *General Studies: G.*

ASB 411 Kinship and Social Organization. (3) S

Meanings and uses of concepts referring to kinship, consanguinity, affinity, descent, alliance, and residence in the context of a survey of the varieties of social groups, marriage, rules, and kinship terminological systems. Prerequisite: 6 hours of anthropology or instructor approval.

ASB 412 History of Anthropology. (3) F
Historical treatment of the development of the culture concept and its expression in the chief theoretical trends in anthropology between 1860 and 1950. Prerequisite: ASB 102 or instructor approval. *General Studies: L2/SB.*

ASB 416 Economic Anthropology. (3) F
Economic behavior and the economy in preindustrial societies; description and classification of exchange systems; relations between production, exchange systems, and other societal subsystems. Prerequisite: ASB 102 or instructor approval. *General Studies: L2/SB.*

ASB 417 Political Anthropology. (3) A
Comparative examination of the forms and processes of political organization and activity in primitive, peasant, and complex societies. Prerequisite: ASB 102 or instructor approval.

ASB 462 Medical Anthropology: Culture and Health. (3) F 1998

Role of culture in health, illness, and curing; health status, provider relations, and indigenous healing practices in United States ethnic groups. Lecture, discussion. *General Studies: C.*

ASB 471 Introduction to Museums. (3) F
History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: ASB 102 and ASM 101 or instructor approval. *General Studies: L2.*

ASB 480 Introduction to Linguistics. (3) F
Descriptive and historical linguistics. Survey of theories of human language, emphasizing synchronic linguistics. *General Studies: SB.*

ASB 481 Language and Culture. (3) S
Application of linguistic theories and findings to nonlinguistic aspects of culture; language change; psycholinguistics. Prerequisite: ASB 102 or instructor approval. *General Studies: SB.*

ASB 483 Sociolinguistics and the Ethnography of Communication. (3) N

Relationships between linguistic and social categories; functional analysis of language use, maintenance, and diversity; interaction between verbal and nonverbal communication. Prerequisites: ASB 480 and ENG 213 (or FLA 400) or instructor approval. *General Studies: SB.*

ASB 501 Applied Medical Anthropology. (3) F

Overview of anthropology's applications in medicine and its adaptations to U.S. ethnic populations. Requires research project in medical setting. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 502 Health of Ethnic Minorities. (3) S
Prevalence of illness, risk factors, health ecology, and medical and indigenous treatments. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 503 Advanced Medical Anthropology. (3) F

Theory in Medical Anthropology and cross-cultural studies that illustrate particular theories. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 504 Ethnic Relations. (3) F

Structural processes of intergroup relations, methods for investigating psychocultural dimensions of ethnicity with focus upon U.S. ethnic groups. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 505 Culture and Psychiatry. (3) F
Psychiatry as a cultural phenomenon and indigenous definitions and treatments of mental disorders across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 506 Gender, Emotions, and Culture. (3) S

Relationships among gender and emotion across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 529 Culture and Political Economy. (3) N

Origin and spread of Western capitalism and its impact on non-Western societies. Ethnographic and historical case studies are utilized. Prerequisite: graduate standing.

ASB 530 Ecological Anthropology. (3) A
Relations among the population dynamics, social organization, culture, and environment of human populations, with special emphasis on hunter-gatherers and extensive agriculturalists.

ASB 532 Graduate Field Anthropology. (2-8) S

Independent research on a specific anthropological problem to be selected by the student in consultation with the staff. May be repeated for credit. Prerequisites: ASM 338 or equivalent; instructor approval.

ASB 536 Ethnohistory of Mesoamerica. (3) N

Indigenous societies of southern Mexico and Guatemala at Spanish contact and their post-conquest transformation. Emphasis is on the Aztec Empire. Prerequisite: graduate standing.

ASB 537 Topics in Mesoamerican Archaeology. (3) N

Changing organization of pre-Columbian civilizations in Mesoamerica is explored through interpretive issues, such as regional analysis, chiefdoms, urbanism, and exchange. Prerequisite: instructor approval.

ASB 540 Method and Theory of Sociocultural Anthropology and Archaeology I. (3) F

Basic issues concerning concepts of social and ethnic groups, cultural and sociological theory, and the nature of anthropological research. Prerequisite: instructor approval.

ASB 541 Method and Theory of Social and Cultural Anthropology. (3) S

Continuation of ASB 540. Prerequisite: ASB 540 or instructor approval.

ASB 542 Method and Theory of Archaeology II. (3) S

Models of human evolution, culture change, and interpretation of hunter-gatherer and tribal societies, ceramic, lithic, and faunal materials. Prerequisite: instructor approval.

ASB 543 Method and Theory of Archaeology III. (3) F

Covers concepts of social complexity along with economy, demography, and social dynamics, followed by archaeological research design. Prerequisite: instructor approval.

ASB 544 Settlement Patterns. (3) N

Spatial arrangement of residences, activity sites, and communities over landscape. Emphasis on natural and cultural factors influencing settlement patterns. Prerequisite: instructor approval.

ASB 546 Pleistocene Prehistory. (3) F

Development of society and culture in the Old World during the Pleistocene epoch, emphasizing technological change through time and the relationship of people to their environment. Prerequisite: ASB 361 or equivalent.

ASB 547 Issues in Old World Domestication Economies. (3) S

Archaeological evidence for transitions in Old World subsistence economies from hunting and gathering to dependence on domesticated plants and animals. Prerequisite: ASB 362 or equivalent.

ASB 550 Economic Archaeology. (3) N

Prehistoric economies in hunter-gatherer, tribal, and complex societies. Subsistence strategies, craft production and specialization, and exchange covered. Prerequisite: instructor approval.

ASB 551 Prehistoric Diet. (3) N

Includes (1) a critical review of techniques for recovering dietary information and (2) theoretical models concerned with explaining diet and nutrition. Prerequisite: instructor approval.

ASB 555 Complex Societies. (3) S

Structural variations in hierarchically organized societies, along with origins, dynamics, and collapse, are examined. Seminar.

ASB 559 Archaeology and the Ideational Realm. (3) N

"Post-processual" and other views concerning relevance of mental phenomena for understanding sociocultural change. Various approaches to inferring prehistoric meanings.

ASB 563 Hunter-Gatherer Adaptations. (3) N

Evolution of prehistoric hunter-gatherer societies in the Old and New Worlds from the most ancient times through protohistoric chiefdoms. Prerequisite: instructor approval.

ASB 567 Southwestern Archaeology. (3) S
Broad coverage of Southwestern cultural developments focusing on current debates and rigorous use of archaeological data in making cultural inferences.

ASB 568 Intrasite Research Strategies. (3) F

Research issues within a single site context. Topics include quantitative spatial analysis, site definition, sampling, distributional analysis, and substantive interpretation.

ASB 571 Museum Principles. (3) F

History, philosophy, and current status of museums. Exploration of collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: ASB 102 and ASM 101 or instructor approval.

ASB 572 Museum Collection Management. (3) S

Principles and practices of acquisition, documentation, care, and use of museum collections; registration, cataloging, and preservation methods; legal and ethical issues. Prerequisite: ASB 571 or instructor approval.

ASB 573 Museum Administration. (3) S

Formal organization and management of museums; governance; personnel matters; fund raising and grantsmanship; legal and ethical issues. Prerequisite: ASB 571 or instructor approval.

ASB 574 Exhibition Planning and Design. (3) S

Exhibition philosophies and development; processes of planning, designing, staging, installing, evaluating, and disassembling temporary and long-term exhibits. Prerequisites: ASB 571 and 572 or instructor approval.

ASB 575 Computers and Museums. (3) F Basics of museum computer application; hardware and software; fundamentals of database management; issues of research, collections management, and administration.

ASB 576 Museum Interpretation. (3) F

Processes of planning, implementing, documenting, and evaluating educational programs in museums for varied audiences—children, adults, and special interest groups. Lecture, discussion. Prerequisite: ASB 571.

ASB 577 Principles of Conservation. (3) S

Preservation of museum objects: nature of materials, environmental controls, and causes of degradation; recognizing problems, damage, and solutions; proper care of objects. Prerequisites: ASB 571 and 572 or instructor approval.

ASB 579 Critical Issues in Museum Studies. (3) F

Current debates of museum practice from an anthropological perspective. Issues of collection, presentation, authenticity, and authority are addressed. Seminar. Prerequisites: ASB 571 or instructor approval.

ASB 591 Seminar. (3) N

Selected topics in archaeology, linguistics, and social-cultural anthropology.

- (a) Archaeological Ceramics
- (b) Archaeology of North America
- (c) Cultural Anthropology
- (d) Culture and Personality
- (e) Evolution and Culture
Cross-listed as ASM 591.
- (f) Historical Archaeology
- (g) Interdepartmental Seminar
Cross-listed as ASM 591.
- (h) Linguistics
- (i) Museum Studies
- (j) Problems in Southwestern Archaeology
- (k) Problems in Southwestern Ethnology
- (l) Social Anthropology

ANTHROPOLOGY (ASM)**ASM 101 Human Origins and the Development of Culture.** (3) F, S

Physical anthropology and archaeology. Evidence and processes of human evolution and of culture change. Primates. Fossil hominids and their tools. Race, variation, and heredity. Environment and human biology. Prehistoric culture and society. *General Studies: SB.*

ASM 241 Biology of Race. (3) F, S

Human variation and its interpretation in an evolutionary context.

ASM 301 Peopling of the World. (3) S

Course reviews all evidence for human dispersal during the last 100,000 years, origins of language, cultures, races, and beginnings of modern humans. Prerequisite: ASM 101. *General Studies: SB.*

ASM 338 Anthropological Field Session. (2–8) S

Anthropological field techniques, analysis of data, and preparation of field reports. May be repeated for credit. Prerequisite: instructor approval.

ASM 341 Human Osteology. (4) F

Osteology, human paleontology, and osteometry. Description and analysis of archaeological and contemporary human populations. 3 hours lecture, 3 hours lab. Prerequisite: ASM 101 or instructor approval.

ASM 342 Human Biological Variation. (4) S

Evolutionary interpretations of biological variation in living human populations, with emphasis on anthropological genetics and adaptation. Nutrition and disease and their relation to genetics and behavior. 3 hours lecture, 3 hours lab. Prerequisites: ASM 101 and MAT 106 (or equivalent) or instructor approval. *General Studies: S2.*

ASM 343 Primatology. (3) F

Evolution and adaptations of nonhuman primates, emphasizing social behavior. Includes material from fossil evidence and field and laboratory studies in behavior and biology. Prerequisite: ASM 101 or instructor approval.

ASM 344 Fossil Hominids. (3) N

Ancient African, Asian, and European human and primate skeletal, dental, and cultural remains. Human biological, behavioral, and cultural evolution. Prerequisite: ASM 101 or instructor approval. *General Studies: H.*

ASM 345 Disease and Human Evolution. (3) F

Interaction of people and pathogens from prehistoric times to the present, with emphasis on disease as an agent of genetic selection. Prerequisite: ASM 101 or instructor approval.

ASM 346 Human Origins. (3) S

Humanity's place in nature; fossils; historic and recent concepts of human races; influence of culture on human evolution.

ASM 348 Social Issues in Human Genetics. (3) S

Moral and social implications of developments in genetic science, particularly as they affect reproduction, medicine, and evolution. *General Studies: SB.*

ASM 365 Laboratory Methods in Archaeology. (4) N

Techniques of artifact analysis. Basic archaeological research techniques; methods of report writing. May be repeated for credit for total of 8 hours. Prerequisite: ASM 101 or instructor approval.

ASM 435 Archaeological Pollen Analysis. (3) F

Theory, methodology, and practice of pollen analytic techniques. Compares uses in botany, geology, and archaeology. 2 hours lecture, 3 hours lab, possible field trips. Prerequisite: instructor approval.

ASM 450 Bioarchaeology. (3) S

Surveys archaeological and physical anthropological methods and theories for evaluating skeletal and burial remains to reconstruct biocultural adaptation and lifeways. Prerequisite: ASM 101 or instructor approval.

ASM 452 Dental Anthropology. (4) F

Human and primate dental morphology, growth, evolution, and genetics. Within- and between-group variation. Dental pathology and behavioral-cultural-dietary factors. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval. *General Studies: S2.*

ASM 454 Comparative Primate Anatomy. (4) S

Functional anatomy of the cranial, dental, and locomotor apparatus of primates, including humans, emphasizing the relation of morphology to behavior and environment. 3 hours lecture, 3 hours lab, dissections, demonstrations. Prerequisite: instructor approval.

ASM 455 Primate Behavior Laboratory. (3) N

Instruction and practice in methods of observation and analysis of primate behavior. Discussion of the relationship between class work on captive animals and field techniques for studying free-ranging groups. Directed readings, 6 hours lab. Prerequisites: ASM 343; instructor approval. *General Studies: L2.*

ASM 465 Quantification and Analysis for Anthropologists. (3) S

Statistical, quantitative, and geometric strategies for envisioning and exploring archaeological, physical anthropological, bioarchaeological, and sociocultural data. Univariate and multivariate methods. Prerequisites: introductory statistical course; instructor approval.

ASM 472 Archaeological Ceramics. (3) N

Analysis and identification of pottery wares, types, and varieties. Systems for ceramic classification and cultural interpretation. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.

ASM 507 Anthropological Study of Disease. (3) A

In-depth introduction to the study of disease processes from an anthropological perspective. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASM 548 Geoarchaeology. (3) F

Geologic context relevant to archaeological research. Topics include sediments, deposition environments, soils, anthropogenic and biogenic deposits, and quaternary chronology. Prerequisite: instructor approval.

ASM 555 Advanced Human Osteology. (3) N

Laboratory and field techniques in dealing with the human skeleton. Emphasis on preparation, identification, radiography, sectioning, microscopy, and data processing. 1 hour lecture, 6 hours lab. Prerequisite: ASM 341 or instructor approval.

ASM 565 Quantitative Archaeology. (3) S

Formal methods of structuring, codifying, and analyzing data for archaeological problems. Designing research to yield data amenable to productive analysis.

ASM 566 Advanced Topics in Quantitative Archaeology. (3) F

Archaeological issues associated with quantitative analysis, e.g., Bayesian and Monte Carlo approaches, simulation, diversity. May be repeated for credit. Prerequisite: ASM 565 or instructor approval.

ASM 573 Lithic Analysis. (3) N

Analysis and interpretation of chipped stone artifacts. Focus on both techniques and underlying concepts and their application to real collections. Prerequisite: instructor approval.

ASM 591 Seminar. (3) N

Selected topics in archaeology and physical anthropology.

- (a) Bioarchaeology
- (b) Evolution and Culture
Cross-listed as ASB 591.
- (c) Interdepartmental Seminar
Cross-listed as ASB 591.
- (d) Physical Anthropology
- (e) Primates and Behavior

Department of Biology

James Collins
Chair

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REGENTS' PROFESSORS
ALCOCK, MARKOW

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HAZEL, HEDRICK, LAWSON,
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DOUGLAS, KAZILEK

RESEARCH PROFESSOR
PEARSON

**RESEARCH ASSOCIATE
PROFESSOR**
DAVIDSON

BIOLOGY—B.S.

The major in Biology consists of a minimum of 43 semester hours in Biol-

ogy, and a minimum of 17 semester hours in related fields, plus a three-semester-hour mathematics proficiency. Required major courses are as follows:

BIO 193	The Nature of Biological Science <i>SI/S2</i> 4 or BIO 181 General Biology <i>SI/S2</i> (4) and BIO 182 General Biology <i>S2</i> (4)
BIO 320	Fundamentals of Ecology 3
BIO 340	General Genetics 4
BIO 353	Cell Biology 3
BIO 360	Basic Physiology 4 or MIC 360 Bacterial Physiology (3) or PLB 308 Plant Physiology (3)
BIO 370	Vertebrate Zoology 4 or BIO 385 Comparative Invertebrate Zoology (4) or MIC 206 Microbiology Laboratory <i>S2</i> (1)* and MIC 220 Biology of Microorganisms (3) or PLB 300 Comparative Plant Diversity <i>L2/S2</i> (4)
BIO 445	Organic Evolution 3
Total	..... 25

* Both MIC 205 and 206 must be taken to secure *S2* credit.

The remaining hours to bring the total to 43 will be selected from among upper-division courses in BIO, MIC, and PLB, in consultation with a Department of Biology advisor. The major must include at least three upper-division laboratory courses, and at least one upper-division course in plant biology (PLB) or microbiology (MIC). Required courses in related fields plus math proficiency are as follows:

CHM 113	General Chemistry <i>SI/S2</i> 4
CHM 115	General Chemistry with Qualitative Analysis <i>SI/S2</i> 5
Choose between the combinations of organic chemistry courses below 4 or 8	
CHM 231	Elementary Organic Chemistry <i>SI/S2</i> (3) ¹
CHM 235	Elementary Organic Chemistry Laboratory <i>SI/S2</i> (1) ¹
-----or-----	
CHM 331, 332	General Organic Chemistry (6)
CHM 335, 336	General Organic Chemistry Laboratory (2)
MAT 210	Brief Calculus <i>NI</i> 3 or any calculus

PHY 101	Introduction to Physics <i>SI/S2</i> 4 or PHY 111, 112 General Physics <i>SI/S2</i> (6) ² and PHY 113, 114 General Physics Laboratory <i>SI/S2</i> (2) ²
Total	..... 20 or 24

- ¹ Both CHM 231 and 235 must be taken to secure *S1* or *S2* credit.
- ² Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure *S1* or *S2* credit.

CONSERVATION BIOLOGY—B.S.

The major in Conservation Biology consists of a minimum of 45 semester hours in the required major courses and a minimum of 13 hours in related fields, plus a three-semester-hour mathematics proficiency. Required courses are as follows:

BIO 193	The Nature of Biological Science <i>SI/S2</i> 4 or BIO 181 General Biology <i>SI/S2</i> (4) and BIO 182 General Biology <i>S2</i> (4)
BIO 217	Conservation Biology 3
BIO 320	Fundamentals of Ecology 3
BIO 340	General Genetics 4
BIO 360	Basic Physiology 4
BIO 410	Techniques in Wildlife Conservation Biology <i>L2</i> 3
BIO 411	Advanced Conservation Biology I 3
BIO 412	Advanced Conservation Biology II 3
BIO 415	Biometry <i>N2</i> 4
Total	..... 31

The remaining hours to bring the total to 45 will be selected from among relevant upper-division courses in BIO and PLB courses or in related departments, in consultation with the Department of Biology. Required courses in related fields plus math proficiency are as follows:

CHM 113	General Chemistry <i>SI/S2</i> 4
CHM 115	General Chemistry with Qualitative Analysis <i>SI/S2</i> 5
Choose between the two combinations of organic chemistry courses below 4 or 8	
CHM 231	Elementary Organic Chemistry <i>SI/S2</i> (3)*
CHM 235	Elementary Organic Chemistry Laboratory <i>SI/S2</i> (1)*
-----or-----	

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

CHM 331, 332	General Organic Chemistry (6)	
CHM 335, 336	General Organic Chemistry Laboratory (2)	
MAT 210	Brief Calculus <i>NI</i>	3 or any calculus
Total		16 or 20

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

Concentration in Biology and Society

The major in Biology with a concentration in biology and society is intended for students with a strong interest in life sciences and in the interaction between life sciences and the society within which science is done. This option consists of a minimum of 44 semester hours in life sciences and societal interface courses, and 12 hours in related fields, plus a three-semester-hour mathematics proficiency. Required courses are as follows:

BIO 193	The Nature of Biological Science <i>S1/S2</i>	4 or BIO 181 General Biology <i>S1/S2</i> (4) and BIO 182 General Biology <i>S2</i> (4)
BIO 311	Biology and Society	3
BIO 320	Fundamentals of Ecology	3 or BIO 445 Organic Evolution (3)
BIO 340	General Genetics	4
BIO 419	Research Colloquium in Biology and Society	6
MAT 210	Brief Calculus <i>NI</i>	3 or any calculus
Total		23

The remaining courses to complete the major are determined by the student in consultation with a biology and society advisor and must be distributed in the following areas:

- 12 hours of upper-division electives from BIO, MIC, PLB;
- 12 hours of interface courses from an approved list from at least three of these areas: ethics, history of science, philosophy of science, and social issues;
- 11 hours of physical sciences (CHM recommended); and
- four hours of an approved course in statistics.

MINOR IN BIOLOGY

The Biology minor consists of 24 semester hours, including BIO 193 The Nature of Biological Science or BIO 181 General Biology and BIO 182 General Biology, and 16 to 20 hours selected with approval of an advisor in the Department of Biology; at least 12 hours must be in the upper division. Courses not available for credit in the Biology major cannot be used for the minor (e.g., BIO 100 The Living World and BIO 201 Human Anatomy and Physiology I). This minor is not available to students majoring in the life sciences.

SECONDARY EDUCATION—B.A.E.

Biological Sciences. The major teaching field consists of a minimum of 40 semester hours and at least 22 hours in supporting courses. Required major courses are as follows:

BIO 193	The Nature of Biological Science <i>S1/S2</i>	4 or BIO 181 General Biology <i>S1/S2</i> (4) and BIO 182 General Biology <i>S2</i> (4)
BIO 320	Fundamentals of Ecology	3
BIO 340	General Genetics	4
BIO 360	Basic Physiology	4
BIO 445	Organic Evolution	3
MIC 206	Microbiology Laboratory <i>S2</i> *	1
MIC 220	Biology of Microorganisms	3
PLB 300	Comparative Plant Diversity <i>L2/S2</i>	4 or PLB 310 The Flora of Arizona (4) or BIO 385 Comparative Invertebrate Zoology (4) or BIO 370 Vertebrate Zoology (4)
PLB 308	Plant Physiology	4
Total		30

* Both MIC 205 and 206 must be taken to secure S2 credit.

The remaining courses in the major (six hours minimum) should be selected to reflect a balance between BIO and PLB courses. Required supporting courses are as follows:

CHM 113	General Chemistry <i>S1/S2</i>	4
CHM 115	General Chemistry with Qualitative Analysis <i>S1/S2</i>	5
GLG 102	Introduction to Geology II (Historical) <i>S2</i> ¹	3 or GLG 300 Geology of Arizona (3)

HPS 330	History of Biology: Conflicts and Controversies <i>H</i>	3 or BIO 316 History of Biology: Conflicts and Controversies <i>H</i> (3)
MAT 170	Precalculus <i>NI</i>	3
PHY 101	Introduction to Physics <i>S1/S2</i>	4 or PHY 111, 112 General Physics <i>S1/S2</i> (6) ² and PHY 113, 114 General Physics Laboratory <i>S1/S2</i> (2) ²
Total		22

¹ Both GLG 102 and 104 must be taken to secure S2 credit.

² Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure S1 or S2 credit.

BIO 480 is required in the professional education program.

The minor teaching field consists of 24 semester hours as follows: BIO 181, 182; 16 additional hours in BIO, MIC, and PLB courses selected to reflect a balance across the disciplines and sub-disciplines in biology. BIO 480 is required in addition to the 24 semester hours in biological sciences.

GRADUATE PROGRAM

The faculty in the Department of Biology offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. (with a concentration in ecology for the M.S. and the Ph.D.). Consult the *Graduate Catalog* for requirements.

The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. See the *Graduate Catalog* for more information.

BIOLOGY (BIO)

BIO 100 The Living World. (4) F, S, SS Principles of biology. Cannot be used for major credit in the biological sciences. 3 hours lecture, 3 hours lab. *General Studies: S1/S2.*

BIO 120 Human Physiology. (4) F, S Basic concepts of general science are discussed using current issues and basic concepts of human physiology as a focus. Cannot be used for major credit in biological sciences. 3 hours lecture, 3 hours lab. *General Studies: S2.*

BIO 181 General Biology. (4) F, S, SS
Biological concepts emphasizing fundamental principles and the interplay of structure and function at the molecular, cellular, organismal, and population levels of organization. Secondary school chemistry strongly recommended. 3 hours lecture, 3 hours lab. Prerequisite: biological sciences major or preprofessional student in health-related sciences. *General Studies:* S1/S2.

BIO 182 General Biology. (4) F, S, SS
Continuation of BIO 181. Secondary school chemistry strongly recommended. Prerequisite: BIO 181. *General Studies:* S2.

BIO 193 The Nature of Biological Science. (4) F
Creative and critical thinking skills in biological research; nature of biological knowledge; role of experimentation, predictions, hypotheses, theories, values. Lecture, lab, discussion. Prerequisite: high school biology. *General Studies:* S1/S2.

BIO 201 Human Anatomy and Physiology I. (4) F, S, SS
Structure and dynamics of the human mechanism. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. *General Studies:* S2.

BIO 202 Human Anatomy and Physiology II. (4) F, S, SS
Continuation of BIO 201. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. Prerequisite: BIO 201 or instructor approval.

BIO 217 Conservation Biology. (3) F
The scientific and technical means for management, maintenance, protection, and restoration of biological resources on this planet. Prerequisite: 8 hours of biology.

BIO 218 Medical History. (1) F
Brief survey of humankind's important inventions and discoveries in the art and science of medicine, illustrating interrelationships of medical ideas.

BIO 241 Human Genetics. (4) F
Introduction to basic concepts in genetics as they are applied to human heredity. Cannot be used for major credit in the Department of Biology. 3 hours lecture, 3 hours lab. Prerequisite: a course in the life sciences. *General Studies:* S2.

BIO 280 Animal Behavior. (3) F
Evolutionary, genetic, physiological, and ecological bases of animal behavior. Prerequisite: 4 hours of BIO or instructor approval.

BIO 300 Natural History of Arizona. (3) F, S
Plant and animal communities of Arizona. Cannot be used for major credit in the biological sciences. Prerequisite: junior standing.

BIO 301 Field Natural History. (1) F, S
Organisms and their natural environment. 2 weekend field trips, field project. Cannot be used for major credit in the biological sciences. Pre- or corequisite: BIO 300.

BIO 302 Cancer and Heart Disease. (3) F
Incidence and mortality statistics for cancer and heart disease; host and environmental risk factors; diagnosis, treatment and prevention strategies. Cannot be counted toward a Biology major. Prerequisites: 12 hours in life sciences and CHM 231 (or equivalent) and an L1 course or instructor approval. *General Studies:* L2.

BIO 303 Radiation and Life. (3) S
Benefits and risks of radiation exposure in society; medical applications, food irradiation, nuclear power, solar UV, population health effects. Cannot be counted toward a Biology major. Prerequisites: 12 hours in life sciences and CHM 231 (or equivalent) and an L1 course or instructor approval. *General Studies:* L2.

BIO 304 Radiation Medicine and Biology. (3) F
Uses of radiation in medicine, including CT, diagnostic x-ray, MRI, nuclear medicine, ultrasound; biological effects of radiation with emphasis on cancer. Prerequisites: 12 hours in life sciences and PHY 112 and an L1 course or instructor approval. *General Studies:* L2.

BIO 310 Special Problems and Techniques. (1–3) F, S
Qualified undergraduates may investigate a specific biological problem under the direction of a faculty member. May be repeated for a total of 6 semester hours. Prerequisites: formal conference with the instructor; approval of the problem by the instructor and department chair.

BIO 311 Biology and Society. (3) S
Explores interactions between biological sciences and society, e.g., biomedical, environmental, ethical, historical, legal, philosophical, political, and social issues. Lecture, discussion. Prerequisite: BIO 193 (or BIO 100) or BIO 181 and 182.

BIO 316 History of Biology: Conflicts and Controversies. (3) N
Focuses on 19th and 20th centuries, considering biology as a discipline, evolution, and problems of heredity, development, and cell theory. Cross-listed as HPS 330. *General Studies:* H.

BIO 318 History of Medicine. (3) N
Scientific study of the human body, changing theories of disease, evolution of practical opinions on treatment, and the emerging institutionalization of medical practice. Cross-listed as HPS 331. *General Studies:* H.

BIO 319 Environmental Science (Nonmajor). (3) F
Environmental and biological concepts used to understand ecological systems with specific references to problems caused by humans. Cannot be used for major credit in the biological sciences. Credit is allowed only for BIO 319 or PLB 320. Cross-listed as PLB 320. *General Studies:* G.

BIO 320 Fundamentals of Ecology. (3) F, S
Organization, functioning, and development of ecological systems; energy flow; biogeochemical cycling; environmental relations; population dynamics. Prerequisite: BIO 182 or instructor approval.

BIO 321 Introductory Ecology Laboratory. (3) S
Laboratory and field observations and experiments to test current concepts and theories in ecology. Lab. Pre- or corequisite: BIO 320. *General Studies:* L2.

BIO 336 Sociobiology. (3) S
Survey of animal and human social behavior examined from an evolutionary perspective. Suitable for nonmajors. BIO 280 is recommended.

BIO 340 General Genetics. (4) F, S, SS
Science of heredity and variation. 3 hours lecture, 1 hour recitation. Prerequisite: BIO 182.

BIO 343 Genetic Engineering and Society. (4) F
Introduction to genetic engineering, with emphasis on applications (gene therapy, DNA fingerprinting, bioremediation, transgenic animals and plants). Lecture, lab. Cross-listed as PLB 352. Prerequisite: BIO 181 or equivalent.

BIO 351 Developmental Anatomy. (3) F
General developmental biology (embryology) and comparative structure of organ systems, illustrated mainly by vertebrate examples. Prerequisite: BIO 182.

BIO 352 Laboratory in Vertebrate Developmental Anatomy. (2) F, S
Morphology of representative embryonic and adult vertebrates. 2 3-hour labs. BIO 351 recommended. Prerequisite: BIO 182.

BIO 353 Cell Biology. (3) F
Survey of major topics in cell biology, including structural, biochemical, and molecular aspects of cell function. Prerequisite: BIO 182.

BIO 360 Basic Physiology. (4) F, S
Physiological mechanisms of the higher vertebrates. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182; CHM 115; MAT 117.

BIO 370 Vertebrate Zoology. (4) F, S
Characteristics, classification, evolution, and natural history of the major groups of vertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.

BIO 385 Comparative Invertebrate Zoology. (4) F
Characteristics, life cycles, adaptations, and evolution of invertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

BIO 386 General Entomology. (4) S 2000
Form, activities, and classification of insects. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.

BIO 394 Special Topics. (2–3) N
Topics of current or special interest in one or more aspects of animal biology. Topics vary. Cannot be used for major credit in life sciences. Prerequisite: junior standing.

BIO 406 Computer Applications in Biology. (3) F
Computer analysis techniques in biology, emphasizing data entry, graphic portrayal, and management and analysis. Employs mainframe and microcomputers. Credit is allowed only for BIO 406 or PLB 432. Cross-listed as PLB 432. Prerequisites: BIO 182 and MAT 117 (or 210) or instructor approval. *General Studies:* N3.

BIO 410 Techniques in Wildlife Conservation Biology. (3) F

Field and analytical techniques used in evaluating population structure, viability and environmental impacts. Lecture, lab. Prerequisites: BIO 217 and 320 or instructor approval. *General Studies: L2.*

BIO 411 Advanced Conservation Biology I. (3) F

Principles of conservation science; biology of threatened species; management principles that meet conservation goals; emphasizing North American ecosystems. Prerequisites: BIO 217, 320.

BIO 412 Advanced Conservation Biology II. (3) F

Global biodiversity patterns, processes and conservation; global environmental change; sustainable use of natural resources; emphasizing international approaches to conservation biology. Prerequisites: BIO 217, 320.

BIO 415 Biometry. (4) F

Statistical methods applied to biological problems, design of experiments, estimation, significance, analysis of variance, regression, correlation, chi square, and bioassay; the use of computers. Does not satisfy laboratory requirements for the liberal arts general studies program. 3 hours lecture, 3 hours lab. Prerequisite: MAT 210 or equivalent. *General Studies: N2.*

BIO 416 Professional Values in Science. (2–3) A

Considers issues related to values in science such as collaboration, finances, legal issues, media, mentoring, ownership of ideas, scientific integrity. Discussion, student projects. Cross-listed as HPS 410. *General Studies: L2.*

BIO 419 Research Colloquium in Biology and Society. (3–6) F, S

Develops critical thinking abilities, research methods, and writing skills for research in the interactions between biological sciences and society. Discussion. Prerequisite: BIO 311 or instructor approval.

BIO 420 Field Zoology. (3) N

Experience in zoological field techniques. Requires weekend or longer field trips. Prerequisite: instructor approval.

BIO 423 Population and Community Ecology. (3) N

Organization and dynamics of population and communities, emphasizing animals. Theoretical and empirical approaches. Prerequisite: BIO 320 or instructor approval.

BIO 425 Animal Ecology. (3) N

Physiological and behavioral adaptations of individual animals to both abiotic and biotic environments. Prerequisite: BIO 320.

BIO 426 Limnology. (4) S

Structure and function of aquatic ecosystems, with emphasis on freshwater lakes and streams. 3 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 320 or instructor approval. *General Studies: L2.*

BIO 428 Biogeography. (3) F

Environmental and historical processes determining distributional patterns of animals and plants, emphasizing terrestrial life. Prerequisites: BIO 182 (or equivalent); junior standing. *General Studies: L2.*

BIO 435 Research Techniques in Animal Behavior. (3) S 1999

Experimental and field studies of animal behavior; description and quantification of animal behavior and interpretation of behavior within an evolutionary framework. 1 hour lecture, 6 hours lab. Prerequisite: BIO 280. *General Studies: L2.*

BIO 441 Cytogenetics. (3) F 1999

Chromosomal basis of inheritance. Cross-listed as PLB 412. Prerequisite: BIO 340.

BIO 442 Cytogenetics Laboratory. (2) F 1999

Microscopic analysis of meiosis, mitosis, and aberrant cell division. 6 hours lab. Cross-listed as PLB 413. Pre- or corequisite: BIO 441 or PLB 412.

BIO 445 Organic Evolution. (3) F

Processes of adaptive change and speciation in sexual populations. Prerequisite: BIO 241 or 340.

BIO 446 Principles of Human Genetics. (3) A

Genetics in human populations, including medical aspects. Prerequisite: BIO 340. *General Studies: L2.*

BIO 450 Advanced Developmental Biology. (3) S

Current concepts and experimental methods involving differentiation and biosynthetic activities of cells and organisms, with examples from microorganisms, plants, and animals. Prerequisite: BIO 351.

BIO 453 Animal Histology. (4) S

Microscopic study of animal tissues. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

BIO 454 Aquatic Insects. (3) N

Systematics and ecology of aquatic insects. Prerequisite: BIO 386.

BIO 464 Photobiology. (3) F 1998

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Cross-listed as PLB 440. Prerequisites: CHM 231 (or 331); 12 hours of courses in life sciences.

BIO 465 Neurophysiology. (3) S 2000

Detailed treatment of cellular and organismal neurophysiology and nervous system function. Prerequisite: BIO 360.

BIO 466 Neurophysiology Laboratory. (2) S 2000

Intracellular and extracellular electrophysiological recording techniques, histological preparations, and dye-filling techniques. 6 hours lab. Pre- or corequisite: BIO 465.

BIO 470 Systematic Zoology. (4) S 1999

Philosophy, theory, practice of interpreting animal diversity, including species concepts, speciation, nomenclature, and evolutionary and phylogenetic classification emphasizing phylogenetics. 3 hours lecture, 3 hours lab. Prerequisites: junior standing; 18 hours in life sciences. *General Studies: L2.*

BIO 471 Ornithology. (3) S

The biology of birds. 2 hours lecture, 3 hours lab, weekend field trips. Prerequisite: BIO 370 or instructor approval.

BIO 472 Mammalogy. (4) F 1998

Classification, structure, habits, ecology, and distribution of mammals, emphasizing North American forms. 3 hours lecture, 3 hours lab or field trip, weekend field trips. Prerequisite: BIO 370 or instructor approval.

BIO 473 Ichthyology. (3) S 1999

Systematics and biology of recent and extinct fishes. 2 hours lecture, 3 hours lab or field trip, weekend field trips required. Prerequisites: BIO 370 and 425 or instructor approval.

BIO 474 Herpetology. (3) S 2000

Systematics and biology of recent and extinct reptiles and amphibians. 2 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 370.

BIO 480 Methods of Teaching Biology. (3) S

Methods of instruction, experimentation, organization, and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences.

BIO 495 Undergraduate Thesis. (3) F, S, SS

Guided research culminating in the preparation of an undergraduate thesis based on supervised research done in this and previous semesters. Prerequisites: at least 3 hours of BIO 310 (or 499); formal conference with instructor; instructor and department chair approval.

BIO 502 Transmission Electron Microscopy. (3) F

Theory, use, and methods of preparing biological materials for transmission electron microscopy. Materials fee. Lecture, lab. Prerequisite: instructor approval.

BIO 505 Scanning Electron Microscopy. (3) S

Theory, use, and methods of preparing biological materials for scanning electron microscopy. Materials fee. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.

BIO 508 Scientific Data Presentation. (2) S

Techniques necessary for presentation of scientific data used in journal publications, grant proposals, and visual presentations. Lecture, lab. Prerequisite: instructor approval.

BIO 520 Biology of the Desert. (2) N

Factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Prerequisite: 10 hours of biological sciences or instructor approval.

BIO 522 Populations: Evolutionary Ecology. (3) S

Principles of population biology and community ecology within an evolutionary framework. 2 hours lecture, 2 hours recitation. Prerequisites: BIO 320, 415 (or MAT 210), 545.

BIO 524 Ecosystems. (3) F 1999

Structure and function of terrestrial and aquatic ecosystems, with emphasis on productivity, energetics, biogeochemical cycling, and systems integration. Prerequisite: BIO 320 or equivalent.

BIO 526 Quantitative Ecology. (3) N

Sampling strategies, spatial pattern analysis, species diversity, classification, and applications of multivariate techniques to ecology. 2 hours lecture, 3 hours lab. Prerequisites: BIO 415 (or equivalent); a course in ecology.

BIO 529 Advanced Limnology. (3) N

Recent literature, developments, methods, and limnological theory; field and lab application to some particular topic in limnology. Prerequisite: BIO 426.

BIO 543 Molecular Genetics. (3) F

Nature and function of the gene; emphasis on the molecular basis of inheritance and gene expression in prokaryotes and eukaryotes. Prerequisites: BIO 340; a course in organic chemistry.

BIO 545 Populations: Evolutionary Genetics. (3) F

Mathematical models in the description and analysis of the genetics of populations. Prerequisites: BIO 320 and 415 and 445 or instructor approval.

BIO 547 Techniques in Evolutionary Genetics. (4) S

Practical experience in modern techniques for the study of evolution. Lecture, lab. Prerequisites: BIO 340, 445; instructor approval.

BIO 550 Advanced Cell Biology. (3) S

Applications of contemporary electron microscopic and biochemical/molecular techniques for studying eukaryotic cell functions. Mechanisms of intracellular protein trafficking. Prerequisites: BIO 353 (or 360 or equivalent or PLB 360); CHM 231 (or 331 or equivalent).

BIO 551 Biomembranes. (3) N

Structure and function of biological membranes, emphasizing synthesis, fluidity, exocytosis, endocytosis, and cell responses to hormones and neurotransmitters. Prerequisites: BIO 353 (or equivalent); CHM 231 (or 331 or equivalent).

BIO 552 Developmental Genetics. (3) F 1998

Genetic approaches to the analysis of development during the life cycle of eukaryotic organisms, and the role of genes in the unfolding of the differentiated phenotype. Prerequisite: BIO 340.

BIO 560 Comparative Physiology. (3) S 1999

The analysis of function in invertebrates and vertebrates, emphasizing evolutionary trends in physiological systems. Prerequisite: BIO 360 or equivalent.

BIO 566 Environmental Physiology. (3) S 2000

Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: BIO 320, 360.

BIO 568 Mammalian Physiology. (3) F 1999 Detailed treatment of mammalian organ system functions emphasizing integrative mechanisms. Prerequisite: BIO 360 or equivalent.

BIO 569 Cellular Physiology. (3) F 1998 Emphasizing the molecular basis for cell structure and function. Prerequisites: BIO 360; organic chemistry.

BIO 584 Internship. (1–12) F, S**BIO 591 Seminar.** (1–3) F, S

Topics such as the following are offered:

- Adaptations
- Behavior
- Cell Biology
- Ecology
- Evolution
- Genetic Engineering
- Genetics
- Physiology

May be repeated for credit.

Department of Chemistry and Biochemistry

Morton E. Munk

Chair

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www.asu.edu/clas/chemistry

REGENTS' PROFESSORS

ANGELL, BUSECK, C. MOORE,
O'KEEFFE, PETTIT

PROFESSORS

BALASUBRAMANIAN, BIEBER, BIRK,
BLANKENSHIP, BROWN, CRONIN,
FUCHS, GLAUNSINGER, GLICK,
GUST, HOLLOWAY, LOHR, McMILLAN,
A. MOORE, T. MOORE, MUNK,
PETUSKEY, ROSE, SKIBO,
STEIMLE, WILLIAMS

ASSOCIATE PROFESSORS

ALLEN, WOLF, WOODBURY

ASSISTANT PROFESSORS

BLOOM, BOOKSH, CAUDLE, HAYES,
KOUVETAKIS, PENA, YAGHI

CHEMISTRY—B.A.

The B.A. degree in Chemistry consists of 46 semester hours. Required courses are as follows:

Choose between the two combinations of courses below 9

CHM 113 General Chemistry
SI/S2 (4)

CHM 115 General Chemistry with
Qualitative Analysis
SI/S2 (5)

— or —

CHM 117 General Chemistry
for Majors I *SI/S2* (4)*

CHM 118 General Chemistry
for Majors II *SI/S2* (5)*

CHM 325 Analytical Chemistry 3

CHM 326 Analytical Chemistry
Laboratory 1

Choose between the two combinations of courses below 9 or 8

CHM 317 Organic Chemistry
for Majors I (3)*

CHM 318 Organic Chemistry
for Majors II (3)*

CHM 319 Organic Chemistry
Laboratory for
Majors I (1)*

CHM 320 Organic Chemistry
Laboratory for
Majors II (2)*

— or —

CHM 331, 332 General Organic
Chemistry (6)

CHM 335, 336 General Organic
Chemistry
Laboratory (2)

CHM 341 Elementary Physical
Chemistry 3

CHM 343 Physical Chemistry
Laboratory 1

CHM 453 Inorganic Chemistry 3

Total 29 or 28

* CHM 117, 118, 317, 318, 319, and 320 are strongly recommended for qualified students.

Related courses must include the following:

MAT 270 Calculus with Analytic
Geometry I *NI*¹ 4

MAT 271 Calculus with Analytic
Geometry II¹ 4

PHY 111, 112 General Physics
SI/S2^{2,3} 6

PHY 113, 114 General Physics
Laboratory *SI/S2*^{2,3} 2

Total 16

¹ Equivalent courses may be taken in place of MAT 270 and 271.

² More advanced PHY courses may be taken in place of PHY 111, 112, 113, and 114.

³ Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure S1 or S2 credit.

The remaining courses to complete the major are determined by students in consultation with their advisors.

CHEMISTRY—B.S.

The program consists of 42 semester hours in chemistry. Required courses are as follows:

Choose between the two combinations of courses below 9

CHM 113 General Chemistry
SI/S2 (4)

CHM 115 General Chemistry with
Qualitative Analysis
SI/S2 (5)

— or —

CHM 117 General Chemistry for
Majors I *SI/S2* (4)¹

CHM 118 General Chemistry for
Majors II *SI/S2* (5)¹

Choose between the two combinations of courses below 9 or 8

CHM 317	Organic Chemistry for Majors I (3) ¹	
CHM 318	Organic Chemistry for Majors II (3) ¹	
CHM 319	Organic Chemistry Laboratory for Majors I (1) ¹	
CHM 320	Organic Chemistry Laboratory for Majors II (2) ¹	
— or —		
CHM 331, 332	General Organic Chemistry (6)	
CHM 335, 336	General Organic Chemistry Laboratory (2)	

Total 18 or 17

Additional required chemistry courses are as follows:

CHM 325	Analytical Chemistry	3
CHM 326	Analytical Chemistry Laboratory	1
CHM 421	Instrumental Analysis	3
CHM 422	Instrumental Analysis Laboratory	1
CHM 441, 442	General Physical Chemistry	6
CHM 444	General Physical Chemistry Laboratory L2 ²	2
CHM 452	Inorganic Chemistry Laboratory L2 ²	1–2
CHM 453	Inorganic Chemistry	3
Total		20–21

¹ CHM 117, 118, 317, 318, 319, and 320 are strongly recommended for qualified students.

² Both CHM 444 and 452 must be taken to secure L2 credit.

The remaining chemistry courses to complete the major are determined by the student in consultation with an advisor. With the consent of the department chair, selected advanced courses from other related scientific disciplines may be accepted in lieu of elective chemistry courses to complete the major.

Additional required related field courses are as follows:

Choose between the two combinations of courses below 15 or 13

MAT 270	Calculus with Analytic Geometry I NI (4)	
MAT 271	Calculus with Analytic Geometry II (4)	

MAT 272 Calculus with Analytic Geometry III (4)

MAT 274 Differential Equations (3)

— or —

MAT 274 Differential Equations (3)

MAT 290 Calculus I NI (5)

MAT 291 Calculus II (5)

PHY 121 University Physics I: Mechanics S1/S2¹ 3

PHY 122 University Physics Laboratory I S1/S2 1

PHY 131 University Physics II: Electricity and Magnetism S1/S2² 3

PHY 132 University Physics Laboratory II S1/S2² 1

PHY 294 University Physics III 3

Total 26 or 24

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Strongly recommended is an appropriate course in computer language, such as CSE 181 Applied Problem Solving with BASIC or CSE 183 Applied Problem Solving with FORTRAN.

Transfer students are interviewed and advised of possible preparatory work. They must contact the department to arrange for the interview in advance of registration. See "Major Requirements," page 306.

American Chemical Society Certification. A student who satisfactorily completes the B.S. degree program is certified by the Department of Chemistry and Biochemistry to the American Chemical Society (ACS) as having met the specific requirements for undergraduate professional training in chemistry. Graduates meeting ACS guidelines can receive a certificate to indicate this fact.

Emphasis in Biochemistry. The major in Chemistry with an emphasis in biochemistry consists of 38 semester hours in chemistry plus work in related fields. Required courses are as follows:

Choose between the two combinations of courses below 8 or 9

CHM 113	General Chemistry S1/S2 (4)	
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CHM 116 General Chemistry S1/S2 (4) or CHM 115 General Chemistry with Qualitative Analysis S1/S2 (5)

— or —

CHM 117 General Chemistry for Majors I S1/S2 (4)¹

CHM 118 General Chemistry for Majors II S1/S2 (5)¹

Choose between the three combinations of courses below 9 or 8

CHM 317 Organic Chemistry for Majors I (3)

CHM 318 Organic Chemistry for Majors II (3)

CHM 319 Organic Chemistry Laboratory for Majors I (1)

CHM 320 Organic Chemistry Laboratory for Majors (2)

— or —

CHM 317 Organic Chemistry for Majors I (3)

CHM 318 Organic Chemistry for Majors II (3)

CHM 319 Organic Chemistry Laboratory for Majors I (1)

CHM 336 General Organic Chemistry Laboratory (1)

— or —

CHM 331, 332 General Organic Chemistry (6)

CHM 335, 336 General Organic Chemistry Laboratory (2)

CHM 325 Analytical Chemistry 3

Choose between the two combinations of courses below 8

CHM 341 Elementary Physical Chemistry (3)

CHM 463 Biophysical Chemistry (3)

CHM 464 Biophysical Chemistry Laboratory L2 (2)²

— or —

CHM 441, 442 General Physical Chemistry (6)

CHM 444 General Physical Chemistry Laboratory L2 (2)³

CHM 453 Inorganic Chemistry 3

CHM 461, 462 General Biochemistry 6

CHM 467 General Biochemistry Laboratory L2² 2

Total 38 or 40

¹ CHM 117 and 118 are strongly recommended for qualified students.

² Both CHM 464 and 467 must be taken to secure L2 credit.

³ Both CHM 444 and 452 must be taken to secure L2 credit.

Additional required related field courses are as follows:

BIO	181	General Biology <i>SI/S2</i>	4
BIO	182	General Biology <i>S2</i>	4
BIO	340	General Genetics	4

Choose between the two combinations of courses below 12 or 10

MAT 270 Calculus with Analytic Geometry I *NI* (4)

MAT 271 Calculus with Analytic Geometry II (4)

MAT 272 Calculus with Analytic Geometry III (4)

— or —

MAT 290 Calculus I *NI* (5)

MAT 291 Calculus II (5)

PHY 121 University Physics I: Mechanics *SI/S2*¹ 3

PHY 122 University Physics Laboratory I *SI/S2*¹ 1

PHY 131 University Physics II: Electricity and Magnetism *SI/S2*² 3

PHY 132 University Physics Laboratory II *SI/S2*² 1

Total 32 or 30

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

The remaining courses to complete the major are determined by students in consultation with their advisors.

MINOR IN CHEMISTRY AND BIOCHEMISTRY

A minor in Chemistry and Biochemistry is awarded to students who complete the following required courses:

CHM 113 General Chemistry *SI/S2*¹ 4

CHM 115 General Chemistry with Qualitative Analysis *SI/S2* 5 or CHM 116 General Chemistry *SI/S2* (4)

CHM 421 Instrumental Analysis 3

CHM 422 Instrumental Analysis Laboratory 1

Choose between the two combinations of courses below 7 or 8

CHM 231 Elementary Organic Chemistry *SI/S2* (3)²

CHM 235 Elementary Organic Chemistry Laboratory *SI/S2* (1)²

CHM 361 Principles of Biochemistry (3)

— or —

CHM 331, 332 General Organic Chemistry (6)

CHM 335, 336 General Organic Chemistry Laboratory (2)

Choose between the two combinations of courses below 4 or 8

CHM 341 Elementary Physical Chemistry (3)¹

CHM 343 Physical Chemistry Laboratory (1)¹

— or —

CHM 441, 442 General Physical Chemistry (6)

CHM 444 General Physical Chemistry Laboratory *L2* (2)³

Minimum total 24

¹ Equivalent courses may be taken in place of CHM 113, 115 or 116, 341, and 343.

² Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

³ Both CHM 444 and 452 must be taken to secure L2 credit.

SECONDARY EDUCATION—B.A.E.

Chemistry. Students may pursue one of two options for the chemistry major teaching field.

Option One. The academic specialization consists of 48 semester hours in chemistry plus work in related fields. Required courses are as follows:

CHM 113 General Chemistry *SI/S2* 4

CHM 115 General Chemistry with Qualitative Analysis *SI/S2* 5

CHM 325 Analytical Chemistry 3

CHM 326 Analytical Chemistry Laboratory 1

CHM 331, 332 General Organic Chemistry 6

CHM 335, 336 General Organic Chemistry Laboratory 6

CHM 341 Elementary Physical Chemistry 3

or CHM 441, 442 General Physical Chemistry (6)

CHM 361 Principles of Biochemistry 3

CHM 480 Methods of Teaching Chemistry 3

or PHY 480 Methods of Teaching Physics (3)

Total 34

The remaining chemistry courses to complete the specialization are determined by students in consultation with their advisors.

Additional required related field courses are as follows:

MAT 270 Calculus with Analytic Geometry I *NI* 4

MAT 271 Calculus with Analytic Geometry II 4

PHY 111, 112 General Physics *SI/S2** 6

PHY 113, 114 General Physics Laboratory *SI/S2** 2

Total 16

* Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure S1 or S2 credit.

Option Two. The academic specialization consists of 31 semester hours of chemistry, which includes all of the required chemistry courses listed in option one and selection of the corresponding option in either mathematics or physics, that is, completion of an additional 30 semester hours in the chosen area as specified by the department selected.

The minor teaching field consists of the following required courses:

CHM 113 General Chemistry *SI/S2* 4

CHM 115 General Chemistry with Qualitative Analysis *SI/S2* 5

Choose between the two combinations of courses below 10 or 12

CHM 231 Elementary Organic Chemistry *SI/S2* (3)*

CHM 325 Analytical Chemistry (3)

CHM 326 Analytical Chemistry Laboratory (1)

CHM 361 Principles of Biochemistry (3)

— or —

CHM 331, 332 General Organic Chemistry (6)

CHM 335, 336 General Organic Chemistry Laboratory (6)

CHM 341 Elementary Physical Chemistry 3

Total 22 or 24

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

The remaining courses to complete the specialization are determined by students in consultation with their advisors.

GRADUATE PROGRAMS

The faculty in the Department of Chemistry and Biochemistry offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. Consult the *Graduate Catalog* for requirements.

The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. For more information, contact Bonnie Engel, PS D121, 602/965-0743.

CHEMISTRY (CHM)

CHM 101 Introductory Chemistry. (4) F, S, SS

Elements of general chemistry. Adapted to the needs of students in nursing, home economics, agriculture, and physical education. Recommended for general studies credit. Normally followed by CHM 231. 3 hours lecture, 1 hour discussion, 2 hours lab. Credit is allowed for *only* CHM 101, 113, 114, or 117. *General Studies:* S1/S2.

CHM 107 Chemistry and Society. (4) F, S
General chemical principles and concepts presented in context of social and technological issues, e.g., energy, pollution, global warming, and others. 3 hours lecture, 1 hour discussion, 2 hours lab. *General Studies:* S1/S2.

CHM 113 General Chemistry. (4) F, S, SS
Principles of chemistry. Adapted to the needs of students in the physical, biological, and earth sciences. 3 hours lecture, 1 hour discussion, 2 hours lab. 1 year of high school chemistry recommended. Credit is allowed for *only* CHM 101, 113, 114, or 117. Prerequisite: MAT 106 or 3 semesters of high school algebra. *General Studies:* S1/S2.

CHM 114 General Chemistry for Engineers. (4) F, S

One semester college chemistry with emphasis toward engineering. 3 hours lecture, 1 hour discussion, 2 hours lab. Students without high school chemistry or chemical engineering majors must enroll in the CHM 113, 116 sequence instead of CHM 114. Credit is allowed for *only* CHM 101, 113, 114, or 117 and for *only* CHM 114, 115, 116, or 118. Prerequisites: MAT 106 or 3 semesters of high school algebra; 1 year of high school chemistry. *General Studies:* S1/S2.

CHM 115 General Chemistry with Qualitative Analysis. (5) F, S, SS

Continuation of CHM 113. Equilibrium theory, chemistry of metals, nonmetals, and metalloids and the introduction to organic chemistry. Laboratory includes qualitative analysis. 3 hours lecture, 2 hours discussion, 4 hours lab. Credit is allowed for *only* CHM 114, 115, 116, or 118. Prerequisite: CHM 113 or 2 years of high school chemistry. *General Studies:* S1/S2.

CHM 116 General Chemistry. (4) F, S
Continuation of CHM 113. Equilibrium theory, chemistry of metals, nonmetals, and metalloids and the introduction to organic chemistry. 3 hours lecture, 1 hour discussion, 2 hours lab. Credit is allowed for *only* CHM 114, 115, 116, or 118. Prerequisite: CHM 113 or 2 years of high school chemistry. *General Studies:* S1/S2.

CHM 117 General Chemistry for Majors I.

(4) F
Atomic and molecular structure, properties and physical states of matter, thermodynamics, kinetics, acids and bases, chemical analysis, and stoichiometry. 3 hours lecture, 1 conference, 2 hours lab. Credit is allowed for *only* CHM 101, 113, 114, or 117. Prerequisites: 3 years of high school mathematics; minimum of 1 year of high school physics. Prerequisite with a grade of "B" or higher: minimum of 1 year of high school chemistry. *General Studies:* S1/S2.

CHM 118 General Chemistry for Majors II. (5) S

Continuation of CHM 117. 3 hours lecture, 1 conference, 5 hours lab. Credit is allowed for *only* CHM 114, 115, 116, or 118. Prerequisite: CHM 117. Corequisite: MAT 270 or 290. *General Studies:* S1/S2.

CHM 231 Elementary Organic Chemistry. (3) F, S

Survey of organic chemistry, with emphasis on the reactivity of basic functional groups. Credit is allowed for *only* CHM 231, 317, or 331. Prerequisite with a grade of "B" or higher: CHM 101 or 114 or 115 or 116 or 117 or 1 year of high school chemistry or instructor approval. *General Studies:* S1/S2 (if credit also earned in CHM 235).

CHM 235 Elementary Organic Chemistry Laboratory. (1) F, S

Organic chemistry experiments in synthesis, purification, analysis, and identification. Lab. Pre- or corequisite: CHM 231. *General Studies:* S1/S2 (if credit also earned in CHM 231).

CHM 302 Environmental Chemistry. (3) S
Explores major environmental issues, problems, and solutions from analytical and chemistry perspectives. Prerequisites: CHM 114 (or 115 or 116 or 118), 231 (or 331).

CHM 317 Organic Chemistry for Majors I. (3) F

Structures, reaction mechanisms and kinetics, and systematic syntheses of organic compounds. Credit is allowed for *only* CHM 231, 317, or 331. Prerequisite: CHM 115 or 118. Corequisite: CHM 319.

CHM 318 Organic Chemistry for Majors II. (3) S

Continuation of CHM 317. Credit is allowed for *only* CHM 318 or 332. Prerequisite: CHM 317. Corequisite: CHM 320.

CHM 319 Organic Chemistry Laboratory for Majors I. (1) F

Emphasis on mechanisms, kinetics, and products of organic reactions. 1 conference, 3 hours lab. Credit is allowed for *only* CHM 319 or 335. Pre- or corequisite: CHM 317.

CHM 320 Organic Chemistry Laboratory for Majors II. (2) S

Continuation of CHM 319. 1 conference, 7 hours lab. Credit is allowed for *only* CHM 320 or 336. Prerequisite: CHM 319. Corequisite: CHM 318.

CHM 325 Analytical Chemistry. (3) F, SS

Principles and methods of chemical analysis. Prerequisite: CHM 115 or 116.

CHM 326 Analytical Chemistry Laboratory.

(1) F, SS
Experiments in chemical analysis. 4 hours lab. Corequisite: CHM 325.

CHM 331 General Organic Chemistry. (3) F, S, SS

Chemistry of organic compounds. Credit is allowed for *only* CHM 231, 317, or 331. Prerequisite: CHM 115 or 116 or 118.

CHM 332 General Organic Chemistry. (3) F, S, SS

Continuation of CHM 331. Credit is allowed for *only* CHM 318 or 332. Prerequisite: CHM 331.

CHM 335 General Organic Chemistry Laboratory. (1) F, S, SS

Microscale organic chemical experiments in separation techniques, synthesis, analysis and identification, and relative reactivity. 4 hours lab. Credit is allowed for *only* CHM 319 or 335. Corequisite: CHM 331.

CHM 336 General Organic Chemistry Laboratory. (1) F, S, SS

Continuation of CHM 335. 4 hours lab. Credit is allowed for *only* CHM 320 or 336. Prerequisite: CHM 335. Corequisite: CHM 332.

CHM 341 Elementary Physical Chemistry. (3) F

Thermodynamics, equilibrium, states of matter, solutions, and chemical kinetics. For students in premedical, biological, and educational curricula. Not open to students who have taken CHM 441. Prerequisites: CHM 115 (or 114 or 118 or 325), 231 (or 331); MAT 271; PHY 112.

CHM 343 Physical Chemistry Laboratory. (1) F

Physical chemistry experiments. 1 hour conference, 3 hours lab. Credit is allowed for *only* CHM 343 or 444. Corequisite: CHM 341 or 441.

CHM 361 Principles of Biochemistry. (3) F, SS

Structures, properties, and functions of proteins, enzymes, nucleic acids, carbohydrates, and lipids; the utilization and synthesis of these materials by living systems, and the relationship of these processes to energy production and utilization. Not open to students who have taken CHM 461. Credit is allowed for *only* CHM 361 or 461. Prerequisite: CHM 231 or 318 or 332.

CHM 367 Elementary Biochemistry Laboratory. (1) F, SS

Qualitative/quantitative analyses of constituents of biological systems, enzyme activity measurements and metabolic studies. 1 hour conference, 3 hours lab. Pre- or corequisite: CHM 361 or instructor approval.

CHM 392 Introduction to Research Techniques. (1-3) F, S, SS

Instrumental methods and philosophy of research by actual participation in chemical research projects. May be repeated for a total of 6 semester hours. Prerequisites: approvals of advisor and research supervisor.

CHM 421 Instrumental Analysis. (3) S

Principles of instrumental methods in chemical analysis. Electroanalytical and optical techniques. Prerequisites: CHM 325, 326. Pre- or corequisite: CHM 442.

CHM 422 Instrumental Analysis Laboratory. (2) S

Experiments in chemical analysis by electro-analytical and optical techniques. 6 hours lab. Corequisite: CHM 421.

CHM 424 Separation Science. (3) N

Basic theory and practical aspects of gas, liquid, ion-exchange, and gel-permeation chromatographies, and other important industrial and research techniques. 2 hours lecture, 4 hours lab. Prerequisite: CHM 318 or 332 or 442 or instructor approval.

CHM 431 Qualitative Organic Analysis. (3) S

Systematic identification of organic compounds. 1 hour lecture, 6 hours lab. Prerequisites: CHM 118 (or 326) and 320 (or 336) or instructor approval.

CHM 441 General Physical Chemistry. (3) F

Laws of thermodynamics and their applications, properties of gases, solids, liquids and solutions, reaction kinetics, wave mechanics, molecular spectroscopy, and statistical thermodynamics. Credit is allowed for *only* CHM 341 or 441. Prerequisites: MAT 272 (or 291); PHY 241. Corequisite: MAT 274.

CHM 442 General Physical Chemistry. (3) S
Continuation of CHM 441. Prerequisite: CHM 441; MAT 274.

CHM 444 General Physical Chemistry Laboratory. (2) S

Physical chemical experiments. 1 conference, 5 hours lab. Credit is allowed for *only* CHM 343 or 444. Prerequisite: CHM 441. *General Studies: L2 (if credit also earned in CHM 452).*

CHM 452 Inorganic Chemistry Laboratory. (1–2) S

Preparation and characterization of typical inorganic substances, emphasizing methods and techniques. 1 conference, 5 hours lab. Prerequisite: instructor approval. *General Studies: L2 (if credit also earned in CHM 444).*

CHM 453 Inorganic Chemistry. (3) S

Principles and applications of inorganic chemistry. Prerequisite: CHM 341 or 441.

CHM 461 General Biochemistry. (3) F

Structure, chemistry, and metabolism of biomolecules and their role in the biochemical processes of living organisms. Credit is allowed only for CHM 361 or 461. Prerequisites: CHM 318 (or 332) and 341 (or 441) or instructor approval.

CHM 462 General Biochemistry. (3) S

Continuation of CHM 461. Prerequisite: CHM 461 or instructor approval.

CHM 463 Biophysical Chemistry. (3) S

Principles of physical chemistry as applied to biological systems. Prerequisite: CHM 341 or 441.

CHM 464 Biophysical Chemistry Laboratory. (2) S

Introduction to physical methods in modern biochemistry. Prerequisite: CHM 463. *General Studies: L2 (if credit also earned in CHM 467).*

CHM 467 General Biochemistry Laboratory. (2) S

The application of modern chemical and physical methods to biochemical problems; purification and characterization of biological macromolecules; quantitative measurement of enzyme activity and properties; evaluation of metabolic processes. 1 conference, 5 hours lab. Prerequisite: CHM 461. *General Studies: L2 (if credit also earned in CHM 464).*

CHM 471 Solid-State Chemistry. (3) F

Crystal chemistry, thermodynamics and electrochemistry of solids, nonstoichiometric compounds, diffusion and solid-state reactions, crystal growth, and selected topics. Pre- or corequisite: CHM 441 or instructor approval.

CHM 480 Methods of Teaching Chemistry. (3) S

Organization and presentation of appropriate content of chemistry; preparation of reagents, experiments, and demonstrations; organization of stock rooms and laboratories; experience in problem solving. Prerequisite: instructor approval.

CHM 481 Geochemistry. (3) F

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as GLG 481. Prerequisite: CHM 341 (or 441) or GLG 321.

CHM 485 Meteorites and Cosmochemistry. (3) N

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as GLG 485.

CHM 501 Current Topics in Chemistry. (1) F, S

May be repeated for credit. Prerequisite: instructor approval.

CHM 521 Computer Enhanced Analytical Chemistry. (3) N

Overview of chemometric tools in analytical chemistry, including multivariate calibration, spectral deconvolution, and experimental design. 2 hours lecture, 4 hours lab.

CHM 523 Advanced Analytical Chemistry. (3) A

Theoretical principles of analytical instrumentation and measurements. Prerequisites: CHM 325 and 442 or instructor approval.

CHM 525 Spectrochemical Methods of Analysis. (4) N

Theoretical and practical considerations involving the use of optical instruments for chemical analyses. Emphasis on state of the art trends. 3 hours lecture, 3 hours lab. Prerequisite: CHM 442 or instructor approval.

CHM 526 X-ray Methods of Analysis. (4) N

Theoretical and practical considerations involving the use of X-ray diffraction and spectroscopy for chemical and structural analyses. 3 hours lecture, 3 hours lab. Prerequisite: CHM 442.

CHM 527 Electrical Methods of Chemical Analysis. (4) N

Theoretical and practical considerations of polarographic, potentiometric, amperometric techniques, including modern electrochemical methods. 2 hours lecture, 6 hours lab. Prerequisite: CHM 442.

CHM 531 Advanced Organic Chemistry I. (3) F

Reaction mechanisms, reaction kinetics, linear free energy relationships, transition state theory, molecular orbital theory, and Woodward-Hoffmann rules. Prerequisites: CHM 318 (or 332), 442.

CHM 532 Advanced Organic Chemistry II. (2) S

Continuation of CHM 531. Prerequisite: CHM 531.

CHM 537 Organic Reactions. (3) S

Important synthetic reactions of organic chemistry emphasizing recently discovered reactions of preparative value. Prerequisite: CHM 531.

CHM 541 Advanced Thermodynamics. (3) F

Equilibrium thermodynamics, chemical reactions, and phase equilibria. Introduction to statistical thermodynamics, critical phenomena, and kinetics. Prerequisite: CHM 442.

CHM 545 Quantum Chemistry I. (3) F

Basic quantum theory, chemical bonding, and molecular structure. Prerequisite: CHM 442.

CHM 546 Quantum Chemistry II. (3) S

Quantum theory of rate processes. Principles of spectroscopy and nonlinear optics. Prerequisite: CHM 545.

CHM 548 Chemical Kinetics. (2) N

Kinetic theory and rate processes. Prerequisite: CHM 545.

CHM 553 Advanced Inorganic Chemistry. (3) S

Principles of modern inorganic chemistry and their applications over the entire periodic system. Prerequisites: CHM 442 and 453 or equivalents.

CHM 556 Topics in Inorganic Chemistry. (3) N

May be repeated for credit. Prerequisites: CHM 553; instructor approval.

CHM 563 Biophysical Chemistry. (3) N

Physical chemistry of macromolecules, especially proteins, nucleic acids, and polysaccharides. Thermodynamics, hydrodynamics, and spectroscopy of and their relation to structure. Prerequisites: CHM 442, 462.

CHM 568 Molecular Mechanisms of Photosynthesis. (3) N

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as PLB 558. Prerequisite: instructor approval.

CHM 579 Topics in Solid-State Chemistry. (3) N

May be repeated for credit. Prerequisite: instructor approval.

CHM 582 Topics in Geochemistry and Cosmochemistry. (3) N

Topics of current interest for students in chemistry and other fields. Sampling of data and thought concerning phase equilibria, element distribution, meteorites, the Earth, and other planets. May be repeated for credit. Prerequisite: instructor approval.

CHM 583 Phase Equilibria and Geochemical Systems. (3) N

Natural reactions at high temperatures and pressures; silicate, sulfide, and oxide equilibria. Cross-listed as GLG 583.

Department of Chicana and Chicano Studies

Vicki L. Ruiz
Chair

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www.asu.edu/clas/chicana

PROFESSORS

CANDELARIA, PADILLA, RUIZ

ASSOCIATE PROFESSOR

ESCOBAR

ASSISTANT PROFESSORS

ALDAMA, HABELL-PALLAN, MAGAÑA

The Chicana and Chicano Studies program is an interdisciplinary degree program that examines the experiences, culture, artistic endeavors, and current status of people of Mexican descent living in the United States. The curriculum focuses on the practical application of Chicana and Chicano Studies (CCS) for career development in selected professions and service to the community based on an understanding of the humanities, social sciences, and the arts.

CHICANA AND CHICANO STUDIES—B.A.

The major in Chicana and Chicano Studies requires 45 semester hours of course work. A minimum of 30 semester hours must be CCS, CSH, and CSS courses. The remaining course work must be in a related field to be approved by an advisor. All CCS majors must take 15 semester hours in the following core courses:

CCS 101	Introduction to Chicana and Chicano Studies	3
CCS 111	Introduction to Chicana and Chicano Culture	3
CCS 498	Pro-Seminar	3
	Two semester sequence in Chicana and Chicano history	6

Within the 45 semester hours, CCS majors must also take 18 semester hours in one of two concentrations—humanities/cultural studies or social sciences/policy—and 12 hours in the other concentration for a grand total of 45 semester hours.

Majors will be expected to fulfill the college's language requirement in Spanish. Although the department advisor can make exceptions on a case by

case basis, all majors must demonstrate proficiency in Spanish.

All Chicana and Chicano Studies majors must take an established minor or credential of at least 18 semester hours in another field.

CHICANA AND CHICANO STUDIES MINOR

The Chicana and Chicano Studies minor requires 18 semester hours of course work. All Chicana and Chicano Studies minors must take the following courses:

CCS 101	Introduction to Chicana and Chicano Studies	3
	or CCS 111 Introduction to Chicana and Chicano Culture (3)	
HIS 430	20th-Century Chicano History	3
	Total	6

Students must also take at least three credits in both CCS concentrations: humanities/cultural studies and social sciences/policy.

Within the 18 semester hour requirement, students must take a minimum of 12 semester hours in CCS, CSH, and CSS courses. Any courses taken in a related field must be approved by an advisor.

CHICANA AND CHICANO STUDIES (CCS)

CCS 101 Introduction to Chicana and Chicano Studies. (3) F

Historical and contemporary issues in the Chicana and Chicano community; focus on economic, sociological, cultural, and political status of Chicanas and Chicanos in the U.S. *General Studies: C.*

CCS 111 Introduction to Chicana and Chicano Culture. (3) S

Interdisciplinary analysis of customs, values, belief systems, and cultural symbols; special attention is given to cultural continuity and change. *General Studies: C.*

CCS 300 Chicana and Chicano Culture and Society. (3) F

Intensive analysis of how Mexican American writers, artists, film makers, entertainers, and academicians have interpreted aspects of the Chicana and Chicano experience. *General Studies: C.*

CCS 445 Teaching Chicana and Chicano Studies in Native Language. (3) A

Approaches/techniques for infusion of Chicana and Chicano Studies content into elementary and secondary bilingual curriculum. Taught in Spanish. Prerequisite: proficiency in Spanish.

CCS 446 Teaching Chicana and Chicano Studies in the Schools. (3) A

Approaches/techniques for infusion of Chicana and Chicano Studies content into elementary and secondary curriculum; designed for teachers who will work with Chicana and Chicano students.

CCS 498 Pro-Seminar. (3) A

Required courses for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

CHICANA AND CHICANO STUDIES (CSH)

CSH 220 Chicana and Chicano Cultural Expression. (3) A

Interrelation between economic, social and political status and forms of artistic expression, i.e., music, dance, drama, literature, and graphic arts.

CSH 310 Chicana and Chicano Folklore. (3) A

Analysis of Chicana and Chicano folk beliefs, traditions, and practices. *General Studies: HU, C.*

CSH 350 Mexican and Mexican American Artistic Production. (3) A

Overview of Mexican and Mexican American artistic production from colonial times to present; emphasis on religious and folk art.

CSH 351 Contemporary Chicana and Chicano Art. (3) A

Intensive analysis of contemporary Chicana and Chicano art movement as appraised within the context of contemporary American art and the art of Mexico. *General Studies: HU, C.*

CSH 363 Chicana and Chicano Literature. (3) F

Development of Chicana and Chicano literature; study of genres and themes; attention to literary antecedents. Cross-listed as ENG 363. *General Studies: L2/HU, C.*

CSH 485 Chicana Writers. (3) A

Critical reading of Mexican American women authors; emphasis on contemporary (post-1970) poetry, novels, short stories, and essays. *General Studies: L2/HU, C.*

CSH 498 Pro-Seminar. (3) A

Required course for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

CHICANA AND CHICANO STUDIES (CSS)

CSS 315 Chicano Family Structures and Perceptions. (3) A

Traditional and changing family relationships; emphasis on gender and intergenerational relations and impact of modern society on traditional family values.

CSS 330 Chicana and Chicano Politics. (3) A

Historical/contemporary analysis of Chicana and Chicano political ideologies, attitudes, strategies, and movements; relations with governmental agencies; participation in political process.

CSS 331 Contemporary Issues in the Chicana and Chicano Community. (3) S Historical, demographic, and sociological overview of the status of Chicanas and Chicanos in the U.S. and of salient issues affecting that community. *General Studies: C.*

CSS 336 Issues in Immigration and Migration. (3) A Historical/contemporary overview of Mexican immigration into and within the U.S.; factors affecting population movement, settlement patterns, and migrants' incorporation into society. *General Studies: C, H.*

CSS 340 Chicanas and Chicanos in the U.S. Economy. (3) S Historical/contemporary analysis of Chicanas' and Chicanos' relationship with the American economic system; emphasis on impact of changing American economy on Chicana and Chicano community. *General Studies: C.*

CSS 432 Issues in Chicana and Chicano Gender. (3) A Analysis of social construction of gender identities; emphasis on impact of American and Mexican cultural values on normative gender relations. *General Studies: C.*

CSS 490 Field Studies in the Chicana and Chicano Community. (3) A Introduction to principles and methods of qualitative research applied to the Chicana and Chicano community.

CSS 498 Pro-Seminar. (3) A Required course for majors on topic selected by instructor; writing intensive course related to the development of interdisciplinary research skills.

Computer Science

A major in Computer Science is offered in both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Faculty and course descriptions appear on pages 216–221.

COMPUTER SCIENCE—B.S.

The program in Computer Science consists of 34 hours of core course work and 15 semester hours of senior-level breadth courses in the major. Also required are 18 semester hours of technical elective and mathematics courses approved by the department. The university requirement for literacy and critical inquiry is to be met in part by ECE 400 or a departmental L2.

A minimum cumulative GPA of 2.50 is required to begin upper-division work in the major. A minimum grade of "C" is required in all CSE courses used for degree credit.

For more information, contact an advisor in the Office for Academic Programs, SS 111, or the Computer Science and Engineering Advising Center in GWC 224.

The degree is accredited by the Computer Science Accreditation Board, so more than 120 semester hours are required to complete the degree.

Economics

A B.A. or B.S. degree in Economics is offered in both the College of Liberal Arts and Sciences and the College of Business. Faculty, course descriptions, and the major requirements in the College of Business are listed on pages 154–156.

ECONOMICS—B.A. OR B.S.

The program in Economics consists of 45 semester hours of course work, 24 of which, at a minimum, must be in economics, and the remainder in closely related fields to be selected from the "Approved List of Related Field Courses" in consultation with the faculty advisor.

The following lower-division courses are required and must be counted as part of the 45-hour major:

ECN 111	Macroeconomic Principles <i>SB</i>	3
ECN 112	Microeconomic Principles <i>SB</i>	3
MAT 210	Brief Calculus <i>N1</i>	3
STP 226	Elements of Statistics <i>N2</i>	3
Total	.....	12

While MAT 210 meets the minimum mathematics requirement to major in Economics, all Economics majors who anticipate going on to graduate school in economics or in business or to law school are encouraged to take MAT 270 Calculus with Analytic Geometry I offered in sections taught via the "reform" calculus method. The relevant section line numbers are available from the Department of Mathematics. Majors are encouraged to pursue further course work in mathematics. MAT 270 may be taken in lieu of MAT 210.

To qualify for upper-division course work in economics, the Economics ma-

ior must earn a minimum grade of "C" in each of the previously listed courses, have junior class standing (56 semester hours), and have a minimum cumulative GPA of 2.50. ECN 313 Intermediate Macroeconomic Theory and ECN 314 Intermediate Microeconomic Theory are required and should be taken after the completion of the previously listed courses and before other upper-division courses in economics.

Credit earned by an Economics major in ECN 484 Economics Internship, whether as a legislative intern or through the Department of Economics Internship Program (and ECN 493 Honors Thesis), may not be used to satisfy the minimum 24 hours of economics course work requirement. However, up to six hours of ECN 484 and 493 may be used to meet the related fields requirement. See "Major Requirements," page 306.

Latin American Studies Certificate or Emphasis. Students majoring in Economics may elect to pursue a Latin American Studies Certificate or Emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 308, for more information.

MINORS IN ECONOMICS

Minor in General Economics. The minor in General Economics consists of 18 semester hours of credit which includes ECN 111 and ECN 112 plus any 12 hours of upper-division economics courses for which all prerequisites have been met.

Minors in General Economics are encouraged to take calculus and statistics, which are prerequisites for ECN 313 Intermediate Macroeconomic Theory and ECN 314 Intermediate Microeconomic Theory so that these courses might be included in the minor. The College of Business does not permit its professional program students to enroll in this minor.

Minor in Economics for Students Planning a Career in Law. One of the most dramatic recent developments in law is the integration of economic analysis in legal theory and decision making. Curricula at all major law

schools reflect this change. Consequently, future lawyers are being trained with courses that rely increasingly on microeconomic theory and econometrics.

The applications of economics to law have moved beyond the traditional areas of antitrust and regulation. First-year law courses now include microeconomics to contracts, torts, criminal law, property, and constitutional law.

The minor in Economics for Students Planning a Career in Law provides an opportunity for prospective law students to take courses that provide them with analytical tools essential for the study of law. The prelaw minor consists of a minimum of 18 semester hours. The College of Business does not permit its professional program students to enroll in this minor.

Required courses are as follows:

ECN 111	Macroeconomic Principles <i>SB</i>	3
ECN 112	Microeconomic Principles <i>SB</i>	3
ECN 314	Intermediate Microeconomic Theory <i>SB</i>	3
ECN 450	Law and Economics <i>L2</i>	3
ECN 453	Government and Business.....	3
Total		15

Also required is at least one additional course from the following:

ACC 316	Managerial Uses of Accounting.....	3
ECN 421	Earnings and Employment <i>L2/SB</i>	3
ECN 480	Introduction to Econometrics <i>N2</i>	3
ECN 494	Public Choice.....	3
FIN 361	Managerial Finance.....	3

SECONDARY EDUCATION— B.A.E.

The minor teaching field consists of 21 semester hours. ECN 111 Macroeconomic Principles and ECN 112 Microeconomic Principles and MAT 210 Brief Calculus are required. The remainder must be approved by the advisor in consultation with the student.

Social Studies. See page 390.

GRADUATE PROGRAMS

The faculty in the Department of Economics offer programs leading to the M.S. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

Faculty and course descriptions are listed on pages 154–156.

Department of English

Nancy A. Gutierrez
Chair
(LL B504) 602/965–3168
www.asu.edu/clas/english

REGENTS' PROFESSORS

N. DUBIE, RIOS

PROFESSORS

BENDER, BJORK, BOYER, BRACK, BRINK, BUCKINGHAM, CARLSON, DONELSON, HELMS, KEHL, LESTER, LIGHTFOOT, A. NILSEN, D. NILSEN, PARKER-RHODES, RICHARD, ROEN, SANDS, WILKINS

ASSOCIATE PROFESSORS

ADAMS, BATES, CHANCY, CORSE, DeLAMOTTE, J. DUBIE, GOLDBERG, GREEN, GUTIERREZ, HORAN, JANSSEN, D.B. MAHONEY, MAJOR, MILLER, MORGAN, NELSON, OJALA, RAMAGE, SCHWALM, SENSIBAR

ASSISTANT PROFESSORS

BIVONA, CASTLE, FUSE, GOGGIN, HARRIS, JOHNSON, LUSSIER, McCABE, PERRY, PRITCHARD, STEVENS, TOHE, VAN GELDEREN

SENIOR LECTURERS

COOK, DUGAN

LECTURERS

COOPER, DWYER, KYBURZ, D.M. MAHONEY, OBERMEIER, ORLICH, SUDOL, WHEELER

ACADEMIC PROFESSIONAL

GLAU

ENGLISH—B.A.

The B.A. degree in English consists of 45 semester hours in English. Required courses are as follows:

ENG 200	Critical Reading and Writing about Literature <i>L1/HU</i>	3
ENG 221, 222	Survey of English Literature <i>HU, H</i>	6
ENG 241, 242	American Literature <i>HU</i>	6
ENG 312	English in Its Social Setting <i>HU/SB</i>	3
	or ENG 314 Modern Grammar (3)	
	or ENG 413 History of the English Language <i>HU</i> (3)	
ENG 421	Shakespeare <i>HU</i>	3
Total		21

Also required are an upper-division course in English literature before 1660, an upper-division course in English literature between 1660 and 1900, an upper-division course in 20th-century British or American literature, and an upper-division course in women's literature or American ethnic literature. Twelve additional hours are free electives chosen from the department's offerings at the 200 level or above. A grade of "C" or higher is required in all courses taken for the major. *No course may be used to satisfy more than one requirement.* At least 18 hours must be in upper-division courses.

MINOR IN ENGLISH

The English minor consists of 24 hours in English. Required courses are as follows:

ENG 200	Critical Reading and Writing about Literature <i>L1/HU</i>	3
ENG 221	Survey of English Literature <i>HU, H</i>	3
	or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
ENG 241	American Literature <i>HU</i>	3
	or ENG 242 American Literature <i>HU</i> (3)	
ENG 312	English in Its Social Setting <i>HU/SB</i>	3
	or ENG 314 Modern Grammar (3)	
	or ENG 413 History of the English Language <i>HU</i> (3)	
ENG 421	Shakespeare <i>HU</i>	3
Total		15

Also required is one upper-division course in English or American literature. Six additional hours are free electives chosen from the department's offerings at the 200 level or above. A grade of "C" or higher is required in all courses taken for the minor.

SECONDARY EDUCATION— B.A.E.

The major teaching field consists of 42 semester hours in English. Required courses are as follows:

ENG 200	Critical Reading and Writing about Literature <i>L1/HU</i>	3
ENG 212	English Prose Style <i>L1</i>	3
	or ENG 215 Strategies of Academic Writing <i>L1</i> (3)	
	or ENG 216 Persuasive Writing on Public Issues <i>L1</i> (3)	
	or ENG 217 Personal and Exploratory Writing <i>L1</i> (3)	
ENG 221, 222	Survey of English Literature <i>HU, H</i>	6

ENG 241, 242	American Literature <i>HU</i>	6
ENG 312	English in Its Social Setting <i>HU/SB</i>	3
	or ENG 314 Modern Grammar (3)	
ENG 421	Shakespeare <i>HU</i>	3
ENG 471	Literature for Adolescents <i>HU</i>	3
ENG 480	Methods of Teaching English	3
Total	.....	30

Also required is one course in women's literature or American ethnic literature. Nine additional hours are free electives chosen from English department offerings, six hours of which must be in the upper division. ENG 471 and 480 must be taken before student teaching.

The minor teaching field consists of the following required courses:

ENG 200	Critical Reading and Writing about Literature <i>L1/HU</i>	3
ENG 212	English Prose Style <i>L1</i>	3
	or ENG 215 Strategies of Academic Writing <i>L1</i> (3)	
	or ENG 216 Persuasive Writing on Public Issues <i>L1</i> (3)	
	or ENG 217 Personal and Exploratory Writing <i>L1</i> (3)	
ENG 221	Survey of English Literature <i>HU, H</i>	3
	or ENG 222 Survey of English Literature <i>HU, H</i> (3)	
ENG 241	American Literature <i>HU</i>	3
	or ENG 242 American Literature <i>HU</i> (3)	
ENG 312	English in Its Social Setting <i>HU/SB</i>	3
	or ENG 314 Modern Grammar (3)	
ENG 471	Literature for Adolescents <i>HU</i>	3
ENG 480	Methods of Teaching English	3
	Upper-division English elective	3
Total	.....	24

These courses are also recommended for Elementary Education majors.

GRADUATE PROGRAMS

The faculty in the Department of English offer programs leading to the M.A. degree in English (with concentrations in comparative literature, English linguistics, literature and language, and rhetoric and composition), Master of Fine Arts degree in Creative Writing (options include fiction, nonfiction, po-

etry, and screenwriting), Master of Teaching English as a Second Language degree, and Ph.D. degree in English with concentrations in literature and rhetoric/composition and linguistics. Consult the *Graduate Catalog* for requirements.

ENGLISH (ENG)

ENG 101 First-Year Composition. (3) F, S, SS
Discovering, organizing, and developing ideas in relation to the writer's purpose, subject, and audience. Emphasis on modes of written discourse and effective use of rhetorical principles. Foreign students, see ENG 107. Prerequisite: see pages 79 and 351–352.

ENG 102 First-Year Composition. (3) F, S, SS
Critical reading and writing; emphasis on strategies of academic discourse. Research paper required. Foreign students, see ENG 108. Prerequisite with a grade of "C" or higher: ENG 101.

ENG 105 Advanced First-Year Composition. (3) F, S
A concentrated composition course for students with superior writing skills; intensive reading; research papers; logical and rhetorical effectiveness. Not open to students with credit in First-Year Composition. Prerequisite: see pages 79 and 351–352.

ENG 107 English for Foreign Students. (3) F, S
For students from non-English speaking countries who have studied English in their native countries, but who require practice in the idioms of English. Intensive reading, writing, and discussion. Satisfies the graduation requirement of ENG 101.

ENG 108 English for Foreign Students. (3) F, S
For foreign students; critical reading and writing; strategies of academic discourse. Research paper required. Satisfies graduation requirement of ENG 102. Prerequisite with a grade of "C" or higher: ENG 107.

ENG 114 English Grammar and Usage. (3) F, S
The fundamentals of English grammar (word and phrase structure) and of English usage (punctuation, grammatical correctness).

Completion of the First-Year Composition requirement is a prerequisite for all English courses above the 100 level.

ENG 200 Critical Reading and Writing about Literature. (3) F, S
Introduction to the terminology, methods, and objectives of the study of literature, with practice in interpretation and evaluation. Prerequisite: English major or minor. *General Studies: L1/HU.*

ENG 201 World Literature. (3) F
The classical and medieval periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General Studies: HU, H.*

ENG 202 World Literature. (3) S
The Renaissance and modern periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General Studies: HU, H.*

ENG 204 Introduction to Contemporary Literature. (3) A
Poetry, fiction, drama, and possibly other genres. *General Studies: HU.*

ENG 210 Introduction to Creative Writing. (3) F, S
Beginning writing of poetry, fiction, and drama (both stage and screen). Separate sections for each genre. Each genre may be taken once.

ENG 212 English Prose Style. (3) N
Analysis and practice of writing in various classical and modern prose styles. Prerequisite: English major or approval of advisor and instructor. Prerequisite with a grade of "B" or higher: ENG 102 *General Studies: L1.*

ENG 213 Introduction to the Study of Language. (3) F, S
Language as code; phonetics, phonology, morphology, and syntax; the lexicon; language acquisition; sociolinguistics.

ENG 215 Strategies of Academic Writing. (3) F, S
Advanced course in techniques of analyzing and writing academic expository prose. Writing is research based. *General Studies: L1.*

ENG 216 Persuasive Writing on Public Issues. (3) F, S
Advanced course in techniques of analyzing and writing persuasive arguments addressing topics of current public interest. Papers are research based. *General Studies: L1.*

ENG 217 Personal and Exploratory Writing. (3) F, S
Using writing to explore one's self and the world one lives in; emphasis on expository writing as a means of learning. *General Studies: L1.*

ENG 218 Writing about Literature. (3) F, S
Advanced writing course requiring analytical and expository essays about fiction, poetry, and drama. For non-English majors. *General Studies: L1.*

ENG 221 Survey of English Literature. (3) F, S
Medieval, Renaissance, and 18th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General Studies: HU, H.*

ENG 222 Survey of English Literature. (3) F, S
Romantic, Victorian, and 20th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General Studies: HU, H.*

ENG 241 American Literature. (3) F, S
From colonial times to the Civil War, including the growth of nationalism and romanticism. *General Studies: HU.*

ENG 242 American Literature. (3) F, S
From the Civil War to the present. Development of realism, naturalism and modernism, and contemporary trends in prose and poetry. *General Studies: HU.*

ENG 245 Popular Culture Issues. (3) F, S
Selected topics in various forms of popular culture related to written texts. May be repeated for credit when topic varies.

A term paper or equivalent out-of-class written work is required in all upper-division (300–400 level) ENG courses.

ENG 301 Writing for the Professions. (3) F, S

Advanced practice in writing and editing expository prose. Primarily for preprofessional majors. *General Studies: L1.*

ENG 303 Classical Backgrounds of English Literature. (3) N

Selected readings of Greek and Latin literature in translation, emphasizing forms, ideas, and myths, as they relate to literature in English. *General Studies: HU.*

ENG 307 Utopian Literature. (3) N

Selected works from the present to the classical period, including *Walden Two*, *Walden*, *Utopia*, and *The Republic*. *General Studies: L2/HU, H.*

ENG 310 Intermediate Creative Writing. (3) F, S

Separate sections for fiction and poetry. May be taken once for poetry, once for fiction. Lectures, writing assignments, discussion, criticism. Prerequisite: ENG 210 or instructor approval.

ENG 312 English in Its Social Setting. (3) F, S

Introduction to the sociolinguistic study of the English language. *General Studies: HU/SB.*

ENG 314 Modern Grammar. (3) F, S

Modern descriptive models of English grammar.

ENG 321 Introduction to Shakespeare. (3) F, S

Shakespeare's major comedies, histories, and tragedies. *General Studies: L2/HU.*

ENG 331 American Drama. (3) A

Major works in the development of American drama from its beginnings to the present. *General Studies: L2.*

ENG 332 Major American Novels. (3) A

Novels from the 19th century to the present studied in their historical and cultural contexts. *General Studies: L2.*

ENG 333 American Ethnic Literature. (3) A

Examination of America's multiethnic identity through works of literature that depict American ethnic, gender, and class sensibilities. *General Studies: L2, C.*

ENG 345 Selected Authors or Issues. (3–4) N

Different topics may be offered. Film topics with lab may carry 4 credits. Repeat credit for different topics.

ENG 352 Short Story. (3) F, S

Development of the short story as a literary form; analysis of its technique from the work of representative authors. *General Studies: HU.*

ENG 353 African American Literature: Beginnings through the Harlem Renaissance. (3) F

Thematic and cultural study of African American literature through the Harlem Renaissance. *General Studies: L2/HU, C.*

ENG 354 African American Literature: Post-Harlem Renaissance to the Present. (3) S

Thematic and cultural study of African American literature since the Harlem Renaissance. *General Studies: L2/HU, C.*

ENG 355 History of the Drama. (3) N

Development of European drama from the Greek to the Romantic Period. *General Studies: L2/HU.*

ENG 356 Biblical Backgrounds of Literature. (3) A

Readings in Old and New Testaments, emphasizing ideas, literary types, and sources as they appear in literature. *General Studies: HU.*

ENG 357 Introduction to Folklore. (3) N

Survey of the history, genres, and dynamics of folklore, with emphasis on oral traditions. *General Studies: HU.*

ENG 359 American Indian Literatures. (3) N

Selected oral traditions of American Indians and their influences on contemporary Native American literary works. *General Studies: L2/HU, C.*

ENG 361 Silent Film. (4) F

Development of motion pictures from 1850 through 1930. 3 hours lecture, screenings. *General Studies: HU.*

ENG 362 Sound Film Genres. (4) S

Examination of the Western, the horror film, the comedy, and other genres. 3 hours lecture, screenings. *General Studies: HU.*

ENG 363 Chicana and Chicano Literature. (3) F

Development of Chicana and Chicano literature; study of genres and themes; attention to literary antecedents. Cross-listed as CSH 363. *General Studies: L2/HU, C.*

English majors and minors are expected to have completed ENG 200 before taking 400-level literature courses.

ENG 400 History of Literary Criticism. (3) N

Major critics and critical traditions in the western world. Prerequisite: 6 hours of literature or instructor approval. *General Studies: HU.*

ENG 405 Style and Stylistics. (3) N

Linguistic, rhetorical, and literary approaches to the analysis of style in poetry, fiction, and other forms of written discourse.

ENG 409 Advanced Screenwriting II. (3) N

Application of the principles taught in a complete feature-length screenplay.

ENG 411 Advanced Creative Writing. (3) F, S

Separate poetry and fiction workshops for experienced writers, emphasizing individual style. May be taken once for poetry, once for fiction. Prerequisite: ENG 310 or instructor approval.

ENG 412 Professional Writing. (3) N

Lectures and conferences concerning techniques of writing for publication. Prerequisite: ENG 310 or instructor approval.

ENG 413 History of the English Language. (3) A

Development of English from the earliest times to the modern period. Prerequisite: junior standing or instructor approval. *General Studies: HU.*

ENG 415 Medieval Literature. (3) N

Medieval English literature in translation, from *Beowulf* to Malory (excluding Chaucer), emphasizing cultural and intellectual backgrounds; includes continental works. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 416 Chaucer: *Canterbury Tales*. (3) A

Chaucer's language, his last work, and its relationship to continental and insular traditions. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 417 Chaucer: *Troilus and Criseyde* and the Minor Works. (3) N

Chaucer's language, his major poem, and his early works in their medieval context. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 418 Renaissance Literature. (3) N

Poetry and prose, 1485–1603, excluding the drama. Humanism and major genres; More, Sidney, Spenser, and other representative writers. Prerequisite: ENG 221 or instructor approval. *General Studies: L2/HU.*

ENG 419 English Literature in the Early 17th Century. (3) N

Prose and poetry, exclusive of Milton and the drama. Metaphysical, Cavalier, and neoclassical verse; Donne, Jonson, Bacon, and other representative writers. Prerequisite: ENG 221 or instructor approval. *General Studies: L2/HU.*

ENG 421 Shakespeare. (3) F, S

A selection of comedies, histories, and tragedies. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 422 Studies in Shakespeare. (3) A

Topics for close examination in selected dramatic and/or nondramatic works. May be repeated for credit when topics vary. Prerequisite: ENG 421 or instructor approval. *General Studies: HU.*

ENG 423 Renaissance Drama. (3) N

Drama of the Tudor and early Stuart periods (exclusive of Shakespeare). Includes Kyd, Marlowe, Jonson, and Webster. Prerequisite: ENG 221 or instructor approval. *General Studies: L2/HU.*

ENG 424 Milton. (3) A

Selected prose and poetry, emphasizing *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 425 Romantic Poetry. (3) N

Poetry of Wordsworth, Coleridge, Shelley, Keats, and Byron. *General Studies: HU.*

ENG 426 Victorian Poetry. (3) N

Poetry of the second half of the 19th century. Special study of Tennyson, Browning, and Arnold. Prerequisite: ENG 222 or instructor approval. *General Studies: L2/HU.*

ENG 427 Restoration and Early 18th Century. (3) N

Writers and movements in the nondramatic literature of the Restoration and early 18th century. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 428 The Later 18th Century. (3) N

Writers, movements, and books during the second half of the 18th century. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 430 Victorian Cultural Backgrounds. (3) N

Social, religious, and other cultural issues in prose by such writers as Carlyle, Ruskin, Darwin, Arnold, Pater, and Morris. Prerequisite: ENG 222 or instructor approval. *General Studies: L2/HU.*

ENG 435 19th-Century American Poetry. (3) N

Themes and developments in American poetry to 1900, including Poe, Whitman, and Dickinson. *General Studies: HU.*

ENG 439 Restoration and 18th-Century Drama. (3) S 1999

English drama 1600–1800. Prerequisite: ENG 221 or instructor approval. *General Studies: HU.*

ENG 440 American Literature to 1815. (3) N

Thought and expression from the time of the first English-speaking colonies to 1815. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 441 20th-Century American Drama. (3) N

American drama since World War I, especially experimental techniques. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*

ENG 442 20th-Century British and Irish Poetry. (3) N

Theory and practice of poetry since 1900. Prerequisite: ENG 222 or instructor approval.

ENG 443 American Poetry, 1900–1945. (3) N

Developments in theory and practice of major poets. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*

ENG 444 Studies in American Romanticism, 1830–1860. (3) N

Cultural expression in works of representative writers. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 445 American Realism, 1870–1900. (3) N

Writers and influences that shaped the development of literary realism. *General Studies: L2/HU.*

ENG 448 20th-Century British and Irish Novel. (3) N

Theory and practice of the novel since 1900. Prerequisite: ENG 222 or instructor approval. *General Studies: HU.*

ENG 451 The Novel to Jane Austen. (3) N

From origins of prose fiction through the 18th century. *General Studies: HU, H.*

ENG 452 The 19th-Century Novel. (3) N

From Scott to Conrad. *General Studies: HU.*

ENG 453 The American Novel to 1900. (3) N

The rise and development of the novel to Dreiser. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 454 The American Novel, 1900–1945. (3) N

Developments in theory and practice of major novelists. Prerequisite: ENG 241 or 242 or instructor approval. *General Studies: HU.*

ENG 455 The Form of Verse: Theory and Practice. (3) N

Types, history, criticism, and schools of theory of metrical form. Analysis of lyric, narrative, and dramatic poetry.

ENG 457 American Poetry Since 1945. (3) A

Major American poets of the period. Developments in theory and practice. Prerequisite: ENG 241 or instructor approval. *General Studies: HU.*

ENG 458 American Novel Since 1945. (3) N

Major novelists of the period. Developments in theory and practice. Prerequisite: ENG 242 or instructor approval. *General Studies: L2/HU.*

ENG 460 Western American Literature. (3) A

Critical examination of ideas and traditions of the literature of the western United States, including the novel. *General Studies: L2/HU.*

ENG 461 Women and Literature. (3) N

Selected topics in literature by or about women. May be repeated for credit when topics vary. *General Studies: HU.*

ENG 462 20th-Century Women Authors. (3) N

Critical examination of literature by 20th-century women writers. May be repeated for credit when topics vary. *General Studies: HU.*

ENG 463 European Drama from Ibsen to 1914. (3) N

Chief continental and British dramatists of the period, emphasizing the beginnings and development of realism. *General Studies: HU.*

ENG 464 European Drama from 1914 to the Present. (3) N

Chief continental and British dramatists of the period, emphasizing experimental techniques. *General Studies: HU.*

ENG 471 Literature for Adolescents. (3) F, S

Prose and poetry that meet the interests and capabilities of junior high and high school students. Recent literature stressed. A passing grade of at least "C" required before students are permitted to student teach in English. *General Studies: HU.*

ENG 480 Methods of Teaching English. (3) F, S

Methods of instruction, organization, and presentation of appropriate content in English. A passing grade of at least "C" required before students are permitted to student teach in English. Prerequisite: ENG 312 or 314 or 413.

ENG 500 Research Methods. (3) A

Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.

ENG 501 Introduction to Comparative Literature. (3) N

Problems, methods, and principles, illustrated by selected critical essays and literary texts.

ENG 502 Contemporary Critical Theory. (3) A

An advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as HUM 549.

ENG 507 Old English. (3) N

Elements of Old English grammar with selected readings.

ENG 508 Old English Literature. (3) N

Intensive literary, linguistic, and cultural study of Old English literature. May be repeated for credit when topics vary. Prerequisite: ENG 507.

ENG 509 Middle English. (3) N

A study of the principal dialects of the language with selected readings. Prerequisite: graduate standing.

ENG 512 The Teaching of Composition. (3) N

The theory and practice of teaching writing at all levels. Emphasis on current research. Prerequisites: teaching experience; instructor approval.

ENG 515 Middle English Literature. (3) N

English literature from the 12th through the 15th centuries, exclusive of Chaucer. Prerequisite: ENG 509 or instructor approval.

ENG 517 Contemporary Rhetorical Theory. (3) A

Investigation of the work of such important rhetorical theorists as Burke, Toulmin, Perelman, Gates, and Cixous.

ENG 520 Renaissance Literature. (3) N

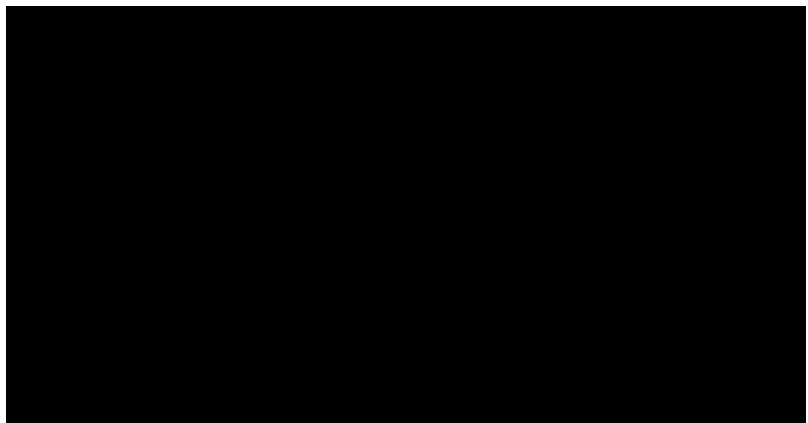
Poetry and prose of the English Renaissance, excluding drama.

ENG 521 Shakespeare. (3) A

A selection of comedies, histories, and tragedies presented in the context of literary history and critical theories, with an emphasis on classical and medieval backgrounds.

ENG 525 American Literary Criticism. (3) N

Analysis and discussion of leading historical and critical interpretations of American literature from the beginnings to the present.



Karen Adams, associate professor of English, conducts a lecture during a modern grammar class.

Tim Trumble photo

ENG 530 Classical Rhetoric and Written Composition. (3) F 1999

Relationship of major texts in classical rhetoric to developments in composition theory, literary theory, and practice through the 19th century.

ENG 531 Rhetorical Theory and Literary Criticism. (3) S 1999

Intensive study of major rhetorical theorists of the 20th century in such areas as literary criticism, discourse theory, and composition theory.

ENG 532 Composition Theory. (3) N

Intensive study in the rhetorical categories of invention, arrangement, style, aims, modes, and forms of written discourse.

ENG 545 Studies in English Literature. (3) N

This course offers selected authors or issues and may be repeated for credit.

ENG 547 Studies in American Literature. (3) N

This course offers selected authors or issues and may be repeated for credit.

ENG 549 Studies in Comparative Literature. (3) N

This course offers selected authors or issues and may be repeated for credit.

ENG 550 Contemporary Comparative Literature. (3) N

Comparative studies in modern literature in English and other literatures in translation. May be repeated for credit when content varies.

ENG 560 Studies in Dramatic Forms. (3) F, N

Selected topics in dramatic and cinematic literature, history, criticism, theory, and cross-disciplinary study. May be repeated for credit when topic varies. Lecture, studio.

ENG 571 Advanced Study in Literature for Adolescents. (3) N

History and criticism of adolescent literature. Prerequisite: ENG 471 or instructor approval.

ENG 573 Censorship and Literature. (3) N

The history of censorship, primarily in the United States, and significant court decisions that affected writers and books.

ENG 591 Seminar. (3) F, S

Selected topics regularly offered in the various areas of English studies.

LINGUISTICS (LIN)

See the *Graduate Catalog* for the LIN courses.

WRITING ACROSS THE CURRICULUM (WAC)**WAC 101 Introduction to Academic Writing.** (3) F, S

Combines classroom and supplemental instruction to teach academic genres of writing, including definition, summary, and analysis.

WAC 107 Introduction to Academic Writing for International Students. (3) F, S

For students from non-English speaking countries. Combines classroom and supplemental instruction with intensive reading, writing, and discussion.

Department of Exercise Science and Physical Education

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REGENTS' PROFESSOR

D.M. LANDERS

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DARST, KRAHENBUHL, MARTIN,
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PHILLIPS, SWAN, K. THOMAS

SENIOR LECTURER

D.M. LANDERS

LECTURERS

JONES, PRIDE

EXERCISE SCIENCE/PHYSICAL EDUCATION—B.S.

The B.S. degree in Exercise Science/Physical Education consists of 42 semester hours, including 21 semester hours of required EPE core courses (EPE 110 may be repeated for credit). The remaining 21 semester hours of EPE and other courses are prescribed by the specific concentration the student selects.

The required EPE core courses are as follows:

EPE	110	Movement Analysis Laboratory	6
EPE	200	Introduction to Exercise Science and Physical Education	3
EPE	335	Biomechanics	3
EPE	340	Physiology of Exercise	3
EPE	345	Motor and Developmental Learning	3
EPE	352	Psychosocial Aspects of Physical Activity	3
Total			21

Each EPE core course has specific prerequisite courses that must be taken before taking the respective core course. These prerequisite courses include the following:

BIO	201	Human Anatomy and Physiology I S2	4
BIO	202	Human Anatomy and Physiology II	4
CHM	101	Introductory Chemistry S1/S2	4
MAT	117	College Algebra N1	3
PGS	101	Introduction to Psychology SB	3
PHY	111	General Physics S1/S2*	3
Total			21

* Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

All prerequisite and EPE courses must be completed with a minimum grade of "C." The requirements for the specific concentrations are described below.

Majors must elect either the exercise science, exercise and wellness, or physical education concentration.

Exercise and Wellness Concentration. Candidates for the exercise and wellness concentration must complete 21 semester hours beyond the required EPE core courses by taking the following:

EPE	300	Foundations of Exercise and Wellness	3
EPE	320	Program Development and Leadership	3
EPE	420	Exercise Testing	3
EPE	425	Exercise Prescription	3
EPE	484	Internship	6
Total			18

Three semester hours must be selected from an approved list of concentration electives that includes EPE courses and courses from nutrition, computer science/statistics, and business.

Exercise Science Concentration. Candidates for the exercise science concentration must complete 21 semester hours beyond the core courses in the major field, at least 12 of which must carry EPE prefixes, be upper-division courses, and concern the theoretical subjects of the core. The remaining nine semester hours may carry either EPE prefixes or prefixes from related disciplines selected with the advice and consent of a faculty advisor. Activity courses may not be used to fulfill part of the 21 semester hour requirement. No more than six semester hours may be in independent study courses.

Physical Education Concentration.

Candidates must complete 21 semester hours beyond the EPE core courses, 12 of which must carry EPE prefixes from the required course list below.

EPE 361	Physical Education in the Secondary School	3
EPE 376	Physical Education for the Elementary School	3
EPE 382	Physical Education for the Atypical Student	3
EPE 480	Methods of Teaching Physical Education	3
Total		12

The remaining nine semester hours of related coursework can carry either EPE, psychology, special education, child development, and/or education prefixes. Activity courses (EPE 110) may be used to fulfill part of the 21-semester-hour requirement (additional four semester hours maximum). No more than six semester hours may be taken in internship. Internship experiences may only be in elementary and secondary school teaching and coaching settings. A maximum of six semester hours may be in independent study.

EXERCISE SCIENCE/PHYSICAL EDUCATION MINOR

The minor in Exercise Science/Physical Education consists of the core sequence in exercise science and physical education as follows, plus all prerequisite courses:

EPE 110	Movement Analysis Laboratory	6
EPE 200	Introduction to Exercise Science and Physical Education	3
EPE 335	Biomechanics	3
EPE 340	Physiology of Exercise	3
EPE 345	Motor and Developmental Learning	3
EPE 352	Psychosocial Aspects of Physical Activity	3
Total		21

SECONDARY EDUCATION—B.A.E.

Physical Education. Candidates for the B.A.E. degree are required to complete the following courses in physical education in addition to the required EPE core courses:

EPE 361	Physical Education in the Secondary School	3
EPE 376	Physical Education for the Elementary School	3
EPE 382	Physical Education for the Atypical Student	3
EPE 480	Methods of Teaching Physical Education	3
Total		12

Students must also complete a four-semester professional sequence in the College of Education (34 semester hours). Entry into this degree program requires filing an application, passing scores on a Pre-Professional Skills Test (PPST) or American College Test (ACT), 56 semester hours of completed university study, and a minimum GPA of 2.50. See the “College of Education” section for additional requirements.

GRADUATE PROGRAMS

The faculty in the Department of Exercise Science and Physical Education offer programs leading to the Master of Physical Education degree and the M.S. degree in Exercise Science/Physical Education. The department also participates with the Graduate College in the program leading to the Ph.D. degree in Exercise Science and with the College of Education and the Graduate College in the program leading to the Ph.D. degree in Curriculum and Instruction with concentrations in exercise and wellness and in physical education. Consult the *Graduate Catalog* for requirements.

EXERCISE SCIENCE/PHYSICAL EDUCATION (EPE)

A \$5.00 towel and locker fee is required each semester by students using towel and locker facilities for physical education classes and intramural activities.

Physical education activity classes (EPE 105, 205, 305, 310) may not be taken for audit. Excessive absences and/or tardiness are considered disruptive behavior.

EPE 100 Introduction to Health and Wellness. (3) F, S, SS
Current concepts of health and wellness. Cross-listed as HES 100.

EPE 105 Physical Education Activity. (1) F, S, SS
Beginning instruction in a wide variety of sports such as aerobics, aquatics, racquet sports, physical conditioning, and golf. 3 hours/week. “Y” grade only. May be repeated.

EPE 110 Movement Analysis Laboratory. (1–2) F, S, SS

Practical application of biomechanical, physiological, psychological, and learning principles in the analysis of skill acquisition and performance. Prerequisites: EPE 105 proficiency; ESPE major.

EPE 200 Introduction to Exercise Science and Physical Education. (3) F, S, SS
Introduction to the disciplines and professions associated with ESPE, including an overview of historical and philosophical foundations.

EPE 205 Physical Education Activity. (1) F, S, SS
Intermediate levels. Continuation of EPE 105. 3 hours/week. May be repeated for credit.

EPE 283 Prevention and Care of Athletic Injuries. (3) F
Taping, injury recognition, emergency care, and observation procedures in athletic training. Prerequisites: BIO 201, 202.

EPE 290 Sports Officiating. (3) F
Rules and mechanics of officiating used in football, basketball, and volleyball.

EPE 292 Sports Officiating. (3) S
Rules and mechanics of officiating used in softball (slow and fast pitch), baseball, and track and field.

EPE 300 Foundations of Exercise and Wellness. (3) F
Analysis of research in various disciplines which contribute to health promotion and wellness.

EPE 301 Fitness for Living. (1) F, S
Application of principles of physical activity to personal fitness testing and program planning for people of all ages. Telecampus course. Not open to Exercise Science and Physical Education majors or to students who have credit for EPE 325.

EPE 305 Physical Education Activity. (1) F, S, SS
Advanced levels. Continuation of EPE 205, with instructor’s approval. 3 hours a week. May be repeated.

EPE 310 Collegiate Sports. (1) F, S
Participation in men’s or women’s intercollegiate competition. May be repeated for 4 credits, 1 per year. “Y/E” grade.

EPE 320 Program Development and Leadership. (3) S
Principles of planning, organizing, promoting, and leading fitness and wellness programs. For majors only.

EPE 325 Fitness for Life. (3) F, S
Physical fitness and benefits of exercise with emphasis on self-evaluation and personalized program planning for a lifetime. Not open to students with credit in EPE 301.

EPE 334 Functional Anatomy and Kinesiology. (3) S 2000
Muscles, bones, joints, and nerves and how they produce movement. Emphasis on muscle origins, insertions, actions, and innervations. Lecture, lab. Prerequisites: BIO 201, 202.

EPE 335 Biomechanics. (3) F, S, SS
Basic anatomical and mechanical principles applied to human movement. Emphasis is placed on kinematic and kinetic concepts. Prerequisites: BIO 201; MAT 117; PHY 111.

EPE 340 Physiology of Exercise. (3) F, S, SS
Physiological mechanisms of acute responses and chronic adaptations to exercise. Prerequisites: BIO 202; CHM 101.

EPE 345 Motor and Developmental Learning. (3) F, S, SS
Principles of motor skill acquisition across the life span, focusing on the learner and the learning environment. Prerequisites: BIO 201; PGS 101.

EPE 348 Psychological Skills for Optimal Performance. (3) F, S, SS
Application of psychological techniques and their use to improve effectiveness and performance in sport and related areas.

EPE 352 Psychosocial Aspects of Physical Activity. (3) F, S, SS
Interrelationships between physical activity and psychosocial variables, including socialization, cultural values, aggression, and motivation. Includes the psychological benefits of physical activity and exercise adherence. Prerequisites: BIO 201; PGS 101.

EPE 361 Physical Education in the Secondary School. (3) F, S
Current trends and theories, such as elective programs, coed classes, legal issues, contract teaching, curriculum, and administration.

EPE 370 Advanced First Aid. (3) N
Assessment, management, treatment of wounds, injuries, shock, poisoning, burns, sudden illness, emergency rescue, and cardiopulmonary resuscitation. Lecture, lab.

EPE 376 Physical Education for the Elementary School. (3) F, S
Scope and values of physical education in the elementary school. Methods, materials, and practice in teaching activities for primary, intermediate, and upper grades.

EPE 382 Physical Education for the Atypical Student. (3) F, S, SS
Teaching individuals with handicapping conditions physical skills and activities. Prerequisites: BIO 201, 202.

EPE 412 Biomechanics of the Skeletal System. (3) F
Biomechanics of tissues, structures, and major joints of the musculoskeletal system. Discussion of injury mechanisms. Lecture, discussion, some labs. Prerequisite: EPE 335 or instructor approval.

EPE 413 Qualitative Analysis in Sport Biomechanics. (3) S
Developing systematic approach for detecting and correcting errors in human performance using anatomical and mechanical principles. Lecture, lab. Prerequisite: EPE 335.

EPE 414 Electromyographic Kinesiology. (3) F
Muscular contributions to human movement, muscle mechanics, electrophysiological basis, and practical application of electromyography. Lecture, discussion. Prerequisites: EPE 335, 340; instructor approval.

EPE 420 Exercise Testing. (3) F
Theoretical basis and practical application of screening, exercise testing, estimates of energy expenditure, and interpretation of results. Prerequisite: EPE 340.

EPE 425 Exercise Prescription. (3) S
Theoretical bases for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisite: EPE 420.

EPE 440 Exercise Biochemistry. (3) F
Study of bioenergetics and metabolism of cellular (skeletal muscle, heart, and liver) organelles and proteins during exercise. Prerequisite: EPE 340.

EPE 441 Physiology of Women in Sport. (3) S
Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life are emphasized. Prerequisite: EPE 340. *General Studies: L2.*

EPE 442 Physical Activity in Health and Disease. (3) F
The role of physical activity and physical fitness in the development of morbidity and mortality throughout the human life span. Prerequisites: BIO 201, 202; EPE 340. *General Studies: L2.*

EPE 443 Exercise Endocrinology. (3) S
Discussions of current research and theory concerning hormonal changes during exercise. Lecture, discussion. Prerequisite: EPE 340 or instructor approval. *General Studies: L2.*

EPE 448 Applied Sport Psychology. (3) S
Psychological theories and techniques applied to a sport to enhance the performance and personal growth of athletes and coaches. Lecture, discussion. Prerequisites: EPE 345 and 352 or equivalents. *General Studies: L2.*

EPE 460 Theory of Strength Training. (3) S
Research and theories on developing muscular strength; programs for developing muscular strength. Lecture, discussion. Prerequisites: EPE 335, 340. *General Studies: L2.*

EPE 478 Student Teaching in Secondary Schools. (3–12) F, S
The practice of teaching. The relationship of practice and theory in teaching. Prerequisite: two complete semesters of block or equivalent.

EPE 480 Methods of Teaching Physical Education. (3) F, S
Methods of instruction, organization, and presentation of appropriate content in elementary and secondary physical education. Concurrent with student teaching or instructor approval. Prerequisites: EPE 361, 376.

EPE 485 Advanced Techniques of Athletic Training. (3) S
An advanced course in athletic training designed for students seeking NATA certification. Emphasis on therapeutic modalities and rehabilitation procedures. Prerequisites: EPE 283, 370; CPR certification.

EPE 500 Research Methods. (3) F
An introduction to the basic aspects of research, including problem selection, literature review, instrumentation, data handling, methodology, and the writing of research reports and articles.

EPE 501 Research Statistics. (3) S
Statistical procedures; sampling techniques; exercise testing, exercise prescription, hypothesis testing, and experimental designs as they relate to research publications.

EPE 505 Applied Exercise Physiology Techniques. (3) F 1999
Investigative techniques used in the applied exercise physiology laboratory. Emphasis on pulmonary function, body composition, and cardiorespiratory assessment. Lecture, lab. Prerequisite: EPE 340.

EPE 510 Introduction to Biomechanics Research Methods. (3) F
Application of mechanics to human movement analysis. Includes consideration of two-dimensional imaging techniques, force measurement, electromyography, and data processing methods. Lecture, discussion, some labs. Prerequisite: EPE 335 or instructor approval.

EPE 520 Sport Psychology. (4) F
Current research in sport psychology. Includes questionnaire, psychophysiological, and behavioral research techniques. Lecture, discussion. Prerequisites: EPE 448, 500.

EPE 521 Motor Development, Control, and Learning. (4) S 1999
Theory and research on motor skill acquisition, including learning/control and development (i.e., growth, children and exercise, and development learning). Lecture, discussion, some labs. Prerequisites: EPE 345, 500, 501.

EPE 522 Exercise Psychology. (3) S
Contemporary research and theory as related to human behavior and health in an exercise setting. Lecture, discussion. Prerequisite: EPE 500.

EPE 530 Exercise Physiology. (3) F
Immediate and long-term adaptations to exercise with special reference to training and the role of exercise in cardiovascular health. Prerequisite: EPE 340.

EPE 531 Physiology of Women in Sport. (3) S
Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life are emphasized. Prerequisite: EPE 340.

EPE 534 Sports Conditioning. (3) F
Bases of sports conditioning, including aerobic and anaerobic power, strength, flexibility, and analysis of conditioning components for sports.

EPE 535 Factors Influencing Exercise Performance. (3) S
Physiological factors that can affect the ability to exercise, and the body's response to exercise. Lecture, seminar. Prerequisite: EPE 530.

EPE 544 Fitness/Wellness Management. (3) F
Development of the fitness/wellness industry. Planning, organizing, promoting, and managing fitness/wellness programs.

EPE 561 Administration of Athletics. (3) N
Managing an athletic program, including financing, budget policies, staging, and promotion of athletic contests, schedules, travel insurance, and current athletic trends.

EPE 570 Programs and Special Topics in Adapted Physical Education. (3) F Contemporary adapted, developmental, remedial, and corrective physical education programs; understanding of principles, problems, and recent developments in this area.

EPE 571 Improving Sport Skills. (3) SS Factors in successful motor performance in skills used in individual, dual, and team sports.

EPE 572 Trends and Issues in Physical Education. (3) S Literature, research, and practices in contemporary physical education, including finances, Title IX, teaching and coaching philosophies, school organization, and nonteaching physical education programs.

EPE 573 Curriculum and Instruction in Secondary Physical Education. (3) F Current curriculum and instruction practices and research in secondary school physical education. Prerequisite: ESPE major or teaching experience.

EPE 574 Analysis of Teaching Behavior in Sport and Physical Education. (3) N Use of systematic, direct observation techniques in analyzing and evaluating instruction in sport and physical education. Lecture, lab.

EPE 575 Teaching Lifetime Fitness. (3) S Organizing and implementing physical fitness programs in the schools with emphasis on individual problem solving.

EPE 576 Physical Education for Elementary School Children. (3) F Current practices and research pertaining to elementary school physical education programs.

EPE 610 Advanced Topics in Biomechanics. (3) S Three-dimensional imaging techniques, data analysis theory, and integration of biomechanics research tools; includes original research project. Lecture, discussion, some labs. Prerequisite: EPE 510 or instructor approval.

EPE 620 Developmental Motor Skill Acquisition. (3) S 1999 Cognitive-motor theories of learning/performance applied to children's motor skill acquisition. Study of knowledge development and research analysis/techniques. Lecture, discussion. Prerequisite: EPE 521.

EPE 621 Motor Learning/Control. (3) F 1999 Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: EPE 521.

EPE 642 Exercise Epidemiology. (3) S 1998 Physical activity, exercise, and physical fitness and the development of chronic disease. Not open to students who have taken EPE 442. Prerequisites: EPE 340, 500, 501.

HEALTH SCIENCE (HES)

HES 100 Introduction to Health and Wellness. (3) F, S, SS Current concepts of health and wellness. Cross-listed as EPE 100.

Students who satisfactorily complete selected HES 494 courses are eligible to qualify for a certificate of accomplishment from the Centers for Disease Control, U.S. Department of Health and Human Services. See the footnote for information on 494 and other omnibus courses.

Department of Family Resources and Human Development

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PROFESSORS

CHRISTOPHER, FABES, HOOVER, MANORE, C. MARTIN, MERMIS, MORGAN, PETERSON, ROOSA

ASSOCIATE PROFESSORS

BALCAZAR, BOULIN-JOHNSON, DUMKA, GRIFFIN, JOHNSTON, MONTE, VAUGHAN, WILSON

ASSISTANT PROFESSORS

ESTRADA, HANISH, MADDEN-DERDICH, UPDEGRAFF

SENIOR LECTURERS

R. MARTIN, WEIGAND

LECTURER

BODMAN

FAMILY RESOURCES AND HUMAN DEVELOPMENT—B.A. OR B.S.

For the B.S. degree in Family Resources and Human Development (see "Major Requirements," page 306), students must select one of the following three concentrations shown in the "Family Resources and Human Development Concentrations and Options" table on this page. Students are not being accepted to the B.A. program at this time.

Family Resources and Human Development Concentrations and Options

Major	Concentration	Option
Family Resources and Human Development	Family resources and human development in business	Food service management
	Family studies/child development	General dietetics Human nutrition
	Human nutrition—dietetics	

Family Resources and Human Development in Business

Food Service Management Option. The food service management option consists of 42 hours of the following required departmental courses:

FON 100	Introductory Nutrition	3
FON 142	Applied Food Principles	3
FON 344	Nutrition Services Management <i>L1</i>	3
FON 442	Experimental Foods	3
FON 445	Quantity Food Production	3
MGT 301	Management and Organization Behavior	3
	or MGT 394 Special Topics	
MKT 300	Principles of Marketing	3
	or MKT 394 Special Topics	
AGB or business courses	.....	6
Total	.....	27

An additional 15 semester hours within the department must be taken to complete the major. The courses are determined by the students in consultation with their advisor.

In addition, the following courses are required:

CHM 101	Introductory Chemistry <i>S1/S2</i>	4
CHM 231	Elementary Organic Chemistry <i>S1/S2</i> ¹	3
CHM 235	Elementary Organic Chemistry Laboratory <i>S1/S2</i> ¹	1
MIC 205	Microbiology <i>S2</i> ²	3
MIC 206	Microbiology Laboratory <i>S2</i> ²	1
Total	.....	12

¹ Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

² Both MIC 205 and 206 must be taken to secure S2 credit.

Additional business courses are selected in consultation with an advisor.

Family Studies/Child Development

The concentration in family studies/child development consists of the following core courses:

CDE 232	Human Development <i>SB</i>	3
CDE 430	Infant/Toddler Development in the Family <i>SB</i>	3
CDE 498	Pro-Seminar	3
	or FAS 498 Pro-Seminar (3)	
FAS 331	Marriage and Family Relationships <i>SB</i>	3
FAS 361	Introduction to Family/Child Research Methods <i>L1</i> ..	3
FAS 370	Family, Ethnic, Cultural Diversity	3
FAS 431	Parent-Adolescent Relationships	3
FAS 435	Advanced Marriage and Family Relationships <i>SB</i>	3
FAS 440	Fundamentals of Marriage and Family Therapy	3
FON 100	Introductory Nutrition	3
Total	.....	30

In addition, 15 hours of electives must be taken, with at least six hours from the following:

CDE 337	Early Childhood Intervention	3
CDE 338	Child Development Practicum	2-4
CDE 437	Observational and Naturalistic Methods of Studying Children <i>L2/SB</i>	3
CDE 498	Pro-Seminar	3
	or FAS 498 Pro-Seminar (3)	
	or FAS 499 Independent Study (3)	
FAS 330	Personal Growth in Human Relationships <i>SB</i>	3
FAS 332	Human Sexuality	3
FAS 390	Supervised Research Experience	1-3
FAS 432	Family Development	3
FAS 436	Conceptual Frameworks in Family Studies	3
FON 450	Nutrition in the Life Cycle I	3
FON 451	Nutrition in the Life Cycle II	3

The remaining courses are selected in consultation with an advisor.

Human Nutrition—Dietetics

The American Dietetic Association (ADA) has approved the human nutrition—dietetics concentration as a Didactic Program in Dietetics (DPD).

Graduates of a DPD program may apply for dietetic internships or preprofessional practice programs to establish eligibility to write the Dietetic Registration examination. In addition to the required courses, the following courses are required by both the ADA and the Department of Family Resources and Human Development:

BIO 201	Human Anatomy and Physiology I <i>S2</i>	4
BIO 202	Human Anatomy and Physiology II	4
CHM 113	General Chemistry <i>S1/S2</i>	4
CHM 231	Elementary Organic Chemistry <i>S1/S2*</i>	3
CHM 361	Principles of Chemistry	3
Total	.....	18

* Both CHM 231 and 235 must be taken to secure *S1* or *S2* credit.

Additional courses required by the American Dietetic Association for completion of DPD requirements must be selected upon consultation with an advisor. Most of the DPD requirements also satisfy College of Liberal Arts and Sciences graduation requirements.

The following departmental courses are required:

FON 142	Applied Food Principles	3
FON 241	Human Nutrition	3
FON 440	Advanced Human Nutrition I	3
FON 441	Advanced Human Nutrition II	3
FON 444	Diet Therapy	3
Total	.....	15

General Dietetics Option. For the general dietetics option, the following departmental courses are required:

FON 341	Introduction to Planning Therapeutic Diets	3
FON 344	Nutrition Services Management <i>L1</i>	3
FON 445	Quantity Food Production	3
FON 446	Human Nutrition Assessment Lecture/Laboratory	3
FON 448	Community Nutrition <i>L2</i>	3
FON 494	ST: Nutrition and Health Promotion	3
Total	.....	18

Human Nutrition Option. An additional 15 semester hours of courses within the department must be taken to

complete this option. The courses are to be determined by the students in consultation with an advisor.

FAMILY RESOURCES AND HUMAN DEVELOPMENT MINOR

The minor in Family Resources and Human Development consists of 18 semester hours in which students must specialize in one of three emphases. These emphases consist of the following:

1. family studies/child development;
2. foods and nutrition in business; and
3. nutrition.

Each of these emphases requires that at least 12 of the 18 hours must be in upper-division courses.

Family Studies/Child Development.

The family studies/child development emphasis requires that students take the following courses:

CDE 232	Human Development <i>SB</i>	3
CDE 337	Early Childhood Intervention	3
FAS 331	Marriage and Family Relationships <i>SB</i>	3
FAS 440	Fundamentals of Marriage and Family Therapy	3
Total	.....	12

This emphasis also requires that two courses (or six semester hours) be selected from the following:

CDE 430	Infant/Toddler Development in the Family <i>SB</i>	3
CDE 437	Observational and Naturalistic Methods of Studying Children <i>L2/SB</i>	3
CDE 498	Pro-Seminar	3
FAS 431	Parent-Adolescent Relationships	3
FAS 432	Family Development	3

Foods and Nutrition in Business. The foods and nutrition in business emphasis requires that students take the following courses:

FON 100	Introductory Nutrition	3
	or FON 241 Human Nutrition (3)	
FON 142	Applied Food Principles	3
FON 344	Nutrition Services Management <i>L1</i>	3
FON 394	ST: Computers in Nutrition and Foods	3

FON 442	Experimental Foods	3
FON 445	Quantity Food Production	3
Total	.....	18

Nutrition. The nutrition emphasis requires that students take the following courses:

FON 241	Human Nutrition	3
FON 341	Introduction to Planning Therapeutic Diets	3
FON 440	Advanced Human Nutrition I	3
FON 441	Advanced Human Nutrition II	3
FON 444	Diet Therapy	3
Total	.....	15

This emphasis also requires that one additional upper-division course (three hours) be selected from among the following:

FON 446	Human Nutrition Assessment Lecture/ Laboratory	3
FON 448	Community Nutrition L2	3
FON 450	Nutrition in the Life Cycle I	3
FON 451	Nutrition in the Life Cycle II	3
FON 531	Recent Developments in Nutrition	3
FON 532	Current Research in Nutrition I	3
FON 533	Current Research in Nutrition II	3

**SECONDARY EDUCATION—
B.A.E.**

Family Resources and Human Development. The major teaching field consists of 42 semester hours in family resources and human development and six hours in interior design. Major courses required are as follows:

CDE 232	Human Development SB	3
CDE 337	Early Childhood Intervention	3
FAS 330	Personal Growth in Human Relationships SB	3
FAS 331	Marriage and Family Relationships SB	3
FAS 431	Parent-Adolescent Relationships	3
FON 100	Introductory Nutrition	3
FON 142	Applied Food Principles	3
FRD 451	Field Experience	1-12
HEE 461	Presentations in Home Economics	3
HEE 480	Methods of Teaching Home Economics	3-4
HEE 481	Teaching Occupational Home Economics	3
Total	.....	31-43

Also required are two interior design courses.

The College of Education has additional requirements for teacher certification: Arizona Teacher Proficiency Exam (professional knowledge only); 35 hours within the Professional Teacher Preparation Program; and the following courses:

POS 110	Government and Politics SB	3
	or POS 310 American National Government SB (3)	
POS 311	Arizona Constitution and Government	2
	or POS 417 The Arizona Political System SB (3)	

GRADUATE PROGRAMS

The faculty in the Department of Family Resources and Human Development offer programs leading to the M.S. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

CHILD DEVELOPMENT (CDE)

CDE 232 Human Development. (3) F, S Lifespan development from conception through adulthood, with emphasis on family influences. Recognition of individuality within the universal pattern of development. Prerequisites: PGS 101; SOC 101. *General Studies: SB.*

CDE 337 Early Childhood Intervention. (3) F Explores how child development theory affects practice with children and families, emphasizing development of young children and early intervention. Prerequisite: CDE 232 or equivalent.

CDE 338 Child Development Practicum. (2-4) F, S Supervised practicum in the Child Development Lab preparing students for work in child care centers and agencies serving young children and families. Laboratory. Pre- or corequisite: CDE 337.

CDE 430 Infant/Toddler Development in the Family. (3) F An examination of the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 or equivalent. *General Studies: SB.*

CDE 437 Observational and Naturalistic Methods of Studying Children. (3) N In-depth examination of implementing observational and naturalistic studies of children in a variety of settings. 2 hours lecture, 3 hours lab. Prerequisites: CDE 430; 6 hours of psychology. *General Studies: L2/SB.*

CDE 444 Children and Poverty. (3) F The impact that poverty has on children and their families. 2 hours lecture, 3 hours lab. Prerequisites: CDE 232 (or equivalent); 6 hours of upper-division social science credits.

CDE 531 Theoretical Issues in Child Development. (3) S

Major developmental theories, related research, and their application to family interaction. Prerequisites: CDE 430 and 437 (or equivalent) or instructor approval.

CDE 533 Research Issues in Child Development. (3) S

An in-depth exploration and critique of research focusing on child development in a family setting. Prerequisites: CDE 531; FAS 500.

CDE 534 Applied Child Development. (3) S Integration of child development research and theory to understand developmental problems and their relevance to intervention strategies. Prerequisites: CDE 531; FAS 500.

FAMILY STUDIES (FAS)

FAS 301 Introduction to Parenting. (3) F, S Integrated approach to understanding parenting and parent-child interactions. Television course. Prerequisites: PGS 101; SOC 101 (or equivalent).

FAS 330 Personal Growth in Human Relationships. (3) F, S Personal development and behavior as related to competency in interpersonal relationships within the family. Processes of family interaction. Prerequisites: PGS 101; SOC 101 (or equivalent). *General Studies: SB.*

FAS 331 Marriage and Family Relationships. (3) F, S Issues, challenges, and opportunities relating to present-day marriage and family living. Factors influencing interrelations within the family. Prerequisite: course in psychology or sociology. *General Studies: SB.*

FAS 332 Human Sexuality. (3) F, S Relationship of sexuality to family life and to major societal issues. Emphasis on developing healthy, positive, and responsive ways of integrating sexual and other aspects of human living. Prerequisite: PGS 101.

FAS 361 Introduction to Family/Child Research Methods. (3) S Examines basic methods applied to family/child research, critiques current research literature, and applies methods in current topics. Prerequisites: CDE 232; FAS 331. *General Studies: L1.*

FAS 370 Family Ethnic and Cultural Diversity. (3) S An integrative approach to understanding historical and current issues related to the structure and internal dynamics of diverse American families. Prerequisite: PGS 101 or SOC 101.

FAS 390 Supervised Research Experience. (1-3) F, S, SS Practical, firsthand experience within current faculty research projects in family studies or child development. "Y" grade only; may be repeated for total of 6 hours. Prerequisites: FAS 361; 3.00 GPA in major; approval of supervising faculty member before registration.

FAS 431 Parent-Adolescent Relationships. (3) F Dynamics of the relationships between parents and adolescents. Developmental characteristics of adolescence and the corresponding adult stage. Prerequisites: CDE 232; FAS 331.

FAS 432 Family Development. (3) N

Normative changes in families over time from formation until dissolution. Emphasis on the marital subsystem in middle and later years. Prerequisites: CDE 232 and FAS 331 or instructor approval.

FAS 435 Advanced Marriage and Family Relationships. (3) F

Recent research, issues, and trends relating to marriage and family interaction. Influence of family composition, physical environment, family patterns, and values on family dynamics. Prerequisites: FAS 331, 361. *General Studies: SB.*

FAS 436 Conceptual Frameworks in Family Studies. (3) S

Approaches to study families focusing on systems, interactional, exchange, conflict, and developmental frameworks. Applications to diverse individual and family situations. Prerequisites: CDE 232; FAS 331, 361.

FAS 440 Fundamentals of Marriage and Family Therapy. (3) S

Introduction to the fundamental orientations of marriage and family therapy.

FAS 457 Third-World Women. (3) F

Economic, sociopolitical, and demographic context for understanding the roles of third-world women in health, family, work, education, and community. Prerequisite: 6 hours of social science credit or instructor approval.

FAS 500 Research Methods. (4) F

Purposes of research. Experimental design, methods of data collection, and thesis proposal development. Includes practical application research laboratory. 3 hours lecture, 3 hours lab.

FAS 530 Introduction to Marriage and Family Therapy. (3) F

Introduction of major marriage and family therapy orientations. Review history, theory, application, and outcome research for each orientation. Prerequisite: admission to graduate program in FRHD with a concentration in family studies or instructor approval.

FAS 531 Family Theory Development. (3) S

Historical and current approaches to theory development, evaluation, and application in family studies. Prerequisite: FAS 435 or instructor approval.

FAS 536 Dysfunctional Marriage and Family Relationships. (3) N

A critical review of current theory and empirical evidence connecting marital and family interaction patterns with aberrant behavior. Prerequisite: PGS 466 or PSY 573 (or equivalent) or instructor approval.

FAS 537 Interpersonal Relationships. (3) F

Critical examination of current theoretical and research developments in the area of interpersonal relationships. Applications for research and intervention emphasized. Prerequisite: FAS 435 (or equivalent) or instructor approval.

FAS 538 Advanced Techniques in Marriage and Family Therapy. (3) N

An in-depth review of assumptions and advanced techniques associated with contemporary marriage and family therapy approaches. Prerequisite: a graduate-level course in marriage and family therapy or instructor approval.

FAS 539 Research Issues in Family Interaction. (3) F

Critical review of current and past research in the area of family dynamics. Emphasizes interactional processes within the family. Prerequisite: FAS 435 (or equivalent) or instructor approval.

FAS 540 Assessment in Marriage and Family Therapy. (3) S

Instruction in the assessment and outcome evaluation of couples and families involved in marital and family therapy. Lecture, lab. Prerequisites: FAS 500 (or equivalent); PSY 530; instructor approval.

FAS 580 Marriage and Family Therapy Practicum. (3) F, S

Supervised clinical experience in marriage and family therapy; includes development of assessment and outcome evaluation skills. Lecture, lab. Prerequisite: instructor approval.

- (a) First semester (3)
- (b) Second semester (3)
- (c) Third semester (3)

FOOD AND NUTRITION (FON)**FON 100 Introductory Nutrition.** (3) F, S, SS

Basic concepts of human nutrition. Alternative diets and how food choices affect personal health. Prerequisite: nonmajor.

FON 142 Applied Food Principles. (3) F, S

Applied scientific principles of food preparation and production. 2 hours lecture, 3 hours lab.

FON 241 Human Nutrition. (3) F, S, SS

Principles of human nutrition relative to health. Emphasis on nutrients and the factors affecting their utilization in the human body. Prerequisite: CHM 101 or equivalent.

FON 341 Introduction to Planning Therapeutic Diets. (3) S

Cultural, health, and economic aspects of diet planning. Computer and manual assessment of food composition. Review of common therapeutic diets. Prerequisites: FON 142 and 241 (or equivalent).

FON 344 Nutrition Services Management. (3) S

Organization, administration, and management of food and nutrition services in hospitals and other institutions. Field trips may be included. *General Studies: L1.*

FON 440 Advanced Human Nutrition I. (3) F

Metabolic reactions and interrelationships of vitamins, minerals, and water. CHM 332 recommended. Prerequisites: BIO 202; CHM 361; FON 241 (or equivalent).

FON 441 Advanced Human Nutrition II. (3) S

Metabolic reactions and interrelationships of carbohydrate, lipid, and protein. CHM 331 and 332 recommended. Prerequisites: BIO 202; CHM 361; FON 241 (or equivalent).

FON 442 Experimental Foods. (3) F

Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Prerequisites: CHM 231; FON 142.

FON 444 Diet Therapy. (3) S

Principles of nutritional support for prevention and treatment of disease. Prerequisites: BIO 202; FON 241 (or equivalent).

FON 445 Quantity Food Production. (3) S

Standard methods of food preparation in quantity; operation of institutional equipment and menu planning for institutions. Experience in quantity food service. 1 hour lecture, 6 hours lab. May require field trips. Prerequisites: FON 241 (or equivalent) and 344 or instructor approval.

FON 446 Human Nutrition Assessment Lecture/Laboratory. (3) S

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Prerequisites: CHM 367; FON 440 (or 441).

FON 448 Community Nutrition. (3) F

Food-related behaviors; community organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutritional assessment of population groups. PGS 100 and SOC 101 are recommended. Prerequisite: FON 241 or equivalent. *General Studies: L2.*

FON 450 Nutrition in the Life Cycle I. (3) F

Emphasis on nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: FON 241 or equivalent.

FON 451 Nutrition in the Life Cycle II. (3) S

The nutritional requirements and nutrition-related disorders of adolescence, middle adulthood, and later life. Prerequisite: FON 241 or equivalent.

FON 531 Recent Developments in Nutrition. (3) N

Survey of research. Prerequisites: 1 course each in advanced nutrition and biochemistry.

FON 532 Current Research in Nutrition I. (3) S

Vitamins and minerals. Prerequisites: 1 course each in advanced nutrition and biochemistry.

FON 533 Current Research in Nutrition II. (3) F

Carbohydrates, lipids, and proteins. Prerequisites: 1 course each in advanced nutrition and biochemistry.

FON 538 Recent Developments in Foods. (3) N

Discussion and critique of current research. Prerequisite: FON 142.

FON 540 Advanced Micronutrient Metabolism. (3) F

The metabolism of vitamins and minerals, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course each in basic nutrition and biochemistry.

FON 541 Advanced Macronutrient Metabolism. (3) S

The metabolism of protein, fat, and carbohydrate, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course each in basic nutrition and biochemistry.

FON 542 Experimental Foods. (3) F

Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Prerequisites: CHM 231; FON 142.

FON 544 Therapeutic Nutrition. (3) S

Current theories of the nutritional prevention or treatment of various diseases. Prerequisites: 1 course each in basic nutrition and physiology.

FON 545 Recent Developments in Institutional Feeding. (3) S

Current practices in institutional feeding, including supervised practicum with local quantity food operation. 1 hour lecture, 6 hours lab. Prerequisites: FON 142 and 344 *or* instructor approval.

FON 546L Laboratory Techniques in Nutrition Research. (1) S

Laboratory techniques required in nutrition research, including spectroscopy, chromatography, and RIA. Lab. Prerequisites: CHM 361, 367; FON 440 (or 441).

FON 548 Nutrition Program Development. (3) F

The planning, development, implementation, and evaluation of community nutrition programs, including the process of grant applications. Prerequisites: 1 course each in basic nutrition and sociology.

FON 550 Advanced Maternal and Child Nutrition. (3) F

Metabolic characteristics and nutritional needs of the pregnant woman, lactating woman, infant, and child are reviewed in-depth. Prerequisites: 1 course each in basic nutrition, physiology, and biochemistry.

FON 551 Advanced Geriatric Nutrition. (3) S

Metabolic characteristics and nutritional requirements of the elderly are reviewed in depth. Prerequisites: 1 course each in basic nutrition and physiology and biochemistry *or* instructor approval.

FON 580 Dietetics Practicum. (3–9) F, S, SS Structured practical experience in the Preprofessional Practice Program (AP4), supervised by practitioners with whom the student works closely. Practicum. Prerequisite: acceptance into the AP4 program.

FAMILY RESOURCES AND HUMAN DEVELOPMENT (FRD)

FRD 451 Field Experience. (1–12) N Supervised field placement in the area of student's concentration with a community business or agency. Students must make arrangements with instructor 1 semester in advance of enrollment. Prerequisites: completion of 60 hours; instructor approval.

HOME ECONOMICS EDUCATION (HEE)

HEE 461 Presentations in Home Economics. (3) F Presentation and demonstration techniques in teaching home economics. Development of audiovisual materials for home economics content areas. Prerequisites: junior standing; instructor approval.

HEE 480 Methods of Teaching Home Economics. (3–4) F Instruction, organization, presentation, and evaluation of subject matter in home economics. HEE students register for 4 semester hours. Dietetic students register for 3 semester hours.

HEE 481 Teaching Occupational Home Economics. (3) S

Career orientation related to home economics, cooperative work-related instruction, programs, and youth club advisement associated with secondary home economics programs. May include field trips. Prerequisite: Family Resources and Human Development major or minor.

Department of Geography

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REGENTS' PROFESSOR
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ASSISTANT PROFESSORS
SIERRA, WENTZ

GEOGRAPHY—B.A. OR B.S.

Both B.A. and B.S. degrees in Geography consist of 45 semester hours. The required courses are as follows:

GCU 102	Introduction to Human Geography <i>SB</i>	3
GCU 121	World Geography <i>SB, G</i>	4
GCU 495	Quantitative Methods in Geography <i>N2</i>	3
GCU 496	Geographic Research Methods <i>L2</i>	3
GPH 111	Introduction to Physical Geography <i>S1/S2</i>	4
	or GPH 411 Physical Geography (3)	
GPH 371	Cartography	3
GPH 491	Geographic Field Methods	6
GCU approved elective	.....	3
GPH approved electives	.....	3–4
Approved electives	.....	4–6
Minimum total	.....	36

The remaining nine hours are to be made up of electives from related fields of study, chosen in consultation with an

advisor. At least 18 hours must be in upper-division courses. A grade of "C" or higher is required in all courses taken for the major.

Asian Studies Certificate. Students majoring in Geography may elect to pursue an Asian Studies Certificate combining courses from the major with selected outside courses of wholly Asian content. For more information, see "Asian Studies," pages 307–308, and "Southeast Asian Studies," page 309.

Latin American Studies Certificate. Students majoring in Geography may elect to pursue a Latin American Studies Certificate combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 308, for more information.

SPECIAL EMPHASIS PROGRAMS

Two special emphasis programs, meteorology-climatology and urban studies, are optional. Students who wish to graduate with a B.A. or B.S. degree in Geography are not obligated to choose one of these emphases.

Meteorology-Climatology Emphasis. The required courses for the meteorology-climatology emphasis are as follows:

GCU 102	Introduction to Human Geography <i>SB</i>	3
GCU 121	World Geography <i>SB, G</i>	4
GCU 495	Quantitative Methods in Geography <i>N2</i>	3
GCU 496	Geographic Research Methods <i>L2</i>	3
GPH 111	Introduction to Physical Geography <i>S1/S2</i>	4
	or GPH 411 Physical Geography (3)	
GPH 213	Introduction to Meteorology II	3
GPH 215	Introduction to Meteorology Laboratory II	1
GPH 371	Cartography	3
GPH 409	Synoptic Meteorology I	4
GPH 410	Synoptic Meteorology II	4
GPH 412	Physical Climatology	3
	or GPH 413 Meteorological Instruments and Measurement (3)	
	or GPH 414 Climate Change (3)	
GPH 491	Geographic Field Methods	6
Total	.....	41

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

Students must also choose one other three-hour course in GCU. Also required are the following related courses:

PHY 121	University Physics I: Mechanics <i>SI/S2</i> ¹	3
PHY 122	University Physics Laboratory I <i>SI/S2</i> ¹	1
PHY 131	University Physics II: Electricity and Magnetism <i>SI/S2</i> ²	3
PHY 132	University Physics Laboratory II <i>SI/S2</i> ²	1
GCU elective	.....	3
Related courses	.....	12 or 10
(Choose between the two combinations of courses below)		
MAT 270	Calculus with Analytic Geometry I <i>NI</i> (4)	
MAT 271	Calculus with Analytic Geometry II (4)	
MAT 272	Calculus with Analytic Geometry III (4)	
— or —		
MAT 290	Calculus I <i>NI</i> (5)	
MAT 291	Calculus II (5)	
Total	.....	23 or 21

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Urban Studies Emphasis. The required courses for the urban studies emphasis are as follows:

GCU 102	Introduction to Human Geography <i>SB</i>	3
GCU 121	World Geography <i>SB, G</i>	4
GCU 357	Social Geography <i>SB</i>	3
GCU 361	Urban Geography <i>SB</i>	3
GCU 444	Applied Urban Geography	3
GCU 495	Quantitative Methods in Geography <i>N2</i>	3
GCU 496	Geographic Research Methods <i>L2</i>	3
GPH 371	Cartography	3
GPH 491	Geographic Field Methods	6
Total	.....	31

In addition, students must select two courses from the following:

GCU 351	Population Geography <i>SB</i>	3
GCU 359	Cities of the World I <i>G</i>	3
or GCU 360 Cities of the World II <i>G</i> (3)		
GCU 364	Geography of Energy	3
GCU 441	Economic Geography	3
GCU 442	Geographical Analysis of Transportation <i>SB</i>	3

GCU 453	Recreational Geography	3
GPH 481	Environmental Geography	3

If GPH 481 is not selected, a further three-hour GPH course is required. Nine hours in fields related to geography must be in urban-oriented course work.

OFFICE OF CLIMATOLOGY

Dr. R.C. Balling is director of the Office of Climatology. The office performs pure and applied climatic research and supports undergraduate and graduate students at ASU. The office maintains an extensive archive of climatic and meteorologic information on Arizona and the western United States.

SECONDARY EDUCATION— B.A.E.

Geography. The major teaching field consists of 45 semester hours, of which a minimum of 30 must be in geography and 15 in a related teaching field or fields. The following courses are required:

GCU 102	Introduction to Human Geography <i>SB</i>	3
GCU 121	World Geography <i>SB, G</i>	4
GPH 111	Introduction to Physical Geography <i>SI/S2</i>	4
or GPH 411 Physical Geography (3)		
Total	.....	11

In conjunction with an advisor, students choose remaining hours from three groups of human, physical, and regional courses.

Social Studies. See page 390.

GRADUATE PROGRAMS

The faculty in the Department of Geography offer programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

CULTURAL GEOGRAPHY (GCU)

GCU 102 Introduction to Human Geography. (3) F, S
Systematic study of human use of the earth. Spatial organization of economic, social, political, and perceptual environments. *General Studies: SB.*

GCU 121 World Geography. (4) F, S
Description and analysis of areal variations in social, economic, and political phenomena in major world regions. *General Studies: SB, G.*

GCU 141 Introduction to Economic Geography. (3) N
Production, distribution, and consumption of various types of commodities of the world and relationships to the activities of humans. *General Studies: SB.*

GCU 240 Introduction to Southeast Asia. (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/HIS 240/POS 240/REL 240. *General Studies: G.*

GCU 253 Introduction to Cultural and Historical Geography. (3) N
Cultural patterns, including such phenomena as language, religion, and various aspects of material culture. Origins and diffusion and division of the world into cultural areas. *General Studies: SB, G.*

GCU 294 Special Topics. (4) A
Topics include global awareness.

GCU 322 Geography of U.S. and Canada. (3) A
Spatial distribution of relevant physical, economic, and cultural phenomena in the United States and Canada. *General Studies: SB.*

GCU 323 Geography of Latin America. (3) F
Spatial distribution of relevant physical, economic, and cultural phenomena in South, Middle, and Caribbean America. *General Studies: SB, G.*

GCU 325 Geography of Europe. (3) A
Broad and systematic overview of Europe, emphasizing physical, economic and cultural phenomena. *General Studies: SB, G.*

GCU 326 Geography of Asia. (3) F
Spatial distribution of relevant physical, economic, and cultural phenomena in Asia, excluding the former Soviet Union. *General Studies: SB, G.*

GCU 327 Geography of Africa. (3) N
Spatial distribution of relevant physical, economic, and cultural phenomena in Africa. *General Studies: SB, G.*

GCU 328 Geography of Middle East and North Africa. (3) N
Spatial distribution of relevant physical, economic, and cultural phenomena in the Middle East and North Africa. Prerequisite: GCU 121 or instructor approval. *General Studies: SB, G.*

GCU 332 Geography of Australia and Oceania. (3) A
Spatial distribution of relevant physical, economic, and cultural phenomena in Australia, New Zealand, and Pacific Islands. *General Studies: G.*

GCU 344 Geography of Hispanic Americans. (3) S
Examines the homelands, migrations, settlements, landscapes, roles, and selected cultural traditions of Hispanic Americans. *General Studies: C.*

GCU 350 The Geography of World Crises. (3) F, S
Contemporary world crises viewed from a perspective of geographic concepts and techniques. *General Studies: SB, G.*

GCU 351 Population Geography. (3) F
Demographic patterns; spatial, temporal, and structural investigation of the relationship of demographic variables to cultural, economic, and environmental factors. *General Studies: SB.*

GCU 352 Political Geography. (3) N
Relationship between the sociophysical environment and the state. *General Studies: SB, G.*

GCU 357 Social Geography. (3) A
Environmental perception of individuals and groups. The spatial aspect of social and physical environments is stressed. *General Studies: SB.*

GCU 359 Cities of the World I. (3) N
Historical evolution of urban patterns and structures in the Middle East, India, Southeast Asia, China, Japan, and Europe. *General Studies: G.*

GCU 360 Cities of the World II. (3) N
Historical evolution of urban patterns and structures in Latin America, North America, Sub-Saharan Africa, and Australasia. *General Studies: G.*

GCU 361 Urban Geography. (3) F, S
External spatial relations of cities, internal city structure, and spatial aspects of urban problems in various parts of the world, particularly in the United States. *General Studies: SB.*

GCU 364 Geography of Energy. (3) F
Production, transportation, and consumption of energy, emphasizing the electric power industry and its environmental problems.

GCU 421 Geography of Arizona and Southwestern United States. (3) F, S
Geography of the Southwest with an emphasis on Arizona. Divided into physical geography, history, people, and economy. *General Studies: C.*

GCU 423 Geography of South America. (3) S
Prerequisite: GCU 323 or instructor approval. *General Studies: SB, G.*

GCU 424 Geography of Mexico and Middle America. (3) A
Central America and Mexico. Prerequisite: GCU 323 or instructor approval. *General Studies: SB, G.*

GCU 425 Geography of the Mexican-American Borderland. (3) S
Geography of a binational and bicultural region. Examination of settlement, boundary issues, ethnic subregions, population change, industrial development, and urban growth. *General Studies: L2, G.*

GCU 426 Geography of Russia and Surroundings. (3) N
Examines the geography of Russia and other post-Soviet states. Prerequisite: GCU 121 or instructor approval. *General Studies: SB, G.*

GCU 433 Geography of Southeast Asia. (3) S
Examines the biophysical and social features of Southeast Asian nations and peoples. Prerequisite: GCU 326 or instructor approval.

GCU 441 Economic Geography. (3) A
Spatial distribution of primary, secondary, and tertiary economic and production activities. Prerequisite: GCU 141 or instructor approval.

GCU 442 Geographical Analysis of Transportation. (3) S
Networks, modes, economics, and flows at the urban, national, and international scales. Prerequisite: GCU 141 or 441. *General Studies: SB.*

GCU 444 Applied Urban Geography. (3) S
Designed to prepare the student for employment in planning agencies. Includes application of urban geographic principles to present-day planning problems. Prerequisite: GCU 361.

GCU 453 Recreational Geography. (3) N
Examination of problems surrounding the organization and use of space for recreation. Introducing geographic field survey methods of data collection and analysis. Saturday field trips may be required.

GCU 455 Historical Geography of U.S. and Canada. (3) N
Geographical perspective on the evolution of the United States and Canada from pre-Columbian times to early 20th Century.

GCU 474 Public Land Policy. (3) F
Geographic aspects of federal public lands, policy, management, and issues. Emphasis on western wilderness and resource development problems.

GCU 495 Quantitative Methods in Geography. (3) F, S
Statistical techniques applied to the analysis of spatial distributions and relationships. Introduction to models and theory in geography. Prerequisite: MAT 119. *General Studies: N2.*

GCU 496 Geographic Research Methods. (3) F, S
Scientific techniques used in geographic research. Prerequisites: GCU 495; GPH 371, 491. *General Studies: L2.*

GCU 515 Human Migration. (3) F
Economic, political, social, and geographic factors underlying population movements. Migration selectivity, streams and counter-streams, labor migration, and migration decision making. Lecture, seminar. Prerequisite: GCU 351 or instructor approval.

GCU 526 Spatial Land-Use Analysis. (3) N
Determination, classification, and analysis of spatial variations in land-use patterns. Examination of the processes affecting land-use change. Prerequisite: 15 hours of geography or instructor approval.

GCU 529 Contemporary Geographic Thought. (3) S 1999
Comparative evaluation of current philosophy concerning the nature and trends of geography. Prerequisites: 15 hours of geography; instructor approval.

GCU 585 Advanced Research Methods in Geography. (3) F
Specialized research techniques and methodologies in economic, political, or cultural geography.

GCU 591 Seminar. (1–3) F, S, SS
Selected topics in economic, political, or cultural geography. Field trips may be required.

GCU 596 History of Geographic Thought. (3) S 2000
Historical development of geographic thought from pre-Greek days to the early 20th Century.

PHYSICAL GEOGRAPHY (GPH)

GPH 111 Introduction to Physical Geography. (4) F, S
Spatial and functional relationships among climates, landforms, soils, water, and plants. 3 hours lecture, 3 hours lab. Field trips are required. *General Studies: S1/S2.*

GPH 210 Introduction to Environmental Geography. (3) F
Principles of physical geography relating to environmental problems pertinent to contemporary society. Pollution, maladjusted land use, and resource exploitation.

GPH 211 Landform Processes. (3) S
Geographic characteristics of landforms and earth-surface processes, emphasizing erosion, transportation, deposition, and implications for human management of the environment. Prerequisite: GPH 111. *General Studies: L1.*

GPH 212 Introduction to Meteorology I. (3) F
Fundamentals of weather and climate, including basic atmospheric processes and elements. Students whose curricula require a laboratory course must also register for GPH 214. Prerequisite: GPH 111 or instructor approval. *General Studies: S2 (if credit also earned in GPH 214).*

GPH 213 Introduction to Meteorology II. (3) S
Fundamentals of meteorological/climatological analysis, including terminology and symbolism. Recommended for meteorology/climatology program students. Prerequisite: GPH 212 or instructor approval.

GPH 214 Introduction to Meteorology Laboratory I. (1) F
Introduction to basic meteorological/climatological data and measurements. 3 hours lab. Suggested concurrent enrollment in GPH 212. *General Studies: S2 (if credit also earned in GPH 212).*

GPH 215 Introduction to Meteorology Laboratory II. (1) S
Fundamentals of Meteorological/climatological map analysis and interpretation. Recommended for meteorology/climatology program students. May be taken concurrently with GPH 213. Prerequisite: GPH 214 or instructor approval.

GPH 271 Maps and Map Reading. (3) S
Map types, uses, limitations and evolution. Communication via paper and digital medium. Navigation, interpretation, projections, sources, symbols, classification, case, handling.

GPH 314 Global Change. (3) F
Response of Earth's natural systems (atmosphere, hydrosphere, lithosphere, biosphere) to past environmental change, and effects of potential future changes.

GPH 371 Cartography. (3) F, S
Philosophy and practical aspects of map production; communications, symbolism, data manipulation, presentation, decision making, generalization, linework, lettering, digital media employed. Prerequisite: GPH 111.

GPH 372 Air Photo Interpretation. (3) S
Subset, remote sensing, includes: photogrammetry, films, aerial geometry, image components, stereoscopy, photogrammetry, ground truthing, interpret physical, cultural, economic, intelligence information. Prerequisite: GPH 211 or any Cultural Geography (GCU) course or instructor approval.

GPH 373 Cartographic Design. (3) F
Advanced design using desktop mapping. Cartographic decision making, qualitative and quantitative symbol design, projections, color. Prerequisites: GPH 371 or instructor approval.

GPH 381 Geography of Natural Resources. (3) A
Nature and distribution of natural resources and the problems and principles associated with their use.

GPH 401 Topics in Physical Geography. (1–3) A
Open to students qualified to pursue independent studies. Field trips may be required. Prerequisite: instructor approval.

GPH 405 Energy and Environment. (3) S
Sources, regulatory and technical controls, distribution, and consequences of the supply and human use of energy. Prerequisite: courses in the physical or life sciences or instructor approval.

GPH 409 Synoptic Meteorology I. (4) F 1999
Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisites: MAT 270; PHY 131, 132.

GPH 410 Synoptic Meteorology II. (4) S 2000
Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisite: GPH 409.

GPH 411 Physical Geography. (3) A
Introduction to physiography and the physical elements of the environment. Open only to students who have not taken GPH 111. Field trips.

GPH 412 Physical Climatology. (3) A
Physical processes in the earth-atmosphere system on regional and global scales; concepts and analysis of energy, momentum, and mass balances. Prerequisites: GPH 212 and 213 or instructor approval.

GPH 413 Meteorological Instruments and Measurement. (3) A
Design and operation of ground-base and aerological weather measurement systems. Collection, reduction, storage, retrieval, and analysis of data. Field trips are required. Prerequisites: GPH 212 and 213 or instructor approval.

GPH 414 Climate Change. (3) S
Survey of three climate research areas: paleoclimatology, theories (e.g., greenhouse warming), numerical modeling. Prerequisite: GPH 212 or instructor approval.

GPH 418 Landforms of the Western United States. (3) A
Study landforms and geomorphic processes in the western United States, including lecture, topographical maps, aerial photographs, satellite imagery, and field trips. Lecture, critical inquiry, laboratory, field work. Prerequisites: GPH 211 (or equivalent); completion of L1 class. *General Studies: L2.*

GPH 425 Plant Geography. (3) F
Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as PLB 422. Prerequisite: BIO 182 or GPH 111.

GPH 433 Alpine and Arctic Environments. (3) N
Regional study of advantages and limitations of the natural environment upon present and future problems involving resource distribution, human activities, and regional and inter-regional adjustments. Field trips are required. Prerequisite: GPH 111 or instructor approval.

GPH 471 Geographic Information Systems. (3) F, S
GIS as a basis for microcomputer spatial analysis and synthesis. Includes digitizing, database organization, spatial retrieval, and graphics. Prerequisite: instructor approval.

GPH 474 Dynamic Meteorology I. (3) F 1998
Large-scale atmospheric motion, kinematics, Newton's laws, wind equation, baroclinics, vorticity, and the midlatitude depression. Prerequisites: GPH 213, 215; MAT 271; PHY 131, 132.

GPH 475 Dynamic Meteorology II. (3) S 1999
Topics in climate dynamics. General circulation, numerical modeling, teleconnection phenomena, and surface-atmosphere interaction. Prerequisite: GPH 474 or instructor approval.

GPH 481 Environmental Geography. (3) A
Problems of environmental quality, including uses of spatial analysis, research design, and field work in urban and rural systems. Field trips are required. Prerequisite: instructor approval.

GPH 491 Geographic Field Methods. (6) S, SS 1999
Field techniques, including use of aerial photos, large-scale maps, and fractional code system of mapping; urban and rural field analysis to be done off campus. Travel fees required. Prerequisites: GCU 102, 121; GPH 111.

GPH 511 Fluvial Processes. (3) A
Geographical aspects of processes of river erosion, transportation, sedimentation: emphasizing spatial characteristics of forces, resistance, landforms, sediment; includes computer applications. Prerequisites: GPH 111 (or GLG 101) and 211 (or GLG 362) or instructor approval.

GPH 533 Snow and Ice. (3) S 1999
Processes, distribution, climatic interactions of snow/ice emphasizing mass balance, snow stratigraphy/metamorphism and glacier/snowpack climatology. Lecture, field work. Prerequisite: instructor approval.

GPH 571 Computer Mapping and Graphics. (3) N
Utilization of the digital computer in analysis and mapping of geographic data. Includes plotting, surficial display, compositing, and graphics. Field trips. Prerequisites: GPH 371; instructor approval.

GPH 575 Geographic Applications of Remote Sensing. (3) N
Use of imaging and nonimaging methods of remote acquisition of data, including satellite sensors, airborne radar, multiband scanning, conventional photographic sensors, and ground-based equipment. Field trips are required. Prerequisites: GCU 585 (or GPH 491); GPH 372.

GPH 591 Seminar. (1–3) F, S
Selected topics in physical geography. Field trips may be required.

Department of Geology

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Interim Chair
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REGENTS' PROFESSORS BUSECK, GREELEY, MOORE

PROFESSORS
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STUMP, TYBURCZY, WILLIAMS

ASSISTANT PROFESSORS
ARROWSMITH, O'DAY,
SHARP, TANG

GEOLOGY—B.S.

The B.S. degree in Geology requires 39 semester hours including the following core courses or their equivalents:

GLG 101	Introduction to Geology I (Physical) S1/S2 ¹	3
GLG 102	Introduction to Geology II (Historical) S2 ²	3
GLG 103	Introduction to Geology I— Laboratory S1/S2 ¹	1
GLG 104	Introduction to Geology II— Laboratory S2 ²	1
GLG 310	Structural Geology	3
GLG 321	Mineralogy	3
GLG 400	Geology Colloquium	1
GLG 424	Petrology	3
GLG 435	Sedimentology	3
GLG 450	Geology Field Camp L2	6
Total		27

¹ Both GLG 101 and 103 must be taken to secure S1 or S2 credit.

² Both GLG 102 and 104 must be taken to secure S2 credit.

In addition, two of the following four branch courses must be taken:

GLG 335	Paleontology	3
GLG 418	Geophysics	3
GLG 470	Hydrogeology	3
GLG 481	Geochemistry	3

To complete the total required hours, other upper-division courses in geology (excluding GLG 300, 302, and 304) or courses in related fields listed as approved by the department may be taken. See "Major Requirements," page 306.

Supporting courses required in related fields include:

CHM 113, 116	General Chemistry S1/S2	8
MAT 270	Calculus with Analytic Geometry I N1	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
	or MAT 274 Elementary Differential Equations (3)	
PHY 121	University Physics I: Mechanics S1/S2 ¹	3
PHY 122	University Physics Laboratory I S1/S2 ¹	1
PHY 131	University Physics II: Electricity and Magnetism S1/S2 ²	3
PHY 132	University Physics Laboratory II S1/S2 ²	1
Total	.....	28

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

MAT 290 Calculus I and MAT 291 Calculus II may be substituted for MAT 270, 271, and 272.

MINOR IN GEOLOGY

A minor in Geology is awarded to students who complete a minimum of 23 hours of geology courses. Required courses are as follows:

GLG 101	Introduction to Geology I (Physical) S1/S2 ¹	3
GLG 102	Introduction to Geology II (Historical) S2 ²	3
GLG 103	Introduction to Geology I— Laboratory S1/S2 ¹	1
GLG 104	Introduction to Geology II— Laboratory S2 ²	1
GLG 310	Structural Geology	3
GLG 321	Mineralogy	3
GLG 400	Geology Colloquium	1
Total	.....	15

¹ Both GLG 101 and 103 must be taken to secure S1 or S2 credit.

² Both GLG 102 and 104 must be taken to secure S2 credit.

The remaining eight semester hours may be chosen among other upper-division geology courses, except GLG 300

and 400, after consultation with a departmental advisor.

GRADUATE PROGRAMS

The faculty in the Department of Geology offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. Consult the *Graduate Catalog* for requirements.

GEOLOGY (GLG)

GLG 101 Introduction to Geology I (Physical). (3) F, S, SS
Basic principles of geology, geochemistry, and geophysics. Rocks, minerals, weathering, earthquakes, mountain building, volcanoes, water, and glaciers. Possible weekend field trips. *General Studies: S1/S2 (if credit also earned in GLG 103).*

GLG 102 Introduction to Geology II (Historical). (3) S
Basic principles of applied geology and the use of these principles in the interpretation of geologic history. Possible weekend field trips. Prerequisite: GLG 101. *General Studies: S2 (if credit also earned in GLG 104).*

GLG 103 Introduction to Geology I—Laboratory. (1) F, S, SS
Three hours lab, some field trips. Corequisite: GLG 101. *General Studies: S1/S2 (if credit also earned in GLG 101).*

GLG 104 Introduction to Geology II—Laboratory. (1) S
Laboratory techniques involving map interpretation, cross sections, and fossils. 3 hours lab, possible field trips. Prerequisite: GLG 103 or equivalent. Corequisite: GLG 102. *General Studies: S2 (if credit also earned in GLG 102).*

GLG 105 Introduction to Planetary Science. (4) S
Solar system objects and their geologic evolution, surfaces, interiors, and atmospheres; weekly laboratory for data analysis and experiments; weekend field trip. Lecture, lab. *General Studies: S2.*

GLG 110 Environmental Geology. (3) F
Geological studies as they apply to interactions between humans and earth. Includes geological processes and hazards, resources, and global change. *General Studies: S2 (if credit also earned in GLG 111), G.*

GLG 111 Environmental Geology Laboratory. (1) F
Basic geological processes and concepts. Emphasis on geology-related environmental problems concerning Arizona. Case histories and field studies. Lab. Corequisite: GLG 110. *General Studies: S2 (if credit also earned in GLG 110).*

GLG 300 Geology of Arizona. (3) A
Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Majors who have taken GLG 101 for credit may not enroll.

GLG 302 Man and Geologic Environment. (3) N
Geologic hazards, problems of waste disposal and land-use planning, and environmental problems related to solid earth.

GLG 304 Geology of the Grand Canyon. (2) N
Review of the discovery, history, origin, and geology of the Grand Canyon of the Colorado River in Arizona. Six-day field trip down the river (first 6 days after commencement in May) required at student's expense. Field research and term paper on trip also required.

GLG 305 Geology of the Earth, Moon, and Planets. (3) S
Geological studies of the planets and satellites through the analysis of spacecraft data and field studies. Weekend field trips. Prerequisites: GLG 101 and 105 and 300 or equivalents.

GLG 310 Structural Geology. (3) S
Geologic structures and the mechanical processes involved in their formation. 2 hours lecture, 3 hours lab. Possible field trips. Prerequisites: GLG 101; MAT 270 (or 290).

GLG 321 Mineralogy. (3) F
Crystal chemistry, crystallography, mineral identification, origin and occurrence of minerals, systematic mineralogy. 2 hours lecture, 3 hours lab, possible field trips. Prerequisites: CHM 113; MAT 270 (or 290). Pre- or corequisite: CHM 116.

GLG 335 Paleontology. (3) F
Introduction to concepts and analytical techniques in biogeology, paleobiology, paleoecology, and paleoenvironmental reconstruction from the fossil record. 2 hours lecture, 3 hours lab. Prerequisites: GLG 102 and MAT 270 (or 290) or instructor approval.

GLG 336 Invertebrate Paleontology. (3) N
Biology, skeletal morphology, and systematics of fossil invertebrates. One or two projects emphasizing population analysis and techniques in paleontology. Lecture, 6 hours lab, possible field trips. Prerequisite: GLG 102 or instructor approval. Pre- or corequisite for Geology majors: GLG 335.

GLG 362 Geomorphology. (3) N
Land forms and processes which create and modify them. Laboratory and field study of physiographic features. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 101. Pre- or corequisite: GLG 310.

GLG 400 Geology Colloquium. (1) F, S
Presentation of recent research by faculty and guests. Written assignments required. 1 semester hour required for Geology majors; may be repeated for a total of 2 semester hours. Prerequisite: 2 courses in the department or instructor approval.

GLG 405 Geology of the Moon. (3) N
Current theories of the origin and evolution of the moon through photogeological analyses and consideration of geochemical and geophysical constraints. Possible weekend field trip. Prerequisite: GLG 105 or 305 or instructor approval.

GLG 406 Geology of Mars. (3) N

Geological evolution of Mars through analyses of spacecraft data, theoretical modeling, and study of terrestrial analogs; emphasis on current work. Possible weekend field trip to Northern Arizona. Prerequisite: GLG 105 or 305 or instructor approval.

GLG 412 Geotectonics. (3) F

Earthquakes, earth's interior, formation of oceanic and continental crust, and plate tectonics. Emphasis on current work. Prerequisite: GLG 310.

GLG 416 Field Geophysics. (3) S

Methods of applied geophysical exploration; seismic refraction, gravity, electrical resistivity, geomagnetics. Includes survey planning, data acquisition, processing, analysis, and interpretation. Lecture, field exercises. Prerequisite: one course in geology or instructor approval.

GLG 418 Geophysics. (3) F

Solid earth geophysics; geomagnetism, gravity, seismology, heat flow. Emphasis on crust and upper mantle. Prerequisites: GLG 310 and MAT 272 and PHY 131 or instructor approval.

GLG 419 Thermal-Mechanical Processes in the Earth. (3) F

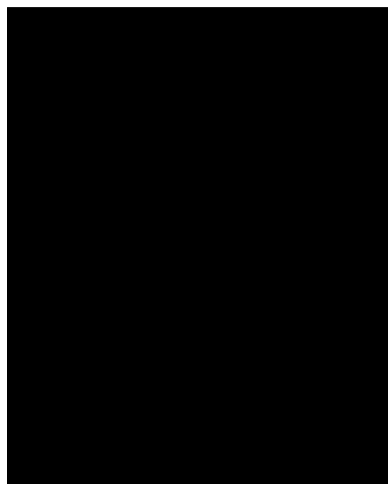
Emphasis on applied mathematical techniques, heat conduction problems in geology, thermal convection, stresses in the lithosphere, and viscoelastic processes in the Earth. Prerequisite: PHY 131.

GLG 420 Volcanology. (3) A

Distribution of past and present volcanism, types of volcanic activity, mechanism of eruption, form and structure of volcanoes, and geochemistry of volcanic activity. Possible weekend field trips. Prerequisite: GLG 424.

GLG 424 Petrology. (3) F

Origin of igneous and metamorphic rocks. Optical mineralogy, hand specimen identification, and thin-section analysis. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 321.



Kenneth Edgett, director of the Mars Global Surveyor education program, uses a model to explain the Pathfinder to students.

Tim Trumble photo

GLG 435 Sedimentology. (3) S

Origin, transport, deposition, and diagenesis of sediments and sedimentary rocks. Physical analysis, hand specimen examination, and interpretation of rocks and sediments. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisites: GLG 102, 321.

GLG 436 Principles of Stratigraphy. (3) N

Principles of interpreting lithostratigraphic, magnetostratigraphic, biostratigraphic, chronostratigraphic, and chronostratigraphic units; correlation and facies relationships in stratified rocks. Applied stratigraphy project(s). Lecture, possible field trips. Prerequisites: GLG 102; instructor approval.

GLG 441 Ore Deposits. (3) N

Origin, occurrence, structure, and mineralogy of ore deposits. Possible weekend field trips. Prerequisite: GLG 424 or instructor approval.

GLG 450 Geology Field Camp. (6) SS

Geological mapping techniques on aerial photos and topographic maps. Field based with excursions. Prerequisites: GLG 310, 321. *General Studies: L2.*

GLG 455 Advanced Field Geology. (3–4) F, S

Geologic mapping in igneous, sedimentary, and metamorphic terrains of the Basin and Range province of Arizona. Weekend field trips. May be repeated for credit. Prerequisite: GLG 450 or instructor approval.

GLG 456 Cordilleran Regional Geology. (3) F

Systematic coverage through space and time of the geological development of western North America, emphasizing the western United States. Prerequisite: senior major or graduate student in Geology or instructor approval.

GLG 470 Hydrogeology. (3) S

Geology of groundwater occurrence, aquifer and well hydraulics, water chemistry and quality, contaminant transport, remediation. Emphasis on quantitative methods. Prerequisites: GLG 101 (or 103); MAT 270; PHY 121.

GLG 481 Geochemistry. (3) S

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as CHM 481. Prerequisite: CHM 341 (or 441) or GLG 321.

GLG 485 Meteorites and Cosmochemistry. (3) N

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as CHM 485.

GLG 490 Topics in Geology. (1–3) F, S, SS

Special topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

GLG 500 Geology Colloquium. (1) F, S

Presentation of recent research by faculty and invited guests. 1 semester required for all geology graduate students. May be repeated for total of 2 semesters. Research paper required. Prerequisite: instructor approval.

GLG 501 Geology of Arizona. (3) A

Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Research paper required.

GLG 504 Geology of the Grand Canyon. (2) S

Review of the discovery, history, origin, and geology of the Grand Canyon of the Colorado River in Arizona. 6-day field trip down the river (first 6 days after commencement in May) required at student's expense. Field research and term paper on trip also required.

GLG 510 Advanced Structural Geology. (3) N

Mechanics of rock deformation, emphasizing relationship between field observation, theory, and experiment. Stress, strain, simple constitutive relationships, failure criteria, and the basis of continuum methods. Possible field trips. Prerequisites: GLG 310 and 424 or instructor approval.

GLG 520 Advanced Physical Volcanology. (2–3) A

Selected volcanologic topics, including explosive eruption processes, lava flow mechanics, and intrusive mechanisms. Field trips possible. Prerequisite: GLG 420 or instructor approval.

GLG 524 Advanced Igneous Petrology. (3) N

Theoretical and practical aspects of the genesis of igneous rocks. Study of selected sites. Modern laboratory techniques. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 424.

GLG 525 Advanced Metamorphic Petrology. (3) N

Theoretical and laboratory study of metamorphic rocks. Processes of contact and regional metamorphism. Advanced methods and instrumentations. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 424.

GLG 562 Quaternary Geology. (3) N

Geology of the Quaternary Period in both glaciated and unglaciated areas. Stratigraphy, correlation, and environmental application of Quaternary deposits. Special reference to the Southwest. 2 hours lecture, 3 hours lab, some field trips during lab, possible weekend field trips. Prerequisite: GLG 362 or instructor approval.

GLG 581 Isotope Geochemistry. (3) N

Geochemistry and cosmochemistry of stable and radioactive isotopes; geochronology; isotope equilibria. Cross-listed as CHM 581. Prerequisite: instructor approval.

GLG 582 Physical Geochemistry. (3) N

Application of thermodynamic and kinetic principles to geochemical processes. Prerequisite: CHM 341 (or 441) or GLG 321.

GLG 583 Phase Equilibria and Geochemical Systems. (3) N

Natural reactions at high temperatures and pressures; silicate, sulfide, and oxide equilibria. Cross-listed as CHM 583. Prerequisites: GLG 582; instructor approval.

GLG 591 Seminar. (1–3) F, S, SS

Topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

GLG 598 Special Topics. (1–3) F, S, SS

Special topics in geology. May be repeated for credit. Prerequisite: instructor approval.

Department of History

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PROFESSORS

ADELSON, BATALDEN, BURG,
 DAVIS, DELLHEIM, FUCHS, GIFFIN,
 GRATTON, IVERSON, KLEINFELD,
 LAVRIN, LUCKINGHAM, MacKINNON,
 PYNE, ROSALES, ROTHSCHILD,
 RUIZ, STOWE, TAMBS, TILLMAN,
 TRENNERT, WARNICKE

ASSOCIATE PROFESSORS

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 FULLINWIDER, GRAY, HURTADO,
 KAHN, RUSH, SIMPSON,
 L. SMITH, R. SMITH, SOERGEL,
 STONER, VANDERMEER,
 WARREN-FINDLEY

ASSISTANT PROFESSORS

GULLETT, HENDRICKS, LONGLEY,
 McKEE, THORNTON

SENIOR INSTRUCTIONAL PROFESSIONAL

LUEY

HISTORY—B.A.

The B.A. degree in History consists of 45 semester hours, of which 30 must be in history and 15 in related fields to be approved by the advisor in consultation with the student. Courses in related fields may also be used to satisfy general college requirements. HIS 300 Historical Inquiry is required and is a prerequisite for HIS 498 Pro-Seminar. HIS 498 Pro-Seminar is required, except for honors students, who may substitute HIS 493 Honors Thesis. At least 18 hours in history courses and nine hours in the related fields must be in upper-division courses. Students are required to take at least six hours in each of two different subject areas and at least three hours in a third subject area all within the discipline of history. These subject areas include U.S., European, British, Latin American, and Asian history. A minimum GPA of 2.25 in the 30 hours of history courses is required. See "Major Requirements," page 306.

HISTORY—B.S.

The B.S. degree in History consists of 36 semester hours in history (including HIS 381 and 382) and 18 hours in closely related fields and quantitative studies, as approved by the program directors in consultation with the student. HIS 381 Quantification in History and HIS 382 Historical Statistics are required for all degree candidates and should be completed, in sequence, by the end of the junior year. Courses in related fields may also be used to satisfy general college requirements. At least 27 hours in history courses and nine hours in the related fields must be in the upper division. At least six hours in history must be taken in each of two of the following areas: U.S., Latin American, British, Asian, and European history. A minimum GPA of 2.25 in the 42 hours of history courses is required. Students must earn a minimum grade of "C" in HIS 381, 382, and their prerequisite, MAT 117 or higher. See "Major Requirements," page 306.

Asian Studies Certificate. Students majoring in History may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," pages 307–308, for more information.

Latin American Studies Certificate. Students majoring in History may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 308, for more information.

MINOR IN HISTORY

The History minor consists of 18 semester hours of course work, at least 12 hours of which are in the upper division.

SECONDARY EDUCATION— B.A.E.

History. The major teaching field consists of 42 semester hours, of which at least 30 must be in history courses. At least 18 of the history hours must be in upper-division courses. At least three semester hours must be taken in U.S.

history. The remaining history and related area courses must be selected in consultation with an advisor from the Department of History. A minimum GPA of 2.25 in history courses is required for admission to practice teaching and for graduation. HIS 495 Methods of Teaching History may not be counted as part of the 42-hour requirement for the academic specialization.

The minor teaching field consists of 24 semester hours in history courses, of which at least nine must be in upper-division courses. The program must include at least three hours in U.S. history.

Social Studies. See page 390.

GRADUATE PROGRAMS

The faculty in the Department of History offer programs leading to the M.A. and Ph.D. degrees. A Certificate in Scholarly Publishing is also available. Consult the *Graduate Catalog* for requirements.

HISTORY (HIS)

HIS 100 Western Civilization. (3) F, S
 Traces origin and development of Western societies and institutions from the ancient world through the Middle Ages. *General Studies: SB, H.*

HIS 101 Western Civilization. (3) F, S
 Traces origin and development of Western societies and institutions from the Renaissance and Reformation through Age of Enlightenment. *General Studies: SB, H.*

HIS 102 Western Civilization. (3) F, S
 Traces origin and development of Western societies and institutions from the French Revolution to the present. *General Studies: SB, G, H.*

HIS 103 The United States. (3) F, S
 Growth of the Republic from colonial times through the Civil War period. *General Studies: SB, H.*

HIS 104 The United States. (3) F, S
 Growth of the Republic from the Civil War period to the present day. *General Studies: SB, H.*

HIS 107 Introduction to Japan. (3) A
 Historical survey of the people, culture, politics, and economy of Japan, supplemented by audiovisual presentations. Intended for nonmajors. *General Studies: SB, G, H.*

HIS 111 Global History Since 1500. (3) F, S
 Survey of Africa, the Americas, and Eurasia; changes in communication, communities, demography, economics, environment, politics, religion, technology, warfare, and women. Lecture, CD-ROM, electronic forum, discussion. *General Studies: G, H.*

- HIS 230 American Social History.** (3) A American society from the colonial period to the present. Ethnicity, race, age, and sex as factors in historical experience. Lecture, discussion. *General Studies: L1, H.*
- HIS 240 Introduction to Southeast Asia.** (3) F An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/POS 240/REL 240. *General Studies: G.*
- HIS 270 Judaism in American History.** (3) N A chronological analysis of Jews and Judaism in American history and letters. *General Studies: SB, H.*
- HIS 273 American Military History.** (3) N A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference. *General Studies: SB, H.*
- HIS 294 Selected Topics in History.** (3) N A full description of topics for any semester is available in the Department of History office. May be repeated for credit.
- HIS 300 Historical Inquiry.** (3) F, S Historical methods and critical inquiry related to particular events and processes. Topics vary. Required course for majors. Prerequisite for HIS 498. Discussion, seminar, lecture. Prerequisite: ENG 102. *General Studies: L1/SB, H.*
- HIS 303 American Cultural History.** (3) F, S Culture in a broad connotation, including ideas, ideals, the arts, and social and economic standards from the nation's colonial background and early national period. *General Studies: SB, H.*
- HIS 304 American Cultural History.** (3) F, S Culture in a broad connotation, including ideas, ideals, the arts, and social and economic standards from the age of industrialism and modern America. *General Studies: SB, H.*
- HIS 305 Asian Civilizations.** (3) A The civilizations of China, Japan, and India to mid-17th century. *General Studies: SB, G, H.*
- HIS 306 Asian Civilizations.** (3) F, S The civilizations of China, Japan, and India from the mid-17th century to present. May also include Southeast Asia. *General Studies: SB, G, H.*
- HIS 308 Modern Southeast Asia.** (3) S Vietnam, Laos, Cambodia, Thailand, Burma, Malaysia, Singapore, Brunei, Indonesia, and Philippines since 1750: imperialism, revolution, and independence. Lecture, discussion. *General Studies: SB, G, H.*
- HIS 309 History of Chinese Science.** (3) A Explores development of traditional Chinese science in the context of Chinese thought and society and in comparison with developments elsewhere. Lecture, discussion. Cross-listed as HPS 325.
- HIS 312 Interpreting China's Classics.** (3) F Study of selected Confucian and/or Taoist classics and ways they have been read in both Asian and Western scholarship. Cross-listed as HUM 312. *General Studies: L2/HU, H.*
- HIS 315 Japan in the Age of the Samurai.** (3) F, S History of the warrior class of Japan, 700–1868.
- HIS 320 Ancient Greece.** (3) F History and civilization of the Greek world from the Bronze Age to the Roman conquest of the Hellenistic kingdoms. *General Studies: SB, H.*
- HIS 321 Rome.** (3) S History and civilization of Rome from the beginning of the Republic to the end of the Empire. *General Studies: SB, H.*
- HIS 322 The Middle Ages.** (3) A Political, socioeconomic, and cultural developments of Western Europe during the Early Middle Ages. Prerequisite: HIS 100 or instructor approval. *General Studies: SB, H.*
- HIS 323 The Middle Ages.** (3) A Political, socioeconomic, and cultural developments of Western Europe during the High Middle Ages. Prerequisite: HIS 100 or instructor approval. *General Studies: SB, H.*
- HIS 324 Renaissance.** (3) F Antecedents and development of the Renaissance in Italy and its spread to the rest of Europe. *General Studies: L2/SB, H.*
- HIS 325 Reformation.** (3) S The Protestant and Catholic Reformation in the 16th century. *General Studies: L2/SB, H.*
- HIS 326 Early Modern Europe.** (3) A Social, economic, cultural, and political changes in 17th-century Europe. *General Studies: SB, H.*
- HIS 327 Early Modern Europe.** (3) N Social, economic, cultural, and political changes in 18th-century Europe. *General Studies: SB, H.*
- HIS 329 19th-Century Europe.** (3) A Political, social, economic, and intellectual currents in Europe from Napoleon to 1866. *General Studies: SB, H.*
- HIS 330 19th-Century Europe.** (3) A Political, social, economic, and intellectual currents in Europe from 1866–1918. *General Studies: SB, H.*
- HIS 331 20th-Century Europe.** (3) N Europe in its world setting since World War I, emphasizing major political and social issues. 1914–1945. *General Studies: SB, G, H.*
- HIS 332 20th-Century Europe.** (3) N Europe in its world setting since World War II, emphasizing major political and social issues from 1945 to the present. *General Studies: SB, G, H.*
- HIS 333 Women and Society in Europe.** (3) N Women's role, status, and achievements in Europe, 1750–1950. Changes in everyday life, sex roles, family patterns, work, and culture. *General Studies: L2/HU/SB, H.*
- HIS 335 Family, Class, and Society in Modern Europe.** (3) N Family life, sex roles, work, crime, population changes, and their relationship to political, economic, and social changes. Prerequisite: upper-division standing or instructor approval. *General Studies: L2/SB, H.*
- HIS 351 England.** (3) A Political, economic, and social development of the English people to the 17th century. *General Studies: SB, H.*
- HIS 352 England.** (3) N Political, economic, and social development of the English people from 17th century to the present. *General Studies: SB, H.*
- HIS 357 19th-Century West.** (3) F Social, political, and economic development of trans-Mississippi West beginning with Louisiana Purchase and ending in 1900. *General Studies: SB, H.*
- HIS 358 The West in the 20th Century.** (3) S Role of the western states in American history since 1890 with emphasis on politics, the environment, industry and labor, and the changing position of ethnic minorities. *General Studies: SB, H.*
- HIS 360 American Indian History to 1900.** (3) F Cultural, economic, political, and social continuity and change of American Indian communities to 1900. Lecture, discussion. *General Studies: SB, C, H.*
- HIS 361 American Indian History Since 1900.** (3) S Cultural, economic, political, and social continuity and change of American Indian communities from 1900 to the present. Lecture, discussion. *General Studies: SB, C, H.*
- HIS 363 African American History I.** (3) A The African American in American history, thought, and culture from slavery to 1865. *General Studies: SB, C, H.*
- HIS 364 African American History II.** (3) A The African American in American history, thought, and culture from 1865 to the present. *General Studies: SB, C, H.*
- HIS 365 Islamic Civilization.** (3) N An interdisciplinary survey of the art, history, and religion of Islamic civilization. *General Studies: HU, H.*
- HIS 366 The Modern Middle East.** (3) N Impact of the Western world upon Middle Eastern governments, religion, and society in the 19th and 20th centuries; problems of modernization and the role of the Middle East in world affairs. *General Studies: SB, G, H.*
- HIS 369 Exploration and Empire.** (3) S An interdisciplinary survey of exploration by Western Civilization over the past 500 years. Lecture, discussion. *General Studies: L2, H.*
- HIS 370 Women in U.S. History, 1600–1880.** (3) F Examination of American women of diverse racial, religious, ethnic groups, and classes; focus is on changing definitions of women's roles. *General Studies: SB, C, H.*
- HIS 371 Women in U.S. History, 1880–1980.** (3) S Examination of American women of diverse racial, religious, ethnic groups, and classes; focus is on changing definitions of women's roles. *General Studies: SB, C, H.*
- HIS 380 History of the Mexican American.** (3) A Role of the Mexican American in U. S. history. *General Studies: SB, H.*
- HIS 381 Quantification in History.** (3) F Quantitative techniques, including political analysis, new economic theory, demography, and social history. Research methods in social science, including design, data collection, and computer skills. Prerequisite: MAT 117 or a course for which MAT 117 is a prerequisite.
- HIS 382 Historical Statistics.** (3) N Historical data analysis, including sampling distributions, tests of hypotheses, t-tests to multiple regression, and nonparametric techniques. Prerequisite: HIS 381. *General Studies: N2.*

HIS 383 Latin America. (3) A

Ancient civilization, explorers and conquerors, and colonial institutions. *General Studies: SB, H.*

HIS 384 Latin America. (3) A

Nationalistic development of the independent republics since 1825. *General Studies: SB, H.*

HIS 394 Selected Topics in History. (3) N

A full description of topics for any semester is available in the Department of History office. May be repeated for credit.

HIS 401 American Colonial History. (3) A

Political, economic, social, and cultural history of the colonial era. Concentrates on English colonies, with some consideration of Spanish, French, and other colonial regions in North America. *General Studies: SB, H.*

HIS 403 Revolution and Constitution. (3) N

The causes, course, and consequences of the American Revolution culminating in the ratification of the Constitution. Prerequisite: HIS 103 or instructor approval.

HIS 404 The Early Republic, 1789–1850. (3) A

Political, social, economic, and cultural development of the United States from the Revolution to 1850. Prerequisite: HIS 103 or instructor approval. *General Studies: L2/SB, H.*

HIS 406 Civil War and Reconstruction. (3) A

Explores the causes, conduct, and consequences of the American Civil War, emphasizing politics and policy. Prerequisite: HIS 103 or instructor approval. *General Studies: L2/SB, H.*

HIS 407 The Emergence of Modern America. (3) A

The triumph of modern political, social, and economic structures and values, 1870–1918; role of region, religion, race, and ethnicity. *General Studies: SB, H.*

HIS 409 Recent American History. (3) A

The United States from 1913–1932, including Wilsonian diplomacy and the First World War, the 1920s, the origins of the Great Depression, Hoover administration. Prerequisite: HIS 104 or equivalent. *General Studies: SB, H.*

HIS 410 Recent American History. (3) A

The United States from 1932–1945, including the New Deal, society during the Depression, Second World War. Prerequisite: HIS 104 or equivalent. *General Studies: SB, H.*

HIS 411 Contemporary America. (3) A

The United States from 1945 to the present. *General Studies: SB, H.*

HIS 414 The Modern American Economy. (3) A

Origins of 19th-century slavery and industrialization; 20th-century crisis and regulation: political economy of an advanced capitalist democracy. Prerequisite: ECN 111 (or 112) or HIS 103 (or 104). *General Studies: SB, H.*

HIS 415 American Diplomatic History. (3) A

American relations with foreign powers, 1776–1898. Prerequisite: HIS 103 or instructor approval. *General Studies: SB, H.*

HIS 416 American Diplomatic History. (3) A

American relations with foreign powers from 1898 to the present. Prerequisite: HIS 104 or instructor approval. *General Studies: SB, G, H.*

HIS 417 Constitutional History of the United States. (3) N

Origin and development of the American constitutional system from Colonial origins through Reconstruction. Prerequisite: HIS 103 or instructor approval. *General Studies: SB, H.*

HIS 418 Constitutional History of the United States. (3) N

Origin and development of the American constitutional system, from Reconstruction to the present. Prerequisite: HIS 104 or instructor approval. *General Studies: SB, H.*

HIS 419 American Urban History. (3) A

The history of the city in American life from colonial times to the late 19th century. *General Studies: SB, H.*

HIS 420 American Urban History. (3) A

The history of the city in American life from the 19th century to the present. *General Studies: SB, H.*

HIS 421 History of American Labor. (3) N

American workers, from the colonial period to the present, including farmers, slaves, housewives, the skilled and unskilled, unionized and nonunionized. Prerequisite: HIS 103 (or 104) or MGT 301. *General Studies: SB, H.*

HIS 422 Rebellious Women. (3) A

Examination of the roles of rebellious women in history through the study of autobiography, biography, and theory. *General Studies: L2/SB, C, H.*

HIS 424 The Hispanic Southwest. (3) N

Development of the Southwest in the Spanish and Mexican periods to 1848. *General Studies: SB, H.*

HIS 425 The American Southwest. (3) A

Development of the Southwest from 1848 to the present. *General Studies: L2/SB, H.*

HIS 426 Indian History of the Southwest. (3) S

Comprehensive review of historical events from prehistoric peoples, the Spanish and Mexican periods, and the American period after 1846 to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, C, H.*

HIS 428 Arizona. (3) F, S

Emergence of the state from early times to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 430 20th-Century Chicano History. (3) A

Historical development of the Chicano community in the 20th century. *General Studies: SB, H.*

HIS 431 The French Revolution and the Napoleonic Era. (3) N

Conditions in France before 1789, the Revolutionary decade from 1789 to 1799, the organization of France under Napoleon, and the impact of changes in France on European society. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 433 Modern France. (3) A

Social, political, economic, and cultural transformations of French society, 1815–present. Impact of industrialization, war and revolution on people's lives. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, G, H.*

HIS 434 Hitler: Man and Legend. (3) F

A biographical approach to the German Third Reich emphasizing nature of Nazi regime, World War II, and historiography. *General Studies: SB, H.*

HIS 435 Modern Germany. (3) A

Germany since 1840. *General Studies: SB, G, H.*

HIS 437 Eastern Europe and the Balkans. (3) N

Peoples and countries of eastern and southeastern Europe in the 19th and 20th centuries from 1800 to 1914, emphasizing the Hapsburg and Ottoman Empires. *General Studies: SB, H.*

HIS 438 Eastern Europe and the Balkans. (3) N

Peoples and countries of eastern and southeastern Europe in the 19th and 20th centuries, emphasizing the successor states from 1914 to the present. *General Studies: SB, G, H.*

HIS 441 Imperial Russia. (3) A

Development of Russian political, economic, social, religious, and intellectual institutions and traditions from the end of the 17th century to the collapse of the tsarist autocracy in 1917. *General Studies: SB, H.*

HIS 442 The Soviet Union. (3) A

An examination of Soviet and post-Soviet politics, economic development, and foreign relations from the 1917 Revolution to the present. *General Studies: SB, G, H.*

HIS 443 Russia and the United States. (3) A

Official and unofficial relations between Russia and the United States, from the late 18th century to the present, emphasizing period following the Bolshevik Revolution. *General Studies: SB, G, H.*

HIS 445 Tudor England. (3) A

Political, social, economic, and cultural developments in 16th-century England. *General Studies: SB, H.*

HIS 446 Stuart England. (3) N

Political, social, economic, and cultural developments in 17th-century England. *General Studies: SB, H.*

HIS 449 Modern Britain. (3) A

Factors contributing to Britain's position as the world's leading power in the 19th century and its decline from that position in the 20th century. *General Studies: SB, G, H.*

HIS 450 British Constitutional History. (3) N

Historical development of the constitutional system of Great Britain from the Middle Ages to the present, emphasizing the growth of democracy. *General Studies: SB, H.*

HIS 451 The British Empire. (3) A

British imperialism and colonialism in Africa, the Americas, Asia, and the South Pacific. Prerequisite: upper-division standing or instructor approval. *General Studies: SB, H.*

HIS 455 Intellectual History of Modern Europe. (3) N

Major developments in European thought from Karl Marx to the present. Prerequisite: upper-division standing or instructor approval. *General Studies: HU, H.*

HIS 456 History of Spain. (3) A

Cultural, economic, political, and social development of Spain from earliest days to 1700. *General Studies: HU/SB, H.*

HIS 457 History of Spain. (3) A

Cultural, economic, political, and social development of Spain from 1700 to the present. *General Studies: HU/SB, G, H.*

HIS 460 Spanish South America. (3) N

Political, economic, and social development of the Spanish-speaking nations of South America since independence. 19th-century developments. *General Studies: SB, H.*

HIS 461 Spanish South America. (3) N

Political, economic, and social development of the Spanish-speaking nations of South America. 20th-century developments. *General Studies: SB, H.*

HIS 463 Intellectual and Cultural History of Latin America. (3) N

Main currents of thought, the outstanding thinkers, and their impact on 19th- and 20th-century Latin America. Cultural and institutional basis of Latin American life. *General Studies: SB, H.*

HIS 464 The United States and Latin America. (3) A

The Latin American struggle for diplomatic recognition, attempts at political union, participation in international organizations since 1810, and relations between the United States and Latin America. *General Studies: SB, G, H.*

HIS 466 Mexico. (3) A

Political, economic, social, and cultural developments from earliest times to 1810. *General Studies: SB, H.*

HIS 467 Mexico. (3) S

Political, economic, social, and cultural developments from 1810 to the present. *General Studies: SB, H.*

HIS 468 Brazil. (3) N

Discovery, conquest, and settlement by the Portuguese; achievement of independence; rise and fall of the empire; problems and growth of the republic to the present. *General Studies: SB, H.*

HIS 469 Chinese Thought and Way. (3) N

China's classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought. *General Studies: SB, H.*

HIS 470 Chinese Thought and Way. (3) N

Evolution of Confucian Tao (Way), its synthesis of Taoism and Buddhism, and 20th-century reactions to that Tao. *General Studies: SB, G, H.*

HIS 471 The United States and Japan. (3) A

Cultural, political, and economic relations in the 19th and 20th centuries. Emphasis on post-World War II period. *General Studies: SB, G, H.*

HIS 473 China. (3) A

Political, economic, social, and cultural history of the Chinese people from early times to the late 17th century. *General Studies: SB, H.*

HIS 474 China. (3) A

Political, economic, social, and cultural history of the Chinese people from mid-17th century to the present. *General Studies: SB, G, H.*

HIS 475 The American Experience in Vietnam, 1945–1975. (3) A

Intersection of American and Asian histories in Vietnam, viewed from as many sides as possible. *General Studies: SB, G, H.*

HIS 477 Japan. (3) A

Political, economic, social, and cultural history of the Japanese people from early times to the 19th century. *General Studies: L2/SB, H.*

HIS 478 Japan. (3) A

Political, economic, social, and cultural history of the Japanese people from 19th century to the present. *General Studies: SB, G, H.*

HIS 481 The People's Republic of China.

(3) N

Analysis of major political, social, economic, and intellectual trends in China since the founding of the People's Republic in 1949. *General Studies: SB, G, H.*

HIS 488 History of Fire. (3) F

A global survey of the natural and cultural history of fire. Lecture, discussion. *General Studies: L2, H.*

HIS 495 Methods of Teaching History. (3) F

Methods in instruction, organization, and presentation of the subject matter of history and closely allied fields.

HIS 498 History Pro-Seminar. (3) F, S

Required course for majors on topic selected by instructor; writing-intensive course related to the development of research skills and writing tools used by historians. Prerequisite: HIS 300.

HIS 502 Public History Methodology. (3) F

Introduction to historical research methodologies, techniques, and strategies used by public historians. Readings, short papers, and guest speakers. Required for students in the public history concentration.

HIS 512 Historians of Early Europe. (3) N

A study of the history of European historical writing from the Greeks to the 18th century.

HIS 513 Historians of Modern Europe. (3) N

A study of 19th- and 20th-century European historical writing.

HIS 514 Historians of the United States. (3) N

A study of the history of American historical writing from the early colonial days to the 20th century.

HIS 515 Studies in Historiography. (3) F, S

Methods and theories of writers of history. May be repeated for credit.

HIS 525 Historical Resource Management.

(3) F

Identification, documentation, and interpretation of historic period buildings, sites, and districts. Emphasis on interdisciplinary efforts among historians, architects, and anthropologists.

HIS 526 Historians and Preservation. (3) S

Preparation of historians for public and private historic preservation programs. Prerequisite: HIS 525 or instructor approval.

HIS 527 Historical Administration. (3) F

Preparation of historians in administration of archives, historical sites, historical museums, historical societies, and historical offices in government agencies.

HIS 532 Community History. (3) N

Techniques and methods of community history emphasizing local resources. Required for community history option. Seminar.

HIS 551 Comparative Histories of War and Revolution. (3) A

A comparative field course of the themes of war and revolution.

HIS 552 Comparative History of Family and Community. (3) N

A comparative course with a focus on family, including minority and ethnic groups, in society.

HIS 553 Comparative History of State and Institutions. (3) N

A comparative course that explores the changing nature of central institutions and government.

HIS 554 Comparative Historical Population Studies: Ethnicity, Economy, and Migration. (3) N

A comparative course that explores the impact of social, cultural, or economic changes in the population.

HIS 555 Comparative Historical Topics. (3) N

This course analyzes a variety of specific social, political, cultural, and intellectual topics.

HIS 591 Seminar. (3) N

Topics may be selected from the following areas:

- (a) British History
- (b) East Asian History
- (c) English History
- (d) European History
- (e) Latin American History
- (f) U.S. History

May be repeated for credit.

SCHOLARLY PUBLISHING (PUB)

See the *Graduate Catalog* for the PUB courses.

Interdisciplinary Humanities Program

Charles J. Dellheim

Director

(LL B605) 602/965–6747

www.asu.edu/clas/humanities

LANGUAGES AND LITERATURES

Regents' Professor: Foster

HUMANITIES

Professors: Dellheim, Kugelmass

Associate Professor: Privateer

Assistant Professors: Baker, Ballew, López-Lázaro, Lund, Romeyn, Wright

HUMANITIES—B.A.

The major in Humanities is interdisciplinary and may be intercollegiate. In consultation with an advisor, the student takes a minimum of 44 semester hours of interdisciplinary humanities

courses from two components: (1) an interdisciplinary core of 23 hours and (2) an area of concentration of 21 hours.

Depending on the concentration chosen, under certain circumstances students may opt to take up to 29 hours in the interdisciplinary core and 15 hours in the area of concentration.

Interdisciplinary Core

Issues, Methods, and Theory (6 minimum)

HUM 200	Encountering the Humanities <i>HU</i>	3
HUM 498	PS: Theory and Culture	3
	Elective	3
<i>Cultures in Context</i> (11)		
HUM 301, 302	Humanities in the Western World <i>L1/HU, H</i>	8
One approved upper-division course on the cultures and traditions of Latin America, Asia, or Africa		
		3
<i>Ethnicity, Race, and Gender</i> (3)		
<i>Art, Science and Technology</i> (3)		
		—
Minimum total		23

Area of Concentration

Required courses from list obtained from advisor

21
Courses must be selected from an approved list or be approved in advance by the undergraduate advisor. Areas of concentration currently include architecture; architecture, culture, and society; business; design; film studies; humanities/liberal arts; justice studies; and planning.

The humanities are those learned bodies of knowledge that are used to express ideas, to understand the meaning of words, and to explore the values and beliefs that underlie our culture and the cultures of others. As defined by the U.S. Congress, the humanities include archaeology, comparative religion, ethics, history, jurisprudence, literature, linguistics, philosophy, the history and criticism of the arts, and those aspects of the social sciences that employ a philosophical or historical rather than quantitative approach to knowledge.

The core courses are to be selected from architecture, art history, dance, English, film studies, history, humanities (HUM), languages and literatures, music, philosophy, religious studies, theatre, and other approved disciplines. These courses may be credited toward the General Studies requirement.

MINOR IN HUMANITIES

The following courses are required for the minor:

HUM 110	Contemporary Issues in the Humanities <i>HU</i>	3
HUM 301	Humanities in the Western World <i>L1/HU, H</i>	4
HUM 302	Humanities in the Western World <i>L1/HU, H</i>	4
	Approved upper-division HUM courses	9
Total		20

GRADUATE PROGRAM

The faculty in the program also offer the M.A. degree in Humanities through the Graduate Committee on Humanities. Consult the *Graduate Catalog* for requirements.

HUMANITIES (HUM)

HUM 110 Contemporary Issues in Humanities. (3) F, S
Responses of literature, art history, history, philosophy, religion, and other disciplines to common problems affecting modern American life. *General Studies: HU.*

HUM 194 Special Topics in the Humanities. (3) N
Open to all students. Topics include
(a) American Fine Arts
(b) Comparative Fine and Performing Arts
(c) Cultures of Ethnic Minorities
(d) Non-Western Cultures
(e) Western Historical or Contemporary Cultures

HUM 200 Encountering the Humanities. (3) S
Introduction to the languages, methods, and objectives of the study of the interdisciplinary humanities. Intersections of ideas, values, and cultural institutions. Lecture, studio, workshop. Prerequisite: Humanities major. *General Studies: HU.*

HUM 294 Special Topics in the Humanities. (3) N
Open to all students. Topics include
(a) American Fine Arts
(b) Comparative Fine and Performing Arts
(c) Cultures of Ethnic Minorities
(d) Non-Western Cultures
(e) Western Historical or Contemporary Cultures

HUM 301 Humanities in the Western World. (4) F
Interrelation of arts and ideas in Western Civilization, Hellenic through medieval. 3 hours lecture, 1 discussion meeting per week. *General Studies: L1/HU, H.*

HUM 302 Humanities in the Western World. (4) S
Interrelation of arts and ideas in Western Civilization, Renaissance to the present. 3 hours lecture, 1 discussion meeting per week. *General Studies: L1/HU, H.*

HUM 310 Japanese Cities and Cultures to 1800. (3) S
Relations among ideas and literary, visual, and performing arts of the ancient aristocracy, medieval samurai, and early modern townspeople. Cross-listed as REL 355. *General Studies: L1/HU, H.*

HUM 312 Interpreting China's Classics. (3) F
Study of select Confucian and/or Taoist classics and ways they have been read in both Asian and Western scholarship. Cross-listed as HIS 312. *General Studies: L2/HU, H.*

HUM 320 Hispanic Cultures: Europe and the Americas. (3) F
Examination of European expansion into the Americas from 15th to 20th centuries with focus on cultural contact, conflict, and compromises. *General Studies: L1/HU, H.*

HUM 340 Contemporary American Film and Popular Culture. (3) F
Study of American film, television, and popular music of past three decades as cultural documents. *General Studies: HU.*

HUM 394 Special Topics in the Humanities. (3) N
Open to all students. Topics include
(a) American Fine Arts
(b) Comparative Fine and Performing Arts
(c) Cultures of Ethnic Minorities
(d) Non-Western Cultures
(e) Western Historical or Contemporary Cultures

HUM 401 The Culture and Legacy of the European Enlightenment. (3) S
Historical survey of eighteenth century European enlightenment and its status within contemporary intellectual culture. Lecture, discussion.

HUM 420 Interpreting Latin America. (3) S
Introduction to protocols and methodologies for cultural interpretation of Latin America, with emphasis on four principal cities as cultural space. *General Studies: HU, G, H.*

HUM 440 Los Angeles and Cultural Theory. (3) S
Analysis of representations of Los Angeles in literary, film, and musical texts and broader implications for contemporary American society. *General Studies: L1/HU, C.*

HUM 450 Technology and Culture. (3) S
Explores sociocultural, ideological, postmodern implications of technology and the role technology plays in social constructions as well as the spaces it creates. Seminar discussion. *General Studies: L1/HU.*

HUM 460 Postmodern Culture and Interpretation. (3) F
Currents and interpretations of postmodern culture; international, comparative perspective on the culture and traditions of contemporary "Europes" and "Americas." Seminar discussion. *General Studies: L2.*

HUM 462 Psychoanalysis and Culture. (3) F
Introduction to intellectual history of psychoanalytic movement of twentieth century and its contribution to humanities disciplines. *General Studies: L2/HU/SB.*

HUM 465 Narrative in the Human Sciences.

(3) F

Theories of narrative and narrativity in the Humanities, concentrating on the problems of specific disciplines and interdisciplinary solutions. *General Studies: L2/HU.*

HUM 494 Special Topics in the Humanities.

(3) N

Open to all students. Topics include

- (a) American Fine Arts
- (b) Comparative Fine and Performing Arts
- (c) Cultures of Ethnic Minorities
- (d) From Courbet to Cézanne: History of European Art 1860–WWI
Cross-listed as ARS 434.
- (e) From David to Daumier: European Art 1780–1860
Cross-listed as ARS 432.
- (f) Italian Cinema
Cross-listed as FLA 494/ITA 420.
- (g) Non-Western Cultures
- (h) Western Historical or Contemporary Cultures

HUM 498 Pro-Seminar in the Humanities.

(3) A

Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. For students with a major in humanities with upper-division standing. May be repeated for a total of 6 semester hours, when topics vary. *General Studies: L2/HU.*

HUM 511 Structures of Knowledge. (3) F

Theories and examples of structures of knowledge, including such topics as metaphor, semiotics, and knowledge of the “other.”

HUM 512 Writing Cultures. (3) S

Theories and methods of representing Western and non-Western cultures in literature, history, ethnography, and pictorial media.

HUM 513 Interpretation of Cultures. (3) A

Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. May be repeated for a total of 6 semester hours, when topics vary.

HUM 549 Contemporary Critical Theory. (3) F

An advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as ENG 502.

HUM 591 Seminar. (3) A

Topics include

- (a) Comedy: Meaning and Form
- (b) Theory and Culture
- (c) Tragedy: Meaning and Form

HUM 598 Special Topics in the Humanities.

(3) N

Open to all students. Topics include

- (a) American Fine Arts
- (b) Comparative Fine and Performing Arts
- (c) Cultures of Ethnic Minorities
- (d) Non-Western Cultures
- (e) Western Historical or Contemporary Cultures

Department of Languages and Literatures

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REGENTS' PROFESSORS

FOSTER, KELLER

PROFESSORS

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CURRAN, EKMANIS, FLYS,
GUNTERMANN, HORWATH, LOSSE,
VALDIVIESO, VOLEK, WETSEL,
WIXTED, WONG

ASSOCIATE PROFESSORS

COTA-CARDENAS, GALINDO,
GARCIA-FERNANDEZ,
W. HENDRICKSON, HERNANDEZ-G.,
LAFFORD, OSSIPOV, REIMAN,
SANCHEZ, SENNER, WILLIAMS

ASSISTANT PROFESSORS

BOLIVAR, BURTON, CANDELA,
COLINA, GROVE, GRUZINSKA,
MARSHALL, NISHIMURA-JENSEN,
REES, SUWARNO, TIPTON,
URIOSTE-AZCORRA, VITULLO

INSTRUCTORS

HABERMAN, KORET, LE, TU

LECTURERS

BERNIER, CRISTO, FEY, FOARD,
S. HENDRICKSON, HUGHES,
McMILLIAN, PETERSEN,
SONANDRES, STIFTEL

BACHELOR OF ARTS DEGREE

The faculty in the department offer majors in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish. Each major consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the major, a minimum of 24 hours must be taken at the 300 or 400 level and must include at least nine hours at the 400 level. Spe-

cific required courses for each major area are listed below and in a brochure available in the department. See “Major Requirements,” page 306.

MAJORS**Asian Languages (Chinese/Japanese)**

Students majoring in Asian Languages (Chinese/Japanese) may select a course of study that focuses on either language.

Chinese. The major requires 45 semester hours. At least nine semester hours must be at the 400 level. In addition to the courses shown below, the student must meet with an advisor and choose at least six semester hours of Japanese language or literature courses (JPN), and appropriate courses in art, humanities, social and behavioral science, and business courses.

Recommended Courses (6)

CHI 101, 102	Elementary Chinese ...	10
CHI 201, 202	Intermediate Chinese G	10
CHI 205	Chinese Calligraphy	1

Required Courses

CHI 313, 314	Advanced Chinese G	6
CHI 321	Chinese Literature LI/HU	3
CHI 322	Chinese Literature LI/HU, G	3
	or FLA 420 Foreign Literature in Translation HU, G (6)	
CHI 413, 414	Introduction to Classical Chinese HU	6
Total		18

Electives (6)

CHI 309, 310	Chinese Conversation	4
CHI 311, 312	Chinese Conversation	4
CHI 494	Special Topics*	1–4
CHI 499	Independent Study*	1–3

* See the *Schedule of Classes* for course titles.

Japanese. The major requires 45 semester hours. At least nine semester hours must be taken from JPN 321, 414 and FLA 421. No more than eight semester hours may be selected from JPN 309, 310, 311, 312.

Recommended Courses (6)

JPN 101, 102	Elementary Japanese	10
JPN 201, 202	Intermediate Japanese <i>G</i>	10
JPN 206	Calligraphy	1

Required Courses

FLA 421	Japanese Literature in Translation <i>L2/HU, G¹</i>	3
JPN 313, 314	Advanced Japanese <i>G</i>	6
JPN 321	Japanese Literature <i>L2/HU, G¹</i>	3
JPN 414	Introduction to Classical Japanese	3
Total		15

Electives (6)

JPN 309, 310	Intermediate Japanese Conversation	4
JPN 311, 312	Intermediate Japanese Conversation <i>G</i>	4
JPN 494	Special Topics ²	1-4
JPN 499	Independent Study ²	1-3

¹ May be repeated for credit.

² See the *Schedule of Classes* for course titles.

In addition to the courses, the student must meet with an advisor and choose at least 6 semester hours of Chinese language or literature courses (CHI), and appropriate courses in art, humanities, social and behavioral science, and business courses.

French

Required courses follow.

Required Courses

FRE 200-level courses	6	
FRE 311 French Conversation <i>G</i>	3	
FRE 312 French Composition <i>G</i>	3	
FRE 321 French Literature <i>L2/HU, H</i>	3	
FRE 322 French Literature <i>L2/HU</i>	3	
Total		18

Select twelve semester hours from the following list including at least nine semester hours from the 400 level:

FRE 315	French Phonetics	3
FRE 319	Business Correspondence and Communication <i>G</i>	3
FRE 411	Advanced Spoken French <i>G</i>	3
FRE 412	Advanced Written French <i>G</i>	3
FRE 415	French Civilization I <i>HU</i>	3
FRE 416	French Civilization II <i>HU, G</i>	3
FRE 422	Applied French Linguistics	3

FRE 423	French Syntax	3
FRE 441	French Literature of the 17th Century <i>HU</i>	3
FRE 442	French Literature of the 17th Century <i>HU, H</i>	3
FRE 445	French Literature of the 18th Century <i>L2/HU</i>	3
FRE 451	French Poetry of the 19th Century	3
FRE 452	French Novel of the 19th Century <i>HU</i>	3
FRE 453	Theater of the 19th Century <i>L2/HU</i>	3
FRE 461	Preatomic Literature <i>HU</i>	3
FRE 462	Postatomic Literature <i>HU</i>	3
FRE 471	The Literature of Francophone Africa and the Caribbean <i>L2/HU</i>	3
FRE 472	Franco-Canadian Civilization	3
FRE 494	Special Topics	1-4
FRE 499	Independent Study	1-3

In addition to the courses, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

German

Required courses follow.

Required Courses

German 200-level courses	6	
GER 311 German Conversation <i>G</i> or GER 312 German Conversation <i>G</i> (3)	3	
GER 313 German Composition <i>G</i>	3	
GER 411, 412 Advanced Grammar and Conversation <i>G</i>	6	
GER 421 German Literature <i>HU</i>	3	
GER 422 German Literature <i>L2/HU</i>	3	
Total		24

Six semester hours are required from the following courses:

GER 415, 416	German Civilization <i>HU, H</i>	6
GER 445	German Literature: Enlightenment to Classicism	3
GER 451	German Literature: Biedermeier to Naturalism	3
GER 494	Special Topics	1-4

Electives (6)

GER 303, 304	Scientific German	6
GER 314	Introduction to German Literature	3
GER 319	Business Correspondence and Communication <i>G</i>	3
GER 394	Special Topics	1-4
GER 494	Special Topics	1-4

In addition to the courses, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Italian

Required courses follow.

Required Courses

ITA 200-level courses	6	
ITA 311, 312	Italian Composition and Conversation <i>G</i>	6
ITA 325	Introduction to Italian Literature <i>HU</i>	3
Total		15

Fifteen semester hours are required from the following list including at least nine semester hours from the 400 level:

ITA 314	Advanced Italian <i>G</i>	3
ITA 415	Italian Civilization <i>L2/HU, G</i>	3
ITA 430	Italian Literature of the Middle Ages <i>HU</i>	3
ITA 441	Dante: <i>Divina Commedia L2/HU</i>	3
ITA 443	Italian Literature of the Renaissance <i>HU, H</i>	3
ITA 446	Italian Literature of the 18th and 19th Century <i>HU</i>	3
ITA 449	20th-Century Italian Literature <i>HU, G</i>	3
ITA 494	Special Topics	1-4
ITA 499	Independent Study	1-3

In addition to the courses shown above, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Russian

Required courses follow.

Required Courses

RUS 211, 212	Basic Russian Conversation <i>G</i>	6
RUS 311, 312	Russian Composition and Conversation <i>G</i>	6
RUS 411	Advanced Composition and Conversation I <i>G</i> or RUS 412 Advanced Composition and Conversation II <i>G</i> (3)	3
Total		15

Fifteen semester hours are required from the following list including at least six semester hours from the 400 level:

RUS 303, 304	Scientific Russian	..... 6
RUS 321	Survey of Russian Literature L2/HU, H	..... 2
RUS 322	Survey of Russian Literature L2/HU	..... 2
RUS 323	Survey of Literature of the Soviet Era L2/HU, G	..... 3
RUS 411	Advanced Composition and Conversation I G	..... 3
RUS 412	Advanced Composition and Conversation II G	..... 3
RUS 417	Applied Russian Phonetics	..... 2
RUS 420	Russian Poetry L2/HU	..... 3
RUS 421	Pushkin L2/HU	..... 3
RUS 423	Dostoyevsky L2/HU	..... 3
RUS 424	Tolstoy L2/HU	..... 3
RUS 425	Chekhov L2/HU	..... 3
RUS 426	Literatures of the Nationalities of the Former Soviet Union L2/HU, G	..... 3
RUS 430	Russian Short Story L2/HU	..... 3
RUS 440	History of the Russian Language	..... 3
RUS 441	Survey of Russian Culture L2/HU, G, H	..... 3
RUS 494	Special Topics	..... 1-4
RUS 499	Independent Study	..... 1-3

In addition to the courses shown above, the student must meet with an advisor and choose at least 15 semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

Spanish

Required courses follow.

Required Courses

SPA 313	Spanish Conversation and Composition G	..... 3
	or SPA 315 Spanish Conversation and Composition for Bilinguals (3)	
SPA 314	Spanish Conversation and Composition G	..... 3
	or SPA 316 Spanish Conversation and Composition for Bilinguals (3)	
SPA 325	Introduction to Hispanic Literature HU	..... 3
SPA 412	Advanced Conversation and Composition G	..... 3
SPA 425	Spanish Literature HU	..... 3
Total		..... 15

Six semester hours are required from the following three courses:

SPA 426	Spanish Literature HU	..... 3
SPA 427	Spanish American Literature L2	..... 3
SPA 428	Spanish American Literature L2, G	..... 3

Select three semester hours from the following three courses:

SPA 471	Civilization of the Spanish Southwest HU	..... 3
SPA 472	Spanish American Civilization HU, G, H 3
SPA 473	Spanish Civilization HU/SB, G 3

Electives (6)

SPA courses 6
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Related Fields

POR 101	Elementary Portuguese 5
POR 201	Intermediate Portuguese G 5

In addition to these courses, the student must meet with an advisor and choose at least six semester hours of courses from appropriate social and behavioral science, humanities, business courses, and other language courses.

MINORS

Each minor in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish consists of 18 hours, of which 12 hours must be in the upper division. In addition, specific required courses for each area follow and are in a brochure in the department.

Chinese

Chinese 313 and 314 Advanced Chinese are required. Consult with an advisor for other courses.

French

FRE 311	French Conversation G	..... 3
FRE 312	French Composition G	..... 3
FRE 321, 322	French Literature L2/HU, H	..... 3

Twelve hours must be at the 300 level or above.

German

GER 311 or 312 German Conversation, GER 313 German Composition, one 400-level German course, and any other upper-division course in German are required. Consultation with an advisor in German is recommended.

Italian

ITA 311 or 312 Italian Composition and Conversation, ITA 325 Introduction to Italian Literature, and at least one 400-level ITA course are required. Students are encouraged to meet with a department advisor.

Japanese

Japanese 313 and 314 Advanced Japanese are required. Consult with an advisor for other courses.

Russian

RUS 303, 304	Scientific Russian	..... 6
RUS 311, 312	Russian Composition and Conversation G	..... 6
RUS 411	Advanced Composition and Conversation I G	..... 3
RUS 412	Advanced Composition and Conversation II G	..... 3
RUS 420	Russian Poetry L2/HU	..... 3

Students must complete two years of language or equivalent.

Spanish

One course from each area—language, literature, and civilization—is required:

Language

SPA 313	Spanish Conversation and Composition G	..... 3
SPA 314	Spanish Conversation and Composition G	..... 3
SPA 315	Spanish Conversation and Composition for Bilinguals G	..... 3
SPA 316	Spanish Conversation and Composition for Bilinguals G	..... 3
SPA 412	Advanced Conversation and Composition G	..... 3

Literature

SPA 325	Introduction to Hispanic Literature HU	..... 3
SPA 425	Spanish Literature HU	..... 3
SPA 426	Spanish Literature HU	..... 3
SPA 427	Spanish American Literature L2	..... 3
SPA 428	Spanish American Literature L2, G	..... 3

Civilization

SPA 471	Civilization of the Spanish Southwest HU	..... 3
SPA 472	Spanish American Civilization HU, G, H	..... 3
SPA 573	Spanish American Essay	..... 3

Students must complete two years of language or equivalent.

CERTIFICATES AND EMPHASES

The following are certificate programs or emphases offered in the Department of Languages and Literatures. For more information on each, see pages 307–309.

Asian Studies Certificate. Foreign language students majoring in Asian Languages (Chinese/Japanese) may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content.

Latin American Studies Certificate.

Foreign language students majoring in Spanish may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content.

Russian and East European Studies.

Any undergraduate major can earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in the section on "Russian and East European Studies," page 309.

Southeast Asian Studies Certificate.

To earn a certificate in Southeast Asian Studies, a student must complete a minimum of 40 semester hours of course work related to Southeast Asia, including two years (20 semester hours) of a Southeast Asian language.

**SECONDARY EDUCATION—
B.A.E.**

Chinese, French, German, Japanese, Russian, and Spanish. Each of the major teaching fields in Chinese, French, German, Japanese, Russian, and Spanish consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the academic specialization, a minimum of 24 hours must be taken at the 300 or 400 level and must include at least nine hours at the 400 level. Specific required courses for each major area are listed in curriculum check sheets of the individual language areas and are available in the department.

The minor teaching field consists of a minimum of 24 semester hours in one foreign language, of which at least 18 hours must be taken at the 300 or 400 level. See individual language area curriculum check sheets for required courses in each minor area.

GRADUATE PROGRAMS

The faculty in the Department of Languages and Literatures offer programs leading to the M.A. degree in French, German, and Spanish and the Ph.D. degree in Spanish. Consult the *Graduate Catalog* for requirements.

**FOREIGN LANGUAGES FOR
INTERNATIONAL PROFESSIONS**

The sequence of two semesters, listed under numbers 107 and 207 in two languages (French and Spanish), integrates an accelerated study, a functional approach to course design, and preparation for international professions (e.g., business, diplomacy, international political economy). It is parallel to the traditional sequence of 101 through 202 and also satisfies the college's foreign language requirement. The sequence differs from traditional basic language programs in that all aspects of the language—vocabulary, grammar, and skill development—are practiced within the context of authentic communication for social and professional purposes in the target culture. Classes meet eight hours weekly, for eight semester hours in each of two semesters.

Students who have had success in learning one foreign language are encouraged to join this program in a second language. Students should contact the Department of Languages and Literatures before registration.

**CERTIFICATE PROGRAM IN
TRANSLATION**

The Certificate Program in Translation is designed to provide the advanced training required for professional translation in both public and private sectors, preparation for the rigorous examinations required by national and international agencies, and training as an ancillary skill for professional fields, such as international business, public health and medicine, and law, in accordance with guidelines recommended by the American Translators' Association. The certificate is a nondegree program consisting of 12 semester hours of course work and two hours of in-service practicum primarily into the receptor language of English from the source language of Spanish. It may be taken simultaneously with course work leading to an undergraduate or graduate degree, as a related area sequence, or as the sole program of study for members of the community who meet the admission requirements of the certificate program but who are

not enrolled in a degree program. A complete brochure is available at the Department of Languages and Literatures, LL B404.

While the certificate program is not yet available in French, FRE translation courses may be available. See the *Schedule of Classes* for course offerings.

Admission Requirements. Since entrance to professional translation is through work, cultural experience, and examination, the two entrance requirements to this certificate program are (1) written proficiency examination in the source and the receptor languages at the level of completion of the fourth year or most advanced composition course in Spanish, which at ASU is SPA 412 and (2) either an academic year at a university in a Spanish-speaking country, an extensive work experience using Spanish, or demonstrated bilingual facility, both written and oral, in English and Spanish.

Certificate Requirements. The certificate program consists of the following prerequisites:

FLA	400	Linguistics <i>SB</i>	3
		or equivalent (SPA 494	
		ST: Introduction to	
		Hispanic Linguistics [3])	
SPA	413	Advanced Spanish	
		Grammar	3
SPA	494	ST: Lexicography	3

The following is a required course:

FLA	401	Translation Theory	
		and Practice	3

Also required are nine hours of applied translation electives in specialized areas chosen from the following courses:

FLA	481	Technical and Scientific	
		Translation	3
FLA	482	Business and Financial	
		Translation	3
FLA	483	Medical and Legal	
		Translation	3
FLA	485	Problems of Literary	
		Translation	3

Also required are two hours of in-service practicum (FLA 484).

FOREIGN LANGUAGE REQUIREMENT

The College of Liberal Arts and Sciences requires knowledge of one foreign language equivalent to the completion of two years' study at the college level. This normally includes a sequence of courses numbered 101 and 102 and 201 and 202 or 107 and 207. For important exceptions in Greek, Latin, and Portuguese, see the statement at the head of respective course descriptions.

FOREIGN LANGUAGE PLACEMENT

Students who transfer from other postsecondary institutions with foreign language credits below the 202 level are placed in a course at the level directly above the work completed.

Students who have completed their secondary education at a school in which the language of instruction was not English are considered to have satisfied the foreign language requirement. Certification of this status is made at the time of admission to ASU. Questions should be addressed to the foreign credentials evaluator at Undergraduate Admissions.

The foreign language requirement can be met in languages not taught at ASU either by transferring credit from another institution or by passing a proficiency examination. When possible, the Department of Languages and Literatures recommends to the college an appropriate source for such examinations and proctors them. Grading is done by the institution that provides the examination, and the student pays any costs incurred. The examination can be used only to demonstrate proficiency; it does not produce semester hours of credit.

Students desiring placement above the 101-level course in French, German, or Spanish should take the placement exam for that language in the Computer Language Laboratory, LL A33.

Ordinarily, no placement or proficiency examination is administered to students who wish to continue studying languages for which high school credits have been earned. Students should be guided by the following principles of equivalency:

1. One unit (one academic year) of high school-level study is considered, for placement purposes only, to equal one semester of study of the same language at the university level. Thus, students with one year of high school study would enroll in the second semester course (102); students with two years of high school study, in the third semester course (201), and so on.
2. Students who feel that their high school language preparation was inadequate may choose to place themselves on a lower level, but not lower than 111 with two or three years of high school study and 201 with four years of high school study.

Students with prior knowledge of a language may meet the college foreign language requirement in any one of the following ways:

1. by satisfactory results in a non-repeatable college-approved proficiency examination;
2. by achieving a grade of at least "C" in the last course of the required sequence; or
3. by achieving a grade of at least "C" in a course at the next higher level.

Students are expected to follow the progressive sequence of 100, 200, and 300. Once a grade of "C" or higher is earned in a 300-level class in a language, students may not earn lower-division credit in that language.

First-year foreign language courses taught by the Department of Languages and Literatures are not open to students who have spent one or more years in a country where that language is the predominant language. Individual language areas may have different policies. Students with questions about this policy should check with the appropriate language coordinator in the department.

If transfer students are uncertain about course equivalencies, they should contact the Department of Languages and Literatures.

LANGUAGE LABORATORY REQUIREMENT

All students enrolled in 101, 102, 201, and 202 language courses are expected to spend a minimum of one hour per week in the language laboratory or

in other assigned audiolingual tape exercises in addition to the regular class periods.

FOREIGN LANGUAGES (FLA)

FLA 150 Introduction to East Asian Culture. (3) S

An introduction to the cultures of China, Japan, and Korea. *General Studies: HU, G.*

FLA 323 Survey of Literature of the Soviet Era in Translation. (3) F, S

Survey main literary movements, prominent authors, most significant works of prose, poetry, and drama of the Soviet period, 1917–1991. *General Studies: L2/HU, G.*

FLA 400 Linguistics. (3) S

Introduction to the analysis of language and its use in social contexts. Topics: morphology, phonology, pragmatics, semantics, syntax, and variation. Open to juniors with instructor approval. *General Studies: SB.*

FLA 401 Translation Theory and Practice. (3) N

Translation theories and professional practices and ethics; bibliography, computer technology, and sample texts for natural and social sciences and humanities. Prerequisite: 4th-year composition or instructor approval in respective language area.

FLA 415 Bilingualism and Languages in Contact. (3) F

Analysis of linguistic aspects of bilingualism, e.g., pidgins and creoles, code-switching, and other contact phenomena; simultaneous/sequential bilingual language acquisition. Prerequisite: FLA 400 (or equivalent) or instructor approval.

FLA 420 Foreign Literature in Translation. (3) F, S

Topics may be chosen from the following:

- (a) Brazilian
- (b) Chinese
- (c) French
- (d) German
- (e) Greek
- (f) Italian
- (g) Latin
- (h) Portuguese
- (i) Russian
- (j) Soviet
- (k) Spanish
- (l) Spanish American

Not for language majors (except in Asian languages and Russian); open to language majors as a related-area course. Graduate students by permission. *General Studies: HU, G.*

FLA 421 Japanese Literature in Translation. (3) F, S

Readings selected by theme or genre or period from various works of Japanese literature in English translation. May be repeated as topic changes. Graduate students by permission. Prerequisite: a course that satisfies the L1 general studies requirement. *General Studies: L2/HU, G.*

FLA 480 Methods of Teaching Foreign Languages. (3) F

Teaching foreign languages and literatures at secondary and college levels. This course does not meet the Liberal Arts and Sciences general studies requirement for humanities and fine arts. Required for admission to SED 478. Prerequisite: 12 hours of upper-division courses in 1 foreign language.

FLA 481 Technical and Scientific Translation. (3) N

Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as engineering, architecture, agriculture, computer technology, electronics, and physical and biological sciences. Prerequisite: FLA 401.

FLA 482 Business and Financial Translation. (3) N

Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as economics, finance, insurance, management, marketing, accounting, advertising, and real estate. Prerequisite: FLA 401.

FLA 483 Medical and Legal Translation. (3) N

Resources and strategies for translation of professional texts in subjects such as medicine, nursing, public health, criminal justice, and international law. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401.

FLA 485 Problems of Literary Translation. (3) N

Theory and practice with emphasis on application through individual translation projects. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401 or instructor approval in the respective language area.

FLA 494 Special Topics. (3) F

Major trends of Italian cinema from the post-war period to the present. Cross-listed as HUM 494/ITA 420.

FLA 515 Second Language Acquisition. (3) S

Discussion and application of theories of second language acquisition. Prerequisite: FLA 400 or equivalent.

FLA 525 Trends and Issues in Foreign Language Teaching. (3) N

Advanced methods seminar, designed for experienced teachers.

ARABIC (ARB)**ARB 101 Elementary Arabic.** (4) F

Reading, writing, speaking, and understanding basic Arabic. 4 hours lecture, 1 hour lab.

ARB 102 Elementary Arabic. (4) S

Reading, writing, speaking, and understanding basic Arabic. 4 hours lecture, 1 hour lab. Prerequisite: ARB 101 or equivalent.

ARB 201 Intermediate Arabic. (4) F

Review of Arabic grammar with emphasis on the development of the skills of listening comprehension, reading, speaking, and writing. 4 hours lecture, 1 hour lab. Prerequisite: ARB 102 or equivalent.

ARB 202 Intermediate Arabic. (4) S

Review of Arabic grammar with emphasis on the development of the skills of listening comprehension, reading, speaking, and writing. 4 hours lecture, 1 hour lab. Prerequisite: ARB 201 or equivalent.

CHINESE (CHI)**CHI 101 Elementary Chinese.** (5) F

Pronunciation, grammar, elementary conversation, and development of basic reading and writing skills. Standard dialect. 5 class hours.

CHI 102 Elementary Chinese. (5) S

See CHI 101. Prerequisite: CHI 101 or equivalent.

CHI 107 Chinese for International Professions I. (10) F

Accelerated program alternative to CHI 101, 102 sequence. Functional approach to needs of international professions. 10 class hours.

CHI 201 Intermediate Chinese. (5) F

Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 5 class hours. Prerequisite: CHI 102 or equivalent. *General Studies: G.*

CHI 202 Intermediate Chinese. (5) S

See CHI 201. Prerequisite: CHI 201 or equivalent. *General Studies: G.*

CHI 205 Chinese Calligraphy. (1) F, S

An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required.

CHI 207 Chinese for International Professions II. (10) S

Continuation of CHI 107, alternative to CHI 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours. Prerequisite: CHI 107 or instructor approval. *General Studies: G.*

CHI 309 Chinese Conversation. (2) F

Aural/oral drills using contemporary stories, articles, and essays. For students with lower-level proficiency. Prerequisite: CHI 202.

CHI 310 Chinese Conversation. (2) S

See CHI 309. Prerequisite: CHI 202.

CHI 311 Chinese Conversation. (2) F

Intensive aural/oral practice in Modern Chinese. For students who have lived in China or a Chinese-speaking environment. Discussion, drill. Prerequisite: CHI 202.

CHI 312 Chinese Conversation. (2) S

See CHI 311. Discussion, drill. Prerequisite: CHI 202.

CHI 313 Advanced Chinese. (3) F

The modern language in general or specific areas depending on the student's needs or interests. 3 hours lecture, arranged lab. Prerequisite: CHI 202 or equivalent. *General Studies: G.*

CHI 314 Advanced Chinese. (3) S

Continuation of CHI 313. Prerequisite: CHI 313. *General Studies: G.*

CHI 321 Chinese Literature. (3) F

Masterworks of the tradition from the 6th century B.C.E. through the 13th century. Readings, lectures, and examinations are in English. *General Studies: L1/HU.*

CHI 322 Chinese Literature. (3) S

Masterpieces from the later tradition and its transition to modern times. Readings, lectures, and examinations are in English. *General Studies: L1/HU, G.*

CHI 413 Introduction to Classical Chinese. (3) F

Reading in various genres of pre-20th century literature (wen-yen), with analysis of the structure of the classical writings. Prerequisite: CHI 314 or instructor approval. *General Studies: HU.*

CHI 414 Introduction to Classical Chinese. (3) S

Continuation of CHI 413. Prerequisite: CHI 413. *General Studies: HU.*

CHI 500 Bibliography and Research Methods. (3) N

Introduction to research materials on China in Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion.

CHI 514 Advanced Classical Chinese. (3) N

Close readings in selected premodern texts, with focus on special grammatical features, and increased vocabulary. Lecture, discussion.

CHI 520 Teaching of Chinese as a Second Language. (3) N

Theory and practice of teaching Chinese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

CHI 535 Advanced Readings. (3) N

Readings in primary and secondary sources in history, art, religious studies, economics, or other fields. Lecture, discussion.

CHI 543 Chinese Language and Linguistics. (3) F

Analysis and discussion, within the framework of linguistic theory, of selected problems in Chinese phonetics, morphology, and syntax. Lecture, discussion.

CHI 585 Problems of Translation. (3) N

Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture, discussion.

CHI 591 Seminar. (3) N

Topics in literary, linguistic, or cultural studies.

FRENCH (FRE)**FRE 101 Elementary French.** (4) F, S, SS

Intensive aural/oral drill in class and laboratory; basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab. Not open to students with credit in FRE 111.

FRE 102 Elementary French. (4) F, S, SS

See FRE 101. Prerequisite: FRE 101 or equivalent.

FRE 107 French for International Professions I. (8) F

Accelerated alternative to FRE 101, 102. Functional approach. Emphasis on speaking, understanding, writing, and reading for communicative competence for international professions.

FRE 111 Fundamentals of French. (4) F, S

Primarily for students with two years of high school French who need review to enter second year study. Not open to students with credit in FRE 101 or 102. 4 hours lecture, 1 hour lab.

FRE 201 Intermediate French I. (4) F, S, SS Grammar review, with emphasis on development of skills of speaking, reading, writing, and listening comprehension. Four hours lecture; 1 hour lab. Prerequisite: FRE 102 or 111 or equivalent. *General Studies: G.*

FRE 202 Intermediate French II. (4) F, S, SS Continuation of grammar review with emphasis on development of skills in speaking, reading, writing, and listening comprehension. 4 hours lecture, 1 hour lab. Prerequisite: FRE 201 or equivalent. *General Studies: G.*

FRE 205 Readings in French Literature. (3) F, S, SS Designed to teach reading with facility and comprehension. Vocabulary building and textual analysis of literary genres are major elements. Prerequisite: FRE 202 or equivalent. *General Studies: G.*

FRE 207 French for International Professions II. (8) S Continuation of FRE 107, alternative to FRE 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: FRE 107 or instructor approval. *General Studies: G.*

FRE 311 French Conversation. (3) F, S Further practice in speaking French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General Studies: G.*

FRE 312 French Composition. (3) F, S Further practice in writing French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General Studies: G.*

FRE 315 French Phonetics. (3) F Practice and theory of French pronunciation. Emphasis is on standard French, although an overview of regional varieties is offered. Lecture and lab. Prerequisite: FRE 311 or equivalent.

FRE 319 Business Correspondence and Communication. (3) S Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: FRE 312 or instructor approval. *General Studies: G.*

FRE 321 French Literature. (3) F, S Representative masterpieces and significant movements of French literature of the middle ages through the 18th century. Prerequisite: FRE 205 or equivalent. *General Studies: L2/HU, H.*

FRE 322 French Literature. (3) F, S Literature of the 19th and 20th centuries. Prerequisite: FRE 205 or equivalent. *General Studies: L2/HU.*

FRE 411 Advanced Spoken French. (3) F, S Improvement of spoken French. Prerequisites: 9 hours of 300-level French, including FRE 311 or equivalents. *General Studies: G.*

FRE 412 Advanced Written French. (3) F, S Improvement of composition skills. Prerequisites: 9 hours of 300-level French, including FRE 312 or equivalents. *General Studies: G.*

FRE 415 French Civilization I. (3) F Political, intellectual, social, economic, and artistic development of France from its origins to the end of the 17th century. Prerequisite: 6 hours of upper-division French. *General Studies: HU.*

FRE 416 French Civilization II. (3) S Political, intellectual, social, economic, and artistic development of France from the 18th century to present. Prerequisite: 6 hours of upper-division French. *General Studies: HU, G.*

FRE 421 Structure of French. (3) F Phonology, morphology, syntax, semantics, and varieties of French. Prerequisites: FRE 311 and 312 or instructor approval.

FRE 422 Applied French Linguistics. (3) S Application of linguistic theory and second language acquisition theory to teaching of French. Prerequisite: ASB 480 or ENG 213 or FLA 400.

FRE 423 French Syntax. (3) F The analysis of French syntactic structure by contemporary theoretical models. Prerequisite: ASB 480 or ENG 213 or FLA 400.

FRE 424 French Phonology. (3) S Introduction to phonological theory and its application to French. Prerequisites: FRE 311 and 312 or instructor approval.

FRE 441 French Literature of the 17th Century. (3) N From 1600 to 1660. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: HU.*

FRE 442 French Literature of the 17th Century. (3) N From 1660 to 1700. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: HU, H.*

FRE 445 French Literature of the 18th Century. (3) N Contributions of the philosophers and the development of the novel and drama. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General Studies: L2/HU.*

FRE 451 French Poetry of the 19th Century. (3) N From Romanticism to Parnassian poetry to Symbolism. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.

FRE 452 French Novel of the 19th Century. (3) N From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*

FRE 453 Theater of the 19th Century. (3) N From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Mirbeau. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: L2/HU.*

FRE 461 Preatomic Literature. (3) F Representative authors from Proust and Malraux to Sartre from 1900 to 1945. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*

FRE 462 Postatomic Literature. (3) S Representative authors including Camus, Duras, and Robbe-Grillet from 1945 to present. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: HU.*

FRE 471 The Literature of Francophone Africa and the Caribbean. (3) N Selected prose, poetry, and drama of black authors from Africa and the Caribbean. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General Studies: L2/HU.*

FRE 472 Franco-Canadian Civilization. (3) S A study of the civilization of Quebec in particular through its history, language, literature, music, and customs. Prerequisite: 9 hours of 300-level French or instructor approval. Cross-listed as FRE 598.

FRE 500 Bibliography and Research Methods. (3) F Required of all graduate students.

FRE 510 Explication de Textes. (3) N Detailed analysis of literary texts.

FRE 515 Intellectual Currents in France, from the Middle Ages to the 18th Century. (3) N Significant social, aesthetic, philosophic, and scientific ideas as presented by major writers of fiction and nonfiction.

FRE 516 Intellectual Currents in France, from the 19th Century to the 20th Century. (3) N See FRE 515.

FRE 521 History of the French Language. (3) N Principal phonological, morphological, and semantic developments of French from Latin to present, with emphasis on old and middle French. Some familiarity with Latin is recommended.

FRE 531 Medieval French Literature. (3) F Readings in the epics, early drama, roman courtois, and other representative literary genres of the Middle Ages.

FRE 535 French Literature of the 16th Century. (3) S Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pleiade.

FRE 591 Seminar. (3) N Topics may be selected from the following:

- Advanced Problems in French Literature
- Balzac
- Corneille, Molière, and Racine
- Diderot, Voltaire, and Rousseau
- Flaubert
- French Existentialist Literature
- French Literary Criticism
- Proust
- Realism and Naturalism
- Romanticism
- Stendhal and Zola

GERMAN (GER)

GER 101 Elementary German. (4) F, S, SS Reading, writing, speaking, and understanding of basic German, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 111.

GER 102 Elementary German. (4) F, S, SS See GER 101. Prerequisite: GER 101 or equivalent.

GER 111 Fundamentals of German. (4) F, S Primarily for students with two years of high school German who need review to enter second-year study. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 101 or 102.

GER 201 Intermediate German. (4) F, S, SS Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: GER 102 or 111 or equivalent. *General Studies: G.*

GER 202 Intermediate German. (4) F, S, SS See GER 201. Prerequisite: GER 201 or equivalent. *General Studies: G.*

GER 303 Scientific German. (3) N Acquisition of a specialized vocabulary through the reading of German scientific publications. Prerequisite: GER 202 or equivalent.

GER 304 Scientific German. (3) N See GER 303. Prerequisite: GER 202 or equivalent.

GER 311 German Conversation. (3) F Expansion of idiom through oral practice dealing with contemporary articles, essays, and stories. 3 semester hours limit for majors. Prerequisite: GER 202 or equivalent. *General Studies: G.*

GER 312 German Conversation. (3) S See GER 311. Prerequisite: GER 202 or equivalent. *General Studies: G.*

GER 313 German Composition. (3) S Intensive practice in writing, emphasizing style, and grammar. Prerequisite: GER 202 or equivalent. *General Studies: G.*

GER 314 Introduction to German Literature. (3) F Beginning study of German poetry, drama, the novel, and the *Novelle*. Prerequisite: GER 202 or equivalent.

GER 319 Business Correspondence and Communication. (3) N Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: GER 313 or instructor approval. *General Studies: G.*

GER 411 Advanced Grammar and Conversation. (3) F Improvement of diction and idiom through intensive oral review. Prerequisite: GER 311 or 312 or equivalent. *General Studies: G.*

GER 412 Advanced Grammar and Composition. (3) S Improvement of writing ability. Prerequisite: GER 313 or equivalent. *General Studies: G.*

GER 415 German Civilization. (3) S Aspects of political, social, and cultural life of the German-speaking world from the beginning through 1600. Prerequisite: any 300-level course in German or instructor approval. *General Studies: HU, H.*

GER 416 German Civilization. (3) F From 1600 through 1945. Prerequisite: any 300-level course in German or instructor approval. *General Studies: HU, H.*

GER 421 German Literature. (3) F From the beginning to classicism. Prerequisite: 6 hours of 300-level German. *General Studies: HU.*

GER 422 German Literature. (3) S From Romanticism to the present. Prerequisite: 6 hours of 300-level German. *General Studies: L2/HU.*

GER 445 German Literature: Enlightenment to Classicism. (3) N Major works of the literary epochs in the century. Prerequisite: GER 321 or instructor approval.

GER 451 German Literature: Biedermeier to Naturalism. (3) N Representative works of prose and poetry from 1820 to 1890. Prerequisite: GER 322 or instructor approval.

GER 453 German Literary Masterpieces on Film. (3) F, S, SS Film and literature in their correlation to each other and to cultural, political, and social trends in German-speaking countries. Special arrangements for graduate students and those without a knowledge of German. Lecture, discussion. *General Studies: HU, G, H.*

GER 461 Contemporary German Literature. (3) S, SS German writers since 1945. Prerequisite: GER 322 or instructor approval.

GER 500 Bibliography and Research Methods. (3) N Required of all graduate students.

GER 511 German Stylistics. (3) N Art of writing literary German, comparative stylistics.

GER 521 History of German Language. (3) N Linguistic development of German from the earliest records to the present.

GER 523 German Drama. (3) N Drama of the 19th and 20th centuries.

GER 525 German Novel. (3) N Special studies in the German novel.

GER 527 The *Novelle*. (3) N Special studies in the German short story.

GER 531 Middle High German Language and Literature. (3) N Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres.

GER 551 Romanticism. (3) N Treatment of early and late Romanticism.

GER 555 Modern German Literature. (3) N Major works from the period of Expressionism to 1945.

GER 591 Seminar. (3) N Special topics are concerned with a figure, theme, or work in German literature or Germanic studies. Topics may be selected from the following:

- Faust
- Germanic Studies
- Goethe
- Grass and Böll
- Hesse
- Kafka
- Kleist
- Schiller

ANCIENT GREEK (GRK)

To satisfy the foreign language requirement students must take GRK 301 and 302.

GRK 101 Elementary Ancient Greek. (4) F Ancient Greek grammar and vocabulary with an emphasis on developing reading skills. For beginning students only.

GRK 201 Intermediate Ancient Greek. (4) S Continuation of GRK 101. Increased emphasis on reading texts adapted from Aristophanes, Demosthenes, and Plato. Prerequisite: GRK 101 or instructor approval.

GRK 301 Ancient Greek Literature. (3) F Readings in the masterpieces of ancient Greek literature; advanced grammar. Authors read are changed each year in accordance with needs of the class. May be repeated for credit. Prerequisite: GRK 201 or instructor approval. *General Studies: HU.*

GRK 302 Ancient Greek Literature. (3) S Continuation of GRK 301. Prerequisite: GRK 201 or instructor approval. *General Studies: HU.*

HEBREW (HEB)

HEB 101 Elementary Modern Hebrew. (4) F Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab.

HEB 102 Elementary Modern Hebrew. (4) S Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Prerequisite: HEB 101 or equivalent.

HEB 201 Intermediate Modern Hebrew. (4) F Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 102 or equivalent.

HEB 202 Intermediate Modern Hebrew. (4) S Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 201 or equivalent.

HEB 313 Advanced Modern Hebrew. (4) F Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 202 or equivalent.

HEB 314 Advanced Modern Hebrew. (4) S Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 313 or equivalent.

INDONESIAN (IDN)

IDN 101 Elementary Indonesian I. (5) F Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab.

IDN 102 Elementary Indonesian II. (5) S Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: IDN 101 or equivalent.

IDN 201 Intermediate Indonesian I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 lectures, 1 hour lab. Prerequisite: IDN 102 or equivalent. *General Studies: G.*

IDN 202 Intermediate Indonesian II. (5) S
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 lectures, 1 hour lab. Prerequisite: IDN 201 or equivalent. *General Studies: G.*

ITALIAN (ITA)

ITA 101 Elementary Italian. (4) F, S
Aural/oral drill in class and laboratory, and basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab.

ITA 102 Elementary Italian. (4) F, S
See ITA 101. Prerequisite: ITA 101 or equivalent.

ITA 201 Intermediate Italian. (4) F, S
Intensive review of the fundamentals of Italian grammatical structure to increase the student's ability in composition, translation, and idiomatic expression. 4 hours lecture, 1 hour lab. Prerequisite: ITA 102 or equivalent. *General Studies: G.*

ITA 202 Intermediate Italian. (4) F, S
See ITA 201. Prerequisite: ITA 201 or equivalent. *General Studies: G.*

ITA 311 Italian Composition and Conversation. (3) F, S
Development of writing ability and oral expression. Prerequisite: ITA 202 or equivalent. *General Studies: G.*

ITA 312 Italian Composition and Conversation. (3) F, S
See ITA 311. Prerequisite: ITA 202 or equivalent. *General Studies: G.*

ITA 314 Advanced Italian. (3) N
An advanced grammar and composition course with readings of selected literary works. Prerequisite: ITA 202 or instructor approval. *General Studies: G.*

ITA 325 Introduction to Italian Literature. (3) F
Italian literature through the interpretation of representative works in drama, poetry, and novel. Prerequisite: ITA 202 or instructor approval. *General Studies: HU.*

ITA 415 Italian Civilization. (3) N
A general survey of the history, literature, art, and music, emphasizing Italy's cultural contribution to Western civilization. Prerequisites: ITA 311, 312 (or 314). *General Studies: L2/HU, G.*

ITA 420 Italian Cinema. (3) F
Major trends of Italian cinema from the post-war period to the present. Cross-listed as FLA/HUM 494.

ITA 430 Italian Literature of the Middle Ages. (3) N
Emphasis on "Stil Novo," Dante's minor works, Petrarch, and Boccaccio. Prerequisite: ITA 325 or instructor approval. *General Studies: HU.*

ITA 441 Dante: *Divina Commedia*. (3) N
Critical reading of the three *Cantiche* (*Inferno*, *Purgatorio*, and *Paradiso*). Prerequisite: ITA 325. *General Studies: L2/HU.*

ITA 443 Italian Literature of the Renaissance. (3) N
Emphasis on Lorenzo de'Medici, Poliziano Castiglione, Machiavelli, Ariosto, and Tasso. Prerequisite: ITA 325 or instructor approval. *General Studies: HU, H.*

ITA 446 Italian Literature of the 18th and 19th Centuries. (3) N
Goldoni, Parini, Alfieri, the poetry of Foscolo and Leopardi, and the sociohistorical novels of Foscolo, Manzoni, and Verga. Prerequisite: ITA 325 or instructor approval. *General Studies: HU.*

ITA 449 20th-Century Italian Literature. (3) N
Major works, figures, and movements of contemporary Italian literature. Prerequisite: ITA 325. *General Studies: HU, G.*

JAPANESE (JPN)

JPN 101 Elementary Japanese. (5) F
Communication skills and basic skills in grammar, reading, and writing, including hiragana, katakana, and about 75 kanji. 5 hours/week.

JPN 102 Elementary Japanese. (5) S
Continuation of JPN 101. Additional 99 kanji. Continued development of communication skills in speaking, listening, reading, writing, and culture. Prerequisite: JPN 101 or equivalent.

JPN 107 Japanese for International Professions I. (10) F
Accelerated program alternative to JPN 101, 102 sequence. Functional approach to needs of international professions. 10 class hours a week.

JPN 201 Intermediate Japanese. (5) F
Continued development of communication skills. Increased emphasis on reading and writing. Review of fundamentals of structure to increase student's abilities in composition and translation. 5 class hours a week. Prerequisite: JPN 102 or equivalent. *General Studies: G.*

JPN 202 Intermediate Japanese. (5) S
Continuation of JPN 201. Prerequisite: JPN 201 or equivalent. *General Studies: G.*

JPN 206 Calligraphy. (1) N
Introduction to the practice of calligraphy in Japan, with emphasis on the derivation of Japanese kana syllabaries from Chinese characters. Prerequisite: CHI 205 or JPN 101.

JPN 207 Japanese for International Professions II. (10) S
Continuation of JPN 107, alternative to JPN 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours a week. Prerequisite: JPN 107 or instructor approval. *General Studies: G.*

JPN 309 Intermediate Japanese Conversation. (2) F
Practice in current usage in expression of ideas. Recommended especially for those who have not had the opportunity to practice Japanese in Japan. Prerequisite: JPN 202.

JPN 310 Intermediate Japanese Conversation. (2) S
Continuation of JPN 309. Prerequisite: JPN 309.

JPN 311 Japanese Conversation and Composition. (3) F
Intensive aural/oral practice leading toward conversational fluency. Practice in writing Japanese, emphasizing current usage. Prerequisite: JPN 202. *General Studies: G.*

JPN 312 Japanese Conversation and Composition. (3) S
See JPN 311. Prerequisite: JPN 202. *General Studies: G.*

JPN 313 Advanced Japanese. (3) F
Continued development of ability to communicate orally and in writing. Exposure to the variety of Japanese written styles. Prerequisite: JPN 202 or equivalent. *General Studies: G.*

JPN 314 Advanced Japanese. (3) S
See JPN 313. Prerequisite: JPN 313 or instructor approval. *General Studies: G.*

JPN 321 Japanese Literature. (3) N
Readings in representative masterpieces of modern Japanese literature. Authors read change each year in accordance with the needs of the class. May be repeated for credit. Prerequisite: JPN 313 or instructor approval. *General Studies: L2/HU, G.*

JPN 414 Introduction to Classical Japanese. (3) S
Readings from various genres of pre-20th-century literature, with analysis of the structure of the classical language. Prerequisite: JPN 313 or instructor approval.

JPN 435 Advanced Readings. (3) N
Readings in history, art, religious studies, economics, or other fields. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

JPN 485 Problems of Translation. (3) N
Theories and practice of translation: strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

JPN 500 Bibliography and Research Methods. (3) N
Introduction to research materials on Japan both in Japanese and in Western languages. Overview of research methods. Lecture, discussion.

JPN 514 Advanced Premodern Japanese. (3) N
Close readings of selected premodern texts, with focus on grammatical and stylistic features. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

JPN 520 Teaching of Japanese as a Second Language. (3) N
Theory and practice of teaching Japanese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

JPN 535 Advanced Readings. (3) N
Readings in primary and secondary sources in history, art, religious studies, literature, or other fields. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

JPN 543 Japanese Language and Linguistics. (3) N

Analysis and discussion of linguistic theories applied to Japanese phonology, morphology, and syntax, including psychological, sociological, and historical aspects.

JPN 585 Advanced Problems of Translation. (3) N

Theories and practice of translation; strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 435 or equivalent.

JPN 591 Seminar. (3) N

Topics in literary, linguistic, or cultural studies.

LATIN (LAT)

Students entering LAT 202 directly from LAT 102 must complete LAT 201 to satisfy the College of Liberal Arts and Sciences language requirements.

LAT 101 Elementary Latin. (4) F, S

Basic Latin grammar with an emphasis on developing reading skills. For beginning students only.

LAT 102 Elementary Latin. (4) F, S

Continuation of LAT 101. Prerequisite: LAT 101 or equivalent.

LAT 201 Intermediate Latin. (4) F

Selected Latin literature, both classical and postclassical; Virgil's *Aeneid*; advanced grammar. Prerequisite: LAT 102 or instructor approval. *General Studies: HU.*

LAT 202 Intermediate Latin. (4) S

See LAT 201. Prerequisite: LAT 102 or instructor approval. *General Studies: HU.*

LAT 421 Roman Literature. (3) F

Readings in the Latin masterpieces. Authors read change each year in accordance with needs of the class. May be repeated for credit. Prerequisite: LAT 202 or instructor approval.

LAT 422 Roman Literature. (3) S

See LAT 421. Prerequisite: LAT 202 or instructor approval.

NORWEGIAN (NOR)**NOR 101 Elementary Norwegian.** (4) F

Reading, writing, speaking and understanding of basic Norwegian. 4 hours lecture, 1 hour lab.

NOR 102 Elementary Norwegian. (4) S

Reading, writing, speaking and understanding of basic Norwegian. 4 hours lecture, 1 hour lab. Prerequisite: NOR 101 or equivalent.

NOR 201 Intermediate Norwegian. (4) F

Review of Norwegian grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: NOR 102 or equivalent.

NOR 202 Intermediate Norwegian. (4) S

Review of Norwegian grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: NOR 201 or equivalent.

PORTUGUESE (POR)

To satisfy the foreign language requirement students must take POR 314 or a higher-numbered POR course.

POR 101 Elementary Portuguese. (5) F

Basic grammar with intensive drills in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: 1 year of Spanish or French or Italian or instructor approval.

POR 201 Intermediate Portuguese. (5) S

Continuation of POR 101. Intensive drill of fundamentals in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: POR 101 or instructor approval. *General Studies: G.*

POR 313 Portuguese Composition and Conversation. (3) F

Designed to develop skill in written Portuguese and corrected oral expression. Must be taken in sequence. Prerequisite: POR 201 or instructor approval. *General Studies: G.*

POR 314 Portuguese Composition and Conversation. (3) S

Continuation of POR 313. Prerequisite: POR 313 or instructor approval. *General Studies: G.*

POR 321 Luso-Brazilian Literature. (3) N

Representative masterpieces of Portuguese and Brazilian literature from the beginning to the present. Prerequisite: POR 313 or instructor approval. *General Studies: HU.*

POR 472 Luso-Brazilian Civilization. (3) N

Lectures, readings, and discussion of important aspects of Luso-Brazilian civilization. Topics from music, art, folklore, literature, history, and politics. Prerequisite: POR 313 or instructor approval. *General Studies: HU, G.*

RUSSIAN (RUS)**RUS 101 Elementary Russian.** (4) F, S, SS

Structural grammar and basic vocabulary. Introduction and reinforcement of aural/oral reading and writing skills. 4 hours lecture, 1 hour lab.

RUS 102 Elementary Russian. (4) S, SS

See RUS 101. Prerequisite: RUS 101 or equivalent.

RUS 201 Intermediate Russian. (4) F, SS

Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 4 hours lecture, 1 hour lab. Prerequisite: RUS 102 or equivalent. *General Studies: G.*

RUS 202 Intermediate Russian. (4) S, SS

See RUS 201. Prerequisite: RUS 201 or equivalent. *General Studies: G.*

RUS 211 Basic Russian Conversation. (3) F

Intensive aural/oral drill to supplement reading and grammatical skills acquired in RUS 101, 102, 201, and 202. Required of Russian majors. Prerequisite: RUS 102. *General Studies: G.*

RUS 212 Basic Russian Conversation. (3) S

See RUS 211. Prerequisite: RUS 102. *General Studies: G.*

RUS 303 Scientific Russian. (3) F

Acquisition of scientific vocabulary through reading from current Russian scientific publications. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. Prerequisite: RUS 102.

RUS 304 Scientific Russian. (3) S

See RUS 303. Prerequisite: RUS 102.

RUS 311 Russian Composition and Conversation. (3) F

Development of writing ability and oral expression. Prerequisite: RUS 202. *General Studies: G.*

RUS 312 Russian Composition and Conversation. (3) S

See RUS 311. Prerequisite: RUS 202. *General Studies: G.*

RUS 321 Survey of Russian Literature. (3) A

Main literary movements, authors, and significant works of prose, poetry, and drama from the beginning to the mid-19th century in translation. Prerequisite: RUS 202 or equivalent. *General Studies: L2/HU, H.*

RUS 322 Survey of Russian Literature. (3) A

An insight into the 19th- and early 20th-century Russian thought, life, and culture by reading translations of works of major writers. Prerequisite: RUS 202 or equivalent. *General Studies: L2/HU.*

RUS 323 Survey of Literature of the Soviet Era. (3) A

Main literary movements, prominent authors, and the most significant works of prose, poetry, and drama of the soviet period from 1917–1991. Prerequisite: RUS 202 or equivalent. *General Studies: L2/HU, G.*

RUS 411 Advanced Composition and Conversation I. (3) F

Designed to improve aural discrimination and self-expression in oral and written skills, emphasizing vocabulary building. Subject materials drawn from current post-Soviet-Russian publications. Prerequisite: RUS 312. *General Studies: G.*

RUS 412 Advanced Composition and Conversation II. (3) S

See RUS 411. Prerequisite: RUS 312. *General Studies: G.*

RUS 417 Applied Russian Phonetics. (2) N

General improvement in the student's language skills through aural/oral training in Russian phonology and an analysis of Russian orthography. Prerequisite: RUS 102.

RUS 420 Russian Poetry. (3) N

Development of Russian poetry from its beginnings to the present, including both native and émigré poets. Topics in criticism and the study of poetics. Prerequisite: RUS 312 or instructor approval. *General Studies: L2/HU.*

RUS 421 Pushkin. (3) N

Pushkin's poetry, plays, and prose fiction, including *Eugene Onegin*, *The Little Tragedies*, *Tales of Belkin*, *Queen of Spades*, and *The Captain's Daughter*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies: L2/HU.*

RUS 423 Dostoyevsky. (3) N

Dostoyevsky's major works of fiction, including *Crime and Punishment* and *Brothers Karamazov*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies: L2/HU.*

RUS 424 Tolstoy. (3) N

Tolstoy's major works, including *War and Peace* and *Anna Karenina*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies: L2/HU*.

RUS 425 Chekhov. (3) N

Chekhov's major works, representative short stories and major plays, including *The Cherry Orchard* and *Three Sisters*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General Studies: L2/HU*.

RUS 426 Literatures of the Nationalities of the Former Soviet Union. (3) N

Including such authors as Belsevica, Kross, Venclova, Kupala, Khvylovy, Sevak, Nasri, Aitmatov, Charents, Cholpan. Prerequisite: RUS 312 or instructor approval. *General Studies: L2/HU, G*.

RUS 430 Russian Short Story. (3) N

Detailed study of representative works of the Russian short story genre. Authors included are from both Imperial and Soviet Russia. Prerequisite: RUS 312 or instructor approval. *General Studies: L2/HU*.

RUS 440 History of the Russian Language. (3) N

Principles of historical linguistics presented through the evolution of the Russian language from Proto-Indo-European to the present. Readings of historical documents in Old Russian and Old Church Slavic. Prerequisite: RUS 312 or instructor approval.

RUS 441 Survey of Russian Culture. (3) N

Interplay of artistic, social, and political forces in the development of Russian culture from the Kievan period to the present. Exclusive use of Russian language source materials. Prerequisite: RUS 312 or instructor approval. *General Studies: L2/HU, G, H*.

RUS 591 Seminar. (3) N

Topics may be selected from the following:

- (a) Baltic Literatures
- (b) Literature from 1956 to August 1991
- (c) Literature Literary Zhdanovism
- (d) 19th-Century Russian
- (e) Post-Soviet Literature
- (f) Pre-19th Century Russian Literature
- (g) Russian Literary Criticism
- (h) Russian Poetry to 1890
- (i) Russian Poetry, 1890 to Present

SCANDINAVIAN (SCA)**SCA 314 Medieval Scandinavia.** (3) F, S

Study in English translation of the Sagas, Edda and Skaldic poetry, history and mythology of the Vikings.

SCA 315 Old Norse. (3) F, S

Readings and study of grammatical structures of Medieval Scandinavian with emphasis on the Sagas and Edda poetry and historical writings.

SCA 316 Scandinavian Cinema. (3) F, S
Presentation of Danish, Norwegian, Icelandic, and Swedish film, with English subtitles, as representatives of contemporary historical culture.

SPANISH (SPA)

Students who have completed their secondary education in a school where Spanish was the official language of instruction should begin their studies at the 325 level or above. For the courses SPA 313 and 314, certain restrictions apply: no student who has completed more than two years of high school in a Spanish-speaking country, where Spanish is the medium of instruction in the school, is allowed to register in a Spanish class below the 400 level.

SPA 101 Elementary Spanish. (4) F, S, SS
Fundamentals of the language. Emphasis on listening, speaking, reading, and writing. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 111.

SPA 102 Elementary Spanish. (4) F, S, SS
See SPA 101. Not open to students with credit in SPA 111. Prerequisite: SPA 101 or equivalent.

SPA 107 Spanish for International Professions I. (8) F

Accelerated program alternative to SPA 101, 102 sequence. Functional approach to needs of international professions.

SPA 111 Fundamentals of Spanish. (4) F, S
Primarily for students with two years of high school Spanish who need review to enter second-year study. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 101 or 102.

SPA 201 Intermediate Spanish. (4) F, S, SS
Continuation of fundamentals. Emphasis on the development of the skills of reading, listening comprehension, speaking, writing, and culture. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111. *General Studies: G*.

SPA 202 Intermediate Spanish. (4) F, S, SS
See SPA 201. Prerequisite: SPA 201 or equivalent. *General Studies: G*.

SPA 203 Intermediate Spanish for Bilinguals. (4) F

For Spanish-speaking students, in lieu of SPA 201. Composition, literature, conversation, grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111 or placement. *General Studies: G*.

SPA 204 Intermediate Spanish for Bilinguals. (4) S

For Spanish-speaking students, in lieu of SPA 202. Composition, literature, conversation, grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 203 or equivalent. *General Studies: G*.

SPA 207 Spanish for International Professions II. (8) S

Continuation of SPA 107, alternative to SPA 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: SPA 107 or instructor approval. *General Studies: G*.

SPA 311 Spanish Conversation. (3) F, S
Designed primarily for nonmajors to promote vocabulary building and communicative expression in Spanish through discussions based on cultural readings. Prerequisite: SPA 202 or equivalent.

SPA 312 Spanish Conversation. (3) F, S
See SPA 311. Prerequisite: SPA 311 or equivalent.

SPA 313 Spanish Conversation and Composition. (3) F, S, SS

Designed to develop skill and accuracy in spoken and written Spanish. Required of majors; SPA 313 and 314 must be taken in sequence. Prerequisite: SPA 202 or equivalent. *General Studies: G*.

SPA 314 Spanish Conversation and Composition. (3) F, S, SS

See SPA 313. Prerequisite: SPA 313 or equivalent. *General Studies: G*.

SPA 315 Spanish Conversation and Composition for Bilinguals. (3) F

Emphasis on comparing standard Spanish with regional Southwest Spanish. May be taken in lieu of SPA 313 and 314. Prerequisite: SPA 202 or 204 or instructor approval.

SPA 316 Spanish Conversation and Composition for Bilinguals. (3) S

See SPA 315. Prerequisite: SPA 315 or equivalent.

SPA 319 Business Correspondence and Communication. (3) N

Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G*.

SPA 325 Introduction to Hispanic Literature. (3) F, S

A critical approach to and analysis of literary types, including poetry, drama, short story, and novel. Required of all majors. Prerequisite: SPA 313. *General Studies: HU*.

SPA 412 Advanced Conversation and Composition. (3) F, S

Oral and written Spanish communication skills, with particular attention given to developing fluency and facility. Required of majors. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G*.

SPA 413 Advanced Spanish Grammar. (3) F

Intensive analysis of the Spanish language. Required of teaching majors. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: G*.

SPA 417 Spanish Phonetics and Phonology. (3) F

Introduction to the theory and practice of Spanish phonetics and phonology. Prerequisite: SPA 412.

SPA 420 Applied Spanish Linguistics. (3) S
Application of linguistic principles to the teaching of Spanish. Prerequisites: FLA 400 (or equivalent); SPA 412. *General Studies: L2*.

SPA 421 Spanish in the Southwest. (3) F

Discussion and linguistic analysis of Southwest Spanish. Prerequisite: SPA 412. *General Studies: L2/SB, C*.

SPA 425 Spanish Literature. (3) F, S

Survey of Spanish literature from its beginning to 1700. Prerequisite: SPA 325. *General Studies: HU*.

SPA 426 Spanish Literature. (3) F, S

Survey of Spanish literature from 1700 to the present. Prerequisite: SPA 325. *General Studies: HU*.

SPA 427 Spanish American Literature. (3) F, S

Survey of major works, figures, and movements from Colonial period to 1880. Prerequisite: SPA 325. *General Studies: L2*.

SPA 428 Spanish American Literature. (3) F, S

Survey of major works, figures, and movements from 1880 to the present. Prerequisite: SPA 325. *General Studies: L2, G.*

SPA 429 Mexican Literature. (3) N

Selected readings from pre-Columbian writers/poets (e.g., Macuilxóchtli) through the novel of the Revolution to the present. Prerequisite: SPA 325.

SPA 434 Drama of the Golden Age. (3) S
Dramatic works of Lope de Vega, Calderón de la Barca, and their contemporaries. Prerequisite: SPA 325.

SPA 435 Cervantes—*Don Quijote*. (3) F
Don Quijote and the development of the novel. Prerequisite: SPA 325.

SPA 454 19th-Century Spanish American Narrative. (3) F
Principal works in the novel, short story, narrative fiction, and narrative (Gauguesque) poetry. Prerequisite: SPA 325.

SPA 456 20th-Century Spanish American Fiction. (3) S
Major works and movements. Prerequisite: SPA 325.

SPA 464 Mexican American Literature. (3) F
Representative literature in Spanish and English by Mexican Americans, emphasizing sociocultural as well as literary values. Prerequisite: SPA 325. *General Studies: HU.*

SPA 471 Civilization of the Spanish Southwest. (3) S
The political, intellectual, social, economic, and artistic development of the Spanish-speaking people of the Southwest. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU.*

SPA 472 Spanish American Civilization. (3) F
Growth of the institutions and cultures of Spanish American people. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU, G, H.*

SPA 473 Spanish Civilization. (3) S
Political, intellectual, social, economic, and artistic development of the Spanish nation from its origin to the present. Prerequisite: SPA 314 or 316 or instructor approval. *General Studies: HU/SB, G.*

SPA 485 Mexican American Short Story. (3) N
Critical study of contemporary short stories by Mexican American authors, with emphasis on their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

SPA 486 Mexican American Novel. (3) N
Social and literary contexts of representative novelists, emphasizing their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

SPA 487 Mexican American Drama. (3) N
Representative dramatic works, with emphasis on the history and development of this genre from its regional origins to the present. Prerequisite: SPA 325 or instructor approval.

SPA 500 Bibliography and Research Methods. (3) F
Required of all graduate students.

SPA 536 Generation of 1898. (3) N
Works of Unamuno, Baroja, Azorín, and their contemporaries, studied against the ideological background of the turn of century in Spain. Prerequisite: SPA 325.

SPA 540 History of the Spanish Language. (3) S
Analysis and discussion of the development of Spanish from Vulgar Latin to the present day. Prerequisite: FLA 400 or equivalent.

SPA 541 Spanish Language in America. (3) F
Discussion and analysis of various regional and social varieties of Spanish in the Americas. Prerequisite: FLA 400 or equivalent.

SPA 542 Studies in the Spanish of the Southwest. (3) S
Examination of bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 or equivalent.

SPA 543 Structure of Spanish. (3) S
Analysis and discussion of data on selected topics in Spanish morphology, semantics, and syntax. Prerequisite: FLA 400 or equivalent.

SPA 545 Concepts of Literary Criticism. (3) S
Aims and methods of modern literary scholarship. Discussion of major theories of literary analysis.

SPA 555 Spanish American Modernism. (3) N
Principal works and figures of literary Modernism, 1880–1920, with emphasis on international literary context of the movement. Prerequisite: SPA 325.

SPA 557 Contemporary Spanish American Poetry. (3) N
Major works and problems in contemporary poetry and poetics, with emphasis on Paz, Parra, Cardenal, and new poetry since 1960. Prerequisite: SPA 325.

SPA 560 Medieval Spanish Literature. (3) N
Major figures and works of the Middle Ages in Spain.

SPA 561 Golden Age Spanish Prose Fiction. (3) N
Major figures and works of the 16th and 17th centuries, with emphasis on the picaresque novel.

SPA 562 Golden Age Spanish Poetry. (3) N
Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

SPA 563 Spanish Romanticism. (3) N
Principal figures and works of the Spanish Romanticism, with emphasis on international literary context of the movement.

SPA 564 19th-Century Spanish Prose Fiction. (3) N
Principal figures and works of Realism in the 19th-century novel, with emphasis on Galdós.

SPA 565 20th-Century Spanish Drama. (3) N
Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

SPA 566 Generation of 1927. (3) N
Major poets of the Generation of 1927, with emphasis on works of Lorca, Guillén, Salinas, and Aleixandre.

SPA 567 Contemporary Spanish Novel. (3) N
Major works of post-Civil War Spanish fiction.

SPA 568 Cervantes. (3) N
An extensive analysis of the prose and theater of Cervantes as a key figure of the Spanish Golden Age. Lecture, seminar.

SPA 570 Indigenous Literatures of Spanish America. (3) N
The indigenous literary traditions, with emphasis on Nahuatl, Mayan, and Quechua literatures through readings in Spanish translations.

SPA 571 Colonial Spanish American Literature. (3) N
The major figures and works from Conquest to Independence.

SPA 572 Spanish American Drama. (3) N
Major contributions of Spanish American drama, with emphasis on contemporary dramatists.

SPA 573 Spanish American Essay. (3) N
Major works of the essay, within the framework of intellectual history and literary movements.

SPA 574 Spanish American Vanguard Poetry. (3) N
Examination of poetic developments, 1920–1940, with emphasis on Huidobro, Vallejo, Neruda, and the international context of their works.

SPA 575 Contemporary Spanish American Novel. (3) N
Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 576 Contemporary Spanish American Short Story. (3) N
Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 577 Regional Spanish American Literature. (3) N
The figures and works of major national (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated for different topics.

SPA 578 Novel of the Mexican Revolution. (3) N
Representative works and authors of this genre (Guzmán, Azuela, Urquiza, Muñoz, and Romero), including related or peripheral offshoots in indigenous novels.

SPA 581 Latin American Popular Culture. (3) N
Studies in selected topics of Latin American popular culture, with emphasis on appropriate academic models for the critical analysis of these materials.

SPA 582 Studies in Latin American Film. (3) N
Examination of the role of film in contemporary Latin American culture; films viewed and analyzed as casebook examples. Seminar.

SPA 591 Seminar. (3) N
Spanish and Spanish American literary, cultural, and linguistic topics.

SPA 691 Figures and Works Seminar. (3) N
Topics may be selected from Spanish and Spanish American literatures.

SWEDISH (SWE)

SWE 101 Elementary Swedish. (4) F
Reading, writing, speaking and understanding of basic Swedish. 4 hours lecture, 1 hour lab.

SWE 102 Elementary Swedish. (4) S
Reading, writing, speaking and understanding of basic Swedish. 4 hours lecture, 1 hour lab. Prerequisite: SWE 101 or equivalent.

SWE 201 Intermediate Swedish. (4) F
Review of Swedish grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: SWE 102 or equivalent.

SWE 202 Intermediate Swedish. (4) S
Review of Swedish grammar with emphasis on the development of the skills of speaking, listening comprehension, reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: SWE 201 or equivalent.

THAI (THA)

THA 101 Elementary Thai I. (5) F
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose readings in Thai script. 4 hours lecture, 1 hour lab.

THA 102 Elementary Thai II. (5) S
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: THA 101 or equivalent.

THA 201 Intermediate Thai I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 102 or equivalent. *General Studies: G.*

THA 202 Intermediate Thai II. (5) S
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 201 or equivalent. *General Studies: G.*

VIETNAMESE (VTN)

VTN 101 Elementary Vietnamese I. (5) F
Basic skills in modern conversational Vietnamese and development of basic reading and writing skills, with special emphasis on tones. 4 hours lecture, 1 hour lab.

VTN 102 Elementary Vietnamese II. (5) S
Basic skills in modern conversational Vietnamese and development of basic reading and writing skills, with special emphasis on tones. 4 hours lecture, 1 hour lab. Prerequisite: VTN 101 or equivalent.

VTN 201 Intermediate Vietnamese I. (5) F
Improve students' speaking, listening, reading, and writing competence through dialogues, reading passages, pattern drill, and grammar and communicative exercises. 4 hours lecture, 1 hour lab. Prerequisite: VTN 102 or equivalent. *General Studies: G.*

VTN 202 Intermediate Vietnamese II. (5) S
Improve students' speaking, listening, reading, and writing competence through dialogues, reading passages, pattern drill, and grammar and communicative exercises. 4 hours lecture, 1 hour lab. Prerequisite: VTN 201 or equivalent. *General Studies: G.*

Department of Mathematics

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REGENTS' PROFESSOR TROTTER

PROFESSORS

ARMBRUSTER, BREMNER, BUSTOZ,
FELDSTEIN, GARDNER, GRACE,
HELTON, HOPPENSTEADT, IHRIG,
JACKIEWICZ, KADELL, KAWSKI,
KIERSTEAD, KUANG, KUIPER,
LEONARD, McDONALD,
MITTELMANN, NICOLAENKO,
RENAUT, RINGHOFER, H.A. SMITH,
H.L. SMITH, THIEME, A. WANG,
C. WANG, WEISS, YOUNG

ASSOCIATE PROFESSORS

BAER, BARCELO, BLOUNT,
CHILDRESS, DRISCOLL, FAN,
FARMER, HASSETT, HURLBERT,
J. JONES, KOSTELICH, KURTZ,
LOHR, MAHALOV, McCARTER,
MOORE, QUIGG, SPIELBERG,
SWIMMER, TAYLOR,
TURNER, WELFERT

ASSISTANT PROFESSORS

CARLSON, HOLST, D. JONES,
NIKITIN, PREWITT, ZANDIEH

MATHEMATICS—B.A.

The B.A. degree in Mathematics consists of a minimum of 36 semester hours in mathematics and additional course work in closely related fields, as approved by the advisor, for a total of at least 51 semester hours. The required courses must include the following:

CSE	200	Concepts of Computer Science <i>N3</i> 3 or CSE 183 Applied Problem Solving with FORTRAN <i>N3</i> (3) or CSE 100 Principles of Programming (3)
MAT	270	Calculus with Analytic Geometry I <i>NI</i> 4
MAT	271	Calculus with Analytic Geometry II 4
MAT	272	Calculus with Analytic Geometry III 4
MAT	274	Elementary Differential Equations 3
MAT	300	Mathematical Structures <i>L2</i> ... 3
MAT	342	Linear Algebra 3

Joaquin Bustoz, professor of Mathematics, is one of 10 teachers nationwide to be honored with a Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.

Jeff Havir photo

MAT 370	Intermediate Calculus	3
	or MAT 371 Advanced Calculus I (3)	
Total	.....	<u>27</u>

Four 400-level MAT or STP courses must also be approved by the advisor.

The department recommends a one-year sequence in some closely related field. Students who plan to attend graduate school in mathematics should choose the B.S. degree.

MATHEMATICS—B.S.

The B.S. degree in Mathematics consists of a minimum of 42 semester hours in mathematics plus additional course work in closely related fields, as approved by the advisor, for a total of at least 55 semester hours. The required hours must include the following:

CSE 200	Concepts of Computer Science <i>N3</i>	3
	or CSE 183 Applied Problem Solving with FORTRAN <i>N3</i> (3) or CSE 100 Principles of Programming (3)	
MAT 270	Calculus with Analytic Geometry I <i>NI</i>	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 342	Linear Algebra	3
Total	.....	<u>18</u>

To satisfy the remaining required hours, the student selects either the applied mathematics, computational mathematics, general mathematics, or statistics and probability option.

General Mathematics Option. For the general mathematics option, the student must take the following courses:

MAT 274	Elementary Differential Equations	3
MAT 300	Mathematical Structures <i>L2</i>	3
MAT 371	Advanced Calculus I	3
MAT 372	Advanced Calculus II	3
MAT 410	Introduction to General Topology	3
	or MAT 415 Combinatorial Mathematics I (3) or MAT 443 Introduction to Abstract Algebra (3) or MAT 445 Theory of Numbers (3)	

MAT 423	Numerical Analysis I <i>N3</i>	3
MAT 461	Applied Complex Analysis ...	3
	or MAT 462 Applied Partial Differential Equations (3) or MAT 475 Differential Equations (3)	
STP 421	Probability	3
Total	.....	<u>24</u>

Three more hours in a MAT course must also be approved by the advisor. The department recommends a one-year sequence in some closely related field.

Pure Mathematics Option. For the pure mathematics option, the student must take the following courses:

CSE 200	Concepts of Computer Science <i>N3</i>	3
	or CSE 100 Principles of Programming (3)	
MAT 274	Elementary Differential Equations	3
MAT 300	Mathematical Structures <i>L2</i>	3
MAT 372	Advanced Calculus II	3
MAT 442	Advanced Linear Algebra	3
MAT 444	Intermediate Abstract Algebra	3
MAT 472	Intermediate Real Analysis ...	3
Total	.....	<u>21</u>

Students must also take two courses from the following:

MAT 410	Introduction to General Topology	3
MAT 415	Combinatorial Mathematics I	3
MAT 445	Theory of Numbers	3
	or MAT 461 Applied Complex Analysis (3) or STP 421 Probability (3)	

Two more MAT or STP courses at the 400 level must also be taken.

Applied Mathematics Option. For the applied mathematics option, the student must take the following courses:

CSE 200	Concepts of Computer Science <i>N3</i> ¹	3
CSE 210	Data Structures and Algorithms I <i>N3</i> ¹	3
CSE 310	Data Structures and Algorithms II	3
MAT 274	Elementary Differential Equations	3
MAT 371	Advanced Calculus I	3
MAT 372	Advanced Calculus II	3
MAT 425	Numerical Analysis II <i>N3</i>	3
MAT 451	Mathematical Modeling <i>N2</i> ...	3
MAT 461	Applied Complex Analysis ...	3

MAT 462	Applied Partial Differential Equations	3
PHY 121	University Physics I: Mechanics <i>S1/S2</i> ²	3
PHY 131	University Physics II: Electricity and Magnetism <i>S1/S2</i> ³	3
STP 421	Probability	3
Total	.....	<u>36</u>

¹ CSE 100, Introduction to Computer Science I, may be substituted for CSE 200 or 210, but this is not recommended.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

For PHY 121 and 131, the corresponding laboratory courses (PHY 122 University Physics Laboratory I and PHY 132 University Physics Laboratory II) are strongly recommended.

Students should choose additional courses from the following:

IEE 476	Operations Research Techniques/ Applications <i>N2</i>	4
MAT 415	Combinatorial Mathematics I	3
MAT 416	Combinatorial Mathematics II	3
MAT 419	Linear Programming <i>N2</i>	3
MAT 423	Numerical Analysis I <i>N3</i>	3
MAT 443	Introduction to Abstract Algebra	3
MAT 452	Introduction to Chaos and Nonlinear Dynamics	3
MAT 455	Introduction to Fractals and Applications	3
MAT 472	Intermediate Real Analysis ...	3
MAT 475	Differential Equations	3
STP 425	Stochastic Processes	3
STP 427	Mathematical Statistics	3

Computational Mathematics Option. For the computational mathematics option, the student must take the following courses:

CSE 200	Concepts of Computer Science <i>N3</i>	3
CSE 210	Data Structures and Algorithms I <i>N3</i>	3
CSE 310	Data Structures and Algorithms II	3
MAT 243	Discrete Mathematical Structures	3
	or MAT 300 Mathematical Structures <i>L2</i> (3)	
MAT 274	Elementary Differential Equations	3
MAT 371	Advanced Calculus I	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MAT 423	Numerical Analysis I <i>N3</i>	3
MAT 425	Numerical Analysis II <i>N3</i>	3
MAT 427	Computer Arithmetic <i>N3</i>	3
STP 326	Intermediate Probability <i>N2</i>	3
	or STP 420 Introductory Applied Statistics <i>N2</i> (3)	—
Total	.....	30

The remaining hours are to include three upper-division courses, at least two of which must be MAT or STP courses, including one at the 400 level, and all of which must be approved by the advisor.

Statistics and Probability Option.

For the statistics and probability option, the student must take the following courses:

MAT 300	Mathematical Structures <i>L2</i> ...	3
MAT 371	Advanced Calculus I	3
	or MAT 472 Intermediate Real Analysis (3)	3
MAT 372	Advanced Calculus II	3
STP 420	Introductory Applied Statistics <i>N2</i>	3
STP 421	Probability	3
STP 425	Stochastic Processes	3
	or STP 427 Mathematical Statistics (3)	—
Total	.....	18

The remaining courses in mathematics and statistics, as approved by the advisor, may be selected from the following:

IEE 476	Operations Research Techniques/ Applications <i>N2</i>	4
MAT 415	Combinatorial Mathematics I	3
MAT 419	Linear Programming <i>N2</i>	3
MAT 421	Applied Computational Methods <i>N3</i>	3
MAT 423	Numerical Analysis I <i>N3</i>	3
MAT 425	Numerical Analysis II <i>N3</i>	3
MAT 442	Advanced Linear Algebra	3
STP 425	Stochastic Processes	3
STP 427	Mathematical Statistics	3
STP 429	Experimental Statistics <i>N3</i>	3

A coherent set of courses in a related field is also required.

Actuarial Science. The faculty in the Department of Mathematics offer courses that cover the content of the mathematical examinations of the Society of Actuaries. The option in statistics and probability is particularly suited to students who wish to pursue actuarial careers. See the department's actuarial advisor for more information.

MINOR IN MATHEMATICS

The minor in Mathematics consists of a minimum of 24 semester hours. Required courses are as follows:

MAT 270	Calculus with Analytic Geometry I <i>N1</i>	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 342	Linear Algebra	3
Total	.....	15

Electives are chosen in consultation with a mathematics advisor and must include three upper-division MAT or STP courses. In addition, CSE 200 Concepts of Computer Science and CSE 210 Data Structures and Algorithms I are recommended. An approved Minor Verification Form must be submitted to the Graduation Office of the College of Liberal Arts and Sciences.

SECONDARY EDUCATION— B.A.E.

Mathematics. Students pursuing the major teaching field may choose from two options.

Option One. With this option, the academic specialization consists of the following required courses:

CSE 200	Concepts of Computer Science <i>N3</i>	3
	or CSE 183 Applied Problem Solving with FORTRAN <i>N3</i> (3)	3
	or CSE 100 Principles of Programming (3)	3
MAT 270	Calculus with Analytic Geometry I	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 300	Mathematical Structures <i>L2</i> ...	3
	or MAT 243 Discrete Mathematical Structures (3)	3
MAT 310	Introduction to Geometry	3
MAT 342	Linear Algebra	3
MAT 370	Intermediate Calculus	3
	or MAT 371 Advanced Calculus I (3)	3
MAT 443	Introduction to Abstract Algebra	3
	or MAT 445 Theory of Numbers (3)	3
MTE 483	Mathematics in the Secondary School	3
STP 420	Introductory Applied Statistics <i>N2</i>	3
Total	.....	36

MTE 482 Methods of Teaching Mathematics in Secondary School is required as part of the 31-hour professional education requirement but cannot be counted as part of the 36-hour major requirement.

Option Two. This option may be exercised only in combination with option two in chemistry (page 321) or physics (page 374). The mathematics portion of this 60-hour program consists of 30 semester hours in mathematics. Required courses are as follows:

MAT 270	Calculus with Analytic Geometry I <i>N1</i>	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
	or MAT 371 Advanced Calculus I (3) or MAT 460 Applied Real Analysis (3)	3
MAT 300	Mathematical Structures <i>L2</i> ...	3
MAT 310	Introduction to Geometry	3
MAT 342	Linear Algebra	3
MAT 443	Introduction to Abstract Algebra	3
Total	.....	27

A computer science course—CSE 100 Introduction to Computer Science I or CSE 183 Applied Problem Solving with FORTRAN or CSE 200 Concepts of Computer Science—is recommended.

Mathematics. The minor teaching field consists of the following required courses:

MAT 270	Calculus with Analytic Geometry I <i>N1</i>	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
MAT 274	Elementary Differential Equations	3
	or MAT 371 Advanced Calculus I (3) or MAT 460 Applied Real Analysis (3)	3
MAT 300	Mathematical Structures <i>L2</i>	3
MAT 310	Introduction to Geometry	3
MAT 342	Linear Algebra	3
Total	.....	24

GRADUATE PROGRAMS

The faculty in the Department of Mathematics offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. Consult the *Graduate Catalog* for requirements.

MATHEMATICS (MAT)

- MAT 106 Intermediate Algebra.** (3) F, S, SS
Topics from basic algebra such as linear equations, polynomials, factoring, exponents, roots, and radicals. Prerequisite: 1 year of high school algebra.
- MAT 114 College Mathematics.** (3) F, S, SS
Applications of basic college-level mathematics to real-life problems. Appropriate for students whose major does not require MAT 117 or 170. Prerequisite: MAT 106 or 2 years of high school algebra. *General Studies: N1.*
- MAT 117 College Algebra.** (3) F, S, SS
Linear and quadratic functions, systems of linear equations, logarithmic and exponential functions, sequences, series, and combinatorics. Prerequisite: MAT 106 or 2 years of high school algebra. *General Studies: N1.*
- MAT 119 Finite Mathematics.** (3) F, S, SS
Topics from linear algebra, linear programming, combinatorics, probability, and mathematics of finance. Prerequisite: MAT 117 or equivalent. *General Studies: N1.*
- MAT 170 Precalculus.** (3) F, S, SS
Intensive preparation for calculus (MAT 260, 270 and 290). Topics include functions (including trigonometric), matrices, polar coordinates, vectors, complex numbers, and mathematical induction. Prerequisite with a grade of "B" or higher: MAT 106. Prerequisite with a grade of "C" or higher: MAT 117 or two years of high school algebra. *General Studies: N1.*
- MAT 210 Brief Calculus.** (3) F, S, SS
Differential and integral calculus of elementary functions with applications. Not open to students with credit in MAT 260, 270, or 290. Prerequisite: MAT 117 or equivalent. *General Studies: N1.*
- MAT 242 Elementary Linear Algebra.** (2) F, S, SS
Introduction to matrices, systems of linear equations, determinants, vector spaces, linear transformations, and eigenvalues. Emphasizes development of computational skills. Prerequisite: 1 semester of calculus or instructor approval.
- MAT 243 Discrete Mathematical Structures.** (3) F, S, SS
Introduction to lattices, graphs, Boolean algebra, and groups, with emphasis on topics relevant to computer science. Prerequisite: 1 semester of calculus.
- MAT 260 Technical Calculus I.** (3) F, S, SS
Analytic geometry, differential, and integral calculus of elementary functions, emphasizing physical interpretation and problem solving. Not open to students with credit in MAT 210, 270, or 290. Prerequisite: MAT 170 or equivalent. *General Studies: N1.*
- MAT 261 Technical Calculus II.** (3) F, S, SS
Continuation of MAT 260. Prerequisite: MAT 260 or instructor approval.
- MAT 262 Technical Calculus III.** (3) F, S
Infinite series, an introduction to differential equations and elementary linear algebra. Prerequisite: MAT 261 or equivalent.
- MAT 270 Calculus with Analytic Geometry I.** (4) F, S, SS
Real numbers, limits and continuity, and differential and integral calculus of functions of 1 variable. Not open to students with credit in MAT 290. The sequence MAT 270 and 271 may be substituted for MAT 290 to satisfy requirements of any curriculum. Prerequisite with a grade of "C" or higher: MAT 170 or equivalent. *General Studies: N1.*
- MAT 271 Calculus with Analytic Geometry II.** (4) F, S, SS
Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, sequences, and series. Not open to students with credit in MAT 291. The sequence MAT 270, 271, 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite with a grade of "C" or higher: MAT 270 or equivalent.
- MAT 272 Calculus with Analytic Geometry III.** (4) F, S, SS
Vector-valued functions of several variables, multiple integration, and introduction to vector analysis. The sequence MAT 270, 271, 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite with a grade of "C" or higher: MAT 271 or equivalent.
- MAT 274 Elementary Differential Equations.** (3) F, S, SS
Introduction to ordinary differential equations, adapted to the needs of students in engineering and the sciences. MAT 272 or equivalent is recommended. Prerequisite: MAT 271 or equivalent.
- MAT 290 Calculus I.** (5) N
Differential and integral calculus of elementary functions; topics from analytic geometry essential to the study of calculus. Prerequisite: MAT 170 or equivalent. *General Studies: N1.*
- MAT 291 Calculus II.** (5) N
Further applications of calculus, partial differentiation, multiple integrals, and infinite series. Prerequisite: MAT 290 or equivalent.
- MAT 300 Mathematical Structures.** (3) F, S
Introduction to rigor and proof in mathematics. Basic logic, set theory, mathematical induction, combinatorics, functions, relations, and probability. Prerequisite: 1 semester of calculus or instructor approval. *General Studies: L2.*
- MAT 310 Introduction to Geometry.** (3) S
Congruence, area, parallelism, similarity and volume, and Euclidean and non-Euclidean geometry. Prerequisite: MAT 272 or equivalent.
- MAT 342 Linear Algebra.** (3) F, S, SS
Linear equations, matrices, determinants, vector spaces, bases, linear transformations and similarity, inner product spaces, eigenvectors, orthonormal bases, diagonalization, and principal axes. Pre- or corequisite: MAT 272 or equivalent.
- MAT 362 Advanced Mathematics for Engineers and Scientists I.** (3) F, S, SS
Vector analysis, Fourier analysis, and partial differential equations. Prerequisites: MAT 272 and 274 or equivalents.
- MAT 370 Intermediate Calculus.** (3) F, S
Theory behind basic 1-variable calculus: continuity, derivative, Riemann integral, sequences, and series. Not open to students with credit in MAT 371. Prerequisites: MAT 272, 300.
- MAT 371 Advanced Calculus I.** (3) F, S
Real numbers, completeness, sequences/series, continuity, uniform theorems, derivative, Riemann integral, pointwise/uniform convergence, Taylor's theorem. Not open to students with credit in MAT 370. Prerequisite: MAT 272 or 300 or instructor approval.
- MAT 372 Advanced Calculus II.** (3) F, S
Open, closed, compact sets in R^n continuity, differentiation, partial differentiation, integration in R^n . Inverse/implicit function theorems. Not open to students with credit in MAT 460. Prerequisite: MAT 371. Pre- or corequisite: MAT 342.
- MAT 410 Introduction to General Topology.** (3) A
Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.
- MAT 415 Combinatorial Mathematics I.** (3) F
Permutations and combinations, recurrence relations, generating functions, graph theory, and combinatorial proof techniques. Prerequisites: MAT 300 and 342 or instructor approval.
- MAT 416 Combinatorial Mathematics II.** (3) S
Continuation of MAT 415 considering some advanced aspects of the theory as well as applications. Topics chosen from transport networks, matching theory, block designs, coding theory, Polya's counting theory, and applications to the physical and life sciences. MAT 443 is recommended. Prerequisite: MAT 415 or instructor approval.
- MAT 419 Linear Programming.** (3) S
Linear programming and the simplex algorithm, network problems, quadratic, and nonlinear programming. Prerequisites: MAT 242 (or 342); 1 semester of college calculus. *General Studies: N2.*
- MAT 421 Applied Computational Methods.** (3) F, S
Numerical methods for quadrature, differential equations, roots of nonlinear equations, interpolation, approximation, linear equations, floating-point arithmetic, and roundoff error. Prerequisites: MAT 271 (or equivalent) and fluency in computer programming (preferably FORTRAN) or instructor approval. *General Studies: N3.*
- MAT 423 Numerical Analysis I.** (3) F, S
Analysis and algorithms for numerical solutions linear/nonlinear equations, direct solvers, iterative procedures, optimization. Determination of eigenvalues. Elementary computer arithmetic. Prerequisites: MAT 342 and 371 and fluency in computer programming or instructor approval. *General Studies: N3.*
- MAT 425 Numerical Analysis II.** (3) F, S
Analysis of and algorithms for numerical interpolation, integration, and differentiation. Numerical solution of ordinary differential equations, and method of lines. Those seeking a methods survey course should take MAT 421. Prerequisites: MAT 342 and 371 and fluency in computer programming or instructor approval. *General Studies: N3.*

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MAT 427 Computer Arithmetic. (3) S

Number systems, hardware/software arithmetic, overflow, significance, rounding, multiple precision, and automatic error control; impact on languages, architectures, robust programming, and software development. Prerequisite: CSE 100 (or 200) or MAT 421 and 423 (or MAT 425) or instructor approval. *General Studies: N3.*

MAT 442 Advanced Linear Algebra. (3) F

Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 443 Introduction to Abstract Algebra. (3) F

Introduction to concepts of abstract algebra. Not open to students with credit in MAT 444. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 444 Intermediate Abstract Algebra. (3) S

Basic theory of groups, rings, and fields, including an introduction to Galois theory. Appropriate as preparation for MAT 543. Prerequisites: MAT 300, 342.

MAT 445 Theory of Numbers. (3) S

Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive roots, and quadratic reciprocity theorem. Prerequisites: MAT 300 and 342 or instructor approval.

MAT 451 Mathematical Modeling. (3) S

A detailed study of 1 or more mathematical models that occur in the physical or biological sciences. May be repeated for credit with instructor approval. Prerequisites: MAT 242 (or 342) and 274 or instructor approval. *General Studies: N2.*

MAT 452 Introduction to Chaos and Nonlinear Dynamics. (3) F

Properties of nonlinear dynamical systems; dependence on initial conditions; strange attractors; period doubling; bifurcations; symbolic dynamics; Smale-Birkhoff theorem; and applications. MAT 371 is recommended. Prerequisites: MAT 242 (or 342), 274.

MAT 455 Introduction to Fractals and Applications. (3) S

Fractals; self-similar structures, fractals with iterated function systems of maps, computing fractals, fractal dimensions, chaotic dynamics on fractals, applications. MAT 371 is recommended. Prerequisites: MAT 242 (or 342), 274.

MAT 460 Applied Real Analysis. (3) S

Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit in MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

MAT 461 Applied Complex Analysis. (3) F, SS

Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 or equivalent.

MAT 462 Applied Partial Differential Equations. (3) S

Second order partial differential equations, emphasizing Laplace, wave, and diffusion equations. Solutions by the methods of characteristics, separation of variables, and integral transforms. Prerequisites: MAT 242 (or 342), 274.

MAT 472 Intermediate Real Analysis. (3) F

Introduction to analysis in metric spaces with emphasis on the real line. Appropriate as preparation for MAT 570. Prerequisites: MAT 300, 342.

MAT 475 Differential Equations. (3) F

Asymptotic behavior of solutions of linear and nonlinear ordinary differential equations, stability, Sturm-Liouville problems, boundary value problems, and singular point behavior of autonomous systems. Prerequisites: MAT 242 (or 342), 274.

MAT 476 Partial Differential Equations. (3) S

First order quasilinear, second order linear (wave, Laplace, heat). Characteristics, harmonic functions, maximum principles, Fourier series, separation of variables. Prerequisites: MAT 274 (or 475), 372 (or 472).

MAT 485 History of Mathematics. (3) N

Topics from the history of the origin and development of mathematical ideas. Prerequisite: MAT 272 or equivalent.

MAT 510 Point Set Topology. (3) F

Topological spaces, metric spaces, compactness, connectedness, local properties, product and decomposition spaces, mappings, covering properties, and separation properties. Prerequisite: MAT 371 or 410 or instructor approval.

MAT 511 Point Set Topology. (3) S

Continuation of MAT 510. Prerequisite: MAT 510 or instructor approval.

MAT 520 Numerical Linear Algebra. (3) F

Direct solution of linear systems, iterative methods, eigenvalues and eigenvectors, singular value decomposition, the QR algorithm, error propagation, arithmetic, and stability. Prerequisites: MAT 342 and 423 (or 421) or instructor approval.

MAT 521 Iterative Methods. (3) S

Numerical methods for solving linear/nonlinear systems of equations (symmetric, non-symmetric). Iterative methods for linear systems, conjugate gradients, multigrid methods, preconditioning, Krylov methods. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 523 Numerical Optimization. (3) N

Linear programming, unconstrained nonlinear minimization, line search algorithms, conjugate gradients, quasi-Newton methods, constrained nonlinear optimization, gradient projection, and penalty methods. Prerequisite: MAT 342 or 371 or 460 or 520 (or equivalent) or instructor approval.

MAT 524 Parallel Numerical Algorithms. (3) N

Algorithms for massively parallel, hypercube architectures; "parallel" FORTRAN; solution of linear, nonlinear systems; partial differential equations; iterative methods; multigrid; domain decomposition. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 526 Numerical Solution of Bifurcation Problems. (3) N

Nonlinear parameter-dependent differential, algebraic equations, numerical solutions; bifurcation, turning points; continuation methods, branch switching; steady-state, time-dependent cases; Hopf Bifurcation. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 530 Numerical Solution of Ordinary Differential Equations. (3) F

One step, linear multistep methods; consistency, order, stability, convergence; discretization, roundoff errors, error estimation, adaptive strategy; implementation, software for nonstiff equations. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 531 Numerical Solution of Stiff Differential Systems. (3) S

Runge-Kutta methods, order conditions, construction of highly stable methods, order stars, error estimation, stepsize selection, contractivity properties, linear multistep methods. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 533 Computational Elliptic and Parabolic Partial Differential Equations. (3) F

Parabolic and elliptic equations, finite difference, finite element methods, stability, consistency, convergence, practical aspects, applications, software. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 534 Computational Hyperbolic Partial Differential Equations. (3) S

Numerical solutions of hyperbolic PDEs, finite difference methods, well-posedness, stability, consistency, convergence, adaptive grids; Maxwell's equations, elastic wave propagation; Navier-Stokes. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 535 Spectral Methods for Partial Differential Equations. (3) N

Spectral, pseudo-spectral theory; Galerkin, collocation methods; Tau-methods, global approximation properties, stability; convergence; solutions for linear, nonlinear systems. Prerequisites: MAT 371 and 423 (or 421) or instructor approval.

MAT 543 Abstract Algebra. (3) F

Groups, modules, rings and fields, Galois theory, homological algebra, and the representation theory. Prerequisite: MAT 444 or instructor approval.

MAT 544 Abstract Algebra. (3) S

Continuation of MAT 543. Prerequisite: MAT 543 or instructor approval.

MAT 550 Variational Methods. (3) F

Calculus of variations and its applications to extremal problems, classical mechanics, and partial differential equations. Prerequisites: MAT 274 and 462 or equivalents.

MAT 551 Linear Operators and Integral Equations. (3) S

Bounded linear and compact operators on Hilbert spaces. Linear integral equations, Fredholm and Hilbert-Schmidt theory, and approximate methods. Distributions. Prerequisites: MAT 242 and 462 or equivalents.

MAT 555 Fractal Geometry. (3) N

Geometry and analysis of fractal sets; definitions of dimensions; calculating dimensions; projections, products of fractals; random fractals; multifractal measures; and applications. Prerequisites: MAT 371, 455. MAT 472 is recommended.

MAT 570 Real Analysis. (3) S
Lebesgue integration, selected function spaces, differentiation, abstract measure theory, and elements of functional analysis. Prerequisite: MAT 372 or instructor approval.

MAT 571 Real Analysis. (3) F
Continuation of MAT 570. Prerequisite: MAT 570 or instructor approval.

MAT 572 Complex Analysis. (3) F
Analytic functions, series and product representations, entire and meromorphic functions, normal families, Riemann mapping theorem, harmonic functions, and Riemann surfaces. Prerequisite: MAT 371 or instructor approval.

MAT 573 Complex Analysis. (3) S
Continuation of MAT 572. Prerequisite: MAT 572 or instructor approval.

MAT 574 Theory of Ordinary Differential Equations. (3) N
Systems, existence proofs, singularities, asymptotic behavior of solutions, boundedness of solutions, eigenvalues and eigenfunctions, and perturbation theory. Prerequisite: MAT 372 or instructor approval.

MAT 575 Theory of Ordinary Differential Equations and Dynamical Systems. (3) N
Geometric approach to ODEs and dynamical systems; (un)stable, center manifolds; structural stability; normal forms; averaging; chaos; persistence. May be repeated for credit with instructor approval. Prerequisites: MAT 452 and 475 or MAT 574 or instructor approval.

MAT 576 Theory of Partial Differential Equations. (3) N
Existence and uniqueness theorems, boundary value and initial value problems, characteristics, Green's functions, maximum principle, distributions, and weak solutions. Prerequisite: knowledge of Lebesgue integration or instructor approval.

MAT 577 Theory of Partial Differential Equations. (3) N
Continuation of MAT 576. Prerequisite: MAT 576 or instructor approval.

MAT 578 Functional Analysis. (3) N
Locally convex, normed, and Hilbert spaces. Linear operators, spectral theory, and application to classical analysis. Prerequisite: MAT 472 or 571 or instructor approval.

MAT 579 Functional Analysis. (3) N
Continuation of MAT 578. Prerequisite: MAT 578 or instructor approval.

MAT 591 Seminar. (1–3) N
Topics may be selected from the following:
(a) Algebra
(b) Analysis
(c) Applied Mathematics
(d) Combinatorial Mathematics
(e) Mathematical Logic
(f) Numerical Analysis
(g) Topology

MATHEMATICS EDUCATION (MTE)

MTE 180 Theory of Elementary Mathematics. (3) F, S, SS
Number systems, intuitive geometry, elementary algebra, and measurement. Intended for prospective elementary school teachers. Prerequisite: MAT 117 or equivalent.

MTE 181 Theory of Elementary Mathematics. (3) A
Continuation of MTE 180. Prerequisite: MTE 180 or instructor approval.

MTE 380 Arithmetic in the Elementary School. (3) A
Historical numeration systems, overview of elementary number theory, including primes, factorization, divisibility, bases, modular systems, linear congruence, and continued fractions. Prerequisite: MTE 181 or instructor approval.

MTE 381 Geometry in the Elementary School. (3) N
Informal geometry, including concepts of length, area, volume, similarity, and congruence. Classification of figures, straightedge and compass constructions, and motion geometry. Prerequisite: MTE 380 or instructor approval.

MTE 480 Mathematics in the Upper-Elementary Grades I. (3) N
An introduction to probability and statistics, including open-ended data gathering and processing, counting techniques, sampling strategies, estimation, and decision making. Prerequisite: MTE 381 or instructor approval.

MTE 481 Mathematics in the Upper-Elementary Grades II. (3) N
Elementary functions and their applications. A thorough investigation of some of the algorithms of basic arithmetic. Prerequisite: MTE 480 or instructor approval.

MTE 482 Methods of Teaching Mathematics in Secondary School. (3) F, SS
Examination of secondary school curricular material and analysis of instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Prerequisite: instructor approval.

MTE 483 Mathematics in the Secondary School. (3) S, SS
Topics in geometry, number theory, algebra, and analysis. Emphasis on unifying principles. Prerequisite: MAT 310 or instructor approval.

MTE 582 Modern Mathematics for Teachers. (3) N
Theory of sets, real number system, transfinite numbers, and other selected topics. Prerequisite: instructor approval.

MTE 583 Abstract Algebra for Teachers. (3) N
Postulational approach to algebra and elementary mathematical systems, including groups and fields. Prerequisite: instructor approval.

MTE 585 Modern Geometry for Teachers. (3) A
Euclidean, projective, and non-Euclidean geometries. Prerequisite: instructor approval.

MTE 587 Analysis for Teachers. (3) N
Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

MTE 588 Analysis for Teachers. (3) N
Continuation of MTE 587. Prerequisite: MTE 587 or instructor approval.

STATISTICS AND PROBABILITY (STP)

STP 226 Elements of Statistics. (3) F, S, SS
Basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling, and correlation. Not open to majors in mathematics or the physical sciences. Prerequisite: MAT 114 or 117 or equivalent. *General Studies: N2.*

STP 326 Intermediate Probability. (3) F, S
Probability models and computations, joint and conditional distributions, moments, and families of distributions. Topics in stochastic processes, simulation, and statistics. Prerequisite: MAT 210 or equivalent. *General Studies: N2.*

STP 420 Introductory Applied Statistics. (3) F, S, SS
Introductory probability, descriptive statistics, sampling distributions, parameter estimation, tests of hypotheses, chi-square tests, regression analysis, analysis of variance, and non-parametric tests. Prerequisite: MAT 117 or equivalent. *General Studies: N2.*

STP 421 Probability. (3) F
Laws of probability, combinatorial analysis, random variables, probability distributions, expectations, moment generating functions, transformations of random variables, and central limit theorem. Prerequisites: MAT 300 and STP 420 or equivalents.

STP 425 Stochastic Processes. (3) S
Markov chains, stationary distributions, pure jump processes, 2D order processes, and other topics in stochastic processes. Prerequisites: MAT 342; STP 421.

STP 427 Mathematical Statistics. (3) S
Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisite: STP 421.

STP 429 Experimental Statistics. (3) S
Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 or equivalent. *General Studies: N3.*

STP 525 Advanced Probability. (3) N
Measure-theoretic foundations of probability, distribution functions and characteristic functions, laws of large numbers and central limit theorems, conditional probabilities, martingales, and topics in stochastic processes. Prerequisites: MAT 571 and STP 421 or instructor approval.

STP 526 Theory of Statistical Linear Models. (3) F
Multinomial distribution, distribution of quadratic forms, full and nonfull rank models, generalized inverses, unbalanced data, variance components, and the large sample theory. Prerequisites: STP 427; knowledge of matrix algebra.

STP 530 Applied Regression Analysis. (3) F
Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 or equivalent.

STP 531 Applied Analysis of Variance. (3) S

Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance, and multiple comparisons. Prerequisite: STP 420 or equivalent.

STP 532 Applied Nonparametric Statistics. (3) F

One sample test, tests of 2 or more related or independent samples, measures of correlation, and tests of trend and dependence. Prerequisite: STP 420 or equivalent.

STP 533 Applied Multivariate Analysis. (3) S

Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 or equivalent.

STP 534 Applied Discrete Data Analysis. (3) N

Models for discrete and count data, measures of association, and log-linear and regression models for contingency tables. Prerequisite: STP 420 or equivalent.

STP 535 Applied Sampling Methodology. (3) S

Simple random, stratified, cluster sampling; variance estimation in complex surveys; nonparametric superpopulation approaches; nonresponse models; computational methods. Prerequisite: STP 420 or equivalent.

STP 591 Seminar. (1–3) N

Topics may be selected from the following:

- (a) Probability
(b) Statistics

Department of Microbiology

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Chair

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PROFESSORS

BURKE, JACOBS,
MOSSMAN, SCHMIDT

ASSOCIATE PROFESSORS

BIRGE, HOFFMAN, MISRA

ASSISTANT PROFESSORS

BLOOM, CHANG, STOUT

CLINICAL FACULTY

DOWNS, LEFEVRE, MASS, ROBERTS

MICROBIOLOGY—B.S.

The B.S. degree in Microbiology consists of a minimum of 41 semester hours in microbiology and approved related fields. Students majoring in Mi-

crobiology are required to take the following courses:

BIO 181	General Biology <i>SI/S2</i>	4
BIO 182	General Biology <i>S2</i>	4
BIO 340	General Genetics	4
Choose between the two combinations of courses below		
CHM 231	Elementary Organic Chemistry <i>SI/S2</i> (3) ¹	3
CHM 235	Elementary Organic Chemistry Laboratory <i>SI/S2</i> (1) ¹	1
CHM 361	Principles of Biochemistry (3)	3
CHM 367	Elementary Biochemistry Laboratory (1)	1
— or —		
CHM 331, 332	General Organic Chemistry (6)	6
CHM 335, 336	General Organic Chemistry Laboratory (2)	2
MIC 206	Microbiology Laboratory <i>S2</i> ²	1
MIC 220	Biology of Microorganisms ...	3
MIC 302	Advanced Bacteriology Laboratory <i>L2</i> ³	2
MIC 360	Bacterial Physiology	3
MIC 401	Research Paper <i>L2</i> ³	1
Total		30

¹ Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

² Both MIC 205 and 206 must be taken to secure S2 credit.

³ Both MIC 302 and 401 must be taken to secure L2 credit.

A minimum of 11 semester hours of upper-division electives in microbiology or approved related fields must be taken.

These elective hours must include two courses chosen from the following:

MIC 421	Experimental Immunology	2
MIC 470	Bacterial Diversity and Systematics	4
MIC 494	Clinical Bacterial Laboratory	3
MIC 495	Undergraduate Research	2
MIC 498	Techniques in Molecular Biology Laboratory	2

In addition, students are required to fulfill the university numeracy requirements with MAT 210 (or 270 or 290) as their N1 course and BIO 420 (or any CSE course that meets the N3 requirement). The required supplemental courses are as follows:

CHM 113	General Chemistry <i>SI/S2</i>	4
CHM 115	General Chemistry with Qualitative Analysis <i>SI/S2</i>	5
PHY 111, 112	General Physics <i>SI/S2</i> *	6
PHY 113, 114	General Physics Laboratory <i>SI/S2</i> *	2
Total		17

* Both PHY 111 and 113 or PHY 112 and 114 must be taken to secure S1 or S2 credit.

CLINICAL LABORATORY SCIENCES—B.S.

The goal of the Clinical Laboratory Sciences degree program is to prepare individuals to practice in the field of clinical laboratory sciences, which includes the major disciplines of clinical chemistry, hematology, immunohematology, and microbiology. Employment opportunities exist in hospital, private, physician, and research laboratories and in government, sales, management, and education. After obtaining a B.S. degree in Clinical Laboratory Sciences, the graduate is eligible for national certification by examination.

A student majoring in Clinical Laboratory Sciences is required to take 40 hours of clinical laboratory sciences courses. Also required are the following courses:

BIO 360	Basic Physiology	4
CHM 113	General Chemistry <i>SI/S2</i>	4
CHM 231	Elementary Organic Chemistry <i>SI/S2</i> ¹	3
CHM 361	Principles of Biochemistry	3
MIC 205	Microbiology <i>S2</i> ²	3
	or MIC 220 Biology of Microorganisms (3)	
MIC 206	Microbiology Laboratory <i>S2</i> ²	1
Total		18

¹ Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

² Both MIC 205 and 206 must be taken to secure S2 credit.

Equivalent courses may be substituted upon approval of an advisor. Students must consult with the clinical laboratory sciences advisor to select general electives courses. Completion of the degree is dependent upon acceptance of the student into the accredited professional study program, which con-

sists of 40 hours of clinical laboratory sciences courses. The university does not guarantee all students to be accepted into the professional study program due to space limitations at the clinical affiliates and restrictions of program accreditation. For more information on acceptance procedures and program standards, contact the department for a program brochure. For proper course planning, students must meet with a clinical laboratory sciences advisor.

MINOR IN MICROBIOLOGY

The minor in Microbiology consists of a minimum of 24 semester hours. Required courses are as follows:

BIO	181	General Biology <i>S1/S2</i>	4
BIO	182	General Biology <i>S2</i>	4
BIO	340	General Genetics	4
MIC	206	Microbiology Laboratory <i>S2</i> ¹	1
MIC	220	Biology of Microorganisms ...	3
MIC	302	Advanced Bacteriology Laboratory <i>L2</i> ²	2
MIC	360	Bacterial Physiology	3
Total			21

¹ Both MIC 205 and 206 must be taken to secure S2 credit.

² Both MIC 302 and 401 must be taken to secure L2 credit.

The remaining upper-division microbiology courses are chosen in consultation with an advisor. Students majoring in Biology may not minor in Microbiology.

GRADUATE PROGRAMS

The faculty in the Department of Microbiology offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. Consult the *Graduate Catalog* for requirements.

The department participates in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology. Consult the *Graduate Catalog* for courses, faculty, and program information or call 602/965-0743 for more information.

CLINICAL LABORATORY SCIENCES/ MEDICAL TECHNOLOGY (CLS)

CLS 100 Introduction to Clinical Laboratory Sciences. (1) F
Introduction to the field of clinical laboratory sciences. Required for Clinical Laboratory Sciences majors.

Enrollment for the following CLS classes is restricted to students admitted to the Clinical Laboratory Sciences Professional Study Program.

CLS 310 Principles of Clinical Chemistry I. (6) S

Theory and application of principles of clinical chemistry, with emphasis on laboratory techniques, pathophysiology, methods of analysis, and assessment of procedure. 3 hours lecture, 9 hours lab.

CLS 320 Principles of Clinical Microbiology I. (6) S

Emphasizes disease mechanisms, isolation, and identification of medically significant fungi and bacteria. Includes principles of laboratory safety and quality control. 3 hours lecture, 9 hours lab.

CLS 330 Principles of Clinical Hematology I/Body Fluids. (3) F

Theory and application of principles in hematology, with emphasis on techniques to evaluate blood dyscrasias and analyze body fluids. 2 hours lecture, 3 hours lab.

CLS 410 Principles of Clinical Chemistry II. (2) SS

Continuation of 310, with emphasis on principles of automation, laboratory computers, and method evaluation. 1 hour lecture, 3 hours lab.

CLS 411 Advanced Applications of Clinical Chemistry. (4) F

Clinical application of theory/techniques from Principles of Clinical Chemistry I and II. Emphasis on operation of common laboratory instrumentation, clinical correlation, and radioimmunoassay. Minimum 180 hours practicum.

CLS 420 Principles of Microbiology II. (2) SS

Disease mechanisms and identification of medically significant parasites. Mycobacteria, Actinomycetes, Chlamydia, Rickettsia, Mycoplasma, and viruses. 1 hour lecture, 3 hours lab.

CLS 421 Advanced Applications of Clinical Microbiology. (4) S

Practical laboratory application of the principles of specimen collection, processing, detection, identification, and antimicrobial testing of medically significant bacteria, fungi, and parasites. Minimum 180 hours practicum.

CLS 430 Principles of Clinical Hematology II/Hemostasis. (3) F

Theory and applications of principles in hematology with emphasis on etiology, pathophysiology, clinical manifestations, and treatment of blood dyscrasias/hemostatic defects. 2 hours lecture, 3 hours lab.

CLS 431 Advanced Applications of Clinical Hematology. (4) S

Practical laboratory application of methods/techniques used to evaluate and diagnose blood dyscrasias/hemostatic defects. Applied techniques in body fluid analysis. Minimum 180 hours practicum.

CLS 440 Principles of Clinical Immunology/Immunohematology. (4) F

Theoretical and practical application of clinical immunology and immunohematology. Emphasizes serological techniques that aid disease diagnosis and blood donor selection. 3 hours lecture, 3 hours lab.

CLS 441 Advanced Applications of Clinical Immunology/Immunohematology. (3) S
Practical laboratory application of the principles of serological methods used in diagnosing disease and selecting blood components for transfusion therapy. Minimum 135 hours practicum.

CLS 450 Principles of Clinical Laboratory Administration. (2) F, S

Principles of management, with emphasis on the clinical laboratory. Basic management process, personnel supervision, identification, and allocation of resources. *General Studies: L2 (if credit also earned in CLS 460).*

CLS 460 Principles of Clinical Laboratory Education. (1) S

Principles of learning, with application to the development of instructional objectives, strategies, and evaluation for teaching-learning situations in the laboratory. *General Studies: L2 (if credit also earned in CLS 450).*

MICROBIOLOGY (MIC)

MIC 205 Microbiology. (3) F, S, SS

Basic course for persons without credit in BIO 181, emphasizing general principles; role of microorganisms in health, ecology, and applied fields. May not be used for Microbiology major credit unless a diagnostic test is passed. Prerequisites: BIO 100 (or PLB 108) and CHM 101 or instructor approval. *General Studies: S2 (if credit also earned in MIC 206).*

MIC 206 Microbiology Laboratory. (1) F, S, SS

Principles and laboratory techniques used in identifying and handling microorganisms. 3 hours lab. Pre- or corequisite: MIC 205 or 220. *General Studies: S2 (if credit also earned in MIC 205).*

MIC 220 Biology of Microorganisms. (3) F, S

Basic course for persons with credit in BIO 181. Detailed study of microbial cells, their structure, genetics, physiology, and taxonomy. Corequisites: BIO 182; CHM 115.

MIC 302 Advanced Bacteriology Laboratory. (2) F, S

Advanced laboratory techniques in bacterial growth, physiology, genetics, microscopy, and basic virology. Required of Microbiology majors. 4 hours lab. Prerequisites: completion of L1 requirement and either A or B. (A) MIC 206 and 220 or (B) MIC 205 and 206 and instructor approval. *General Studies: L2 (if credit also earned in MIC 401).*

MIC 360 Bacterial Physiology. (3) F, S
Mechanisms and control of cell metabolism, structures, and functions. Prerequisite: MIC 220. Pre- or corequisite: CHM 361 or instructor approval.

MIC 380 Medical Parasitology. (3) F
Parasitic diseases of humans, including life cycle events and clinical manifestations. Prerequisite: MIC 205 or 220.

MIC 381 Pathogenic Microbes. (3) S
Host-microbial interactions in infectious disease, with emphasis on pathogenesis, host defenses, and molecular mechanisms of microbial virulence. Prerequisite: MIC 360 or 6 hours of microbiology with instructor approval.

MIC 401 Research Paper. (1) F, S, SS

A paper of 15 or more pages based on library or laboratory research in collaboration with a faculty member. Required of all Microbiology majors. Prerequisites: MIC 302; completion of L1 requirement. *General Studies: L2 (if credit also earned in MIC 302).*

MIC 420 Immunology: Molecular and Cellular Foundations. (3) F

Molecular and cellular foundations of immunology. Antibody/antigen interactions, cellular response, cytokines, immunogenetics, immunoregulation, autoimmunity, psychoneuroimmunology research/medical perspectives. Prerequisites: CHM 231 (or 331) and MIC 205 (or 220) or instructor approval.

MIC 421 Experimental Immunology. (2) F, S

An introduction to the basic techniques, methods, and assays used in immunology. 6 hours lab. Prerequisites: CHM 231 and 331 and MIC 302 or instructor approval.

MIC 425 Advanced Immunology. (3) F, S 2001

A survey of recent advances in immunology, including lymphocyte membranes, lymphokines/biochemistry, molecular genetics, theoretical immunology, immunoregulation, neuroimmunology, and immunologic diseases. Prerequisite: MIC 420 or instructor approval.

MIC 441 Bacterial Genetics. (3) S

Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: BIO 340 and MIC 205 (or 220) or instructor approval.

MIC 442 Bacterial Genetics Laboratory. (1) N

Techniques of mutagenesis, mapping, and strain construction. 4 hours lab. Prerequisites: MIC 206, 302. Pre- or corequisite: MIC 441.

MIC 470 Bacterial Diversity and Systematics. (4) F

Biology, classification, and enrichment culture of the nonpathogenic bacteria. 2 hours lecture, 6 hours lab. Prerequisite: MIC 302.

MIC 485 General Virology. (3) F

Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: BIO 340 and CHM 331 or instructor approval.

MIC 486 General Virology Laboratory. (2) N

An introduction to the growth, assay, and detection of viruses. 6 hours lab. Prerequisite: MIC 302. Pre- or corequisite: MIC 485.

MIC 495 Undergraduate Research. (1-6) F, S, SS

Supervised research in microbiology. May be repeated for credit. Lab. Prerequisites: MIC 206, 220, 302; instructor approval.

MIC 527 Neuroimmunology. (3) S 2000

Studying mind's influence on immunity and the immune system's influence on the mind, neuroimmunologic diseases, and the neuroimmunological circuitry involved. Seminar. Prerequisite: MIC 420 or instructor approval.

MIC 545 Recombinant DNA Methodology. (3) N

Principles of genetic engineering using in vitro DNA recombination; characteristics of plasmid and phage vectors; recombinant selection and physical characterization. Prerequisites: BIO 443; MIC 441; instructor approval.

MIC 546 Recombinant DNA Laboratory. (2) N

Basic techniques in isolation of chromosomal, plasmid, and bacteriophage DNA; transformation; gene-splicing methods. Corequisite: MIC 545.

MIC 581 Molecular Mechanism of Pathogenesis. (3) S 2000

Pathogenic mechanisms and host responses in viral and/or bacterial diseases. Prerequisites: MIC 381 and 420 or instructor approval.

MIC 585 Molecular Virology. (3) N

Selected topics concerning molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

MIC 591 Seminar. (1-3) F, S

Topics may be selected from the following:

- Bacterial Ecology
- Current Research in Microbiology
- Enzymology
- Genetic Engineering
- Genetics
- Immunology
- Molecular Virology
- Neuroimmunology
- Pathogenic Bacteriology

Department of Military Science

Army ROTC

Lt. Col. Wylie K. Bearup
Chair
(MAIN 240) 602/965-3318

PROFESSORS

BEARUP, COX, DALGLEISH

ASSISTANT PROFESSORS

BLEDSOE, DENT, MASSEY,
POOLE, ROBERTS

INSTRUCTORS

ANDREWS, GRIFFIN,
KNOLL, LANE, MAATTA,
RINGENOLDUS, STEVENS

PURPOSE

The Department of Military Science curriculum consists of the basic course (MIS 101, 102, 201, and 202) and the advanced course (MIS 301, 302, 401, and 402). The goal of this professional education curriculum is to prepare students with leadership potential to be commissioned as U.S. Army officers. Objectives include developing the following characteristics in the students: leadership and managerial skills; the ability to think creatively; the ability to speak and write effectively; appreciation of the requirements for national security; and an understanding of the nature and functions of the U.S. Army.

Upon successful completion of the advanced course and graduation, qualified students receive commissions in the Active Army (on a competitive basis), U.S. Army Reserve, or Army National Guard.

In addition to the military science curriculum, core courses in the field of national defense studies are both an integral and parallel source of the department's program. Integrally, they provide MIS courses at all levels with topical intensity and highlight such professionally related areas as military technology; weapons procurement; national intelligence, secrecy, and counterintelligence; civil-military relations; security coalitions and regional defense communities; national, regional, and global levels of strategy; generalship skill-in-action; deterrence dynamics and structure; military doctrine; service-branch livelihood, appropriations rivalry, and interservice cooperation; personnel recruitment, morale, training, advancement, and bureaucratic organization; military reform; threat and threat perception; military-historical experience and analogy; media and biographical insights; the rationale and matrices of security analysis and research; and independently selectable topics.

The department also fields an independent but parallel set of 400-level courses in the areas of geostrategic, politico-strategic, and national defense policy and analysis—available to students irrespective of Reserve Officers' Training Corps (ROTC) status, departmental major, or college affiliation—for assigned credit toward General Studies, social science, and global awareness requirements for graduation. (See catalog qualifications for course 499 Independent Study, page 56.)

GENERAL QUALIFICATIONS

Basic Course. Any student who is enrolled in ASU (or approved by the professor of military science) can enter into military science basic classes. It is strongly recommended that the student be in good physical shape because some of the curriculum requires physical exertion.

Advanced Course. Any student who is enrolled in ASU (or approved by the professor of military science) may participate in military science advanced classes. However, to be fully enrolled

in the advanced course and compete for and obtain a commission in the U.S. Army, students must meet the following requirements:

1. be a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. be of sound physical condition and pass the U.S. Army physical fitness test;
3. meet the required professional military educational requirements; and
4. be at least 17 years of age for entrance into the advanced course and be able to complete all commissioning requirements before age 27.

Only those students in the basic and advanced courses who meet the required standards according to military regulations are eligible to receive financial assistance through the U.S. Army. Faculty of the Department of Military Science are available during normal office hours to answer questions or provide counseling.

The following are various options open to students who wish to obtain a commission in the U.S. Army. Contact the Department of Military Science personnel for more information.

Four-Year Program. Students may enroll in Army ROTC during their freshman year. They take the basic course during the first two years, receiving a total of 12 semester hours of credit for four semesters of study. Upon satisfying the requirements, they enter the advanced course, where they earn 12 additional semester hours for four semesters of study. Students are also required to attend a five-week advanced summer camp at Fort Lewis, Washington, between their junior and senior years. All commissioned officers must meet certain Professional Military Education requirements by completing courses in English, math, and computer literacy. Selected majors such as nursing, engineering, and architecture, among others, may require an additional semester or two, or summer school, to complete all requirements for a degree and commission without excessive course overloads. Upon successful completion of the advanced

course and requirements for a degree, students are commissioned as second lieutenants in the Active Duty Army, U.S. Army Reserve, or Army National Guard.

Two-Year Program. Students must have at least two academic years of college work remaining, either at the undergraduate or graduate level. The student must also have reached academic junior status. This program is open to all students with the exception of three- and four-year Army ROTC scholarship winners (see “Scholarship Programs” on this page). Students seeking enrollment in the two-year program should make application during the spring semester of the calendar year in which they desire to enter the program. They must provide SAT/ACT scores and pass the Army physical fitness test. After successfully completing a paid five-week basic camp, students may enroll in the advanced course. (The camp is conducted during June and July at Fort Knox, Kentucky.) Students who have previous military experience or who are currently members of the National Guard or Reserves may be admitted directly into the two-year program, provided they are academic juniors. They then follow the same program and meet the same requirements as stated for advanced course students in the four-year program.

Qualifications for Admittance to the Advanced Course. The following qualifications are required for admittance to the advanced course:

1. successful completion of the basic course for the students in the four-year ROTC program; for the students in the two-year program, selection for and completion of the six-week basic summer camp or prior military service;
2. score at least 850 on SAT or 19 on ACT;
3. passing the Army physical examination;
4. achieving and maintaining the minimum cumulative GPA required for graduation in the student’s selected major, but no less than 2.00;
5. attainment of at least junior class standing; and

6. maintenance of full-time student status.

Pay and Allowances. Each advanced course student receives one-half the pay of a second lieutenant during attendance at the six-week advanced camp. Uniforms, housing, and meals are provided at camp without cost to the students, and they are reimbursed at the current mileage rate for travel to and from the camp. Students who attend basic camp receive the pay of an army recruit during attendance at basic camp as well as the current mileage rate for travel to and from the camp. All students in the advanced course, regardless of scholarship status, are paid about \$1,500.00 tax-free for each of these two years.

Simultaneous Membership Program. Under this program, ROTC students may simultaneously be members of the Army Reserves or the National Guard. The combination of advance course allowance and pay for Army Reserve or National Guard participation provides more than \$1,250.00 for each semester’s involvement.

Scholarship Programs. The Army ROTC offers scholarship programs for outstanding young men and women who are motivated toward a career as professional officers in the U.S. Army. These scholarships are awarded in varying amounts for tuition. In addition, the scholarship pays \$150.00 per month subsistence allowance and \$225.00 each semester for textbooks and supplies. A scholarship for four years is available to freshmen who enter the four-year program. Applications must be submitted in accordance with a schedule furnished by high school counselors. Selection is made on a nationwide basis. Scholarships are also available for three- and two-year periods, commencing with the sophomore and junior years of ROTC respectively. Applications are open to all students in good standing with the university; previous ROTC or military experience is not required for application for three- and two-year scholarships. Selection is made by a review board at the national level. Acceptance of any of the three scholarship programs requires a service commitment to serve in the Active

Army for a period of up to four years after commissioning and graduation.

Active Duty Requirements. Graduates of Army ROTC may serve as officers in the Active Army, Army National Guard, or Army Reserves. Active duty commitments may vary from four years to as little as three months. Scholarship students have up to a four-year active duty commitment.

Graduate and Professional Studies Programs. A delay from call to active duty for up to four years is available to outstanding students who desire to earn graduate or professional degrees. Special programs for graduate and professional studies are available to both Regular Army appointees and U.S. Army Reserve appointees in the following areas: medicine, osteopathy, and clinical psychology.

MILITARY SCIENCE (MIS)

MIS 101 Introduction to the Military. (3) F Overview of mission, organization, and structure of the Army and its role in national defense; discussion of current military issues. 3 hours lecture/conference, 2 hours lab.

MIS 102 Land Navigation, First Aid, and Survival. (3) S Introduction to military maps and land navigation; first aid, and lifesaving techniques; basic outdoor survival skills. 3 hours lecture/conference, 2 hours lab.

MIS 201 American Military History. (3) F A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference, 2 hours lab.

MIS 202 Introduction to Leadership Dynamics. (3) S Introduction to interpersonal dynamics involved in military team operations; theory and application of military leadership principles. 3 hours lecture/conference, 2 hours lab.

MIS 205 ROTC Basic Camp. (4) SS Six-week training program emphasizing practical hands-on skills and leadership development. Taken in lieu of MIS 101, 102, 201, 202. Conducted at Fort Knox, Kentucky.

MIS 301 Advanced Military Science I. (3) F Theory and dynamics of the individual soldier and military units in offensive combat operations. 2 hours lecture-conferences, 1.5 hours of Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalents. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 302 Advanced Military Science II. (3) S Theory and dynamics of military units in defensive combat operations. 2 hours lecture-conferences, 1.5 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalents. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 303 ROTC Advanced Camp. (4) SS Six-week training program emphasizing leadership development and advanced military skills, including tactics, land navigation, and physical training. Conducted at Fort Lewis, Washington. Prerequisites: MIS 301, 302.

MIS 401 Advanced Military Science III. (3) F The military legal system; preparation and conduct of military training; leadership development; ethics and professionalism of the military officer. 3 hours lecture-conferences, 2 hours Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 402 Advanced Military Science IV. (3) S Military correspondence; career planning and personal affairs in service; conduct of training; leadership development; ethics and professionalism of the military officer. 3 hours lecture, 2 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Physical Education Activity (Army Master Fitness).

MIS 410 American Defense Policy I. (3) F Evolution, organization, and execution of U.S. national security policy. *General Studies: SB.*

MIS 412 American Defense Policy II. (3) S Contemporary problems and analytical issues in the formation and implementation of U.S. national security. Prerequisite: MIS 410. *General Studies: SB.*

MIS 414 Comparative Defense Policy Analysis. (3) F Historical problems and analytical issues in the evolution, organization, application, and control of effective military establishments in various political systems. *General Studies: SB.*

MIS 416 Soviet/C.I.S. Foreign and Defense Policies. (3) S Analysis of foreign and security policies of the Soviet Union/C.I.S. and of the successor states to the Warsaw Pact. *General Studies: SB.*

MIS 499 Independent Study: National Defense Analysis. (1-3)

Molecular and Cellular Biology

Bertram L. Jacobs
Director, Executive Committee
602/965-0743
lsvl.la.asu.edu/mcb

GRADUATE PROGRAMS

The interdisciplinary M.S. and Ph.D. degrees with a major in Molecular and Cellular Biology are administered by the Interdisciplinary Committee on Molecular and Cellular Biology. The participating faculty are drawn primarily from four core departments (the De-

partments of Biology, Chemistry and Biochemistry, Microbiology, and Plant Biology), with additional faculty from the Departments of Anthropology and Physics and Astronomy.

For more information, contact the director or refer to the *Graduate Catalog*.

MOLECULAR AND CELLULAR BIOLOGY (MCB)

See the *Graduate Catalog* for the MCB courses.

Department of Philosophy

Brad Armendt
Chair
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www.asu.edu/clas/philosophy

REGENTS' PROFESSOR MURPHY

PROFESSORS

CREATH, FITCH, HUMPHREY,
MAIENSCHIN, WHITE

ASSOCIATE PROFESSORS

ARMENDT, BLACKSON, COHEN,
de MARNEFFE, GULESERIAN,
KOBES, MCGREGOR, REYNOLDS

ASSISTANT PROFESSORS

COWLES, DELANEY

PHILOSOPHY—B.A.

The major in Philosophy consists of 45 semester hours, 33 of which must be upper-division hours. In addition to the 45 semester hours, the mathematics proficiency requirement must be met by completing MAT 117 or higher. In exceptional cases, up to nine units may be in related fields as approved by the undergraduate advisor. Required courses are as follows:

PHI	301	History of Ancient Philosophy <i>HU, H</i>	3
PHI	302	History of Modern Philosophy <i>HU, H</i>	3
PHI	305	Ethical Theory <i>HU</i>	3
PHI	312	Theory of Knowledge <i>HU</i>	3
		or PHI 314 Philosophy of Science <i>HU</i> (3)	
PHI	316	Metaphysics <i>HU</i>	3
		or PHI 317 Philosophy of Mind <i>HU</i> (3)	
PHI	333	Introduction to Symbolic Logic	3

PHI 350 Philosophical Argument and Exposition L2	3
Total	21

Also required are at least two of the following courses:

PHI 401 Rationalism	3
PHI 402 Empiricism HU	3
PHI 403 Contemporary Analytic Philosophy HU	3
PHI 413 Advanced Symbolic Logic	3
PHI 420 Topics in Philosophy	3
PHI 494 Special Topics	3

Exceptions by special permission of the chair only. PHI 420 may be taken more than once.

Students planning to do graduate work in philosophy should consult an advisor to develop an appropriate selection of courses at the 300 and 400 levels. A minimum grade of "C" is necessary for each course used to fulfill the major requirements. See "Major Requirements," page 306.

History and Philosophy of Science.

The faculty in the Department of Philosophy offer courses bearing the HPS prefix. With the consent of the director of undergraduate studies, these courses may be taken to satisfy the requirements of the Philosophy major.

MINOR IN PHILOSOPHY

A minor in Philosophy consists of 18 semester hours, of which at least 12 must be in the upper division and approved by an advisor in the department. All courses must be passed with a minimum grade of "C."

GRADUATE PROGRAM

The faculty in the Department of Philosophy offer a graduate program leading to the M.A. degree that prepares one for either teaching in a community college or pursuing a Ph.D. degree in Philosophy. Consult the *Graduate Catalog* for requirements.

HISTORY AND PHILOSOPHY OF SCIENCE (HPS)

HPS 322 History of Science. (3) F
Development and application of scientific thinking from ancient times through the 17th century. *General Studies: HU, H.*

HPS 323 History of Science. (3) S
Development and application of scientific thinking from the 18th century to the present. *General Studies: HU, H.*

HPS 325 History of Chinese Science. (3) S
Explores development of traditional Chinese science in the context of Chinese thought and society and in comparison with developments elsewhere. Lecture, discussion. Cross-listed as HIS 309.

HPS 330 History of Biology: Conflicts and Controversies. (3) A
Focuses on the 19th and 20th centuries, considering biology as a discipline, evolution, and problems of heredity, development, and cell theory. Cross-listed as BIO 316. *General Studies: H.*

HPS 331 History of Medicine. (3) A
Scientific study of the human body, changing theories of disease, evolution of practical opinions on treatment, and the emerging institutionalization of medical practice. Students may receive credit for this course and BIO 218. Cross-listed as BIO 318. *General Studies: H.*

HPS 402 Technology, Society, and Human Values. (3) A
Values that motivate humankind to create technology. Areas of conflict and resolution of conflict between values and technology. Readings and discussions with visiting lecturers. Prerequisite: junior standing.

HPS 410 Professional Values in Science. (2–3) A
Considers issues related to values in science such as collaboration, finances, legal issues, media, mentoring, ownership of ideas, scientific integrity. Discussion, student projects. Cross-listed as BIO 416. *General Studies: L2.*

PHILOSOPHY (PHI)

PHI 101 Introduction to Philosophy. (3) F, S, SS
Exploration of issues that philosophers have traditionally considered, including morality, reality, and knowledge. *General Studies: HU.*

PHI 103 Principles of Sound Reasoning. (3) F, S, SS
Fallacies, validity, and soundness of arguments. May include syllogistic, elementary symbolic, inductive logic, and scientific method. Prerequisite: ENG 101. *General Studies: L1/HU.*

PHI 301 History of Ancient Philosophy. (3) F
History of western philosophy from its beginnings through the Hellenistic period. *General Studies: HU, H.*

PHI 302 History of Modern Philosophy. (3) S
History of western philosophy from the Renaissance through Kant. *General Studies: HU, H.*

PHI 304 Existentialism. (3) N
Covers such topics as absurdity, authenticity, the meaning of life and death, responsibility, and subjectivity. May include readings in phenomenology. *General Studies: HU.*

PHI 305 Ethical Theory. (3) A
Current theories about the nature of morality (metaethics) and about what is right and wrong (normative ethics). Prerequisite: PHI 306 or 307 or instructor approval. *General Studies: HU.*

PHI 306 Applied Ethics. (3) F, S, SS
Philosophical discussion of contemporary moral and political issues, such as abortion, euthanasia, animal rights, affirmative action, and sexual rights. *General Studies: HU.*

PHI 307 Philosophy of Law. (3) A
Nature and source of law and its relation to morality. Legal rights, legal enforcement of morals, civil disobedience, liability and responsibility, punishment, judicial reasoning, justice, property, and differences between theories of natural and positive law. *General Studies: HU.*

PHI 308 Philosophy of Art. (3) A
Central problems in philosophy of art, e.g., the nature of a work of art, modern and traditional theories of art, aesthetic perception and experience, and objectivity and relativity in art criticism. *General Studies: HU.*

PHI 309 Social and Political Philosophy. (3) A
Alternative principles and methods relevant to problems of human association and conflict; justice and power, freedom and equality, and autonomy and order are discussed. Prerequisite: PHI 305 or instructor approval. *General Studies: HU.*

PHI 310 Environmental Ethics. (3) A
Examination of a full range of philosophical positions pertaining to our moral relationship to the natural world; anthropocentrism, individualism, biocentrism. *General Studies: HU.*

PHI 311 Philosophy in Literature. (3) A
Selected works of literature introduce philosophical problems such as the nature of moral goodness and people's relation to the world and other people. *General Studies: HU.*

PHI 312 Theory of Knowledge. (3) A
Nature, sources, and limits of human knowledge. Topics may include truth, a priori knowledge, empirical knowledge, perception, induction, and skepticism. Prerequisite: 1 course from among PHI 101, 103, 301, 302, 333, 350. *General Studies: HU.*

PHI 314 Philosophy of Science. (3) A
The structure and justification of scientific theories, explanation, and theory change. The roles of observation and laws, theoretical concepts and entities, reduction, probability, confirmation, space and time, and causation. *General Studies: HU.*

PHI 315 Philosophy of Language. (3) A
Problems pertaining to the nature of language, including meaning, reference, truth, definition, analyticity, translatability, synonymy, and contributions of contemporary linguistics. Prerequisite: PHI 103 or 333 or 350. *General Studies: HU.*

PHI 316 Metaphysics. (3) A
Problems pertaining to the nature of reality. Topics may include nature of person, minds, substance, universals, space, time, causation, and modality. Prerequisite: 1 course from among PHI 101, 103, 301, 333, 350. *General Studies: HU.*

PHI 317 Philosophy of Mind. (3) A
Nature of consciousness. The common sense view of mind, behaviorism, materialism, dualism, functionalism, self-knowledge, and knowledge of other minds. Prerequisite: 1 course from among PHI 101, 103, 301, 302, 333, 350. *General Studies: HU.*

PHI 318 Philosophy of Religion. (3) A
Classical arguments for the existence of God. The argument from evil against the existence of God. Justification of religious belief. *General Studies: HU.*

PHI 319 Philosophy of Computing. (3) N
Philosophical problems surrounding the theory of computation. Ethics and epistemology of computing, mind and AI, neural network computing, turing machines. Lecture, lab, discussion. *General Studies: N3/HU.*

PHI 325 Philosophy of Social Science. (3) N
Philosophical problems surrounding the aims, structure, and methods of the social sciences. *General Studies: HU/SB.*

PHI 332 19th-Century Philosophy. (3) N
The history of 19th-century philosophical thought, emphasizing either the German or the British traditions. Prerequisite: PHI 302. *General Studies: HU.*

PHI 333 Introduction to Symbolic Logic. (3) A
Symbolic techniques, emphasizing deductions and proofs in the propositional and first order predicate calculi.

PHI 335 History of Ethics. (3) A
Major works of moral philosophy, both ancient and modern, such as those by Plato, Aristotle, Hobbes, Hume, Kant, and Mill. Prerequisite: PHI 101 or 306 or 307 or instructor approval. *General Studies: HU.*

PHI 350 Philosophical Argument and Exposition. (3) S
The development of techniques of philosophical argument and exposition. Frequent written exercises. Course content may vary with instructor. Prerequisites: major; instructor approval. *General Studies: L2.*

PHI 401 Rationalism. (3) N
Examination of classical philosophical rationalism, as in Descartes, Spinoza, Malebranche, or Leibniz. Contemporary rationalist thought may also be examined. Prerequisites: PHI 302; 1 course from among PHI 305, 309, 312, 316, 317.

PHI 402 Empiricism. (3) N
Examination of representatives of either classical or contemporary philosophical empiricism, e.g., Bacon, Hobbes, Locke, Butler, Berkeley, Reid, Hume, Mill, Carnap, and Ayer. Prerequisites: PHI 302 and 305 (or 309 or 312 or 316 or 317). *General Studies: HU.*

PHI 403 Contemporary Analytic Philosophy. (3) A
Aims and methods of such 20th-century philosophers as Frege, Moore, Russell, Wittgenstein, Carnap, Ayer, Wisdom, Ryle, Austin, Strawson, Quine, and Sellars, with application to metaphysics and epistemology. Prerequisites: PHI 302; 1 course from among PHI 312, 314, 315, 316, 317, 401, 402. *General Studies: HU.*

PHI 413 Advanced Symbolic Logic. (3) N
Properties of formal systems axiomatizing propositional and 1st-order predicate logic. May also include modal logic, number theory, and limits of logicism. Prerequisite: PHI 333.

PHI 420 Topics in Philosophy. (3) A
Course descriptions on file in department. Topics may be selected from the following:
(a) History of Philosophy
(b) Metaphysics/Epistemology
(c) Philosophy of Language/Logic
(d) Philosophy of Science
(e) Value Theory
Courses may be repeated for credit. Prerequisite: one relevant upper-division PHI course or instructor approval.

PHI 591 Seminar. (1–3) A
Topics may be selected from the following:
(a) Aesthetics
(b) Epistemology
(c) Ethics
(d) History of Philosophy
(e) Logic
(f) Metaphysics
(g) Philosophy of Language
(h) Philosophy of Law
(i) Philosophy of Science
(j) Social and Political Philosophy

Department of Physics and Astronomy

Howard G. Voss

Chair

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www.asu.edu/clas/dopa/dopa.html

REGENTS' PROFESSOR SPENCE

PROFESSORS

BAUER, BENNETT, BURSTEIN,
COMFORT, COWLEY, DOAK, DOW,
HANSON, HESTENES, JACOB,
KAUFMANN, LINDSAY, NIGAM,
PAGE, REZ, RITCHIE, SANKEY,
SCHEINFEIN, SMITH, STARRFIELD,
TILLERY, TSEN, TSONG, VENABLES,
VOSS, WINDHORST, WYCKOFF

ASSOCIATE PROFESSORS

AANNESTAD, ACHARYA, ALARCON,
BENIN, CHAMBERLIN, CULBERTSON,
HERBOTS, HESTER, MARZKE,
MENENDEZ, SCHMIDT

PHYSICS—B.S.

Students majoring in Physics may pursue one of two options.

Option I. Designed for students who wish to pursue physics at the bachelor or graduate degree levels, option I consists of the following required courses:

PHY 150	Physics I	4
	or PHY 121 University Physics I: Mechanics S1/S2 (3) ¹ and PHY 122 University Physics Laboratory I S1/S2 (1) ¹	
PHY 151	Physics II S1/S2	4
	or PHY 131 University Physics II: Electricity and Magnetism S1/S2 (3) ² and PHY 132 University Physics Laboratory II S1/S2 (1) ²	
PHY 201	Mathematical Methods in Physics I	3
PHY 252	Physics III S1/S2	4
PHY 302	Mathematical Methods in Physics II	2
PHY 310	Classical Particles, Fields, and Matter I	3
PHY 311	Classical Particles, Fields, and Matter II	3
PHY 314	Quantum Physics I	3
PHY 315	Quantum Physics II	3
PHY 333	Electronic Circuits and Measurements	3
PHY 334	Advanced Laboratory I	2
PHY 412	Classical Particles, Fields, and Matter III	3
PHY 416	Quantum Physics III	3
PHY 441	Statistical and Thermal Physics I	3
PHY 465	Advanced Laboratory II	2
Total		45

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Supporting mathematics courses are as follows:

	Choose between the two combinations of MAT courses below	12 or 10
MAT 270	Calculus with Analytic Geometry I NI	4
MAT 271	Calculus with Analytic Geometry II	4
MAT 272	Calculus with Analytic Geometry III	4
	— or —	
MAT 290	Calculus I NI	5
MAT 291	Calculus II	5

Additional courses in physics and related fields are selected with the approval of the advisor. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Option II. The interdisciplinary option II is designed for students who wish to obtain an undergraduate physics preparation for entry into other professions or graduate programs. A total of 53 hours are required, including the following courses:

Choose between the two combinations of MAT courses
 below 12 or 10

MAT 270	Calculus with Analytic Geometry I <i>NI</i> (4)	
MAT 271	Calculus with Analytic Geometry II (4)	
MAT 272	Calculus with Analytic Geometry III (4)	
— or —		
MAT 290	Calculus I <i>NI</i> (5)	
MAT 291	Calculus II (5)	

PHY 150	Physics I 4	
	or PHY 121 University Physics I: Mechanics <i>SI/S2</i> (3) ¹ and PHY 122 University Physics Laboratory I <i>SI/S2</i> (1) ¹	
PHY 151	Physics II <i>SI/S2</i> 4	
	or PHY 131 University Physics II: Electricity and Magnetism Physics <i>SI/S2</i> (3) ² and PHY 132 University Physics Laboratory II Physics <i>SI/S2</i> (1) ²	
PHY 201	Mathematical Methods in Physics I 3	
PHY 252	Physics III <i>SI/S2</i> 4	
PHY 302	Mathematical Methods in Physics II 2	
PHY 310	Classical Particles, Fields, and Matter I 3	
PHY 311	Classical Particles, Fields, and Matter II 3	
PHY 314	Quantum Physics I 3	
PHY 315	Quantum Physics II 3	
PHY 333	Electronic Circuits and Measurements 3	
PHY 334	Advanced Laboratory I 2	
PHY 412	Classical Particles, Fields, and Matter III 3	
PHY 441	Statistical and Thermal Physics I 3	
Total	..... 52 or 50	

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

The remaining courses are selected from physics and an area of concentration as approved by the student's advisor. Examples of possible areas of concentration are astronomy, astrophysics, materials science, physical chemistry,

applied mathematics, geophysics, biological physics, philosophy of science, scientific journalism, and premedical and prelaw programs. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Emphasis in Astronomy

The astronomy faculty offer courses in astronomy both for nonscience majors and for science and physics majors. For an emphasis in astronomy, the following courses (or their equivalents) should be taken:

AST 321	Introduction to Planetary and Stellar Astrophysics <i>SI/S2</i> ¹ 3
AST 322	Introduction to Galactic and Extragalactic Astrophysics <i>SI/S2</i> ² 3
AST 421	Astrophysics I 3
AST 422	Astrophysics II 3
AST 499	Independent Study 3
Total	..... 15

¹ Both AST 113 and 321 must be taken to secure S1 or S2 credit.
² Both AST 114 and 322 must be taken to secure S1 or S2 credit.

MINOR IN ASTRONOMY

The minor in Astronomy consists of a minimum of 24 semester hours. Required courses are as follows:

AST 113	Astronomy Laboratory I <i>SI/S2</i> ¹ 1
AST 114	Astronomy Laboratory II <i>SI/S2</i> ² 1
AST 321	Introduction to Planetary and Stellar Astrophysics <i>SI/S2</i> ² ... 3
AST 322	Introduction to Galactic and Extragalactic Astrophysics <i>SI/S2</i> ² 3
PHY 150	Physics I 4
	or PHY 121 University Physics I: Mechanics <i>SI/S2</i> (3) ³ and PHY 122 University Physics Laboratory I <i>SI/S2</i> (1) ³
PHY 151	Physics II <i>SI/S2</i> 4
	or PHY 131 University Physics II: Electricity and Magnetism <i>SI/S2</i> (3) ⁴ and PHY 132 University Physics Laboratory II <i>SI/S2</i> (1) ⁴
PHY 252	Physics III <i>SI/S2</i> 4
Approved electives	..... 4
Total	..... 24

¹ Both AST 113 and 321 must be taken to secure S1 or S2 credit.

² Both AST 114 and 322 must be taken to secure S1 or S2 credit.
³ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
⁴ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Electives are chosen with the approval of an astronomy advisor from upper-division courses in physics and astronomy.

MINOR IN PHYSICS

The minor in Physics consists of a minimum of 29 semester hours. Required courses are as follows:

PHY 150	Physics I 4
	or PHY 121 University Physics I: Mechanics <i>SI/S2</i> (3) ¹ and PHY 122 University Physics Laboratory I <i>SI/S2</i> (1) ¹
PHY 151	Physics II <i>SI/S2</i> 4
	or PHY 131 University Physics II: Electricity and Magnetism <i>SI/S2</i> (3) ² and PHY 132 University Physics Laboratory II <i>SI/S2</i> (1) ²
PHY 201	Mathematical Methods in Physics I 3
PHY 252	Physics III <i>SI/S2</i> 4
PHY 302	Mathematical Methods in Physics II 2
PHY 310	Classical Particles, Fields, and Matter I 3
PHY 311	Classical Particles, Fields, and Matter II 3
PHY 314	Quantum Physics I 3
Approved electives	..... 4
Total	..... 30

¹ Both PHY 121 and 122 must be taken to secure S1 or S2 credit.
² Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Electives are chosen with the approval of the physics advisor from upper-division courses in physics and astronomy.

SECONDARY EDUCATION—B.A.E.

Physics. Two options are available for physics as the major teaching field. *Option One.* The major teaching field consists of 42 semester hours. Required courses are as follows:

PHY 150	Physics I ¹ 4 or PHY 121 University Physics I: Mechanics S1/S2 (3) ² and PHY 122 University Physics Laboratory I S1/S2 (1) ²	PHY 151	Physics II S1/S2 ¹ 4 or PHY 131 University Physics II: Electricity and Magnetism S1/S2 (3) ³ and PHY 132 University Physics Laboratory II S1/S2 (1) ³
PHY 151	Physics II S1/S2 ¹ 4 or PHY 131 University Physics II: Electricity and Magnetism S1/S2 (3) ³ and PHY 132 University Physics Laboratory II S1/S2 (1) ³	PHY 201	Mathematical Methods in Physics I ⁴ 3
PHY 201	Mathematical Methods in Physics I 3	PHY 252	Physics III S1/S2 ¹ 4
PHY 252	Physics III S1/S2 ¹ 4	PHY 302	Mathematical Methods in Physics II 2
PHY 302	Mathematical Methods in Physics II 2	PHY 310	Classical Particles, Fields, and Matter I 3
PHY 310	Classical Particles, Fields, and Matter I 3	PHY 311	Classical Particles, Fields, and Matter II 3
PHY 311	Classical Particles, Fields, and Matter II 3	PHY 333	Electronic Circuits and Measurements 3
PHY 333	Electronic Circuits and Measurements 3	PHY 361	Introductory Modern Physics 3 or PHY 314 Quantum Physics I (3)
PHY 361	Introductory Modern Physics 3 or PHY 314 Quantum Physics I (3)	PHY 480	Methods of Teaching Physics ⁵ 3 or PHY 484 Internship: Physics Teaching (3)
PHY 480	Methods of Teaching Physics 3 or PHY 484 Internship: Physics Teaching (3)	Total	..... 32
Approved electives	..... 10		
Total	..... 42		

¹ PHY 111, 112, 113, and 114 or equivalents may be substituted for PHY 150, 151, and 252 on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

Electives are chosen in physics or other closely related fields, subject to the approval of the advisor.

Option Two. The interdisciplinary 60-hour option two consists of 30 semester hours in physics and an additional 30 semester hours in either chemistry (see page 321) or mathematics (see page 362). The physics portion of this program requires the following courses:

PHY 150	Physics I ¹ 4 or PHY 121 University Physics I: Mechanics S1/S2 (3) ² and PHY 122 University Physics Laboratory I S1/S2 (1) ²
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PHY 151	Physics II S1/S2 ¹ 4 or PHY 131 University Physics II: Electricity and Magnetism S1/S2 (3) ³ and PHY 132 University Physics Laboratory II S1/S2 (1) ³
PHY 201	Mathematical Methods in Physics I ⁴ 3
PHY 252	Physics III S1/S2 ¹ 4
PHY 302	Mathematical Methods in Physics II 2
PHY 310	Classical Particles, Fields, and Matter I 3
PHY 311	Classical Particles, Fields, and Matter II 3
PHY 333	Electronic Circuits and Measurements 3
PHY 361	Introductory Modern Physics 3 or PHY 314 Quantum Physics I (3)
PHY 480	Methods of Teaching Physics ⁵ 3 or PHY 484 Internship: Physics Teaching (3)
Total	..... 32

¹ PHY 111, 112, 113, and 114 or equivalents may be substituted for PHY 150, 151, and 252 on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

⁴ Physics/Math option: MAT 274 plus MAT 342 may be substituted for PHY 201.

⁵ Physics/Chemistry: CHM 480 may be substituted for PHY 480.

Minor Teaching Field. The minor teaching field consists of 24 semester hours. Required courses are as follows:

PHY 150	Physics I ¹ 4 or PHY 121 University Physics I: Mechanics S1/S2 (3) ² and PHY 122 University Physics Laboratory I S1/S2 (1) ²
PHY 151	Physics II S1/S2 ¹ 4 or PHY 131 University Physics II: Electricity and Magnetism S1/S2 (3) ³ and PHY 132 University Physics Laboratory II S1/S2 (1) ³
PHY 201	Mathematical Methods in Physics I 3
PHY 252	Physics III S1/S2 ¹ 4
PHY 314	Quantum Physics I 3 or PHY 361 Introductory Modern Physics (3)

PHY 480	Methods of Teaching Physics 3 or PHY 484 Internship: Physics Teaching (3)
Approved Elective	..... 3
Total	..... 24

¹ PHY 111, 112, 113, and 114 may be substituted for PHY 150, 151, and 252, or equivalents, on approval of the advisor.

² Both PHY 121 and 122 must be taken to secure S1 or S2 credit.

³ Both PHY 131 and 132 must be taken to secure S1 or S2 credit.

The remaining hours are selected from upper-division courses in physics or astronomy (including AST 113 and 114), subject to approval of the advisor.

GRADUATE PROGRAMS

The faculty in the Department of Physics and Astronomy offer programs leading to the degrees of Master of Natural Science, M.S., and Ph.D. Consult the *Graduate Catalog* for requirements.

ASTRONOMY (AST)

AST 111 Introduction to Solar Systems Astronomy. (3) F

History; properties of light; instruments; study of solar system and nearby stars. For non-science majors. Optional lab (AST 113). *General Studies: S1/S2 (if credit also earned in AST 113).*

AST 112 Introduction to Stars, Galaxies, and Cosmology. (3) S

Structure and evolution of stars; star clusters; galaxies; cosmology. For non-science majors. Optional lab (AST 114). *General Studies: S1/S2 (if credit also earned in AST 114).*

AST 113 Astronomy Laboratory I. (1) F
Astronomical observations and experiments designed to help the student become familiar with the sky, telescopes, and astronomical measurements. 2.5 hours lab. Pre- or corequisites: AST 111 (or 321); a working knowledge of high school algebra and geometry. *General Studies: S1/S2 (if credit also earned in AST 111 or 321).*

AST 114 Astronomy Laboratory II. (1) S
Similar to AST 113, but material chosen to supplement AST 112 and 322. 2.5 hours lab. Pre- or corequisites: AST 112 (or 322); a working knowledge of high school algebra and geometry. *General Studies: S1/S2 (if credit also earned in AST 112 or 322).*

AST 321 Introduction to Planetary and Stellar Astrophysics. (3) F

Physical laws; celestial mechanics; properties of planets, the sun, and other stars; formation and evolution of stars and planetary systems. Prerequisites: MAT 270 (or 290); PHY 150. *General Studies: S1/S2 (if credit also earned in AST 113).*

AST 322 Introduction to Galactic and Extragalactic Astrophysics. (3) S
Evolved stars; introduction to relativity; galaxies and interstellar matter; structure and dynamics of galaxies; cosmology. Prerequisite: AST 321 or instructor approval. *General Studies: S1/S2 (if credit also earned in AST 114).*

AST 421 Astrophysics I. (3) F
Aspects of observational astronomy; atomic properties of matter; stellar atmospheres; stellar structure, evolution; nucleosynthesis; compact objects; close binary systems. Prerequisites: AST 321; PHY 311, 314.

AST 422 Astrophysics II. (3) S
Interstellar medium; gaseous nebulae; shock waves; stellar dynamics; star clusters and stellar populations; galaxies and their evolution; cosmology. Prerequisites: AST 321; PHY 412.

PHYSICAL SCIENCES (PHS)

PHS 110 Fundamentals of Physical Science. (4) F, S

One-semester survey of the principles of physics and chemistry. Understanding of elementary algebra is presumed. 3 hours lecture, 2 hours lab. *General Studies: S1/S2.*

PHS 208 Patterns in Nature. (4) F, S
Project-oriented science course with computer training to develop critical thinking, and technical skills for student-oriented science lessons K-12. Lecture, lab. Cross-listed as STE 208. Prerequisite: college-level science course or instructor approval. *General Studies: S1/S2.*

PHYSICS (PHY)

PHY 101 Introduction to Physics. (4) F, S
Emphasizes applications of physics to life in the modern world. Understanding of elementary algebra is presumed. 3 hours lecture, 1 recitation, 2 hours lab. *General Studies: S1/S2.*

PHY 105 Basic Physics. (3) F
One-semester survey of the principles of physics. Primarily for students who intend to take PHY 121, 131 but have not taken high school physics. 3 hours lecture, 1 recitation. Prerequisites: algebra and trigonometry.

PHY 111 General Physics. (3) F, S, SS
Noncalculus treatment of the principles of physics for nonphysics majors. Students whose curricula require a laboratory course must also register for PHY 113. 3 hours lecture, 1 recitation. Prerequisite: trigonometry. *General Studies: S1/S2 (if credit also earned in PHY 113).*

PHY 112 General Physics. (3) F, S, SS
Continuation of PHY 111. Students whose curricula require a laboratory course must also register for PHY 114. Prerequisite: PHY 111. *General Studies: S1/S2 (if credit also earned in PHY 114).*

PHY 113 General Physics Laboratory. (1) F, S, SS
Elementary experiments in physics. 2 hours lab. Outside preparation for experiments and report writing are required. May be taken concurrently with, or subsequent to, PHY 111. *General Studies: S1/S2 (if credit also earned in PHY 111).*

PHY 114 General Physics Laboratory. (1) F, S, SS
See PHY 113. May be taken concurrently with, or subsequent to, PHY 112. *General Studies: S1/S2 (if credit also earned in PHY 112).*

PHY 121 University Physics I: Mechanics. (3) F, S, SS
Kinematics, Newton's laws, work, energy, momentum, conservation laws, dynamics of particles, solids, and fluids. 3 hours lecture, 1 hour recitation. Prerequisite: MAT 270 or 290 or instructor approval. *General Studies: S1/S2 (if credit also earned in PHY 122).*

PHY 122 University Physics Laboratory I. (1) F, S, SS
Lab accompanying PHY 121. Pre- or corequisite: PHY 121. *General Studies: S1/S2 (if credit also earned in PHY 121).*

PHY 131 University Physics II: Electricity and Magnetism. (3) F, S, SS
Electric charge and current, electric and magnetic fields in vacuum and in materials, and induction. AC circuits, displacement current, and electromagnetic waves. 3 hours lecture, 1 hour recitation. Prerequisites: MAT 271 (or 291 or instructor approval); PHY 121. Corequisite: MAT 272 or instructor approval. *General Studies: S1/S2 (if credit also earned in PHY 132).*

PHY 132 University Physics Laboratory II. (1) S, SS
Lab accompanying PHY 131. Pre- or corequisite: PHY 131. *General Studies: S1/S2 (if credit also earned in PHY 131).*

PHY 150 Physics I. (4) S
Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity. 3 hours lecture, 3 hours lab. Prerequisite: MAT 270 or 290 or equivalent.

PHY 151 Physics II. (4) F
Continuation of PHY 150. Electromagnetic fields; Ampere's and Faraday's Laws; Maxwell's equations; basic circuit elements. 3 hours lecture, 3 hours lab. Prerequisites: MAT 271 (or 291 or equivalent); PHY 121, 122 (or PHY 150). *General Studies: S1/S2*

PHY 190 Seminar: Physics as a Curriculum and a Profession. (1) F, S
Seminar for new Physics majors. Instruction and information on curriculum, departmental functions, and professional preparation. Weekly meetings and excursions. Pass/fail grading.

PHY 201 Mathematical Methods in Physics I. (3) S
Differential equations, linear equations, vectors, matrices, Fourier series, and numerical methods. 2 hours lecture, 2 hours lab. Prerequisite: MAT 272 or equivalent. Corequisite: PHY 252.

PHY 241 University Physics III. (3) F, S
Thermodynamics, kinetic theory, physical and wave optics, relativity, photons, matter waves, atomic physics. 3 hours lecture, 1 hour recitation. Prerequisites: PHY 131; nonmajor.

PHY 252 Physics III. (4) S
Continuation of PHY 151. Wave physics, oscillations, harmonic systems, physical optics, thermodynamics, kinetic theory. 3 hours lecture, 3 hours lab. Prerequisites: MAT 272 (or equivalent); PHY 131 and 132 (or PHY 151 or equivalent). Corequisite: PHY 201. *General Studies: S1/S2.*

PHY 302 Mathematical Methods in Physics II. (2) F
Continuation of PHY 201. Vector calculus, complex variables, partial differential equations, special functions, numerical methods. 1 hour lecture, 3 hours lab. Prerequisite: PHY 201 or equivalent.

PHY 310 Classical Particles, Fields, and Matter I. (3) F
Particle kinematics, mechanics, conservation laws, particle motion in force fields, dynamics of two-body systems, reference frames, rigid body motion, relativity. Corequisites: PHY 302 and 314 or instructor approval.

PHY 311 Classical Particles, Fields, and Matter II. (3) S 1999
Electrostatic and gravitational fields, Poisson and Laplace equations, dielectric materials, magnetic fields and materials, magnetic induction, Faraday's Law. Prerequisites: PHY 302, 310. Corequisite: PHY 315 or instructor approval.

PHY 314 Quantum Physics I. (3) F 1998
Photons, models of the atom, wave properties of matter, introduction to wave mechanics, 1-dimensional systems in quantum mechanics. Prerequisites: PHY 201 and 252 or equivalents. Corequisites: PHY 302 and 310 or instructor approval.

PHY 315 Quantum Physics II. (3) S
General principles of quantum mechanics, 3-dimensional problems, approximation methods, spin, introduction to many-particle systems. Prerequisites: PHY 302, 310, 314. Corequisite: PHY 311 or instructor approval.

PHY 333 Electronic Circuits and Measurements. (3) F, S
Basic principles of electronic circuit analysis and measurement techniques using modern instrumentation and computer-aided analysis of data. 1 hour lecture, 3 hours lab. Equivalent effort outside of the lab is required. Corequisite: PHY 201 or instructor approval.

PHY 334 Advanced Laboratory I. (2) S
Selected experiments from contemporary physics. Emphasis on modern instrumentation, computer-assisted acquisition and analysis of data, and report form writing. Lecture, lab. Prerequisites: PHY 310, 314, 333.

PHY 361 Introductory Modern Physics. (3) F, S
Special relativity and introductory quantum theory with applications drawn from atomic, nuclear, and solid-state physics. 3 hours lecture, 1 recitation. Prerequisite: PHY 131.

PHY 412 Classical Particles, Fields, and Matter III. (3) F
Electromagnetic fields of moving charges, Maxwell's equations, harmonic phenomena, oscillations, waves, electromagnetic radiation, covariant electromagnetism, introduction to general relativity. Prerequisites: PHY 311, 333. Corequisite: PHY 416 or instructor approval.

PHY 416 Quantum Physics III. (3) F
Introduction to the quantum theory of atoms, molecules, solids and nuclei, Dirac's equation. Prerequisites: PHY 311, 315. Corequisite: PHY 412 or instructor approval.

PHY 420 Research Paper. (1) F, S
Scientific report writing. Culminates in a paper based on library or laboratory research or both. Taken in conjunction with other courses as approved. Conference. Prerequisite: instructor approval. *General Studies: L2.*

PHY 441 Statistical and Thermal Physics I.

(3) F
Statistical and experimental basis of heat, temperature, and entropy. Mechanical and statistical basis of the laws of thermodynamics. Applications of macroscopic thermodynamics. Phase equilibrium. Prerequisites: PHY 311, 315.

PHY 442 Statistical and Thermal Physics II.

(3) S
Principles and applications of statistical mechanics. Quantum statistics of ideal gases and simple solids. Equilibrium of phases and chemical species. Transport theory. Irreversible processes and fluctuation. Prerequisite: PHY 441.

PHY 452 Physical Optics.

(3) F
Principles of reflection, refraction, diffraction. Additional topics from contemporary optics may include Fourier transform spectroscopy, linear systems theory, holography. 2 hours lecture, 2 hours lab. Prerequisites: PHY 302, 311, 315. Corequisite: PHY 412.

PHY 462 Nuclear and Particle Physics.

(3) S
Static properties of nuclei, natural and induced radioactivity, nuclear reactions, nuclear models and energy levels, mesons and hyperons, and interaction of photons and electrons with matter. Prerequisites: PHY 311, 315.

PHY 465 Advanced Laboratory II.

(2) F, S
Continuation of PHY 334. Students are encouraged to substitute laboratory research project in consultation with faculty sponsor. Prerequisite: PHY 334.

PHY 466 Advanced Laboratory III.

(1–3) F, S
Continuation of PHY 465. Prerequisite: PHY 465.

PHY 480 Methods of Teaching Physics.

(3) S
Evaluation of various approaches to the teaching of high school physics. Preparation of demonstrations and experiments. Organization of a laboratory. Designed for secondary school physics teachers. Prerequisite: instructor approval.

PHY 481 Solid-State Physics.

(3) S
Structure, elastic properties, and dynamics of crystals; electron motions in crystals under applied fields. Prerequisites: PHY 311, 315.

PHY 484 Internship: Physics Teaching.

(1–4) F, S, SS
Preparation for high school physics teaching. Student works closely with a faculty member in the elementary physics program. May be repeated for a total of 6 semester hours. Prerequisite: instructor approval.

PHY 495 Project Research.

(1–3) F, S
Supervised project in physics or astrophysics. May be repeated for credit. Prerequisite: instructor approval.

PHY 501 Methods of Theoretical Physics.

(3) F, S
Provides mathematical foundations for graduate students in basic and applied physics. Complex variables, vector spaces, operators, matrices, ordinary differential equations, integral equations and transforms, and special functions. May include additional topics.

PHY 502 Methods of Theoretical Physics.

(3) F, S
Continuation of PHY 501. Prerequisite: PHY 501.

PHY 521 Classical Mechanics.

(3) F
Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory.

PHY 523 Relativity.

(3) N
Special and general theories of relativity. Prerequisite: PHY 532 or instructor approval.

PHY 531 Advanced Electricity and Magnetism.

(3) F
Electrostatics and magnetostatics; potential theory and theory of constitutive relations; Maxwell's equations; the wave equation, plane electromagnetic waves, cavities, and wave guides.

PHY 532 Electrodynamics.

(3) S
Special theory of relativity, covariant formulation of electromagnetic interactions; inhomogeneous wave equations, Lienard-Wiechert potentials, and radiation fields; interactions of charged particles and electromagnetic waves, scattering, dispersion. Prerequisites: PHY 412 and 531 or instructor approval.

PHY 541 Statistical Physics.

(3) F
Probability theory and principles of statistical inference; evaluating experimental data; foundations of statistical mechanics; general laws of thermodynamics from microscopic theories; calculation of specific properties of bulk matter.

PHY 551 X-ray and Electron Diffraction.

(3) S
Fresnel and Fraunhofer diffraction in integral formulation; diffraction of X-rays and neutrons by crystal lattices; structures of solids, including crystal structure analysis; theory and techniques of electron microscopy/diffraction of crystalline/noncrystalline specimens. Prerequisite: PHY 481 or instructor approval.

PHY 561 Nuclear Physics.

(3) F, S
Two nucleon interaction, Clebsch-Gordon coefficients, internucleon forces, meson theory and high energy scattering, nuclear binding energy, nuclear models, transition probability estimates, nuclear reactions, and beta decay. Prerequisite: PHY 576 or instructor approval.

PHY 562 Nuclear Physics.

(3) F, S
Continuation of PHY 561. Prerequisite: PHY 561 or instructor approval.

PHY 568 Elementary Particle Physics.

(3) N
Classification of particles; phenomenology of strong, electromagnetic and weak interactions, cross sections, and decay rates; isotopic spin and higher symmetries; structure of reaction amplitudes. Prerequisite: PHY 577.

PHY 569 Elementary Particle Theory.

(3) N
Continuation of PHY 568. Prerequisite: PHY 568.

PHY 576 Quantum Theory.

(3) F, S
Abstract approach to quantum mechanics in Hilbert space; observables and their corresponding operators, eigenstates, and eigenvalues; quantum dynamics; approximation methods; systems of identical particles; angular momentum and group representation theory; collision processes; relativistic quantum theory. Prerequisite: PHY 521.

PHY 577 Quantum Theory.

(3) F, S
Continuation of PHY 576. Prerequisite: PHY 576.

PHY 578 Relativistic Quantum Theory.

(3) F, S
Relativistic 1-particle equations, Klein-Gordon equation, Dirac equation, 2d quantization, theory of scattering, S-matrix, Feynman diagrams, quantum electrodynamics, and renormalization procedures. Prerequisite: PHY 577.

PHY 579 Relativistic Quantum Theory.

(3) F, S
Continuation of PHY 578. Prerequisite: PHY 578.

PHY 581 Solid-State Physics.

(3) F
Quantum theory of solids, including phonons, lattice specific heats, band structure models, Fermi surfaces, thermal expansion, plasmons, electron-phonon interactions, and scattering by lattice defects. Pre- or corequisite: PHY 576.

PHY 582 Solid-State Physics.

(3) S
Elements of transport theory, thermal conduction, electronic conduction in metals, mobility in semiconductors, Hall effect, magnetoresistance, and selected topics of current research. Prerequisite: PHY 581.

PHY 587 Quantum Optics.

(3) F, S
Quantization of the electromagnetic field. Quantum theory of coherence, photon counting, photon states, lasers, density operators, and atomic Raman scattering. Prerequisite: PHY 576.

PHY 588 Quantum Optics.

(3) F, S
Continuation of PHY 587. Prerequisite: PHY 587.

Department of Plant Biology

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Chair

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PROFESSORS

BACKHAUS, KLOPATEK, NASH,
PINKAVA, SOMMERFELD,
TRELEASE, VERMAAS

ASSOCIATE PROFESSORS

CLARK, FRASCH, MARTIN, PIGG,
ROBERSON, STROMBERG, STUTZ,
SZAREK, TOWILL, WEBBER

ASSISTANT PROFESSORS

DAY, POGSON

ACADEMIC PROFESSIONALS

BINGHAM, LANDRUM,
LOBRUTTO, SHARP

PLANT BIOLOGY—B.S.

The Department of Plant Biology provides four curricular options to meet the needs of students whose interests are in rapidly expanding areas within the life sciences. Students may choose

the general program option which allows the opportunity to develop strength in one area or discipline. Others may choose to design a broader, but interdisciplinary program in one of the following three optional concentrations: environmental science and ecology, molecular biosciences/biotechnology, and urban horticulture.

Each concentration promotes interaction between diverse groups and captures the growing interdisciplinary nature of scientific investigations. When one of these options is chosen, the title will appear on transcripts and other university documents.

The four curricular options prepare students for careers in technical, industrial, and educational fields as well as professional degree programs in medicine or research and postgraduate education in the life sciences.

General Program

The B.S. degree in Plant Biology consists of 54 semester hours. The required major courses are as follows:

BIO	181	General Biology <i>SI/S2</i>	4
BIO	182	General Biology <i>S2</i>	4
BIO	320	Fundamentals of Ecology	3
		or PLB 350 Applied Genetics (4)	
BIO	353	Cell Biology	3
PLB	306	Plant Anatomy	4
PLB	308	Plant Physiology	4
PLB	484	Internship	3
		or PLB 499 Independent Study (3)	
Total			25

Additional biological or physical science elective courses, totaling 11 to 16 semester hours, are also required.

Required supplemental courses in chemistry are as follows:

CHM	113	General Chemistry <i>SI/S2</i>	4
CHM	115	General Chemistry with Qualitative Analysis <i>SI/S2</i>	5
Choose between the two combinations of organic chemistry courses below			
		4 or 8	
CHM	231	Elementary Organic Chemistry <i>SI/S2</i> (3)*	
CHM	235	Elementary Organic Chemistry Laboratory <i>SI/S2</i> (1)*	
— or —			
CHM	331, 332	General Organic Chemistry (6)	

CHM	335, 336	General Organic Chemistry Laboratory (2)	
Total			13 or 17

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

Courses meeting the university numeracy requirement are as follows:

MAT	210	Brief Calculus <i>N1</i>	3
Choose one of the three courses below:			
BIO	415	Biometry <i>N2</i>	4
PLB	430	Statistical Analyses in Environmental Science	3
PLB	432	Computer Applications in Biology <i>N3</i>	3

Special Concentration Programs

Three special concentration programs are optional. Students who wish to pursue the general program in Plant Biology are not obligated to choose one of these specific programs. Each special concentration program is expected to be interdisciplinary and contain course work outside both the department and the College of Liberal Arts and Sciences. Each concentration includes hands-on technical training.

Environmental Science and Ecology.

The B.S. degree in Plant Biology concentrating in environmental science and ecology consists of 60 semester hours. The required major courses are as follows:

BIO	320	Fundamentals of Ecology	3
Choose between the two combinations of Geology courses below			
		4	
GLG	101	Introduction to Geology I <i>SI/S2</i> (3) ¹	
GLG	103	Introduction to Geology Laboratory <i>SI/S2</i> (1) ¹	
— or —			
GLG	110	Environmental Geology <i>S2</i> (3) ²	
GLG	111	Environmental Geology Laboratory <i>S2</i> (1) ²	
GLG	362	Geomorphology	3
		or GLG 470 Hydrogeology (3)	
PLB	310	The Flora of Arizona	4
PLB	322	Environmental Science (Major)	3
PLB	420	Plant Ecology: Organisms and Populations	3
		or PLB 421 Plant Ecology: Communities and Ecosystems (3)	

PLB	484	Internship	3
		or PLB 499 Independent Study (3)	
Total			23

¹ Both GLG 101 and 103 must be taken to secure S1 or S2 credit.

² Both GLG 110 and 111 must be taken to secure S2 credit.

Additional biological or physical science elective courses, totaling 16 hours, are also required.

Required supplemental courses in biology and chemistry are as follows:

BIO	181	General Biology <i>SI/S2</i>	4
BIO	182	General Biology <i>S2</i>	4
CHM	113	General Chemistry <i>SI/S2</i>	4
CHM	115	General Chemistry with Qualitative Analysis <i>SI/S2</i> ...	5
CHM	231	Elementary Organic Chemistry <i>SI/S2</i> *	3
CHM	235	Elementary Organic Chemistry Laboratory <i>SI/S2</i> *	1
Total			21

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

Courses meeting the university numeracy requirement are as follows:

MAT	210	Brief Calculus <i>N1</i>	3
Choose one of the two courses below			
		3	
PLB	430	Statistical Analyses in Environmental Science (3)	
PLB	432	Computer Applications in Biology <i>N3</i> (3)	

Molecular Biosciences/Biotechnology. The B.S. degree in Plant Biology concentrating in molecular biosciences/biotechnology consists of 60 semester hours. The required major courses are as follows:

BIO	353	Cell Biology	3
PLB	340	Plant Cell Physiology	4
PLB	350	Applied Genetics	4
PLB	444	Plant Growth and Development	3
PLB	484	Internship	3
		or PLB 499 Independent Study (3)	
Total			17

Additional biological or physical science elective courses, totaling 11–14 hours, are also required.

Required supplemental courses in biology, chemistry, and physics are as follows:

BIO 181	General Biology <i>S1/S2</i>	4
BIO 182	General Biology <i>S2</i>	4
CHM 113	General Chemistry <i>S1/S2</i>	4
CHM 115	General Chemistry with Qualitative Analysis <i>S1/S2</i> ...	5
CHM 231	Elementary Organic Chemistry <i>S1/S2</i> ¹	3
CHM 235	Elementary Organic Chemistry Laboratory <i>S1/S2</i> ¹	1

Choose between any two combinations of courses below 4 or 8

CHM 361	Principles of Biochemistry (3)	
CHM 367	Elementary Biochemistry Laboratory (1)	
— or —		
CHM 461	General Biochemistry (3)	
CHM 462	General Biochemistry (3)	
CHM 467	General Biochemistry Laboratory <i>L2</i> (2) ²	
PHY 121	University Physics I: Mechanics	3
PHY 122	University Physics Laboratory I	1
Total		29 or 33

¹ Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

² Both CHM 464 and 467 must be taken to secure L2 credit.

Courses meeting the university numeracy requirement are as follows:

MAT 210	Brief Calculus for Life Sciences <i>N1</i>	3
Choose one of the two courses below 3-4		
BIO 406	Computer Applications in Biology <i>N3</i> (3)	
BIO 415	Biometry <i>N2</i> (4)	

Urban Horticulture. The B.S. degree in Plant Biology concentrating in urban horticulture consists of 54 semester hours. The required major courses are as follows:

PLB 260	Plants in Cities: Introduction to Urban Horticulture <i>S2</i>	4
PLB 362	Landscape Plants I	3
PLB 364	Urban Forestry	3
PLB 370	Landscape Practices	3
PLB 414	Plant Pathology <i>L2</i>	3
PLB 484	Internship	3
PLB 498	Special Topics in Urban Horticulture	1

Choose one of the three courses below 3-4

BIO 320	Fundamentals of Ecology (3)	
PLB 306	Plant Anatomy (4)	
PLB 308	Plant Physiology (4)	
Choose one of the three courses below 3		
PLB 366	Interiorscape (3)	
PLB 372	Turf Management (3)	
PLB 472	Greenhouse/Nursery Management (3)	

Total 26-27

Additional elective courses from other disciplines, totaling seven to eight hours, are also required.

Required supplemental courses in biology, chemistry, and soils are as follows:

BIO 181	General Biology <i>S1/S2</i>	4
BIO 182	General Biology <i>S2</i>	4
CHM 101	Introductory Chemistry	4
CHM 231	Elementary Organic Chemistry <i>S1/S2</i> *	3
CHM 235	Elementary Organic Chemistry Laboratory <i>S1/S2</i> *	1

Choose between the two combinations of courses below 4

ERS 130	Soils and Environmental Quality (4)	
— or —		
ERS 225	Soils (3)	
ERS 226	Soils Laboratory (1)	

Total 20

* Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

Courses meeting the university numeracy requirement are as follows:

MAT 210	Brief Calculus <i>N1</i>	3
Choose one of the three courses below 3-4		
BIO 415	Biometry <i>N2</i> (4)	
PLB 430	Statistical Analyses in Environmental Science (3)	
PLB 432	Computer Applications in Biology <i>N3</i> (3)	

PLANT BIOLOGY MINOR

The minor consists of a minimum of 24 semester hours. Required courses are as follows:

BIO 181	General Biology <i>S1/S2</i>	4
BIO 182	General Biology <i>S1/S2</i>	4
Choose one of the three courses below 4		
PLB 306	Plant Anatomy (4)	
PLB 308	Plant Physiology (4)	
PLB 310	Flora of Arizona (4)	

The remaining 12 hours are selected by the student through consultation with an academic advisor. Eight of these 12 hours must be in upper-division courses in the life sciences or other advisor-approved areas.

The minor can be designed after one of the four curricular options offered by the department. Courses not available for credit for majors in the life sciences cannot be used for the minor. Courses in the minor may not be used to count toward a major in the life sciences.

GRADUATE PROGRAMS

The faculty in the Department of Plant Biology offer programs leading to the degrees of M.S. and Ph.D. The faculty also participate in programs leading to the Master of Natural Science degree when one of the concentrations is plant biology. Select faculty collaborate with the faculty in the Departments of Biology, Chemistry and Biochemistry, and Microbiology in offering programs leading to the M.S. and Ph.D. degrees in Molecular and Cellular Biology. Other select faculty collaborate in the interdisciplinary concentration in ecology.

PLANT BIOLOGY (PLB)

PLB 108 Concepts in Plant Biology. (4) F, S, SS

Introduction to concepts of plant biology that are of human relevance using commercially important, edible, and medicinal plants as examples. Not for majors in the biological sciences. 3 hours lecture, 3 hours lab. *General Studies: S1/S2.*

PLB 300 Comparative Plant Diversity. (4) F Survey of major plant groups and other photosynthetic organisms. Emphasis on comparative data analysis, evolutionary inference, and phylogenetic methods. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent. *General Studies: L2/S2.*

PLB 302 Plants and Civilization. (3) F Plants and plant products used by people throughout the world. Cultivation, processing, and uses in modern life (beverages, fibers, foods, medicinals, and perfumes). Prerequisite: BIO 182 or PLB 108 or equivalent.

PLB 304 Biology of Algae and Fungi. (3) S Ecology, economics, and evolutionary diversity of the algae and fungi. Traditional and modern biotechnological uses. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 306 Plant Anatomy. (4) F

Development and mature structure of tissues of vascular plants; patterns and modifications of the leaf, stem, root, and the flower. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 308 Plant Physiology. (4) S 2000

Concepts of plant function: carbon metabolism, energy acquisition, regulation of growth and development, stress responses, and water and nutrient uptake. Prerequisites: BIO 182 (or equivalent); CHM 101 (or 115 or 231).

PLB 310 The Flora of Arizona. (4) S

Principles of taxonomy; identification of Arizona plants. 2 hours lecture, 6 hours lab. Prerequisite: BIO 182 or equivalent or instructor approval.

PLB 400 Lichenology. (3) S 1999

Chemistry, ecology, physiology, and taxonomy of lichens. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

PLB 402 Mycology. (3) S

Fungal morphology and systematics with an introduction to fungal cell biology, ecology, economic significance, and growth and development. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or MIC 206 or equivalent.

PLB 404 Phycology. (4) S

The algae (both fresh water and marine forms), emphasizing field collection and identification of local representatives. Morphological, ecological, and economic aspects of the algae. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

PLB 406 Vascular Plant Structure. (4) S 2000

Comparative form and evolutionary trends in the major groups of vascular plants. 3 hours lecture, 3 hours lab. Prerequisite: PLB 300 or equivalent.

PLB 407 Plant Fossils and Evolution. (4) S 1999

A broad survey of plant life of the past, including the structure of plant fossils, their geologic ranges, geographic distribution, and paleoenvironment. 3 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 182 or equivalent.

PLB 408 Pollen and Spores. (3) N

Significance of fossil and extant pollen, spores, and other palynomorphs to ecology, evolution, stratigraphy, and systematics. 2 hours lecture, 1 hour lab. Prerequisite: instructor approval.

PLB 410 Angiosperm Taxonomy. (3) S 2000

Principles underlying angiosperm phylogeny. 2 hours lecture, 3 hours lab. Prerequisite: PLB 370 or instructor approval.

PLB 411 Taxonomy of Southwestern Vascular Plants. (4) SS

Identification of the vascular plants of the Southwest and the principles underlying their classification. 3 hours lecture, 6 hours lab, 2 field trips. Not open to students who have had PLB 310.

PLB 412 Cytogenetics. (3) F 1999

Chromosomal basis of inheritance. Credit is allowed only for BIO 441 or PLB 412. Cross-listed as BIO 441. Prerequisite: BIO 340.

PLB 413 Cytogenetics Laboratory. (2) F 1999

Microscopic analysis of meiosis, mitosis, and aberrant cell division. 6 hours lab. Credit is allowed only for BIO 442 or PLB 413. Cross-listed as BIO 442. Pre- or corequisite: BIO 441 or PLB 412.

PLB 414 Plant Pathology. (3) F

Identification and control of biotic and abiotic factors that cause common disease problems to plants. Prerequisite: PLB 360. *General Studies: L2.*

ENVIRONMENTAL SCIENCE AND ECOLOGY**PLB 320 Environmental Science**

(Nonmajor). (3) F

Environmental and biological concepts used to understand ecological systems with specific references to problems caused by humans. Cannot be used for major credit in the biological sciences. Credit is allowed only for BIO 319 or PLB 320. Cross-listed as BIO 319. *General Studies: G.*

PLB 322 Environmental Science (Major).

(3) F

The nature of environmental and biological interaction: historical and modern examples. Field and laboratory techniques for quantification: supporting principles. 2 hours lecture, 3 hours lab. Prerequisites: BIO 182 or GLG 101 and 103 or GLG 110 and 111.

PLB 420 Plant Ecology: Organisms and Populations. (3) S 1999

Factors and controls on the physiological ecology and organization of plants and plant populations using empirical and theoretical approaches. 2 hours lecture, 2 hours lab. Prerequisite: BIO 320 or PLB 322 or equivalent.

PLB 421 Plant Ecology: Communities and Ecosystems. (3) S 2000

Plant community organization, field sampling techniques and the structure and function of terrestrial ecosystems emphasizing the role of vegetation. 2 hours lecture, 3 hours lab. Prerequisite: BIO 320 or PLB 322 or equivalent.

PLB 422 Plant Geography. (3) N

Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as GPH 425. Prerequisite: BIO 182 or GPH 111.

PLB 430 Statistical Analyses in Environmental Science. (3) S 2000

ANOVAS, 1-way classification of factorial and partially hierarchic designs; introductory multivariate statistics. 1 3-hour lecture at night. Prerequisite: MAT 210 or equivalent.

PLB 432 Computer Applications in Biology. (3) F

Computer analysis techniques in biology, emphasizing data entry, management and analysis, and graphic portrayal. Employs mainframe and microcomputers. Credit is allowed only for BIO 406 or PLB 432. Cross-listed as BIO 406. Prerequisites: BIO 182 and MAT 117 (or 210) or instructor approval. *General Studies: N3.*

PLB 434 Ecological and Landscape Modeling. (3) S 2000

Techniques of modeling ecological processes and systems using matrix and dynamic models with computer simulations. Prerequisite: BIO 420 or PLB 432 or equivalent.

PLB 520 Plant Structural Adaptation. (2-3) F 1998

Adaptive traits of leaf size/unique growth form on energy transfer efficiency; stomatal architecture and water-use efficiency; applications of stable isotopes. Prerequisite: BIO 320 or PLB 306 (or 308) or equivalent.

PLB 522 Plant Photosynthetic Adaptation.

(3) F 1999

Evolution and ecology of C_4 and CAM; adaptive traits improving competitive ability in natural environments; comparative physiology of desert plants. Prerequisite: PLB 308 or instructor approval.

PLB 524 Methods in Environmental Plant Physiology. (3) S 1999

Techniques to measure and quantify microclimate and mass transfer. Supporting principles. 2 hours lecture, 3 hours lab. Prerequisite: BIO 320 or PLB 308.

MOLECULAR BIOSCIENCES/ BIOTECHNOLOGY**PLB 340 Plant Cell Physiology.** (4) S 1999

Survey of structural and biochemical aspects of plant cell function and the relationships of cell function to whole plant processes. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182 (or equivalent); CHM 101 (or 115 or 231).

PLB 350 Applied Genetics. (4) F, S

Introduction to molecular genetics with emphasis on application of genetics in solving biological questions and engineering organisms in biotechnology. 2 hours lecture, 6 hours lab. Prerequisite: BIO 181 or equivalent.

PLB 352 Genetic Engineering and Society. (4) F

Introduction to genetic engineering, with emphasis on applications (gene therapy, DNA fingerprinting, bioremediation, transgenic animals and plants). Lecture, lab. Credit is allowed only for BIO 343 or PLB 352. Cross-listed as BIO 343. Prerequisite: BIO 181 or equivalent.

PLB 440 Photobiology. (3) F 1998

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Credit is allowed only for BIO 464 or PLB 440. Cross-listed as BIO 464. Prerequisites: CHM 231 (or 331); 12 hours of courses in life sciences.

PLB 442 Algal and Fungal Physiology. (3) N

Cellular physiology and biochemistry of algae and fungi; responses of these organisms to chemical and physical stimuli and their process of morphogenesis. Prerequisites: BIO 182 (or equivalent); CHM 231.

PLB 444 Plant Growth and Development. (3) S 1999

Molecular basis of development, role of signal transduction pathways/gene regulation in control of organ formation, pollination, germination and growth. Prerequisite: BIO 182 or instructor approval.

PLB 540 Plant Metabolism. (3) N

General plant metabolism and typical plant products, emphasizing biosynthesis and functions of storage products, cell wall constituents, plant acids, pigments, hormones, and numerous secondary products. Prerequisite: PLB 340 or CHM 231 or instructor approval.

PLB 550 Plant Molecular Biology. (2) S 2000

Biochemistry and molecular biology of plant organelles, including protein targeting, plant viruses, and molecular designs for plant improvements. Prerequisite: instructor approval.

PLB 552 Plant Genetic Engineering. (3) S 2000

Plant transformation utilization of transgenic plants, transient gene expression assays, and applications of plant genetic engineering. Prerequisite: instructor approval.

PLB 553 Plant Genetic Engineering Laboratory. (2) S 2000

Plant transformation, utilization of transgenic plants, transient gene expression assays, and applications of plant genetic engineering. 6 hours lab. Prerequisite: instructor approval.

PLB 558 Molecular Mechanisms of Photosynthesis. (3) S 2000

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as CHM 568. Prerequisite: instructor approval.

URBAN HORTICULTURE

PLB 260 Plants in Cities: Introduction to Urban Horticulture. (4) S

Principles and practices of horticulture, emphasizing development, growth, and propagation of horticultural plants and environmental factors that affect these processes. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or PLB 108. *General Studies: S2.*

PLB 360 Southwest Home Horticulture. (2) F, S

Multimedia course for nonmajors surveying contemporary topics in southwest home horticulture, including landscaping, flower and vegetable gardening, citriculture, interiorscaping, and others.

PLB 362 Landscape Plants I. (3) S

Identification, culture, and use of amenity plants in urban landscapes. Prerequisite: PLB 260 or equivalent.

PLB 363 Landscape Plants II. (3) S

Identification, culture, and use of amenity plants in urban gardens. Prerequisite: PLB 260 or equivalent.

PLB 364 Urban Forestry. (3) F

The establishment, care, and maintenance of ornamental trees, shrubs, and vines. Prerequisite: PLB 260 or equivalent.

PLB 366 Interiorscape. (3) F 1999

Identification, culture, and use of container-grown plants for interior environments. Prerequisite: PLB 260 or instructor approval.

PLB 370 Landscape Practices. (3) S 1999

Installation, irrigation, and maintenance of amenity plants in urban landscape with an emphasis on integrated landscaping technologies. 2 hours lecture, 3 hours lab. Prerequisite: PLB 260 or equivalent.

PLB 372 Turf Management. (3) N

Selection, establishment, and maintenance of turf grasses for lawn and sports areas. 2 hours lecture, 3 hours lab. Prerequisite: PLB 260 or equivalent.

PLB 472 Greenhouse/Nursery Management. (3) F 1998

Greenhouse structures, environment, and nursery operation. Includes irrigation, nutrition, and other principles relative to container-grown species. Prerequisites: ERA 325; PLB 370.

PLB 554 Plant Biotechnology. (3) N

Aseptic, clonal propagation of plants and in vitro culture of cells, organs, and tissues. 2 hours lecture, 3 hours lab. Prerequisite: PLB 308 or 340 or 370.

Department of Political Science

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KEATING

POLITICAL SCIENCE—B.A.

The B.A. degree in Political Science consists of 42 semester hours, of which 30 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Chicana and Chicano Studies, Economics, Geography, History, Psychology, and Sociology, and the African American Studies and the Women's Studies programs. At least 15 hours in political science must be in upper-division courses. The following courses are required:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	
POS 150	Comparative Government <i>SB, G</i>	3
	or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301	Empirical Political Inquiry <i>SB</i>	3
Total	.....	12

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of "C" or higher; no more than one "D" grade in a lower-division course may be counted in the major. See "Major Requirements," page 306. No more than six hours of POS 484 Internship may be applied to the major.

POLITICAL SCIENCE—B.S.

The B.S. degree in Political Science consists of 48 semester hours, of which 36 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Chicana and Chicano Studies, Economics, Geography, History, Psychology, and Sociology, and the African American Studies and the Women's Studies programs. At least 21 hours in political science must be in upper-division courses. The following courses are required:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	
POS 150	Comparative Government <i>SB, G</i>	3
	or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301	Empirical Political Inquiry <i>SB</i>	3
POS 401	Political Statistics <i>N2</i>	3
	Approved Electives	6
Total	.....	21

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of "C" or higher; no more than one "D" grade in a lower-division course may be counted in the major. See "Major Requirements," page 306. No more than six hours of POS 484 Internship may be applied to the major.

Asian Studies Certificate. Students majoring in Political Science may elect to pursue an Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," pages 307–308, for more information.

Latin American Studies Certificate.

Students majoring in Political Science may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 308, for more information.

MINOR IN POLITICAL SCIENCE

The minor in Political Science consists of 18 semester hours in political science courses, 12 hours of which must be upper-division courses. Students who minor in Political Science must have two courses from among the following:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	
POS 150	Comparative Government <i>SB, G</i>	3
POS 160	Global Politics <i>SB, G</i>	3

Students who minor in Political Science must have a minimum GPA of 2.00 for all courses that count toward the minor. Upper-division courses that count toward the minor must have a grade of "C" or higher; no more than one "D" in a lower-division course may be counted toward the minor. No more than three hours of POS 484 Internship and three hours of POS 499 Independent Study may be applied to the minor.

**SECONDARY EDUCATION—
B.A.E.**

Political Science. The major teaching field consists of 45 semester hours, 30 of which must be in political science and 15 in closely related fields. The following courses are required:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	
POS 150	Comparative Government <i>SB, G</i>	3
	or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301	Empirical Political Inquiry <i>SB</i>	3
POS 417	The Arizona Political System <i>SB</i>	3

POS 480	Methods of Teaching Government	3
Total	.....	18

Courses may be substituted for POS 417 and 480 with departmental approval.

Students who pursue this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper-division courses that count toward the major must have a grade of "C" or higher; no more than one "D" grade in a lower-division course may be counted in the academic specialization. No more than six hours of POS 484 Internship may be applied to the major.

The minor teaching field consists of 24 semester hours in political science courses. The following six courses are required:

POS 101	Political Ideologies <i>SB</i>	3
POS 110	Government and Politics <i>SB</i>	3
	or POS 310 American National Government <i>SB</i> (3)	
POS 150	Comparative Government <i>SB, G</i>	3
	or POS 160 Global Politics <i>SB, G</i> (3)	
POS 301	Empirical Political Inquiry	3
POS 417	The Arizona Political System <i>SB</i>	3
POS 480	Methods of Teaching Government	3
Total	.....	18

Courses may be substituted for POS 417 and 480 with departmental approval.

Students who pursue this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the academic specialization. Upper-division courses that count toward the academic specialization must have a grade of "C" or higher; no more than one "D" grade in a lower-division course may be counted in the minor.

Social Studies. See page 390.

GRADUATE PROGRAMS

The faculty in the Department of Political Science offer programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

POLITICAL SCIENCE (POS)

POS 101 Political Ideologies. (3) F, S
Leading political ideas and belief systems, e.g., Marxism, liberalism, conservatism, theories of democracy, and alternative futures. *General Studies: SB.*

POS 110 Government and Politics. (3) F, S
Major institutions of modern government and processes of individual and group political activity, with emphasis on the American experience. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 310. *General Studies: SB.*

POS 150 Comparative Government. (3) F, S
Political institutions and processes in selected foreign countries, including origins, strengths, and weaknesses of contemporary political systems and political development. *General Studies: SB, G.*

POS 160 Global Politics. (3) F, S
The nature of contemporary world politics through the study of both general theoretical topics and specific geographical areas. *General Studies: SB, G.*

POS 220 Political Issues and Public Policy. (3) A
Contemporary social problems and political issues, particularly development of public policy. *General Studies: SB.*

POS 230 Current Issues in National Politics. (3) F, S
Major issues facing national governments in the domestic field. *General Studies: L1/SB.*

POS 240 Introduction to Southeast Asia. (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/HIS 240/REL 240. *General Studies: G.*

POS 260 Current Issues in International Politics. (3) F, S
An analysis of major current problems in world politics. *General Studies: L1/SB, G.*

POS 270 American Legal System. (3) F, S
Concepts, institutions, classifications, and functions of law. The role of the courts and the impact of judicial decision making on social change. *General Studies: SB.*

POS 301 Empirical Political Inquiry. (3) F, S
Logic of political inquiry, including research problems, concepts, hypotheses, theories, measurement, data collection, and analysis. *General Studies: SB.*

POS 310 American National Government. (3) F, S
Powers, functions, and agents of American political institutions. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 110. *General Studies: SB.*

POS 311 Arizona Constitution and Government. (2) F, S
Constitution and government of the State of Arizona. Not open to students having credit for POS 316 or 417. Meets the Arizona constitution requirement for teacher certification. May not be counted for the major or a teaching major or minor in Political Science.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

- POS 313 The Congress.** (3) A
Lawmaking process in the U.S. Congress. *General Studies: SB.*
- POS 314 The American Presidency.** (3) A
Office, role, and power of the American presidency in the American political system. *General Studies: SB.*
- POS 315 The Supreme Court.** (3) A
Role of the Supreme Court in American society and politics; examination of decision-making process and impact of decisions; restraint versus activism. *General Studies: SB.*
- POS 316 State and Local Government.** (3) A
Survey of the operations, problems, and policies of state and local governments in the United States. *General Studies: SB.*
- POS 320 Public Administration.** (3) A
Role of the administrator in the political process with an examination of the basic concepts of bureaucracy. *General Studies: SB.*
- POS 325 Public Policy Development.** (3) A
Relationships between policy development and administrative processes as affected by the various roles of legislative bodies, executive, and administrative agencies. *General Studies: SB.*
- POS 331 Public Opinion.** (3) A
Formation, expression, and influence of individual and organized opinion on political institutions. *General Studies: SB.*
- POS 332 American Political Parties.** (3) A
Development of the American party system. Party organization and functions. *General Studies: SB.*
- POS 333 Interest Groups.** (3) A
Examines how minority, corporate, labor, farm, consumer, environmental, health, education and public interest groups, and single issue movements influence government. *General Studies: SB.*
- POS 336 Electoral Behavior.** (3) A
Voting behavior and the attitudes, perceptions, and activities of the citizenry in the political process. *General Studies: SB.*
- POS 340 History of Political Philosophy I.** (3) A
Western political philosophers and their theories to the 17th century. *General Studies: HU, H.*
- POS 341 History of Political Philosophy II.** (3) A
Western political philosophers and their theories from the 17th to the 20th century. *General Studies: HU, H.*
- POS 346 Problems of Democracy.** (3) A
Issues and problems in democratic theory, e.g., the nature of democracy, majority rule, representation, equality, and the value of political participation. *General Studies: HU.*
- POS 350 Comparative Politics.** (3) A
Theoretical approaches and political institutions, such as parties, pressure groups, legislatures, and executives, from a cross-national perspective. *General Studies: SB, G.*
- POS 356 Western Europe.** (3) A
Structures and behavior of governmental institutions and political processes in selected countries of Western Europe. *General Studies: SB, G.*
- POS 357 South Asia Politics.** (3) A
Analysis of the political culture, politics, and political systems of South Asia. Lecture, discussion. *General Studies: SB, G.*
- POS 358 Southeast Asia.** (3) A
Political background, governmental institutions, political dynamics, and developmental problems of Southeast Asian nations. *General Studies: SB, G.*
- POS 359 African Politics and Society.** (3) N
Comparative analysis of socio-economic forces, political processes, and government institutions in Africa south of the Sahara. *General Studies: SB, G.*
- POS 360 World Politics.** (3) A
Theory and practice of statecraft as applied to selected issues, regions, or eras. *General Studies: SB, G.*
- POS 361 American Foreign Policy.** (3) A
United States in world affairs; foreign policy since World War I. Techniques in formulating American foreign policies. *General Studies: SB, G.*
- POS 364 U.S. National Security Analyses.** (3) A
A theoretical and empirical assessment of U.S. national security policy in the post-cold war era. *General Studies: SB.*
- POS 370 Law and Society.** (3) A
Analysis of debates among social scientists and legal theorists concerning the relationship between "law" and "society." *General Studies: SB.*
- POS 401 Political Statistics.** (3) F, S
Basic concepts in statistics as they facilitate the description, explanation, and prediction of social and political phenomena. *General Studies: N2.*
- POS 410 Urban Government and Politics.** (3) A
Governmental organizations, decision-making structures, and problems of urban political systems. *General Studies: SB.*
- POS 417 The Arizona Political System.** (3) N
Contemporary political problems within the context of Arizona's constitutional, political, and social frameworks. Meets the Arizona Constitution requirement for teacher certification. Not open to students having credit for POS 311. *General Studies: SB.*
- POS 422 Politics of Bureaucracy.** (3) N
Bureaucracy as a political entity; internal dynamics of public agencies; the relationship between public agencies and other political entities. *General Studies: SB.*
- POS 423 Politics of Budgeting.** (3) N
The policy process in budgeting; strategies used to influence this process and recent reforms in public budgeting. *General Studies: SB.*
- POS 426 Elements of Public Policy.** (3) A
Each section may cover one of the following topics: consumer protection, natural resources, criminal justice, environmental protection, science and technology, or theories of public policy. May be repeated for credit when topics vary. *General Studies: SB.*
- POS 431 Campaigns and Elections.** (3) A
Examine campaigns from a multitude of perspectives including the politician, reporter, campaign strategist, and voter. Lecture, discussion. *General Studies: SB.*
- POS 433 Money and Politics.** (3) A
The role of money and special interests in elections, campaign politics, and public policymaking in American politics. Lecture, discussion. *General Studies: SB.*
- POS 434 Media and Politics.** (3) A
The study of mass media and politics in the United States, e.g., media and elections, media and government. Lecture, discussion. *General Studies: SB.*
- POS 435 Women and Politics.** (3) N
Women's roles in various political contexts. Focus varies with instructor. *General Studies: SB, C.*
- POS 439 Minority Group Politics in America.** (3) N
Role of minority groups in American politics. *General Studies: SB, C.*
- POS 442 American Political Thought.** (3) A
Political theories and movements from the colonial period to the present. *General Studies: HU.*
- POS 443 Topics in Contemporary Political Theory.** (3) A
Major problems and theories in contemporary political thought. *General Studies: HU.*
- POS 445 Asian Political Thought.** (3) A
Contemporary political ideas and theories in selected Asian countries, including the impact of Marxist and non-Marxist theories on revolutionary processes. *General Studies: SB, G.*
- POS 450 Russia and Successor States.** (3) A
Description and analysis of political institutions and practices in Russia and successor states. *General Studies: SB, G.*
- POS 451 China, Japan, and the Koreas.** (3) A
A comparative analysis of the political modernization experiences of China, Japan, and the two Koreas, focusing on their differing reactions to the West. *General Studies: SB, G.*
- POS 452 China.** (3) A
Background of the Communist revolution, political processes, and developmental problems in China from a comparative perspective. *General Studies: SB, G.*
- POS 453 South America.** (3) A
Governmental institutions, political processes, and developmental problems of the South American states. *General Studies: SB, G.*
- POS 454 Mexico.** (3) A
Mexican federal, state, and local governmental institutions. *General Studies: SB, G.*
- POS 455 Central America and the Caribbean.** (3) A
Governmental institutions, political processes, and developmental problems of the nation-states and dependent areas of Central America and the Caribbean. *General Studies: SB, G.*

POS 459 South and Southern Africa. (3) A Post-apartheid South African government and politics; South Africa and the southern African region; regional security and development. *General Studies: SB, G.*

POS 463 Inter-American Relations. (3) A Diplomatic relations among the Latin American states. Development of U.S. foreign policy toward Latin America. *General Studies: SB, G.*

POS 465 International Organization and Law. (3) A History, practical political significance, and future of international institutions, transnational regimes, and international law. *General Studies: SB, G.*

POS 467 International Security. (3) A Examination of issues affecting the international security of states and peoples, e.g., military, economic, technological, environmental, and demographic. *General Studies: SB, G.*

POS 468 Comparative Asian Foreign Policies. (3) A Foreign policies of the Asian states, emphasizing their security relations and movements toward regionalism. *General Studies: SB, G.*

POS 471 Constitutional Law I. (3) A Development of the U.S. Constitution as reflected in decisions of the Supreme Court; jurisdiction and organization of the federal courts; judicial review; separation of powers; federalism; the commerce clause; national taxing and spending power; state police power. *General Studies: SB.*

POS 472 Constitutional Law II. (3) A Development of the U.S. Constitution as reflected in decisions of the Supreme Court: due process; equal protection of laws; individual rights; civil liberties. *General Studies: SB.*

POS 480 Methods of Teaching Government. (3) N Methods of instruction, organization, and presentation of subject matter in political science. Prerequisite: 15 hours in political science or instructor approval.

POS 485 Political Economy. (3) A Problems, policies, and possibilities of various political-economic systems and the interrelationship of capitalism, socialism, and democracy. *General Studies: SB.*

POS 486 International Political Economy. (3) A Contending approaches to historical and contemporary issues of international political economy, including global welfare, equality, ecology, and peace. *General Studies: SB, G.*

POS 498 Pro-Seminar. (3) A Small group study and research for advanced students within their major area. Prerequisite: major in the department or instructor approval. *General Studies: L2.*

POS 501 Methods of Political Science. (3) A Problems of method and knowledge in political science, strategies of political inquiry, and issues in philosophy of social science.

POS 502 Philosophy of Political Inquiry. (3) A Problems of knowledge and method in political science, with attention to both empirical and evaluative analysis.

POS 503 Empirical Political Inquiry. (3) A Research methods and techniques of the discipline, emphasizing empirical foundations and analytic methods employed in subfields. Prerequisites: POS 401 (or equivalent); instructor approval.

POS 530 American Politics. (3) A Examines major debates in the study of American political processes. Covers parties, media, elections, public opinion, nominations, and social choice theory. Seminar.

POS 532 American Political Institutions. (3) N Examines major debates in the study of American governmental institutions. Covers legislative branch, executive branch, judicial branch, and interest groups. Seminar.

POS 545 Themes in Political Thought. (3) N Examination of a particular theme or problem in political thought from both a historical and contemporary perspective. Seminar. Course may be repeated with approval of the director of graduate studies. Prerequisite: instructor approval.

POS 550 Comparative Politics. (3) A Surveys major approaches across topical areas such as revolutions, authoritarianism, policy processes, interest groups, and electoral politics. Focus varies with instructor. Seminar.

POS 560 International Relations. (3) A Surveys major theoretical approaches and debates in international relations. Seminar.

POS 563 Comparative Asian Security Policies. (3) N Analyzes domestic and international constraints, belief systems, and economic components in security decisions by major powers and Asian nations. Seminar. Prerequisite: instructor approval.

POS 591 Seminar. (3) A
(a) American Politics
(b) Comparative Politics
(c) Global Politics
(d) Political Theory

POS 598 Special Topics. (3) A
(a) American Politics
(b) Comparative Politics
(c) Global Politics
(d) Political Theory

POS 601 Advanced Experimental Research. (3) N Introduces experimental and quasi-experimental research designs in political research, including laboratory techniques and topics in the analysis of variance. Prerequisite: POS 503 or equivalent.

POS 602 Advanced Survey Research. (3) N Presents design and conduct of political surveys, including sampling, instrument design, scaling, and statistical and graphical analysis of survey data. Prerequisite: POS 503 or equivalent.

POS 603 Polimetrics I. (3) A Introduces theory and practice of linear regression analysis. Provides skills to read, understand, and evaluate professional literature using regression analysis. Prerequisites: POS 401 and 503 or instructor approval.

POS 604 Polimetrics II. (3) A Apply quantitative techniques to research topics producing publishable papers through exposure to time-series, logit and probit, and simultaneous equations. Prerequisites: POS 401 and 503 and 603 or instructor approval.

POS 606 Qualitative and Textual Analysis. (3) S 1999 Method and theory for the analysis of qualitative materials, systematic approaches for case studies, content analysis, critical analysis of texts. Discussion, seminar.

POS 635 State Politics and Public Policy. (3) N Introduction to comparative state policy emphasizing policy or performance differences among the states and the reasons for these differences. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

POS 636 Electoral Behavior. (3) N Introduces fundamental concepts of electoral behavior. Emphasizes presidential elections and examines why people vote and how their votes are determined. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

POS 638 Law and Politics. (3) N Emphasizes research into such topics as constitutional law, women and the law, American legal system, judicial process, and judicial selection. Seminar. Prerequisite: instructor approval.

POS 651 Politics of Change and Development. (3) N Examines contending approaches to national, social, and political change. Seminar. Prerequisite: instructor approval.

POS 660 The Modern World System. (3) N Theoretically driven, historical analysis of the organization and operation of the international political economy since the 16th century. Seminar. Prerequisite: instructor approval.

POS 661 The State. (3) N Examines theories of state, state-society relations, and interstate politics emphasizing questions of sovereignty, territoriality, violence, representation, democracy, and change. Seminar. Prerequisite: instructor approval.

POS 662 International Organization. (3) N History, practical political significance, and future of international institutions, transnational regimes, and other approaches to international organization. Seminar. Prerequisite: instructor approval.

POS 664 War, Peace, and Conflict Processes. (3) N The systematic analysis of the causes of war, the preconditions for peace, and approaches to the resolution of conflict. Seminar. Prerequisite: instructor approval.

POS 665 Foreign Policy Theory. (3) N Examines foreign policy theory and methods. Development and critique of research designs analyzing foreign policy processes within and among nations. Seminar. Prerequisite: instructor approval.

POS 792 Research. (3) F, S Projects in various areas of political science. Prerequisite: doctoral student.

Department of Psychology

J. Jay Braun
Chair

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www.asu.edu/clas/psych

REGENTS' PROFESSORS

CIALDINI, EISENBERG, RUSSO

PROFESSORS

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BRAUN, BRAVER, CASTRO,
CHASSIN, HOMA, KAROLY, KENRICK,
KILLEEN, KNIGHT, LANYON, LINDER,
OKUN, PARKINSON, PRESSON,
REICH, SADALLA, SANDLER,
SOMERVILLE, VAN ORDEN, WEST,
WOLCHIK, ZAUTRA

ASSOCIATE PROFESSORS

CASTANEDA, CHARTIER, FABRICIUS,
FEHR, LESHOWITZ, MacKINNON,
MILLSAP, NAGOSHI, NEISEWANDER,
NEMEROFF, NEUBERG, ROSSI,
SAENZ, STONE

ASSISTANT PROFESSORS

CONRAD, DAVIS, GEST,
GOLDINGER, GONZALES, KHOO

LECTURERS

BARTON, WEIGAND

The Department of Psychology maintains an Undergraduate Advisement Office staffed by trained personnel. All Psychology majors are encouraged to meet with an undergraduate advisor once each semester to ask questions regarding the choice of courses. Failure to do so may prevent graduation at the expected time. It is the responsibility of the student to consult with an undergraduate advisor.

PSYCHOLOGY—B.A.

The B.A. degree in Psychology consists of 31 semester hours in psychology, including at least 15 upper-division semester hours. Required courses, which must be passed with a minimum grade of "C," are as follows:

PGS 101 Introduction to Psychology *SB* 3

PGS 315 Personality Theory and Research *SB* 3
or PGS 341 Developmental Psychology *SB* (3)
or PGS 350 Social Psychology *SB* (3)
PSY 230 Introduction to Statistics *N2* 3
PSY 290 Research Methods *L1/S2* 4
PSY 323 Sensation and Perception 3
or PSY 320 Learning and Motivation (3)
or PSY 324 Memory and Cognition (3)
or PSY 325 Physiological Psychology (3)
Total 16

Also required are one additional upper-division PSY course (excluding PSY 494, and 499); two additional upper-division PGS or PSY courses; and two additional psychology courses, excluding PGS 270. No more than a total of three hours in PGS 394 and 494 and PSY 494 combined may be used to complete the 15 hours of upper-division requirements. Students may take a maximum of six hours of PGS 394 and six hours of PGS 494 and PSY 494 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of "C." They must be approved by an undergraduate advisor and include MAT 119 (or higher) in addition to one course from among the following:

CSE 180 Computer Literacy 3
CSE 185 Internet and the World Wide Web 3

See "Major Requirements," page 306.

PSYCHOLOGY—B.S.

The B.S. degree in Psychology consists of 31 semester hours in psychology, including at least 15 upper-division hours. Required courses, which must be passed with a minimum grade of "C," are as follows:

PGS 101 Introduction to Psychology *SB* 3
PGS 315 Personality Theory and Research *SB* 3
or PGS 341 Developmental Psychology *SB* (3)
or PGS 350 Social Psychology *SB* (3)
PSY 230 Introduction to Statistics *N2* 3
PSY 290 Research Methods *L1/S2* 4

PSY 230 Introduction to Statistics *N2* 3
PSY 290 Research Methods *L1/S2* 4
PSY 323 Sensation and Perception 3
or PSY 320 Learning and Motivation (3)
or PSY 324 Memory and Cognition (3)
or PSY 325 Physiological Psychology (3)
Total 16

Also required are one additional upper-division PSY course (excluding PSY 494); two additional upper-division PGS or PSY courses; and two additional psychology courses excluding PGS 270. No more than a total of three hours in PGS 394 and 494 and PSY 494 combined may be used to complete the 15 hours of upper-division requirements. Students may take a maximum of six hours of PGS 394 and six hours of PGS 494 and PSY 494 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of "C." They must be approved by an undergraduate advisor and include MAT 210 Brief Calculus; one life science lab course (BIO or MIC); one physical science lab course (AST, CHM, GLG, or PHY); and one course from among the following:

CSE 180 Computer Literacy 3
CSE 185 Internet and the World Wide Web 3

Further, the science courses taken to satisfy the B.S. requirements cannot be used to meet the College of Liberal Arts and Sciences natural science distribution requirements. See "Major Requirements," page 306.

MINOR IN PSYCHOLOGY

The minor in Psychology consists of 22 hours in psychology, including the following:

PGS 101 Introduction to Psychology *SB* 3
PGS 315 Personality Theory and Research *SB* 3
or PGS 341 Developmental Psychology *SB* (3)
or PGS 350 Social Psychology *SB* (3)
PSY 230 Introduction to Statistics *N2* 3
PSY 290 Research Methods *L1/S2* 4

PSY 323	Sensation and Perception	3
	or PSY 320 Learning and Motivation (3)	
	or PSY 324 Memory and Cognition (3)	
	or PSY 325 Physiological Psychology (3)	
Total		16

Two additional upper-division PGS or PSY courses are required.

A maximum of three hours of research (PGS 394, 494; PSY 494) may be used to meet the minor requirements. Students with an appropriate equivalent course may exclude PSY 230 from the requirements. All courses must be passed with a minimum grade of "C."

SECONDARY EDUCATION— B.A.E.

Psychology. The minor teaching field consists of 24 semester hours. See a departmental advisor.

Social Studies. See page 390.

GRADUATE PROGRAMS

The faculty in the Department of Psychology offer a program leading to the Ph.D. degree. Consult the *Graduate Catalog* for requirements.

PSYCHOLOGY (PGS)

PGS 101 Introduction to Psychology. (3) F, S, SS

Major areas of theory and research in psychology. Participation in department-sponsored research or an educationally equivalent alternative activity is required. *General Studies: SB.*

PGS 222 Human Sexual Behavior. (3) F, S
Patterns of sexual behavior, including variations and deviations; theories of sexual attraction, sex differences, and sexual dysfunction and treatment. Prerequisite: PGS 101. *General Studies: SB.*

PGS 270 Psychology of Adjustment. (3) F, S, SS
Principles of mental health, adjustment, conflict, stress, and coping processes derived from clinical and experimental research. Intended for nonmajors; cannot be used for major credit. Prerequisite: PGS 101. *General Studies: SB.*

PGS 304 Effective Thinking. (3) A
Understanding and improving your intellectual and behavioral skills; information analysis, inference, logic, problem solving, and decision making. Prerequisite: MAT 119 or PSY 230 or equivalent. *General Studies: L1.*

PGS 306 Environmental Psychology. (3) F, S, SS
Concepts and research strategies in the study of behavior in interaction with physical environment. Prerequisite: PGS 101. *General Studies: SB.*

PGS 315 Personality Theory and Research. (3) F, S, SS
Definition and description of personality in terms of theoretical and methodological approaches. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 341 Developmental Psychology. (3) F, S
Behavior development analyzed in terms of psychological principles. Current research in human development. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 344 Directed Child Study. (3–4) F, S, SS
Theories and methods of intervention with preschool children and supervised practicum in the Child Study Laboratory. 1 hour lecture, 6–8 hours practicum. Prerequisites: CDE 232 (or PGS 341); instructor approval. *General Studies: L2.*

PGS 350 Social Psychology. (3) F, S, SS
Human social behavior, including such concepts as aggression, attraction, attribution, conformity, groups, helping, person perception, and persuasion. Prerequisite: PGS 101. *General Studies: SB.*

PGS 351 Honors Social Psychology. (3) N
A critical analysis of human social behavior for honors students; topics include stereotyping, social influence, attraction, aggression, helping, groups, and attitudes. Lecture, discussion. Open only to students without previous credit for PGS 350. Prerequisites: PGS 101; honors standing; instructor approval. *General Studies: L2/SB.*

PGS 365 Community Psychology. (3) F, S
Mental health and psychological well-being in the community, emphasizing current issues and related research. Prerequisite: PGS 315 or 350. *General Studies: SB.*

PGS 399 Supervised Research. (1–3) F, S, SS
Experience within the context of current faculty research projects. Student is assigned responsibility depending on qualifications. "Y" grade only. May be repeated for a total of 6 hours. Prerequisites: approval of faculty member before registration; "B" average in major. Pre- or corequisite: PSY 230 or equivalent.

PGS 414 History of Psychology. (3) F, S
Historical development of psychology from its philosophical beginnings to the present. Prerequisites: PGS 101; PSY 230, 290. *General Studies: L2/SB.*

PGS 427 Psychology of Aging. (3) N
Analysis of loss, maintenance, and gain associated with cognitive and affective aging. Individual differences in coping with normative life transitions. Prerequisites: PGS 101, 341. *General Studies: L2/SB.*

PGS 430 Industrial Psychology. (3) F, S, SS
Organizations and management systems; motivation and work performance; human factors in systems design and evaluation; personnel selection and testing. Prerequisite: MGT 301 or PGS 101.

PGS 441 Cognitive Development. (3) F, S
Experimental and theoretical literature in child development and behavior. Prerequisite: PGS 341 or instructor approval. *General Studies: L2/SB.*

PGS 443 Abnormal Child Psychology. (3) F, S

The major disorders of childhood and adolescence (e.g., autism, hyperactivity, phobias, and delinquency) are covered, including cause, diagnosis, treatment, and prevention. Prerequisites: PGS 101 and 1 course from among PGS 315 and 341 and 350 or instructor approval. *General Studies: L2/SB.*

PGS 444 Adolescent Psychology and Psychopathology. (3) N
An advanced level survey of normal adolescent psychological development and psychological disorders of this age period. Lecture, discussion. Prerequisites: PGS 101, 341; PSY 290. *General Studies: L2.*

PGS 445 Child Language and Drawing. (3) F
Language acquisition and developmental changes in drawing, considered in the context of cognitive developmental stages. Children's representation and communication of knowledge through language and drawing. Prerequisite: PGS 341. *General Studies: SB.*

PGS 446 Social Development. (3) N
Theory, research, and issues regarding social development are discussed. Example topics: formation of attachments, prosocial development, and gender-role development. Lecture, seminar. Prerequisite: PGS 341. *General Studies: L2.*

PGS 450 Social Perception and Cognition. (3) N
A critical analysis of human social perception and social cognition. Topics include attribution, inference, memory, attention, impression formation, stereotype change. Lecture, discussion. Prerequisites: PGS 101, 350. *General Studies: L2.*

PGS 451 Stereotyping, Prejudice, and Discrimination. (3) N
A critical investigation of the processes underlying, and the factors contributing to, stereotyping, prejudice, and discrimination. Lecture, discussion. Prerequisites: PGS 101, 350. *General Studies: L2.*

PGS 452 Applied Social Psychology. (3) F
The study of applications of social psychological theory and concepts in natural settings; research design and data analysis. Lecture, lab-type activities. Prerequisites: PGS 101, 350; PSY 230. *General Studies: L2.*

PGS 453 Organizational Behavior. (3) N
A survey of psychological theory and research as applied to the behavior of individuals in organizational settings. Lecture, discussion. Prerequisites: PGS 101, 350.

PGS 458 Group Dynamics. (3) F
Theories and methods of group leadership, group effectiveness, communication within groups, and relations between groups and individual members. Prerequisite: PGS 350.

PGS 461 Interpersonal Influence. (3) N
Principles and procedures that affect the process of social influence, consideration of attitudinal, compliance inducing, and perceptual influences. Prerequisite: PGS 350. *General Studies: SB.*

PGS 462 Health Psychology. (3) F, S
Contributions of psychology to health promotion and illness prevention, adaptation to acute and chronic illness, and to the health care system. Prerequisites: PSY 230, 290.

PGS 463 Advanced Psychology of Adjustment. (3) F

Critical analysis and effective expression of psychological theory and research of the topic of adjustment. Lecture, discussion, writing. Prerequisites: PSY 230, 290; completion of 1st-year English requirements; L1 course. *General Studies: L2.*

PGS 464 Minority Issues in Psychology. (3) S

Psychological issues relating to the diversity of human cultural experiences and among ethnic minorities in the U.S. Prerequisite: PSY 290.

PGS 465 Psychology of Stress and Coping. (3) F

Readings in theory and research in the area of stress and coping. Lecture, discussion, class presentations. Prerequisites: PGS 315 (or 350); PSY 290. *General Studies: L2.*

PGS 466 Abnormal Psychology. (3) F, S, SS

Historical and current definitions, theory, and research concerning abnormal behavior. Major categories of psychopathology, including related treatment approaches. Prerequisites: PGS 101; PSY 290. *General Studies: SB.*

PGS 467 Psychology of Magical Beliefs. (3) N

The psychological nature and bases of magical beliefs and their impact on health behaviors, eating practices, and interpersonal relations. Lecture, seminar. Prerequisites: PGS 315 and 466 and PSY 434 or instructor approval. *General Studies: L2.*

PGS 468 Psychology and Law. (3) F, S
Theories, research, and practice in psychology as related to law, including criminal, civil, domestic relations, and professional issues. Lecture, discussion. Prerequisite: PSY 290.

PGS 471 Psychological Testing. (3) S

Methods and theory of psychological testing; various types of psychological tests; consideration of ethical, social, and legal aspects of testing. Prerequisite: PSY 290.

PGS 472 Clinical Psychology. (3) F, S
Clinical psychology as a science and profession. Historical development, methods of interviewing, assessment, and therapeutic intervention. Prerequisite: PGS 466.

PSYCHOLOGY (PSY)**PSY 230 Introduction to Statistics.** (3) F, S, SS

Basic concepts in descriptive and inferential statistics, emphasizing applications to psychology. The course has both self-paced (PSI) and lecture sections. Prerequisites: MAT 117; PGS 101. *General Studies: N2.*

PSY 290 Research Methods. (4) F, S
Planning, execution, analysis, and reporting of experiments. Literature, procedures, and instruments in representative areas of psychological research. 3 hours lecture, 3 hours lab. Prerequisite: PSY 230. *General Studies: L1/S2.*

PSY 320 Learning and Motivation. (3) F, S, SS

Principles of conditioning and motivation; approaches to learning, including acquisition of verbal materials, concepts, and motor skills; memory and transfer. Prerequisite: PSY 290.

PSY 323 Sensation and Perception. (3) F, S
Underlying processes of vision, audition, and the other senses. Application of current research and theory in a laboratory environment. Prerequisite: PSY 290 or instructor approval.

PSY 324 Memory and Cognition. (3) F, S, SS

Processes underlying information storage and retrieval, including different kinds of memory, forgetting, depth of processing, and control processes. Prerequisite: PSY 290.

PSY 325 Physiological Psychology. (3) F, S, SS

Relationships of physiological processes to behavior. Emphasis is on nervous system functioning. Prerequisites: PSY 290 (or 2 courses in biological science); instructor approval.

PSY 330 Statistical Methods. (3) S

Advanced application of statistics to psychology. Highly recommended for students interested in attending graduate school. 3 hours lecture, 1 hour lab. Prerequisite: PSY 230. *General Studies: N2.*

PSY 390 Experimental Psychology. (3) S
Continuation of concepts in PSY 290, with emphasis on multifactor designs and programmatic sequence of experiments. Lecture, lab. Prerequisite: PSY 290. *General Studies: L2.*

PSY 420 Analysis of Behavior. (3) N
Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 290. *General Studies: L2.*

PSY 424 Genetic Psychology. (3) S
Introduction to the concepts, methodologies, and findings of behavioral genetics for Psychology majors. Prerequisites: PGS 100; PSY 230, 290. *General Studies: L2.*

PSY 425 Biological Bases of Behavior. (3) N

Critical study of physiological psychology; brain mechanisms underlying motivation, and learning. Prerequisite: PSY 325. *General Studies: L2.*

PSY 426 Neuroanatomy. (4) N
Structure and function of mammalian brain, including sheep brain dissection. 3 hours lecture, 3 hours lab. Prerequisite: PSY 325 or equivalent. *General Studies: L2.*

PSY 434 Cognitive Psychology. (3) S
The human organism as a processor of information, from perception to cognition. Abstract concepts, semantic memory, attention, and mental imagery. Prerequisite: PSY 323 or 324 or instructor approval. *General Studies: L2.*

PSY 437 Human Factors. (3) F
Emphasis on human factors in high technology systems. Specific topics include systems development, systems analysis techniques, displays, and controls. Prerequisites: PSY 290 and upper-division standing or instructor approval. *General Studies: L2.*

PSY 470 Psychopharmacology. (3) F, S
Basis of drug action at physiological and behavioral levels. Psychological and medical applications and limitations of drugs used in the treatment of mental illness. Prerequisites: PSY 325; 1 semester each of biology and chemistry.

PSY 501 Supervised Teaching. (4) F
Experience in and examination of perspectives on teaching undergraduate psychology. Prerequisites: graduate standing in psychology; instructor approval.

PSY 506 Survey of Research in Environmental Psychology. (3) F

Major topics and paradigms in the study of person-environment relationships. Prerequisite: instructor approval.

PSY 512 Advanced Learning. (3) N
Principles and theories of learning, emphasizing research literature. Prerequisite: instructor approval.

PSY 524 Advanced Physiological Psychology. (3) N

Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite: instructor approval.

PSY 528 Sensation and Perception. (3) N
Principles of sensory and perceptual processes, emphasizing research literature. Prerequisite: instructor approval.

PSY 529 Correlation and Psychometric Theory. (3) S

Principles of correlational techniques, including regression and multiple correlation. Psychometric theory, including reliability and validity. Prerequisite: instructor approval.

PSY 530 Intermediate Statistics. (3) F
Continuation of PSY 529. Psychological statistics, emphasizing the analysis of variance and the design of experiments. Prerequisite: PSY 529 or instructor approval.

PSY 535 Cognitive Processes. (3) N

Theoretical/empirical treatment of the human organism as a processor of information, including abstraction, memory structure, problem solving, and thinking. Prerequisite: instructor approval.

PSY 541 Research in Cognitive Development. (3) N

Theoretical and empirical issues in the study of children's knowledge and cognitive processes. Comparison of research in Piagetian and other traditions. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

PSY 542 Social Development. (3) N

Major issues in the area of social development are topics for review and critique. Theory, research, and content are covered. Prerequisite: instructor approval.

PSY 550 Advanced Social Psychology. (3) F, S

Theory and research concerning interpersonal perception, decision making, attitude formation and change, group processes, social motivation, and interaction processes. Prerequisite: instructor approval.

PSY 551 Advanced Social Psychology. (3) F, S

Continuation of PSY 550. Prerequisite: PSY 550 or instructor approval.

PSY 553 Social Influence. (3) N

Research literature relevant, for example, to attitude formation and change, conformity, obedience, power, compliance, and altruism. Prerequisite: PSY 551 or instructor approval.

PSY 555 Experimental and Quasi-Experimental Designs for Research. (3) N
Review of research techniques. Laboratory and field research analyzed; applications to specific topics. Prerequisite: instructor approval.

PSY 569 Advanced Study of Personality. (3) N
Personality as a theoretical concept in psychology, including definitional problems, behavioral and traditional approaches, the measurement of personality, and current research issues. Prerequisite: instructor approval.

PSY 572 Psychological Assessment. (3) F
Theory and research on assessment of personality, psychopathology, and intelligence, and construction of psychological assessment instruments. Prerequisite: admission to clinical Ph.D. program or instructor approval.

PSY 573 Psychopathology. (3) F
Theory and research relating to the contribution of psychological, social, physiological, and genetic factors to the development and persistence of abnormal behavior. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

PSY 574 Psychotherapy. (3) S
A detailed survey of the theoretical and empirical literature relating to verbal psychotherapy and interviewing methods. Structured role-playing practice in the major procedures. Prerequisite: admission to the clinical Ph.D. program or instructor approval.

PSY 578 Child Psychopathology. (3) N
Major theories and research related to the development of deviant behaviors in children, including some supervised experience in child assessment. Prerequisite: PSY 572 or instructor approval.

PSY 582 Community Psychology. (3) SS
Community systems, intervention techniques, consultation models, history and current status of community mental health movement, and conceptualization of the roles of community psychologists in social system intervention. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 588 Consultation Methods. (3) N
Several theories and strategies of organizational consultation. The development of consultative skills through simulation and practical experience. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 624 Clinical Neuroscience. (3) S
An examination of the biological underpinnings of psychological disorders at the molecular, cellular, and system levels (schizophrenia, depression, anxiety, etc.). Lecture, pro-seminar. Prerequisites: graduate standing; instructor approval.

Department of Religious Studies

Linell E. Cady
Chair
(ECA 377) 602/965-7145
www.asu.edu/clas/religious_studies

PROFESSORS

CADY, FELDHAUS, FOARD, WENTZ

ASSOCIATE PROFESSORS

COUDERT, GEREBOFF, MOORE,
MORRISON, SCHOBER,
SWANSON, WOODWARD

ASSISTANT PROFESSORS

CLAY, FESSENDEN, UMAR

LECTURER

DAMREL

RELIGIOUS STUDIES—B.A.

The B.A. degree in Religious Studies consists of 45 semester hours, 30 of which must be in religious studies (including 21 in upper-division courses) and 15 of which must be in related fields. In order for the student to become acquainted with the character and role of religions across a wide spectrum of social and historical contexts, the 30 semester hours in religious studies must include the following courses:

1. REL 305 Ritual, Symbol, and Myth;
2. at least one course from each of the following distribution areas: Religion in the Americas, Religion and Asian Cultures, and Religion and Western Cultures; and
3. two research seminars, including REL 405 Problems in Religious Studies, which may be repeated for credit.

In place of a second seminar, a student may take REL 499 in order to write an undergraduate thesis.

The Religious Studies major is an appropriate choice for students wishing to explore such areas as African/African American Studies; Islamic Studies; Myth, Ritual, and the Arts; Native American Studies; and Religion and Politics. All majors must plan their programs in consultation with a depart-

mental advisor. A minimum GPA of 2.50 is required in the 30 semester hours of religious studies courses.

MINOR IN RELIGIOUS STUDIES

The minor in Religious Studies consists of 18 semester hours, at least 12 of which must be in the upper division. Both REL 305 and 405 are required. For minor verification, students must consult a department advisor.

CERTIFICATES AND EMPHASES

The following are certificate programs or emphases offered in the Department of Religious Studies. For more information on each, see pages 307–309.

Asian Studies Certificate. Students majoring in Religious Studies may elect to pursue an Asian Studies emphasis or East Asian Studies certificate combining courses from the major with selected outside courses of wholly Asian content.

Jewish Studies Emphasis. Students majoring in Religious Studies may elect to pursue a Jewish Studies emphasis combining courses from the major with selected outside courses in the area of Jewish Studies.

Latin American Studies Certificate. Students majoring in Religious Studies may elect to pursue a Latin American Studies certificate combining courses from the major with selected outside courses of wholly Latin American content.

Russian and East European Studies. Students majoring in Religious Studies may elect to earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in the section on “Russian and East European Studies,” page 309.

Southeast Asian Studies Emphasis. Students majoring in Religious Studies may elect to earn a Certificate in Southeast Asian Studies by successfully completing the requirements.

Women’s Studies. Students majoring in Religious Studies may elect to earn a Certificate in Women’s Studies by successfully completing the requirements.

GRADUATE PROGRAM

The faculty in the Department of Religious Studies offer a graduate program leading to the M.A. degree for those who wish to enter a doctoral program in the study of religions, for those who wish to teach at the community college level, and for those in nonacademic careers who desire general competence in the academic study of religions. Consult the *Graduate Catalog* for requirements.

RELIGIOUS STUDIES (REL)

REL 100 Religions of the World. (3) F, S
An introduction to the history of religious traditions of the world, including Buddhism, Christianity, Hinduism, Islam, Judaism, and others. Not open to students who have completed REL 200. *General Studies: HU, G.*

REL 200 The Study of Religious Traditions. (3) A
A writing-intensive course introducing analytical skills necessary for understanding religious traditions. Beliefs, practices, and communities of several religious traditions of the world. Not open to students who have completed REL 100. *General Studies: L1/HU, G.*

REL 201 Religion and the Modern World. (3) A
An introduction to the nature and role of religious beliefs and practices in shaping the lives of individuals and societies, with particular attention to the modern world. *General Studies: L1/HU.*

REL 202 Religion and Popular Culture. (3) F, S
Explores various intersectors between religion and the popular media, including music, news, advertising, the visual arts, literature, performance, and film. Lecture, discussion. *General Studies: HU, C.*

REL 203 Saints and Sinners: Explorations in Sacred Biography. (3) F, S
A comparison of the role of biography across religions to examine the process of categorizing people as saints or sinners. Lecture, discussion. *General Studies: HU, H.*

REL 205 Living and Dying. (3) F, S
Ways that religions have understood birth, sexuality and death and the passing of generations. Examples from traditions throughout the world. Lecture, discussion. *General Studies: HU.*

REL 210 Introduction to Judaism. (3) A
The beliefs, ceremonies, festivals, and institutions of Judaism emphasizing the contemporary era. The course presupposes no previous knowledge about Judaism. *General Studies: L1/HU, H.*

REL 225 African American Religion. (3) A
Introduction to the history and development of the African American religious tradition. Lecture, discussion. *General Studies: HU, C.*

REL 240 Introduction to Southeast Asia. (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240/GCU 240/HIS 240/POS 240. *General Studies: G.*

REL 270 Introduction to Christianity. (3) A
The beliefs, ceremonies, festivals, and institutions of Christianity, emphasizing the contemporary era. The course presupposes no previous knowledge about Christianity. *General Studies: HU.*

REL 305 Ritual, Symbol, and Myth. (3) A
Ritual, symbol, and myth as types of religious expression, with examples selected from the nonliterate religions of the world. *General Studies: L2/HU.*

REL 310 Western Religious Traditions. (3) F
Religious traditions of Judaism, Christianity, and Islam, comparing their doctrinal, institutional, and ritual systems and social histories. Lecture, discussion. *General Studies: HU, H.*

REL 315 Hebrew Bible (Old Testament). (3) A
The nature, content, background, historical situation, and message of the books of the Hebrew Bible in English translation. *General Studies: L2/HU, H.*

REL 317 Introduction to Rabbinic Judaism. (3) A
A historical analysis of the thought, literature, and institutions of rabbinic Judaism. *General Studies: HU, H.*

REL 320 American Religious Traditions. (3) F, S
Examination of the formation, development, and interaction of major American religious traditions (indigenous, African American, Asian American, and Euro-American). *General Studies: HU, C, H.*

REL 321 Religion in America. (3) F, S
The history of religion in America with attention to issues of historiography, pluralism, gender, race, ethnicity, politics, and social reform. *General Studies: HU, C, H.*

REL 322 Malcolm and Martin. (3) F, S
This course examines and contrasts the lives, ministries, contributions and legacies of Malcolm X and Martin Luther King, Jr. *General Studies: HU, C.*

REL 323 Black Religion: A Biographical Approach. (3) F, S
An examination of the experiences, motivations, and contributions of a number of figures associated with African American religion. *General Studies: HU, C.*

REL 330 Native American Religious Traditions. (3) A
World views and religious thought presented through the art, architecture, literature, music, mythology, ritual, and folklore of representative tribes in North America. *General Studies: HU, C.*

REL 331 History of Native American Religious Traditions. (3) N
The role of religion in Native American history, including missionization, and religious revitalization movements. *General Studies: L2/HU, C, H.*

REL 332 South American Indian Religions. (3) F, S
An introduction to the sacred stories, ceremonies, and beliefs of Native South American peoples in their historical contexts. *General Studies: HU, G.*

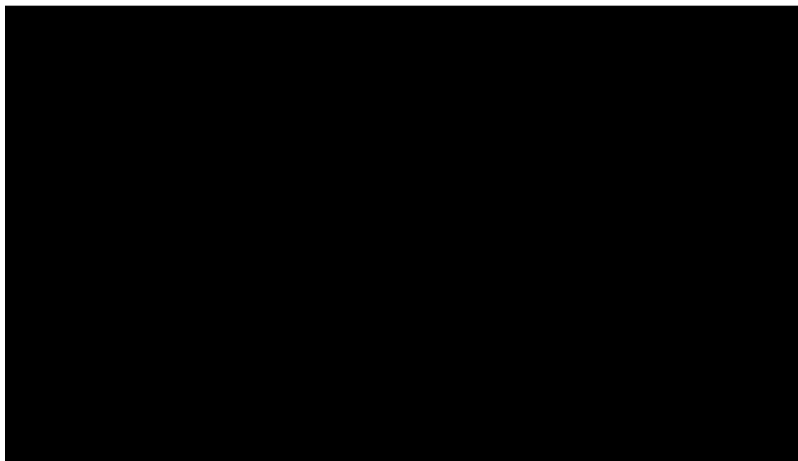
REL 344 Religion and Values in Japanese Life. (3) S
Japanese values expressed in the life and annual cycles of the family, local and national identities, and popular culture. Lecture, discussion. *General Studies: HU, G.*

REL 345 Asian Religious Traditions. (3) F
Introduction to the major concepts of religious beliefs, rituals, and practices in Hinduism and Buddhism. Lecture, discussion. *General Studies: HU, G.*

REL 350 Hinduism. (3) A
The study of diverse forms of Hinduism through its institutions, literature, folklore, art, and architecture. *General Studies: L2/HU, G, H.*

REL 351 Buddhism. (3) A
Doctrines, practices, and institutions of the Buddhist religion, emphasizing its role in the history and culture of Asian societies. *General Studies: L2/HU, G.*

REL 355 Japanese Cities and Cultures to 1800. (3) S
Relations among ideas and literary, visual, and performing arts of the ancient aristocracy, medieval samurai, and early modern townspeople. Cross-listed as HUM 310. *General Studies: L1/HU, H.*



REL 365 Islamic Civilization, 700–1300. (3) F

An introduction to Islamic religion, culture, and societies from 700 to 1300. *General Studies: HU, H.*

REL 366 Islamic Civilization, 1300 to Present. (3) F

Introduction to Islamic religion, culture, and societies from 1300 to present. Lecture, discussion. *General Studies: HU, G, H.*

REL 371 New Testament. (3) A

Origins and literature of early Christian communities; historical investigations of the types of oral and written tradition in the New Testament. *General Studies: HU.*

REL 372 Formation of the Christian Tradition. (3) A

Origins, development, and expansion of Christianity; major themes and tensions from the New Testament world to the beginning of the Middle Ages. *General Studies: HU, H.*

REL 373 Women in Judaism. (3) S

A study of the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as WST 372.

REL 377 Religion in Russia. (3) F, S

Examines the history of the various religious traditions of Russia and the former USSR from an interdisciplinary perspective. *General Studies: HU, H.*

REL 379 Religion, Nationalism, and Ethnic Conflict. (3) F, S

Examines the role of religion in national and ethnic conflict in the contemporary world. *General Studies: HU, G.*

REL 381 Religion and Moral Issues. (3) A

The manner in which human religiousness relates to social concerns, e.g., sexuality, the environment, bioethical issues, and violence. *General Studies: L2/HU.*

REL 385 Contemporary Western Religious Thought. (3) A

Introduction to contemporary Jewish and Christian thought. Topics include religion and politics, problem of evil, interpretations of God, and feminist theology. *General Studies: L2/HU.*

REL 390 Women and Religion. (3) A

The role of women in several organized religions and/or religious sects, including a study of myth and symbols as they are used to establish, maintain, and enforce sex-roles within specific religions. *General Studies: HU, G.*

REL 405 Problems in Religious Studies. (3) F, S

Selected topics in religious studies, involving students in research interests of instructor. May be repeated for credit when topics vary. Seminar. Prerequisite: at least 9 semester hours of REL courses or instructor approval.

REL 410 Judaism in Modern Times. (3) N

Variety of expressions of Judaism and Jewishness in the modern period. Topics may include American Judaism or religious responses to the Holocaust. *General Studies: HU, H.*

REL 415 The Jewish Mystical Tradition. (3) A

Examination of some of the esoteric lore of Judaism. Movements and literature such as Hasidism and Kabbalah are studied. *General Studies: HU.*

REL 420 Religion in American Life and Thought. (3) A

The influence of religion on American society, culture, and ideas; the distinctive character of religion in America. Prerequisite: REL 320 or 321 or equivalent. *General Studies: L2/HU.*

REL 426 American Preachers and Preaching: The Sermon in America. (3) N

The life and work of notable American preachers. The emergence of the preacher as representative of American religion. Prerequisite: REL 320 or 321 or equivalent. *General Studies: L2/HU.*

REL 427 American Religious Thought. (3) N

The thought of representative American religious thinkers, i.e., Jonathon Edwards, William Ellery Channing, Horace Bushnell, and Reinhold Niebuhr. Prerequisite: REL 320 or 321 or equivalent. *General Studies: HU, H.*

REL 444 Religion in Japan. (3) F

Religion in Japanese history, especially the development of Japanese Buddhism, and religion in the modern transformation of Japan. Prerequisite: instructor approval. *General Studies: HU, G, H.*

REL 460 Studies in Islamic Religion. (3) A
Issues in the interpretation and understanding of Islamic texts, history, society, culture, and rituals. Prerequisites: REL 365 and Religious Studies major or instructor approval. *General Studies: HU, G.*

REL 470 Religion in the Middle Ages. (3) A

Religious aspects of medieval life and thought; variety of forms of dissent, heresy, and reform movements from the 4th to 13th centuries. *General Studies: HU, H.*

REL 471 Reformation and Modern Christianity. (3) A

Protestant Reformation to contemporary Christian movements; includes factors in the dissolution of the Medieval Christian synthesis, variety of reform movements and reformation patterns, Catholic counter-reform measures, formation of liberal theology, ecumenical movement, and the World Council of Churches. *General Studies: HU, H.*

REL 486 Modern Critics of Religion. (3) A
Major theories and critiques of religion among modern social, philosophical, and religious thinkers. *General Studies: HU.*

REL 494 Special Topics in Religious Studies. (3) N

Open to all students, freshmen by instructor approval only. Topics may be selected from various areas.

REL 498 Pro-Seminar in Religious Studies. (3) A

For students with a major or minor emphasis in Religious Studies.

REL 501 Research Methods in Religious Studies. (3) F

An exploration of the major themes and methods in the study of religion, with primary focus on classical texts. Lecture, discussion.

REL 502 Research Methods in Religious Studies. (3) F, S

An exploration of the major themes and methods in the study of religion, with primary focus on contemporary texts. Lecture, discussion.

REL 591 Seminar. (3) N

Topics on methodological issues in the study of religion. Prerequisite: Religious Studies graduate student or instructor approval.

REL 598 Special Topics. (3) F, S

Topics are selected from the following areas:

- (a) Christianity, Greco-Roman Religion
 - (b) Comparative Western, Ancient Near East, Judaism
 - (c) Islam
 - (d) Native American Religion
 - (e) Problems in Religious Studies
 - (f) Religion in America
 - (g) Religion in East Asia
 - (h) Religion in South Asia
 - (i) Study of Religion, Comparative Religion
 - (j) Western Religious Thought, Ethics
- May be repeated for credit.

Department of Sociology

Robert Snow

Chair

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www.asu.edu/clas/sociology

PROFESSORS

BOLIN, COBAS, GORDON, HARDERT,
LANER, NAGASAWA, SNOW,
THOMAS, WEITZ, WHITAM

ASSOCIATE PROFESSORS

BENIN, KEITH, KULIS, McNEELY,
MILLER-LOESSI, SULLIVAN

ASSISTANT PROFESSORS

BLAIR, ESPINOSA, JACOBSON,
QIAN, RHEA

LECTURERS

EVERTS, FINE, PADILLA

INSTRUCTOR

WILLIAMS

SOCIOLOGY—B.A.

The B.A. degree in Sociology requires a minimum of 30 hours of Sociology course work and 15 hours in closely related fields. Of the 30 required hours, a minimum of 18 hours must be upper-division with at least 12 of the 18 upper-division hours taken in residence at ASU Main Campus. All upper-division courses in the major

must be completed with a grade of "C" or higher. The following courses are required:

SOC 101	Introductory Sociology SB 3	or SOC 301 Principles of Sociology SB (3)
SOC 391	Sociological Research SB 3	
SOC 395	Social Statistics I N2 3	
SOC 470	Racial and Ethnic Minorities SB 3	or SOC 474 Afro-American in Modern Society L2/SB, C (3)
SOC 483	History of Social Thought L2/SB 3	or SOC 485 Sociology of Knowledge L2/SB (3)
	or SOC 486 Contemporary Theory SB (3)	
Total	.....	15

Sociology majors may complete the remaining 15 required hours through selecting one of two options. For a general sociology preparation, students must choose five courses that will sample at least three of the six sociology content areas:

1. family;
2. intergroup relations and social psychology;
3. political/comparative-historical;
4. social problems and processes;
5. stratification/occupations/organization; or
6. urban sociology/demography.

If majors desire a narrower preparation in a specialized area of sociology, they may complete the remaining 15 hours through the focus area option. At present, five substantive focus areas have been articulated: family issues, urban issues, diversity issues, work/organizational issues, and health issues. Students choosing this option to fulfill major requirements must complete two required focus area courses and select SOC 484 Internships are available within the focus area option.

Information concerning the two options for fulfilling major requirements is available in the Department of Sociology office, the Sociology Advising Center, and on the Internet at www.asu.edu/clas/sociology/undergraduate/advising.

MINOR IN SOCIOLOGY

The minor in Sociology requires 18 hours, of which 12 hours must be upper-division courses, with at least 6 upper-division hours completed at ASU Main Campus. The required courses are as follows:

SOC 101	Introductory Sociology SB 3	or SOC 301 Principles of Sociology SB (3)
One of the following	.....	3
SOC 391	Sociological Research SB (3)	
SOC 395	Social Statistics I N2 (3)	
SOC 483	History of Social Thought L2/SB (3)	or SOC 485 Sociology of Knowledge L2/SB (3)
	or SOC 486 Contemporary Theory SB (3)	

The remaining four courses consist of sociology electives.

SECONDARY EDUCATION—B.A.E.

Social Studies. The major teaching field of social studies education consists of 63 semester hours, of which 30 hours may be in criminal justice, economics, geography, history, political science, psychology, and sociology and are exactly those courses required for the B.A. degree in Sociology. Of the remaining hours, two groups of 12 hours each and one of six hours are generally taken in related social sciences plus SED 480 Special Methods of Teaching Social Studies.

The minor teaching field consists of 24 semester hours, at least six of which must be upper division. SOC 101 or 301, and SOC 470 Racial/Ethnic Minorities or SOC 474 Afro-American in Modern Society are required. The remaining 21 hours must be approved by the sociology advisor in consultation with the student and must include at least one course from at least four of the following seven areas:

1. family;
2. intergroup relations and social psychology;
3. political/comparative-historical;
4. racial/ethnic relations;
5. social problems and processes;
6. stratification/occupations/organization; or
7. urban sociology/demography.

GRADUATE PROGRAMS

The faculty in the Department of Sociology offer programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

SOCIOLOGY (SOC)

SOC 101 Introductory Sociology. (3) F, S, SS

Fundamentals of sociology, organization of human groups and society, processes of interaction, and social change. Not open to students who have credit for SOC 301. 2 hours lecture, 1 hour discussion. *General Studies:* SB.

SOC 301 Principles of Sociology. (3) F, S, SS

Intensive and critical analysis of the concepts of sociology. Not open to students who have credit for SOC 101. *General Studies:* SB.

SOC 312 Sociology of Adolescence. (3) F, S

Cultural values and the social processes that help explain the development of the phenomenon of modern adolescence, including investigation of adolescent subcultures and cross-cultural references. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 315 Courtship and Marriage. (3) F, S, SS

An overview of courtship, marriage, and related processes, focusing on problematic aspects of these institutions from the sociological perspective. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 318 Overview of Aging. (3) F

Multidisciplinary introduction to gerontology. Explores the characteristics, experiences, needs, and problems of older persons. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 321 Sociology of Work. (3) S

Social and cultural analysis of industry. Occupational roles, status, and social participation of workers. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 331 Environmental Sociology. (3) F

Analysis of human organizational responses to population growth, technological change, and environmental stressors on both a national and global scale. Prerequisites: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 332 Urban Sociology. (3) F, S

Growth, characteristics, and problems of the modern city. Prerequisite: SOC 101 or 301. *General Studies:* SB, G.

SOC 333 Population. (3) F, S, SS

Theories of population change; births, deaths, and migration; population policies. Prerequisite: SOC 101 or 301. *General Studies:* SB, G.

SOC 340 Sociology of Deviant Behavior.

(3) F, S, SS

A sociological analysis of stigmatized behaviors and conditions, including the causes, effects, and management of stigma. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies:* SB.

SOC 341 Modern Social Problems. (3) F, S, SS

Race relations, poverty, unemployment, and other current issues. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 352 Social Change. (3) F, S

Patterns of social change, resistance to change, and change-producing agencies and processes. Prerequisite: SOC 101 or 301. *General Studies: SB, G, H.*

SOC 360 Sociological Psychology. (3) F, S Interaction patterns between the sociocultural order and individuals; socialization process; norms, roles, and statuses; collective behavior. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 361 Variant Sexuality. (3) F

Sociological research and theories dealing with homosexuality, transvestism, transsexualism, and other variations in sexual orientation and gender identity. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 365 The Sociology of Mass Communication. (3) F, S

A sociological exploration of the major mass media as a communicative process in American society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 368 Sociology of Everyday Life. (3) F, S

Examination of routine everyday behavior as it relates to problems of social order, control, change, identity, and relationships. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 391 Sociological Research. (3) F, S, SS

Methods of sociological research, including the fundamental assumptions underlying research and some practical experience in research design, data collection techniques, and data analysis. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 395 Social Statistics I. (3) F, S, SS

Application of descriptive and inferential statistical methods to research problems in sociology. Prerequisites: SOC 101 (or 301), 391; N1 course. *General Studies: N2.*

SOC 415 The Family. (3) F, S, SS

The family considered from the institutional viewpoint; its historical development and its adaptation to a changing culture; the family system in many cultures. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 416 Marriage Problems in Contemporary Society. (3) S

Marital and family problems in today's society from the viewpoint of personal and cultural adjustment. Prerequisites: SOC 101 (or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L2/SB.*

SOC 417 Family Violence. (3) F, S

Study of current research and theory on several aspects of domestic violence, including child maltreatment, spousal aggression, and courtship violence. Prerequisite: instructor approval. *General Studies: SB.*

SOC 418 Aging and the Life Course. (3) F, S

Social aspects of aging. Theoretical and methodological perspectives and problems of aging such as life satisfaction, retirement, and adjustment to role loss. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 420 Sociology of Religion. (3) S

Interrelationship of culture, society, and religion; religion and social stratification; religious, economic, and political institutions; social change and religion. Emphasis on American society and institutions. Prerequisites: ASB 102 (or SOC 101 or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L2/SB.*

SOC 421 Sociology of Education. (3) S

Contemporary sociological perspectives are used to examine effects of schools and schooling on individuals and society. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 422 Sociology of Complex Organizations. (3) F

Sociological studies of government agencies, industrial firms, labor unions, military establishments, and other large-scale organizations. Prerequisite: 6 hours in sociology, including SOC 101 or 301 or instructor approval. *General Studies: L2/SB.*

SOC 423 Social Class and Stratification. (3) S

Social classes and the function of these groupings in a society. Prerequisites: SOC 101 (or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: L2/SB.*

SOC 424 Politics of Women's Health. (3) S 1999

Women as health care workers and issues of health, illness, and health care for women. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 427 Sociology of Health and Illness. (3) F

Social aspects of physical and mental illness and sociological analysis of the health care system and its practitioners. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L2/SB.*

SOC 428 AIDS and Society. (3) F

This course provides a sociohistorical perspective on stigma and illness in general and on AIDS in specific. Prerequisite: SOC 101 or 301 or instructor approval.

SOC 429 Sociology of Law. (3) S

Examination of law as an institution; its origins, operations, and consequences. Emphasis on contemporary legal issues and problems. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 433 Demographic Methods. (3) S

Science of population analysis; problems in measurements of size, composition, and changes in population. Prerequisite: SOC 101 or 301. *General Studies: SB.*

SOC 446 Sociology of Crime. (3) F

The process of criminalization, exploring the behavior of the definers of crime, and the behavior of those defined as criminals. Prerequisites: SOC 101 (or 301) and 340 or instructor approval. *General Studies: SB.*

SOC 451 Comparative Sociology. (3) F

Cross-cultural study of basic social institutions; the methodology of cross-cultural research. Prerequisite: ASB 102 or SOC 101 (or 301) or instructor approval. *General Studies: SB, G.*

SOC 455 Collective Behavior. (3) S

Social causes and consequences of such noninstitutionalized forms of behavior as crowds, cults, publics, social movements, and revolutions. Prerequisites: SOC 101 (or 301) and an additional 3 hours in sociology or instructor approval. *General Studies: SB.*

SOC 456 Political Sociology. (3) S

Social factors associated with voting; nature and structure of the electorate and political parties and the nature of national and international power structure. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB, G.*

SOC 464 Women's Roles. (3) S

Sociological analysis of the development, nature, and consequences of traditional and alternative roles of women in contemporary society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L2/SB, C.*

SOC 470 Racial and Ethnic Minorities. (3) F, S, SS

Problems of minorities in the United States and in other racially and ethnically heterogeneous societies. Evaluation of theories of prejudice and of research dealing with discrimination, desegregation, and assimilation. Lecture, discussion. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 474 Afro-American in Modern Society. (3) F, S, SS

Social and cultural heritage of black Americans; achievements and current trends. Lecture, discussion. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L2/SB, C.*

SOC 483 History of Social Thought. (3) S, SS

Social thought in human culture. Background of modern sociology. Prerequisite: SOC 101 or 301. *General Studies: L2/SB.*

SOC 485 Sociology of Knowledge. (3) F

Relationship between social conditions and the development of knowledge in modern society. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: L2/SB.*

SOC 486 Contemporary Theory. (3) S

Contemporary issues and crises in social theory with major focus on particular theorists. Ideological factors in theory, philosophical issues, the nature of theory and its relationship with methodology. Prerequisite: SOC 101 or 301 or instructor approval. *General Studies: SB.*

SOC 501 Practicum in Survey Research. (3) F, S

A research practicum in survey field work, analysis, and reporting in the Phoenix Area Study. Prerequisite: SOC 391 or equivalent.

SOC 502 Practicum in Survey Research. (3) F, S

Continuation of SOC 501. Prerequisite: SOC 501.

SOC 503 Sociology as a Profession I. (1) F
Becoming and working as a sociologist, including how to write a vita, choose a thesis topic, or find dissertation data. Prerequisite: graduate Sociology major.

SOC 504 Sociology as a Profession II. (1) S
Becoming and working as a sociologist, including how to write a vita, choose a thesis topic, or find dissertation data. Prerequisite: graduate Sociology major.

SOC 505 Social Statistics II: Multivariate Analysis. (3) F, SS

Analysis of variance, multiple regression, dummy variable regression, path analysis, and related topics. Computer application to problem solving. Prerequisites: SOC 395 (or equivalent); a proficiency examination.

SOC 507 Social Statistics IIIA: Categorical Data Analysis. (3) F

Logistic and log-linear models through computer applications. Social mobility, dynamic analysis, and discriminate analysis may also be included. Prerequisite: SOC 505 or instructor approval.

SOC 508 Social Statistics IIIB: Structural Equation Analysis. (3) S

Structural equation models are taught using LISREL and other computer packages. Topics include multiple group analyses and ordinal endogenous variable models. Prerequisite: SOC 505 or instructor approval.

SOC 509 Social Statistics IIIC: Event History Analysis. (3) F, S

Proportional hazards models and other methods for analyzing longitudinal data and establishing hazard rates of events for exploratory variables. Prerequisite: SOC 505 or equivalent.

SOC 515 Studies of the Family. (3) S

Current developments in the study of marriage and the family. Prerequisite: instructor approval.

SOC 585 Development of Sociology. (3) F

Major sociological theorists, including Durkheim, Weber, Marx, Parsons, Merton, Dahrendorf, Homans, and Mead. Prerequisite: instructor approval.

SOC 586 Contemporary Sociological Theory. (3) S

Analysis of major theories, including structural-functional, conflict, social exchange, symbolic interaction, and role theory. Prerequisite: instructor approval.

SOC 587 Contemporary Issues in Sociology. (3) S

Philosophy of social science. Contemporary issues in sociological theory and methods. Prerequisite: instructor approval.

SOC 588 Methodological Issues in Sociology. (3) S

Basic methodological issues in the application of scientific methods to the study of human social life. Emphasis on limited number of major works, with contrasting approaches to issues.

Department of Speech and Hearing Science

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PROFESSORS

S. BACON, CASE, DORMAN,
LaPOINTE, MOWRER, WILCOX

ASSOCIATE PROFESSOR
SINEX

ASSISTANT PROFESSORS

HADLEY, LISS, RISPOLI, SHARMA

CLINICAL ASSOCIATE PROFESSORS

C. BACON, BROWN, MINTZ, REMSON

CLINICAL ASSISTANT PROFESSORS

COOK, MURPHY, WEXLER

LECTURER

HOWARD

INSTRUCTORS

BARTO, BEAL-GEVARTER,
BIGWOOD, NEUMANN,
O'BRIEN, QUINN

SPEECH AND HEARING SCIENCE—B.S.

The B.S. degree in Speech and Hearing Science consists of 45 semester hours of speech and hearing science courses emphasizing the developmental and scientific aspects of language, speech, and hearing. The following courses, or their approved equivalents, are required:

SHS 250	Introduction to Phonetics	3
SHS 310	Anatomical and Physiological Bases of Speech	3
SHS 311	Physical and Physiological Bases of Hearing	3
SHS 367	Language Science <i>SB</i>	3
SHS 375	Speech Science	3
SHS 376	Psychoacoustics	3
SHS 384	Hearing Disorders	3
SHS 401	Introduction to Audiologic Evaluation	3
SHS 402	Modifying Communicative Behavior	3
SHS 431	Developmental Speech Disorders	3
SHS 450	Observation	1
SHS 465	Speech and Language Acquisition <i>SB</i>	3

SHS 470	Developmental Language Disorders	3
SHS 496	Aural Rehabilitation	3
Total		40

The remaining speech and hearing science courses to complete the major are determined by the students in consultation with an advisor. A list of approved electives is available through the department. Supporting courses from related fields must include the following or their equivalents:

BIO 201	Human Anatomy and Physiology I <i>S2</i>	4
MAT 170	Precalculus <i>N1</i>	3
PGS 101	Introduction to Psychology <i>SB</i>	3
PSY 230	Introduction to Statistics <i>N2</i>	3
Total		13

GRADUATE PROGRAMS

The faculty in the Department of Speech and Hearing Science offer programs leading to the M.S. degree in Communication Disorders and Ph.D. degree in Speech and Hearing Science. Consult the *Graduate Catalog* for requirements.

SPEECH AND HEARING SCIENCE (SHS)

SHS 105 Introduction to Human Communication Disorders. (3) F, S

Introduction to hearing, language, and speech problems in children and adults. Lecture, demonstration.

SHS 174 American Sign Language I. (4) F, S

Basic receptive/expressive conversational skills; basic grammar and syntax rules. Orientation to deafness and deaf culture. Lecture, drill, practice, dialogue, and discussion.

SHS 175 American Sign Language II. (4) F, S

Further development of receptive/expressive conversation skills in ASL; finger spelling. Continued exploration of deaf culture. Lecture, discussion, drill, practice. Prerequisite: SHS 174.

SHS 250 Introduction to Phonetics. (3) F

An introduction to English phonetics with emphasis on phonetic transcription, articulation, phonology, and disorders of speech.

SHS 274 American Sign Language III. (4) F, S

Develop greater fluency and speed. Emphasis on deaf culture and folklore including storytelling and idioms. Beginning technical and interpreting signs. Lecture, discussion, drill, practice. Prerequisite: SHS 175.

SHS 275 American Sign Language IV. (4) F, S

ASL grammar and syntax, conceptually accurate use of vocabulary, deaf culture, text analysis, and translation. Presentations, finger spelling, drills, and stories. Prerequisite: SHS 274.

SHS 310 Anatomical and Physiological Bases of Speech. (3) F

A noncadaveric study of anatomical systems that underlie human speech and language, including respiration, phonation, articulation, and related nervous system processes.

SHS 311 Physical and Physiological Bases of Hearing. (3) F

Study of the physical characteristics of sound and of the structure and function of the human auditory system. Prerequisites: MAT 117; PHY 111, 113.

SHS 367 Language Science. (3) F

Normative aspects and integration of language structure, comprehension, and production in children and adults. *General Studies: SB.*

SHS 375 Speech Science. (3) F

Normative aspects of speech, hearing, and language. Prerequisites: SHS 310, 311.

SHS 376 Psychoacoustics. (3) S

Introduction to acoustics, cochlear anatomy and physiology, and the perception of sound. Prerequisite: SHS 311 or instructor approval.

SHS 384 Hearing Disorders. (3) S

Pathologies of the ear and associated peripheral and central hearing disorders: characteristics, management, and effects on communication. Prerequisites: SHS 311, 376.

SHS 401 Introduction to Audiologic Evaluation. (3) F

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Cross-listed as SHS 501. Prerequisites: SHS 311 and 376 and 384 or equivalents.

SHS 402 Modifying Communicative Behavior. (3) S

Principles and techniques of modifying speech and language behavior. Prerequisite: SHS 250 or equivalent.

SHS 431 Developmental Speech Disorders. (3) S

Introduction to the nature of articulation, fluency, resonance, and voice disorders in childhood. Prerequisites: SHS 250 and 310 or equivalents.

SHS 450 Observation. (1) F, S

Opportunity to obtain observation experience at the ASU Speech and Hearing Center or at external sites. Prerequisite: instructor approval.

SHS 465 Speech and Language Acquisition. (3) S, SS

Speech and language development in the normal child. Cross-listed as SHS 565. Prerequisite: SHS 367 or equivalent. *General Studies: SB.*

SHS 470 Developmental Language Disorders. (3) F

Introduction to the nature and treatment of language disorders in children. Prerequisite: SHS 465 or instructor approval.

SHS 483 Professional Issues in Communication Disorders. (3) F

Topics related to professional certification, accreditation, code of ethics, graduate education and other issues in speech-language pathology and audiology.

SHS 485 Acquired Speech and Language Disorders. (3) S

Introduction to acquired speech and language disorders across the lifespan. Prerequisites: SHS 250, 310.

SHS 494 Special Topics. (3) F, S

Topics may be selected from the following:

- (a) Hearing Disorders
- (b) Research
- (c) Speech and Language Disorders

May be repeated for credit. Prerequisite: instructor approval.

SHS 496 Aural Rehabilitation. (3) S

Approaches to aural rehabilitation of children and adults. Introduction to educational audiology and assistive listening devices. Cross-listed as SHS 596. Prerequisites: SHS 375 and 376 and 401 or equivalents.

SHS 501 Introduction to Audiologic Evaluation. (3) F

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Cross-listed as SHS 401. Prerequisites: SHS 311 and 376 and 384 or equivalents.

SHS 502 Differential Diagnosis for Audiologic. (4) F

Differential diagnosis of cochlear and retro-cochlear disorders, and assessment of vestibular system. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 or equivalent.

SHS 504 Hearing Aids. (4) S

Operation, application and fitting of amplification devices for the hearing impaired. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 or equivalent.

SHS 505 Computers and Current Technology in Audiology and Speech-Language Pathology. (3) F

Computer applications and current technology as applied to service administration and delivery in the fields of audiology and speech-language pathology. Lecture, lab.

SHS 508 Pediatric Audiology. (3) F

Audiologic assessment, screening, and development considerations for infants and young children. Prerequisite: SHS 401 or 501 or equivalent.

SHS 510 Advanced Hearing Science. (3) N

Anatomical, physiological, and psychophysical aspects of audition. Prerequisite: SHS 376 or instructor approval.

SHS 511 Auditory Perception by the Hearing Impaired. (3) F 1998

A study of how and why sensorineural hearing loss alters the perception of sound. Prerequisite: SHS 376 or instructor approval.

SHS 512 Medical Aspects of Speech and Hearing. (3) F

Correlation of history and physical findings with pathologic physiology and test results in speech and hearing abnormalities.

SHS 515 Audiologic Instrumentation and Calibration. (3) S

Electronic instruments used to produce, modify, and measure characteristics of sound. Measurement standards and methods for calibration of audiologic equipment. Lecture, lab. Prerequisite: SHS 401 or 501 or equivalent.

SHS 516 Auditory Evoked Potentials. (4) S

Continuation of SHS 502, including electrophysiologic assessment of peripheral and central auditory nervous system. Lecture, lab. Prerequisite: SHS 502.

SHS 545 Speech Perception by the Hearing Impaired. (3) F

Speech perceptual problems of the hearing impaired including those who have cochlear implants. Prerequisite: SHS 375 or instructor approval.

SHS 552 Otoacoustic Emissions as a Diagnostic Tool. (3) F 1998

Study of the types of otoacoustic emissions, their theoretical implications and application to clinical diagnostics. Lecture, discussion, lab. Prerequisite: SHS 376 or instructor approval.

SHS 555 Cochlear Implants. (3) S

Current status of cochlear implant research and development. Prerequisites: SHS 504 and 545 or instructor approval.

SHS 565 Speech and Language Acquisition. (3) S

Speech and language development in the normal child. Cross-listed as SHS 465. Prerequisite: SHS 367 or equivalent.

SHS 566 Psychology of Language. (3) S

The psycholinguistic study of the production and comprehension of language across the lifespan.

SHS 567 Neural Bases of Communication Disorders. (3) F

Neuroscience and its application to matters of normal and disordered communication. Pre- or corequisite: SHS 310 or equivalent.

SHS 571 Augmentative Communication and Language Programming. (3) S

Focus on individuals across the age span who are or who are at risk for being unable to communicate with spoken language. Lecture, lab.

SHS 572 Language Assessment and Intervention in Early Childhood. (3) F

Focus on the birth to 5-year-old population who are at risk for or have communication and language disabilities. Prerequisite: SHS 470 or equivalent.

SHS 573 Language Assessment and Intervention with School-Age Populations. (3) S

Focus on later language development, linguistic demands of academic settings, assessment and intervention strategies for older children and adolescents. Prerequisite: SHS 565 or equivalent.

SHS 574 Fluency Disorders and Treatment. (3) F

Phenomena, etiology, assessment, and theories of stuttering are presented, followed by various treatment procedures for children and adults who stutter. Prerequisite: SHS 431 or equivalent.

SHS 575 Aphasia and Related Neurogenic Language Disorders. (3) S

Assessment and treatment of acquired neuro-linguistic impairment. Prerequisite: SHS 567.

SHS 576 Neuromotor Speech Disorders. (3) S

Evaluation and treatment of the dysarthrias and apraxia of speech. Emphasis on acquired adult disorders.

SHS 577 Craniofacial Disorders of Communication. (3) S, SS

Communication disorders related to anomalies of the craniofacial structures, including orofacial clefting of the lip and palate. Prerequisite: SHS 310 or equivalent.

SHS 578 Disorders of Voice. (3) S

Communication disorders related to dysfunction of the phonatory and resonance systems of voice production, assessment, and treatment. Prerequisite: SHS 310 or instructor approval.

SHS 579 Feeding and Swallowing Disorders Across the Lifespan. (3) F

Focus on individuals across the age span who have feeding and/or swallowing disorders. Assessment and treatment strategies are presented. Prerequisite: SHS 567.

SHS 580 Clinical Practicum. (1–6) F, S, SS
Supervised practicum in audiology or speech-language pathology. 1 hour staffing and 3 hours of client contact per week per hour of credit. May be repeated for credit. Prerequisites: instructor approval; student must not have provisional admission status.

SHS 582 Differential Diagnosis of Communication Disorders. (3) S

Procedures for assessing speech/language disorders in children and adults. 3 hours lecture, 2 hours lab. Prerequisites: SHS 250 and 310 and 465 and 567 or equivalents.

SHS 584 Internship. (1–6) F, S, SS

Off-campus directed experiences in audiology or speech-language pathology. May be repeated for credit. Prerequisites: SHS 580; student must consult with coordinator before registration.

SHS 585 Articulation and Phonology: Assessment and Intervention. (3) S

Assessment and treatment of developmental articulation and phonological disorders. Prerequisites: SHS 250 and 310 or equivalents.

SHS 591 Seminar. (3) F, S, SS

Selected topics regularly offered:
(a) Autism and Pervasive Language Disorders
(b) Multiply Handicapped Child

SHS 596 Aural Rehabilitation. (3) S

Approaches to aural rehabilitation in children and adults. Introduction to educational audiology and assistive listening devices. Cross-listed as SHS 496. Prerequisite: SHS 401 or 501 or equivalent.

Women's Studies Program

Mary Logan Rothschild
Director

(EC A209) 602/965–2358

www.asu.edu/clas/womens_studies

WOMEN'S STUDIES CORE FACULTY

Professor: Rothschild; Associate Professor: Ferraro; Assistant Professors: Gutierrez de Soldatenko, Klingler, Lind, Scheiner; Academic Professional: Hopkins

ANTHROPOLOGY

Professor: Koss-Chiono;
Associate Professor: Brandt

ART

Professors: Codell, Magenta;
Associate Professors: Fahlman, Schleif

ART HISTORY

Assistant Professor: Wolfthal

CHICANA AND CHICANO STUDIES

Professor: Ruiz

COMMUNICATION

Professor: Valentine; Associate Professors: Carlson, Nakayama;
Assistant Professors: Flores, Kent

CURRICULUM AND INSTRUCTION

Professor: Edelsky;
Associate Professor: Wilson

EDUCATION

Associate Professor: Guzzeti

EDUCATIONAL MEDIA AND COMPUTERS

Associate Professor: McIsaac

ENGLISH

Professors: Lightfoot, Nilsen, Parker-Rhodes, Richard; Associate Professors: Adams, DeLamotte, Gutierrez, Horan, Morgan, Sensibar;
Assistant Professors: McCabe, Pritchard, Tohe

EXERCISE SCIENCE AND PHYSICAL EDUCATION

Professor: Wells;
Assistant Professor: Swan

FAMILY RESOURCES AND HUMAN DEVELOPMENT

Associate Professor: Martin

GEOGRAPHY

Professor: Burns

HEALTH ADMINISTRATION AND POLICY

Professor: Kronenfeld

HISTORY

Professors: Fuchs, Giffin, Lavrin, Rothschild, Ruiz, Warnicke;
Associate Professor: Stoner; Assistant Professors: Gray, Gullet, Hendricks

JUSTICE STUDIES

Professor: Johnson;
Associate Professors: Romero, Zatz;
Assistant Professor: Menjivar

LANGUAGES AND LITERATURES

Professors: Ahern, Foster, Losse;
Assistant Professors:
Galindo, Gruzinska;
Instructor: Goodman

MANAGEMENT

Associate Professor: Cook

MUSIC

Associate Professor: Williamson

NURSING

Associate Professor: Kenney;
Assistant Professor: Boychuck

PHILOSOPHY

Associate Professor: McGregor

PLANNING

Assistant Professor: Wasserman

POLITICAL SCIENCE

Associate Professor: Dantico;
Assistant Professor: Bower

PSYCHOLOGY

Professors: Berstein, Chassin, Eisenburg, Russo;
Assistant Professor: Saenz

PSYCHOLOGY IN EDUCATION

Professors: Hackett, Kerr; Associate Professor: Moore

RECREATION MANAGEMENT AND TOURISM

Professor: Allison

RELIGIOUS STUDIES

Assistant Professor: Fessenden

SOCIAL WORK

Professor: Coudroglou

SOCIOLOGY

Professors: Gordon, Laner, Miller-Loessi, Weitz;
Associate Professor: Benin;
Assistant Professor: Agadjanian

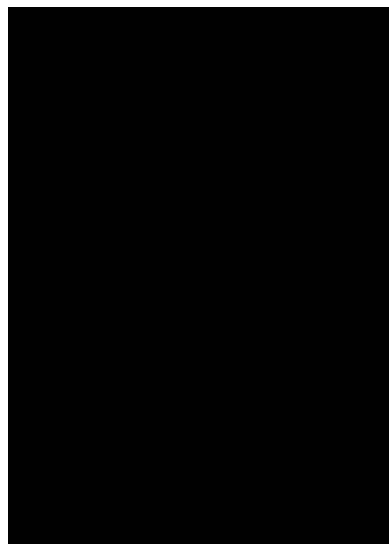
THEATRE

Professor: Knapp

The Women's Studies Program is an interdisciplinary university program housed in the College of Liberal Arts and Sciences. Information on faculty affiliation is provided for reference.

**WOMEN'S STUDIES—
B.A. OR B.S.**

The B.A. or B.S. degrees in Women's Studies consists of 45 hours, of which 33 must be taken from WST prefixes or from other prefixes designated as part of the major. The other 12 must be in closely related fields chosen in consultation with an advisor. At least 36 of the 45 semester hours re-



Exterior of the John J. Ross-William C. Blakley Law Library. Tim Trumble photo

quired for the major must be completed in upper-division courses. In addition, for the B.S. degree, students must complete six hours in statistics, computer science, or quantitative research methods. This sequence must be approved by the Women's Studies Program advisor.

Required Courses. Students must complete the following courses:

WST 100	Women and Society <i>SB, C</i>	3
	or WST 300 Women in Contemporary Society <i>SB, C</i> (3)	
WST 376	Introduction to Feminist Theory <i>L1, C</i>	3
WST 484	Internship	3
WST 498	PS: Theoretical Issues in Women's Studies <i>L2</i>	3
Total	.....	12

Students must also complete three other courses:

1. an upper-division course that provides a historical perspective on the lives and contributions of women;
2. an upper-division course that provides a humanities or fine arts perspective on the lives and contributions of women; and
3. an upper-division course on women in non-Western societies or a course on minority or ethnic women in American society.

A list of approved courses is available each term in the program office.

No course may be used to satisfy more than one requirement.

Electives in Closely Related Fields.

Majors must complete 12 hours of courses in fields closely related to women's studies. These courses may be used to satisfy the general education requirements in the College of Liberal Arts and Sciences.

MINOR IN WOMEN'S STUDIES

The Women's Studies minor consists of 18 semester hours. The following courses are required:

WST 100	Women and Society <i>SB, C</i>	3
	or WST 300 Women in Contemporary Society <i>SB, C</i> (3)	
WST 376	Introduction to Feminist Theory <i>L1, C</i>	3
Total	.....	6

Twelve additional hours of approved women's studies courses must be taken after consultation with a women's studies advisor.

Students pursuing a minor must register at least one semester before graduation and are encouraged to meet with the women's studies academic advisor early in their course of studies.

CERTIFICATE PROGRAM IN WOMEN'S STUDIES

The certificate program is equivalent to an interdisciplinary minor, consisting of 21 semester hours. Students pursuing a certificate must consult with the women's studies advisor. See page 309 for a description of the certificate program.

GRADUATE STUDIES

Although the Women's Studies Program does not offer a graduate degree, it is possible to pursue a graduate degree in some existing programs with a thesis or dissertation topic related to women's studies. Information on such programs can be obtained from the Women's Studies Program office.

COURSES IN WOMEN'S STUDIES

Additional courses appear as Special Topics and vary semester to semester. A list of approved interdisciplinary courses that count toward the 36 hours of requirements for Women's Studies is available each term in the program office.

WOMEN'S STUDIES (WST)

WST 100 Women and Society. (3) F, S Interdisciplinary introduction examining critical issues in women's studies. Not open to students who have credit for WST 300. *General Studies: SB, C.*

WST 300 Women in Contemporary Society. (3) F, S, SS Intensive interdisciplinary examination of such topics as gender roles, work, education, sexuality, politics, health, and law. Not open to students who have credit for WST 100. *General Studies: SB, C.*

WST 372 Women in Judaism. (3) S The impact of feminism on the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as REL 373.

WST 373 Latina/Chicana Issues. (3) F, S Course examines the roles Mexican American, Chicana, and/or Latina immigrant women played historically, socially, and politically in the United States. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: SB, C.*

WST 375 Women and Social Change. (3) S Combines research and theory on a contemporary social problem with a community action experience focusing on women's social change initiatives. Lecture, field placement. *General Studies: C.*

WST 376 Introduction to Feminist Theory. (3) F, S Introduction to feminist theories and exploration of the intersection of gender, race, ethnicity, and class through critical analyses. Prerequisite: WST 100 or 300. *General Studies: L1, C.*

WST 380 Gender, Race, and Class. (3) SS Cultural diversity, class, and gender issues in American social life are explored. Lecture, seminar, analysis papers, and writing. *General Studies: SB, C.*

WST 413 Lesbian Culture: Images and Realities. (3) S Explores aspects of lesbian experience from sociological, psychological, historical, political, and literary critical perspectives. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WST 457 Women in Developing Countries. (3) F Economic, sociopolitical, and demographic contexts for understanding women's roles related to health, family, work, education, and community in developing countries. Prerequisite: 6 hours of social science credit or instructor approval. *General Studies: SB, G.*

WST 460 Women and the Body. (3) F An interdisciplinary look at how representations of woman as body permeate culture and affect a woman's sense of self. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: SB, C.*

WST 464 Voices and Visions. (3) F, S Explores the contributions of visionary women in the humanities, varying from semester to semester. Repeat credit for different topics. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WST 470 Women and Popular Culture. (3) S An interdisciplinary examination of how gender is constructed in popular cultural forms. Lecture, discussion. Prerequisite: WST 100 or 300 or instructor approval. *General Studies: HU, C.*

WST 484 Internship. (1-3) A Practical experience to enhance the academic perspectives that emerge from women's studies instruction. Prerequisite: preapproval by internship coordinator required.

WST 498 Pro-Seminar: Theoretical Issues in Women's Studies. (3) A Reading and research on important theoretical issues in women's studies. *General Studies: L2.*

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84-108. For graduation requirements, see pages 79-83. For omnibus courses offered but not listed in this catalog, see pages 56-57.

College of Nursing

Barbara A. Durand, Ed.D.
Dean

PURPOSE

The faculty in the College of Nursing acknowledge their responsibility to health care consumers for the preparation of individuals who provide nursing care of professional quality through teaching, research, and service. The purpose of the College of Nursing is to provide educational programs that prepare professional nurses to meet the health care needs of individuals, groups, and communities. To achieve this purpose, the college offers undergraduate, graduate, and continuing and extended education programs. Within the context of a liberal education, the degree programs prepare professional nurses who

1. understand and respond to changing health and social needs and services;
2. influence nursing practice and health care through leadership and participation in professional and sociopolitical activities; and
3. utilize scientific knowledge to advance professional nursing practice.

The continuing education program provides opportunities for registered nurses (RNs) to improve and expand their nursing practice to meet the health care needs of various populations and to further their own professional development.

ORGANIZATION

The College of Nursing is organized around two major clinical divisions: adult health/parent-child nursing and community health/psychosocial nursing systems.

The college offers an undergraduate program leading to a Bachelor of Science in Nursing degree, a graduate program leading to an M.S. degree with preparation for advanced practice in nursing, and continuing and extended education opportunities for practicing RNs.

ADMISSION

Preprofessional Admission. Students are admitted into the College of Nursing as “prenursing” students. Admission to ASU as a prenursing student does not guarantee admission into the Professional Nursing Program. Admission to the professional program is competitive with the greatest emphasis

placed on prerequisite grade point average.

In addition to meeting the university requirements for admission, it is recommended that students complete one year each of high school chemistry and biology.

Prenursing students are required to seek academic advising through the College of Nursing Student Services Office. This advising includes course planning as well as information regarding application materials and deadlines.

Professional Program Admission.

Professional Nursing Program courses are offered at ASU Main and ASU West. Students are asked to specify location preference as part of the application process. Students are expected to complete the Professional Nursing Program on the campus assigned upon admission. In the continuing tradition of the college to be at the forefront in nursing education, curriculum revisions are in process. See an advisor for current program information.

Prenursing students are eligible for consideration for admission to the Professional Nursing Program if they meet the following criteria:

1. regular admission to the College of Nursing;
2. good standing with ASU and the College of Nursing;
3. minimum prerequisite GPA of 2.75;
4. completion of designated prerequisite courses with earned grade of “C” or higher in each course;
5. completion of the application form;
6. submission of complete health history, physical examination results, and evidence of required immunizations;
7. proof of CPR certification (Level C American Heart Association Health Care Provider);
8. proof of negative drug screen; and
9. other required materials.

Admission is selective and based on available resources. Meeting the minimum prerequisite GPA does not ensure admission. All qualified applicants may not be admitted.

Transfer Credits. While the university accepts transfer credit from other accredited institutions, all transfer credit may not apply toward a Bachelor of Science in Nursing (B.S.N.) degree.

Students completing course work at a community college or university other than ASU should consult a College of Nursing academic advisor to plan an appropriate sequence of prenursing courses and to apply to the Professional Nursing Program. The college may not accept transfer credit (especially science) completed more than 10 years before the date of application.

Professional Program Transfer. Students requesting to transfer into the Professional Nursing Program with advanced standing may be required to submit letters of recommendation. Any student enrolled in good standing at any nationally accredited baccalaureate school of nursing currently or within the past two years may apply for admission into the Professional Nursing Program. To be considered for admission to the Professional Nursing Program, students must first be admitted to ASU (see pages 59–66). Transfer students must also meet all Professional Nursing Program admission requirements.

Admission of Registered Nurses (RNs). All RNs are admitted as pre-nursing students. In the continuing tradition of the college to be at the forefront in nursing education, curriculum revisions are in process. See an advisor for current program information. Several alternatives are available for RNs to facilitate progress toward the B.S.N., including credit by examination and transfer of previously completed nursing courses. RN students must consult with an advisor in planning their programs of study. Refer to page 396 for professional program admission criteria. In addition, an RN must submit a photocopy of his or her current license to practice nursing as an RN in Arizona. RN students are responsible for adhering to Arizona State Board of Nursing Rules and Regulations.

Readmission to the Professional Program. Students who have not been in continuous enrollment must file a petition requesting readmittance to the Professional Nursing Program and must provide the following documents:

1. proof of current enrollment or readmission to ASU and the College of Nursing,
2. transcripts from all colleges attended, and

3. all other admission requirements as outlined on pages 396–397.

Arizona State Board of Nursing Requirement. To be eligible to write the National Council Licensure Examination for Registered Nurses (NCLEX-RN), a student must have a high school diploma or GED certificate as well as proof of graduation from an accredited nursing program. Applicants are advised that a history of a felony must be reported to the Arizona State Board of Nursing and may influence licensure eligibility.

College Health Requirements. Students enrolled in the Professional Nursing Program are responsible for fulfilling the requirements of the health policies of the College of Nursing. The student is responsible for providing proof to the College of Nursing Student Services Office of having met these requirements before enrollment in the Professional Nursing Program. These health policies include the following requirements:

1. completed College of Nursing Health History Inventory and Record of Physical Examination;
2. proof of measles (rubeola), mumps, and rubella immunization (MMR);
3. proof of annual tuberculosis screening;
4. completed series of Hepatitis B vaccine;
5. current American Heart Association Level C CPR Certification;
6. proof of tetanus, diphtheria immunization (TD);
7. proof of Varicella (chicken pox) immunization;
8. proof of negative drug screen; and
9. annual flu vaccine is recommended.

A Nursing student may not participate in any clinical experience without meeting these requirements.

Essential Functions. Students admitted to the Professional Nursing Program will be expected to meet the Essential Functional Abilities of the Undergraduate Nursing Student. Essential functions for this program include gathering data through the senses (hearing, seeing, etc.), synthesizing information from a variety of sources, making decisions regarding patient care, and performing necessary physical and

mental activities to ensure safe care. For complete details, contact an advisor in the Student Services Office at NUR 108 or call 965–2987.

ASU Health Requirements. See pages 59–60.

Professional Liability Insurance. It is highly recommended that students carry their own personal professional liability insurance when enrolled in clinical nursing courses.

Health and Accident Insurance. It is strongly recommended that all students carry their own health and accident insurance. Some clinical agencies require students to have current health insurance. See the *Undergraduate Student Handbook*. Each student is personally responsible for costs related to any accident or illness during or outside of school activities.

Automobile Insurance. Students are required by state law to carry automobile insurance. Students are responsible for transportation to and from clinical sites. Extensive travel may be required for selected clinical experiences.

ADVISING

Although the College of Nursing provides academic advising, *it is ultimately the responsibility of each student to fulfill academic and program requirements*. Professional advisors are available by appointment in the College of Nursing Student Services Office, 602/965–2987. These advisors assist students with program planning, registration, preparation of needed petitions, verification of graduation requirements, referrals to university and community resources, and career planning.

Student responsibilities include following university guidelines regarding submission of transcripts from all colleges other than ASU and obtaining the necessary signatures or computer verifications required by the university.

Mandatory Advising. Newly admitted, readmitted, and transfer students are required to meet with an academic advisor before registering for their first semester of classes. All freshmen are required to meet with an academic advisor before registering for a second semester of classes. All students are encouraged to meet with an advisor each semester.

Program of Study. A program of study must be filed during the second semester of enrollment in the Professional Nursing Program and before registration for Professional Nursing Program course level Junior Two (JR2) courses.

Student Employment. Students intending to pursue the Professional Nursing Program on a full-time basis should expect to spend approximately 45 hours per week in class and study. It is suggested that any additional activities or employment be kept at a minimum.

DEGREES

Bachelor of Science in Nursing

The completion of the curriculum in Nursing leads to a Bachelor of Science in Nursing (B.S.N.) degree. In the continuing tradition of the college to be at the forefront in nursing education, curriculum revisions are in process. See an advisor for current program information. The purpose of the program is to prepare beginning professional nurses who possess the theoretical foundation and the clinical competence to function in various health care settings. The graduate is prepared to deliver nursing care services to individuals, families, population groups, and communities. The undergraduate program provides a foundation for graduate studies in nursing at the master's level.

Program objectives for the undergraduate curriculum are directed toward preparation of graduates with generalist abilities. Based on theoretical and empirical knowledge from nursing, the humanities, and physical, biological, and behavioral sciences, graduates are prepared to

- use theoretical knowledge from the sciences, humanities, and nursing as a base for critical thinking in professional nursing practice and to develop understanding of person, health, environment, and nursing;
- apply nursing process to provide safe, competent, and effective nursing care utilizing principle-based communication, technical/psychomotor, teaching, management, and therapeutic skills;
- provide comprehensive therapeutic nursing care in partnership with individuals, families, groups, and communities, including those who are culturally diverse and vulnerable;
- demonstrate professional practice which focuses on health promotion, health restorations, health maintenance, and illness care from a holistic perspective;
- participate in critically evaluating and applying research findings to nursing practice and in identifying nursing research problems;
- demonstrate values and behavior consistent with the culture of professional nursing;
- demonstrate personal and leadership characteristics appropriate for professional nursing practice;
- demonstrate responsibility and accountability for professional nursing practice;
- collaborate with nurses, other health care providers, and clients in the delivery of holistic care that is responsive to changing needs and societal trends; and
- participate in evaluating current nursing and health care services and trends, and in identifying future health care needs.

Nursing—M.S.

The faculty in the College of Nursing offer a program leading to an M.S. degree in Nursing with concentrations in adult health nursing, community health nursing, community mental health/psychiatric nursing, nursing administration, and parent-child nursing. The program requires a minimum of 40 semester hours with an earned grade of "B" or higher in all courses on the program of study. Students in the nurse practitioner options are required to complete additional semester hours. Requirements for this program are described in the *Graduate Catalog*. Persons interested in applying for admission to the program should write to the Graduate College for a *Graduate Catalog* and application form (see page 284) and contact the College of Nursing Student Service Office.

CERTIFICATE PROGRAM

A Post-Master's Family Nurse Practitioner certificate is available. For more information, see page 241.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

First-Year Composition Requirement

Completion of both ENG 101 and 102 or ENG 105 with a grade of "C" or higher is required for graduation from ASU in any baccalaureate degree.

General Studies Requirement

All students enrolled in a baccalaureate degree program must satisfy a university requirement of a minimum of 35 semester hours of approved course work in General Studies, as described on pages 84–87. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. Many of the university General Studies requirements may be met through completion of College of Nursing course requirements. See an academic advisor for details. General Studies courses are listed on pages 87–108.

COLLEGE DEGREE REQUIREMENTS

College requirements for graduation are consistent with those of the university.

MAJOR REQUIREMENTS

The Bachelor of Science in Nursing degree requires 120 semester hours.

Nursing Core Courses 1998–1999

Prerequisites

HCR 294	ST: Clinical Health Care Ethics	3
HCR 294	ST: Culture and Health	3
HCR 294	ST: Health Care Organization	3
HCR 294	ST: Pathophysiology	4
Total		13

Junior Year

First Semester

NUR 394	ST: Theory I: Health Integrity	4
NUR 394	ST: Pharmacology	2
NUR 394	ST: Professional Development I	3
NUR 484	Internship: Nursing Practice I	7
Total		16

Second Semester

NUR 394	ST: Theory II: Health Integrity and Alterations	5
NUR 394	ST: Professional Development II	3
NUR 484	Internship: Nursing Practice II	8
Total		16

Senior Year

First Semester

NUR 484	Internship: Nursing Practice III	7
NUR 494	ST: Theory III: Health Integrity and Alterations	6
NUR 494	ST: Professional Development III: The Art of Nursing	3
Total		16

Second Semester

NUR 484	Internship: Nursing Practice IV	8
NUR 494	ST: Theory IV: Health Integrity and Alterations	3
NUR 494	ST: Theory V: Leadership and Management	3
NUR 494	ST: Professional Development IV	2
Total		16
Nursing core total		77

In the continuing tradition of the college to be at the forefront in nursing education, curriculum revisions are in process. In the new Professional Nursing Program curriculum, each semester of courses is prerequisite to subsequent semesters. See an advisor for current program information.

ACADEMIC STANDARDS

Students are admitted into the College of Nursing as prenursing students and are subject to the general standards of academic good standing at the university. However, students who maintain standards of academic good standing do not necessarily qualify for admission into the Professional Nursing Program.

Consideration for admission into the Professional Nursing Program is con-

tingent on achieving at least a “C” in all prerequisite courses and earning a minimum GPA of 2.75 in prerequisite courses. In addition, a grade of “C” or higher is required in all course work for the degree.

Once admitted into the Professional Nursing Program, students are allowed only two nursing course failures within the program. The third failure in a nursing course leads to an automatic disqualification from the College of Nursing.

Probation and/or disqualification is in accordance with university policies. Academic dishonesty is not tolerated in any courses and is subject to specific College of Nursing policies and procedures.

GRADING POLICY FOR NURSING COURSES

Within the undergraduate program, grades are assigned to reflect levels of achievement in relation to course objectives. Students who do not complete a required nursing course satisfactorily, receiving a grade of “D” or “E” (failing) or a mark of “W” (withdrawal), are not eligible to progress in the Professional Nursing Program. A required nursing course may be repeated only once.

Any petition for curriculum adjustment, course substitution, overload, re-admission to a nursing course, or readmission to the Professional Nursing Program must be approved by the College Standards Committee.

Withdrawal is in accordance with the withdrawal policy of the university.

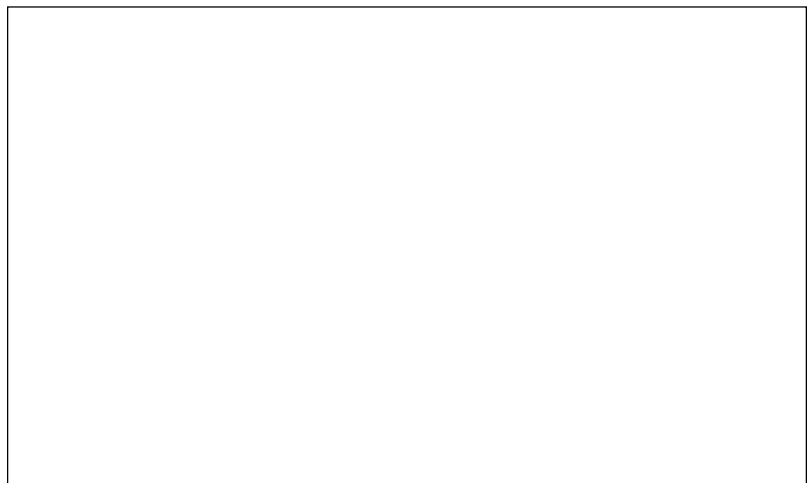
Students who withdraw from required clinical nursing courses must complete the Interruption in Curricular Progression form. The form is completed by the student in conjunction with the faculty of record for the course(s). Re-entry requires advising assistance. See the *Undergraduate Student Handbook*. In addition, students are responsible for completing the university withdrawal procedure.

An incomplete in a required nursing course must be satisfactorily removed before progression in the Professional Nursing Program is permitted. A grade of “I” is not allowed in clinical courses. See pages 72–73 for university policy.

Audited courses are not accepted as course credit in the minimum 120 semester hour requirement for graduation.

STUDENT RESPONSIBILITIES

Health. Students in the College of Nursing who exhibit or demonstrate a lack of physical and mental health necessary to function successfully as a professional nurse may be required to complete a health examination and have the results made available to the College Standards Committee. Students whose health, behavior, and/or performance have been questioned are reviewed for continuation in clinical nursing courses by the College Standards Committee. The student may appear in person before the committee and personally present information relevant to the committee’s review. Additional information may also be presented in writing without making a personal appearance.



Professional. Students are held to the professional standards reflected in the American Nurses Association Code for Nurses. Professional behavior and appearance are required during all nursing course activities.

Student Transportation. Students are responsible for their own transportation to and from health agencies and other selected experience settings, such as home visits to clients. Extensive travel may be required for selected clinical experiences.

Clinical Comprehensive Assessment Test. In preparation for the National Council Licensure Examination for Registered Nurses (NCLEX), all senior students, except RN students, are required to take a comprehensive assessment test before graduation.

Laboratory Fees. In several nursing laboratory and clinical courses, students are provided an opportunity to practice and perfect nursing skills before contact with clients. These courses require an extensive use of equipment and supplies from the college Learning Resource Center. Accordingly, students are assessed a fee for the following courses: NUR 211, 214 (or 314 for RNs), 217, 330, 427, 428, 429, and 430. Consult with an advisor for information on laboratory fees for Nursing courses in the revised curriculum.

SPECIAL PROGRAMS

Honors Program. The Nursing Honors Program provides opportunities for academically talented nursing students to engage in educational enrichment opportunities. The program focuses on students in the Professional Nursing Program; however, opportunities are available in lower-division nursing courses to earn honors credit. For students pursuing upper-division honors work, this enriched learning experience begins in the junior year. Honors course work, consisting of at least 18 hours of upper-division honors credit, offers a challenging curriculum. Honors students are guided to complete honors credit in courses that complement their academic and career goals. Students interested in pursuing the Nursing Honors Program are encour-

aged to seek advisement in the College of Nursing Student Services Office. Once admitted to the Professional Nursing Program, students receive advisement from the honors coordinator.

For more information, call 602/965-2987 or stop by the Student Services Office at NUR 108. Interested students should also contact the University Honors College at 602/965-2359.

ASU West. ASU West hosts upper-division College of Nursing courses.

Continuing and Extended Education Program. The Continuing and Extended Education Program presents a variety of credit and noncredit offerings at ASU Main, ASU West, and off-campus locations. These offerings are designed to assist practicing professional nurses in maintaining and enhancing their competencies, to broaden their scientific knowledge base, and to improve their skills in adapting to the changing health care environment. Programs are organized in response to both the health care needs of the population and the learning needs of nurses engaged in a variety of professional roles and clinical specialties. Workshops, conferences, short evening courses, and special programs are offered at times convenient to the working professional. Some offerings are multidisciplinary and are open to non-RNs. For descriptions of current continuing and extended education offerings, contact the Continuing and Extended Education Program, College of Nursing at 602/965-7431 or visit www.asu.edu/nursing/ceep.html on the World Wide Web.

Community Health Services. The College of Nursing administers a Community Health Services Clinic located in Scottsdale, Arizona. Nurse practitioners provide primary care with an emphasis on promotion of wellness to families and individuals of all ages. Students in the College of Nursing may receive health care through the clinic for a fee. Many students obtain the physical examination required for admission to the Professional Nursing Program at the clinic's facility. The facility also serves as a learning laboratory for both master's and baccalaureate Nursing students.

GENERAL INFORMATION

Student Services. The Student Services Office in the College of Nursing provides academic advising, general advising, and referral to university resources. The staff of the Student Services Office is available to help students with a variety of concerns related to academic or personal issues. Prospective students wanting more information on College of Nursing programs or wanting to schedule an advising appointment should contact the College of Nursing Student Services Office at 602/965-2987.

Scholarship and Financial Aid. For information regarding scholarships and loans, see pages 48-50. Information about scholarship and loan funds for Nursing students may be obtained from the Student Financial Assistance Office or the College of Nursing Student Services Office.

Learning Resources. The Learning Resource Center (LRC) contains a well-supplied nursing laboratory, audiovisual media, a variety of computers, and computer software related to nursing and health care.

Clinical Facilities. Learning experiences with patients/clients and families are provided under the supervision of qualified faculty with the cooperation of a variety of federal, state, county, private health, and other agencies. The College of Nursing has contracts with more than 200 different agencies in the Phoenix metropolitan area and also operates its own unique nurse-managed clinic in a community setting. Various clinical laboratory facilities are available to students in this essential component of the program.

Student Activities. All ASU students are members of the Associated Students of ASU (ASASU) and participate in those campus activities of interest to them. The student government of the university, ASASU, has a strong presence and offers a variety of services and activities. It is the official representative of the student body in matters of governance and budgeting.

College Council of Nursing Students.

The CCNS is a member of ASASU and serves as the governing body of all student activities in the college. The council acts as a liaison between the Graduate Nurse Organization (GNO), the Student Nurse's Association (SNA), and the Nursing Students for Ethnic and Cultural Diversity. The CCNS provides for communication, cooperation, and understanding among undergraduate students, graduate students, and faculty and represents the college in university and nonuniversity affairs.

Graduate Nurse Organization.

GNO is the coordinating body for Nursing students in the graduate program. It provides programs, information, and orientation services for graduate students and complements their academic experiences.

Student Nurses' Association.

SNA is a professional nursing organization. By being a member of SNA, the student belongs to the National Student Nurses' Association (NSNA), which is the student counterpart of the American Nurses Association for RNs. NSNA provides means for financial assistance, career planning, a voice in Washington, an opportunity for involvement, and low-cost comprehensive malpractice insurance.

Nursing Students for Ethnic and Cultural Diversity.

This organization was formed in 1989 to provide a network of information and support for students interested in issues of cultural awareness and diversity.

Sigma Theta Tau. The Beta Upsilon chapter of Sigma Theta Tau was chartered at the College of Nursing in 1976. Membership in Sigma Theta Tau is an honor conferred on undergraduate and graduate students who have demonstrated outstanding academic and professional achievement.

ROTC Program. Students pursuing a commission through either the Air Force or Army ROTC program are required to take from 12 to 20 hours in the Department of Military Science. To preclude excessive course overloads, these students should plan on an additional one to two semesters and/or summer school to complete degree requirements. ROTC students must meet all of the degree requirements of the college.

College of Nursing

Barbara A. Durand
Dean

(NUR 322) 602/965-3244
www.asu.edu/asuweb/nursing

PROFESSORS

DURAND, KENNEY, MELVIN, PERRY

ASSOCIATE PROFESSORS

ADAMS, BAGWELL, BRILLHART,
DIRKSEN, GALE, ISMEURT, KILLEEN,
KOMNENICH, MATTSOON, MOORE,
PRIMAS, ROOT, SHEEHY, THURBER

ASSISTANT PROFESSORS

ALPERS, BOYCHUK, CESAROTTI,
CLARKE-STEFFEN, GARRITY, LONG,
MCCARTHY, NICHOLS, PICKENS,
RODRIGUEZ, SEHESTED,
TOBIASON, ZUNKEL

CLINICAL ASSOCIATE PROFESSORS

BECK, BELL, FARGOTSTEIN,
HAGLER, JASPER, KASTENBAUM,
SCOGGIN, STILLWELL, WHITE

CLINICAL ASSISTANT PROFESSORS

P. JOHNSON, W. JOHNSON,
MINYARD, MORRIS, SHEARMAN,
THORNE, WOTRING

HEALTH CARE RELATED (HCR) NEW CURRICULUM EFFECTIVE 1998

HCR 294 ST: Clinical Health Care Ethics.

(3) F, S, SS
Effective summer session 1998.

An introduction to health care ethics with an emphasis on analysis and ethical decision making at both the clinical and health policy levels for health care professionals. Theoretical foundations of bioethics will be reviewed within historical and contemporary sociocultural contexts.

HCR 294 ST: Culture and Health. (3) F, S
Effective spring 1999.

Relationship between cultures of diverse groups and health/illness. Emphasis on cross-cultural communication, including awareness of own cultural influences, and indigenous and alternative healing practices. Prerequisite: ASB 202

HCR 294 ST: Health Care Organization. (3) F, S

Effective fall 1998.
Overview of United States health care delivery systems; financing, health policy, impact of managed care, and basic principles of budgeting, cost-benefit analysis, and resource management.

HCR 294 ST: Pathophysiology. (4) F, S
Effective fall 1999.

Chemical, biologic, biochemical, and psychological processes are used as a foundation for the understanding of alterations in health. The structural and functional pathophysiology of alterations in health are examined and selected therapeutics are considered. Prerequisites: BIO 202 and MIC 205 and 206 or equivalents.

NURSING (NUR)**NUR 119 Introduction to Nursing and Health.** (3) F, S

Effective through fall 1998.
Basic nursing philosophy, process, and skills, including health promotion content as related to nursing practice. 3 hours lecture.

NUR 204 Pharmacological Therapeutics for Nursing. (3) F, S

Effective through spring 1999.
Drug classifications and prototypes. Psychophysiologic principles of drug action. Knowledge basic to safe administration in nursing practice. Prerequisites: BIO 202 (or equivalent); MIC 205; NUR 119.

NUR 211 Nurse-Client Relationships. (3) F, S

Effective through fall 1998.
Focus on the therapeutic relationship and its application to nursing. Concepts of anxiety, loss, and grief will be emphasized. 2 hours lecture, 3 hours lab. Prerequisites: ENG 102; PGS 101; SOC 101 (or 301 or equivalent). *General Studies: L1.*

NUR 214 Health Assessment in Nursing Practice. (3) F, S

Effective through spring 1999.
Introductory knowledge and skills for systematic physical, psychosocial, nutritional, and developmental nursing assessments for clients over life span. 2 hours lecture, 3 hours lab. Prerequisites: BIO 202 (or equivalent); FON 241; MAT 117. Corequisite: NUR 223.

NUR 217 Basic Clinical Skills. (2) F, S

Effective through spring 1999.
Scientific principles, nursing concepts, and selected psychomotor skills for clinical nursing practice. 1 hour lecture, 3 hours lab. Prerequisites: MAT 117; MIC 205, 206; NUR 119. Corequisite: NUR 223.

NUR 223 Nursing Process and Hospitalized Adult. (6) F, S

Effective through spring 1999.
Theories, concepts, and practice in application of the nursing process in care for the hospitalized adult with selected medical-surgical problems. 3 hours lecture, 9 hours lab. Prerequisites: BIO 202 (or equivalent); CHM 231, 235; NUR 211. Corequisites: NUR 214, 217. Pre- or corequisite: NUR 204.

NUR 308 Pathophysiology. (3) F, S

Effective through fall 1999.
Focuses on concepts explicating alterations in health states. A psychophysiological viewpoint provides the unifying framework. Prerequisites: CHM 231 and 235 and NUR 223 or instructor approval.

NUR 327 Comprehensive Nursing Care of Children. (4) F, S*Effective through spring 2000.*

Nursing concepts and practice in caring for well and hospitalized children in a variety of clinical settings. 2 hours lecture, 6 hours lab. Prerequisite: NUR 329.

NUR 328 Childbearing Family and Women's Health Care. (4) F, S*Effective through fall 1999.*

Nursing concepts and practice in the reproductive and perinatal periods. Includes the impact of childbearing on family members and their relationships. 2 hours lecture, 6 hours lab. Prerequisite: NUR 223.

NUR 329 Psychiatric/Mental Health Nursing. (6) F, S*Effective through fall 1999.*

Guided nursing experiences with individuals and groups based on theory and research. 3 hours lecture, 9 hours lab. Prerequisites: CDE 232 (or equivalent); NUR 223. Pre- or corequisite: FAS 331 or SOC 415 (or equivalent).

NUR 330 Care of Acute and Chronically Ill Adults. (4) F, S*Effective through spring 2000.*

Nursing concepts and practice in caring for hospitalized adults with complex acute and chronic medical-surgical problems. Theoretical bases and related nursing management. 1.5 hours lecture, 7.5 hours lab. Prerequisites: NUR 308; junior standing in Nursing major.

NUR 403 Research in Nursing Practice. (3) F, S*Effective through fall 2000.*

Components of the research process. Significance of research to the improvement of nursing practice and development of the profession. Prerequisites: NUR 328, 329; 3 hours statistics. *General Studies: L2.*

NUR 406 Leadership and Management in Nursing. (2) F, S*Effective through spring 2001.*

Selected theoretical frameworks for organization, management, and leadership in nursing. Prerequisites: NUR 330 and 403 or instructor approval.

NUR 407 Contemporary Issues in Nursing and Health. (2) F, S*Effective through spring 2001.*

Selected contemporary issues influencing nursing and the health care system. Prerequisite: senior status or instructor approval.

NUR 411 Gerontological Nursing. (2) F, S*Effective through fall 2000.*

Provides perspective of biopsychosocial gerontological content applicable to nursing practice and research. Prerequisites: FON 241 and NUR 223 and 308 or instructor approval.

NUR 427 Community Health Nursing. (3) F, S*Effective through fall 2000.*

Introduction to public health theory and principles of community health nursing practice. Prerequisite: NUR 330.

NUR 428 Management of Clients in Health Care Settings. (4) F, S*Effective through spring 2001.*

Application of principles of nursing management and leadership in health care settings. 1 hour lecture, 9 hours lab. Prerequisite: NUR 330. Pre- or corequisites: NUR 406, 407.

NUR 429 Community Health Nursing: Clinical. (4) F, S*Effective through fall 2000.*

Clinical experience in community health nursing roles and leadership strategies in a variety of settings. 12 hours lab. Pre- or corequisite: NUR 427.

NUR 430 Home Health Care. (3) F, S*Effective through spring 2001.*

Issues, trends, and practice in the development and delivery of home health care. 1 hour lecture, 6 hours lab. Prerequisites: NUR 411, 429.

NURSING (NUR) NEW CURRICULUM EFFECTIVE 1998

NUR 306 Professional Development for Registered Nurse Students: Process, Roles, and Function. (3) F, S

Philosophical and theoretical bases for professional nursing practice. Nursing process for decision making. Professional issues, values, and norms. *General Studies: L1.*

NUR 314 Health Assessment for Registered Nurses. (3) F, S

Introductory knowledge and skills for systematic physical, psychosocial, and developmental nursing assessment over the life span. 2 hours lecture, 3 hours lab. Prerequisite: RN status.

NUR 394 ST: Pharmacology. (2) F, S*Effective spring 2000.*

Foundations of pharmacological interventions.

NUR 394 ST: Professional Development I. (3) F, S*Effective spring 2000.*

Introduction to professional nursing roles and responsibilities.

NUR 394 ST: Professional Development II. (3) F, S*Effective fall 2000.*

Introduction to research in professional nursing practice.

NUR 394 ST: Theory I: Health Integrity. (4) F, S*Effective spring 2000.*

Concepts related to health integrity with focus on individual client.

NUR 394 ST: Theory II: Health Integrity and Alterations. (5) F, S*Effective fall 2000.*

Concepts related to selected alterations in health integrity with focus on individuals, families, and groups.

NUR 435 Nursing of Children with Developmental Disabilities. (3) N

Congenital and acquired physical and mental developmental disorders, including the evaluation of child and family and community resources. Prerequisite: NUR 327 or instructor approval.

NUR 441 School Nursing Practice. (3) N

Role of the professional nurse in planning, implementation, and evaluation of the school health program. Prerequisite: NUR 327 or RN status.

NUR 484 Internship: Nursing Practice I. (7) F, S*Effective spring 2000.*

Promote and maintain application of health assessment, nurse process, and basic skills to promote and maintain health integrity of individual client.

NUR 484 Internship: Nursing Practice II. (8) F, S*Effective fall 2000.*

Application of nursing process with selected individuals, families, and groups experiencing alterations in health integrity.

NUR 484 Internship: Nursing Practice III. (7) F, S*Effective spring 2001.*

Application of increasingly sophisticated nursing process with clients in complex situations and selected settings.

NUR 484 Internship: Nursing Practice IV. (8) F, S*Effective fall 2001.*

Capstone course requires synthesis of patterns of knowing. Application of leadership and management concepts in collaborative practice.

NUR 494 ST: Professional Development III: The Art of Nursing. (3) F, S*Effective spring 2001.*

Exploration of the esthetics, ethical, and personal patterns of knowing.

NUR 494 ST: Professional Development IV. (2) F, S*Effective fall 2001.*

Focus on role transition to professional nursing.

NUR 494 ST: Theory III: Health Integrity and Alterations. (6) F, S*Effective spring 2001.*

Concepts related to health integrity and alterations with focus on individuals, families, groups, aggregates, and communities.

NUR 494 ST: Theory IV: Health Integrity and Alterations. (3) F, S*Effective fall 2001.*

Advanced concepts related to health integrity and alterations in that integrity with focus on selected client populations.

NUR 494 ST: Theory V: Leadership and Management. (3) F, S*Effective fall 2001.*

Concepts of leadership and management in professional practice and health care delivery.

NUR 494 Special Topics. (1–4) F, S, SS

Advanced study and/or supervised practice in an area of nursing. Lecture and lab to be arranged. Prerequisite: 12 hours in Nursing major or instructor approval.

NUR 500 Research Methods. (3) F, S

Research methods including research conceptualization and design in nursing. Prerequisite: graduate-level inferential statistics course.

NUR 501 Advanced Adult Health Assessment/Promotion. (3) F

Designed to expand adult health assessment/promotion skills through knowledge/strategies essential for developing and interpreting data. Lecture, demonstration. Prerequisites: college core courses except thesis/project; undergraduate health assessment course. Corequisite: NUR 580.

NUR 502 Management and Maintenance of Adults with Chronic Health Alterations: Theory. (3) S

Includes theory/research that guides the management/maintenance of adults with chronic health alterations. Psychophysiological interrelationships of illnesses emphasized. Lecture, seminar. Prerequisites: NUR 501, 580; admission to the graduate Nursing program; all flexible core courses except thesis/project.

NUR 503 Management and Maintenance of Adults with Acute Health Alterations: Theory. (3) S

Emphasizes theoretical research foundations essential for advanced practice involving care of adults with acute episodic alterations in health. Lecture, seminar. Prerequisite: NUR 501. Pre- or corequisite: NUR 580.

NUR 512 Community Health Nursing: Advanced Theory I. (3) F

Students identify and analyze theoretical perspectives and models guiding advanced community health nursing practice. Lecture, seminar. Prerequisite: all graduate program core courses. Corequisite: NUR 580.

NUR 513 Community Health Nursing: Advanced Theory II. (3) S

Drawing from their internship, students critically examine the application of theory to advanced community health nursing/public health practice. Lecture, seminar. Prerequisite: NUR 512. Corequisite: NUR 580.

NUR 521 Community Mental Health/Psychiatric Nursing: Advanced Mental Health Assessment. (3) F

Students gain knowledge of theories related to holistic health assessment for the promotion of physical/psychological health and develop skill in mental health assessments. Lecture, seminar, lab. Prerequisite: all graduate program core courses.

NUR 522 Community Mental Health/Psychiatric Nursing: Advanced Theory I. (3) F

Analysis of issues, theories, and research in restoration and promotion of mental health. Emphasizes developing conceptual framework for psychiatric nursing. Prerequisite: NUR 521. Corequisite: NUR 580

NUR 523 Community Mental Health/Psychiatric Nursing: Advanced Theory II. (3) S

Focus of this course is development of theoretical basis for intervention and a knowledge base for collaboration and consultation in the mental health area. Prerequisite: NUR 522. Corequisite: NUR 580.

NUR 524 Psychoneuroimmunology Approaches to Practice. (3) SS

Overview of theories, concepts, and research in psychoneuroimmunology including physiological aspects and application to a holistic nursing model. Seminar. Prerequisite: graduate standing.

NUR 531 Nursing of Children: Theory I. (3) F

Focus on current practices, research, and issues related to health promotion and disease prevention for children and adolescents. Lecture, seminar. Prerequisite: all core and flexible courses except thesis and/or applied project. Corequisite: NUR 580.

NUR 532 Nursing of Children: Theory II. (3) S

Focus on concepts, theories, and research as basis for strategies related to management of illness and health maintenance for children. Lecture, seminar. Prerequisite: NUR 531. Corequisite: NUR 580.

NUR 533 Nursing of Children with Special Needs: Theory II. (3) S

Focus on concepts, theories, and research related to acute and chronic health deviations of children. Lecture, seminar. Prerequisite: NUR 531 or instructor approval. Corequisite: NUR 580.

NUR 534 Women's Health: Theory I. (4) F

Focuses on theories, principles, and research related to managing the health of normal perinatal women and families. Cooperative learning strategies. Prerequisite: all graduate program core courses. Corequisite: NUR 580.

NUR 535 Women's Health: Theory II. (4) S

Focuses on management of nursing care for high-risk perinatal women and women with common health problems. Cooperative learning strategies. Prerequisite: NUR 534. Corequisite: NUR 580.

NUR 542 Nursing Administration Theory I. (1-3) F

Critical analysis of leadership theories, organizational dynamics, and nursing administration processes. Seminar, case study. Prerequisite: all graduate program core courses.

NUR 544 Nursing Administration Theory II. (1-3) S

Synthesis of knowledge from previous courses to develop advanced nursing role. Analysis of resource and quality management and informatics. Lecture, seminar. Prerequisites: NUR 542, 543.

NUR 551 Theoretical Foundations of Advanced Practice Nursing. (3) F, S

Designed to facilitate student exploration and examination of the foundations of advanced nursing practice. Lecture, seminar. Prerequisite: enrollment in graduate Nursing program.

NUR 552 Health Care Issues and Systems. (3) F, S

Analysis of organization, financing, service delivery and outcomes of the health system. Emphasizes policy issues, roles, and challenges for nurses. Lecture, seminar.

NUR 553 Life Span Development. (3) F

Critical examination of concepts, theories, issues, and research related to developmental periods throughout the life span. Biological and health, cognitive, psychological, and sociocultural influences are analyzed. Lecture, discussion. Prerequisite: admission to the graduate Nursing program or instructor approval.

NUR 554 Population-Based Health Care. (3) F, S

Identification and assessment of specific community health needs and health care patterns of target populations. Promotion, protection, and improvement of health is addressed when planning health care services. Lecture, seminar. Prerequisite: admission to the graduate Nursing program or instructor approval.

NUR 560 Advanced Health Assessment. (2) S

Expansion of basic health assessment skills and development of clinical problem-solving skills are emphasized for the role of the advanced practice nurse. Assessments of infants, children, adolescents, and adults included. Lecture, lab. Prerequisites: admission to the graduate Nursing program; undergraduate health assessment within the last five years.

NUR 561 Advanced Practice Nursing Role. (2) SS

Focuses on the examination and implementation of the role of the advanced practice nurse, emphasizing major components and subcomponents of the role. Lecture, seminar. Prerequisite: admission to the graduate Nursing program or instructor approval.

NUR 562 Family Nurse Practitioner Theory I: Health Promotion, Management, and Maintenance. (4) F

First didactic role specialty course. Focus on concepts and strategies to promote, manage, and maintain health of child, adult, and family. Corequisite: NUR 580.

NUR 563 Family Nurse Practitioner Theory II: Health Promotion, Management, and Maintenance. (4) S

Second didactic role specialty course utilizing knowledge from previous courses to formulate therapeutic promotion, management, and maintenance for individuals across the life span. Corequisite: NUR 580.

NUR 564 Applied Pharmacotherapeutics for Advanced Practice. (3) S

Lifespan course for advanced nurse practitioners to expand knowledge of pharmacotherapeutic concepts and principles. Lecture, discussion, case studies. Prerequisite: admission to the graduate Nursing program.

NUR 565 Applied Physiology/Pathophysiology in Advanced Practice. (3) S

Advanced nurse practitioner course designed to expand previously acquired anatomy and physiology knowledge and discern pathological alterations across the lifespan. Lecture, seminar, case studies. Prerequisites: admission to the graduate Nursing program or instructor approval; undergraduate anatomy and physiology.

NUR 566 Pediatric Physiology/Pathophysiology. (3) S

Analysis of the patterns of heredity, cellular differentiation, and the development of systems in the infant to adolescent. Prerequisite: admission to the graduate Nursing program or instructor approval.

NUR 571 Teaching in Nursing Programs.

(3) N

Analysis of theories, issues, and research related to teaching in nursing. Focus on the process of teaching/learning. Seminar, cooperative learning. Prerequisite: graduate standing. Corequisite: teaching practicum.

NUR 578 Gestalt Therapy I. (3) F

An introduction to theory and methodology of Gestalt therapy and its uses for mental health promotion and restoration.

NUR 579 Gestalt Therapy II. (3) S

Focus is on further development of Gestalt therapy and its application in working with various client populations. Prerequisite: NUR 578.

NUR 580 Practicum (Electives). (1–4) N

Clinical application of theories, concepts, and principles such as health promotion, health management, health maintenance, teaching, management, and special clinical studies.

NUR 580 Advanced Nursing Practicum I, II. (2–6) F, S

Clinical application of theories, concepts, and principles. The areas of concentration include the following:

- (a) Adult Health Nursing
- (b) Community Health Nursing
- (c) Community Mental Health/Psychiatric Nursing
- (d) Family Health Nursing
- (e) Nursing Administration
- (f) Parent-Child Nursing with the Tracts of the Childbearing Family and Nursing of Children

Conferences. Prerequisites: admission to the graduate Nursing program; instructor approval. Corequisite: NUR 501 or 502 or 503 or 512 or 513 or 522 or 523 or 531 or 532 or 533 or 534 or 535 or 562 or 563 or 584.

NUR 582 Advanced Human Physiology. (3) F

F

Analyzes major theories and concepts of human physiology. Interrelationship of physiology and health is explored.

NUR 584 Community Health Nursing Internship. (3) S

Students operationalize community health nursing/public health content in leadership roles in a variety of community agencies. Clinical internship. Prerequisites: NUR 512, 580. Corequisite: NUR 513.

NUR 585 Stress Reduction. (3) N

Theory, application, and evaluation of mind/body relaxation methods, including physiological effects. Research findings emphasized. Daily student practice. Prerequisite: graduate standing or instructor approval.

NUR 586 Advanced Pathophysiology. (3) S

Manifestation of altered human physiology and disease. Systems theory is used to analyze the relationships of disease and physiology.

NUR 589 Research Utilization. (3) F, S

Emphasis on the synthesis and application of research to an identified clinical nursing problem. Prerequisite: NUR 500. Corequisite: NUR 593.

NUR 591 Seminar. (2–4) N

Advanced topics, including curriculum development and health promotion. Prerequisite: instructor approval in selected courses.

NUR 593 Applied Project. (1) F, S

Preparation of a supervised applied project that is a graduation requirement in some professional majors. Corequisite: NUR 589. Completion of NUR 551 is recommended.

NUR 598 Special Topics. (2–4) N

Special study, including issues in health care and organizations, management in nursing, ethical issues, and clinical nurse specialist role. Prerequisite: instructor approval in selected courses.

NUR 599 Thesis. (1–6) F, S, SS

Research proposal development, data collection and analysis, thesis writing, and thesis oral defense. Six hours required.

Marianne Murzyn, family nurse practitioner, weighs six-month-old Mary Louise Erb at the university's Community Health Services Clinic. The clinic, located in Scottsdale, serves as a learning laboratory for Nursing students in bachelor's and master's degree programs.

Tim Trumble photo

College of Public Programs

Anne L. Schneider, Ph.D.
Dean

PURPOSE

The faculty in the College of Public Programs offer a wide range of undergraduate and graduate course work, both on and off campus, to full-time and part-time students. Each academic unit of the college not only assumes responsibility in preparing its own majors, but provides a variety of service courses for the rest of the university. The college is committed to providing excellence in teaching, research, and public service. Consequently, the units work closely with numerous public, quasi-public, and private agencies at the national, regional, state, and local levels.

ORGANIZATION

The College of Public Programs is composed of five academic units, each administered by a chair or director:

- Department of Communication
- Department of Recreation
Management and Tourism
- School of Justice Studies
- School of Public Affairs
- Walter Cronkite School of
Journalism and
Telecommunication

The general administration of the college is the responsibility of the dean, who is responsible to the university president through the senior vice president and provost. For more information, visit the college's home page at www.asu.edu/copp.

ADMISSION

Freshmen and Transfers. Individuals interested in admission to an undergraduate program in the College of Public Programs should refer to the information on pages 59–62. Those who meet the minimum university admission requirements will be admitted to the undergraduate academic unit of the college as a *premajor* in that respective academic unit.

Major Status Admission Requirements. Entry to any undergraduate academic unit of the college with status as a major requires the completion of at least 56 semester hours with a minimum cumulative GPA of 2.50, the university First-Year Composition requirement (see page 79), the university numeracy requirement (see page 85), and the College of Public Programs writing competence, communication, and computer requirements (see pages

407–408). The academic units may also have additional requirements. The ASU GPA is computed on ASU courses only and must be based on a *minimum* of nine semester hours of courses with grade options of “A,” “B,” “C,” “D,” or “E.”

Most upper-division courses in the college are not open to premajors. Premajors should check the catalog information in their major fields to determine any course enrollment restrictions.

Students should refer to the section of the catalog and advising documents with reference to their preferred areas of study for specialized departmental retention requirements and/or continued enrollment in their major courses.

Transfer Credit. In most cases, course work successfully completed at a regionally accredited four-year institution of higher education is accepted into the respective academic unit.

Transferable course work successfully completed at an accredited two-year institution of higher education (community or junior college) transfers as lower-division credit up to a maximum of 64 semester hours.

Successful completion is defined for purpose of transfer as having received a grade comparable to an “A,” “B,” or “C” at ASU. The acceptance of credits is determined by the director of Undergraduate Admissions, and the utilization of credits toward degree requirements is at the discretion of the academic unit.

ADVISING

The advising mission for the College of Public Programs professional academic advising staff is to assist students in developing meaningful educational plans that will meet their academic, career, and personal goals in an ongoing process of evaluation and clarification.

The advisors strive to perform their duties in a professional, ethical, confidential, accurate, and supportive manner, respecting student diversity and needs, and always holding the individual in highest regard. The student and advisor should accomplish this process in a spirit of shared responsibility to develop academic excellence, strong decision-making skills, and self-reliance.

A student who has been admitted to the College of Public Programs is assigned an academic advisor from the

College of Public Programs Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Broadcasting Emphases: broadcast journalism, business/management	B.A.	Walter Cronkite School of Journalism and Telecommunication
Communication	B.A., B.S.	Department of Communication
Journalism Emphases: news-editorial, public relations, visual journalism	B.A.	Walter Cronkite School of Journalism and Telecommunication
Justice Studies	B.S.	School of Justice Studies
Recreation Concentrations: recreation management, tourism	B.S.	Department of Recreation Management and Tourism
Graduate Degrees		
Communication	M.A.	Department of Communication
Communication Concentrations: communicative development, intercultural communication, organizational communication	Ph.D.	Committee of Faculty
Justice Studies	M.S. ¹	School of Justice Studies
Justice Studies Concentrations: criminal and juvenile justice; dispute resolution; law, justice, and minority population; law, policy, and evaluation; women, law, and justice	Ph.D. ²	Committee on Law and Social Sciences
Justice Studies	J.D./Ph.D. ³	Committee on Law and Social Sciences College of Law
Mass Communication	M.M.C.	Walter Cronkite School of Journalism and Telecommunication
Public Administration Concentrations: public information management, public management, public policy analysis and evaluation, urban management and planning	M.P.A.	School of Public Affairs
Public Administration	D.P.A. ²	Committee on Public Administration
Recreation Concentrations: outdoor recreation, recreation administration, social/psychological aspects of leisure, and tourism and commercial recreation.	M.S.	Department of Recreation Management and Tourism

¹ Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent M.S. degree in Justice Studies and M.A. degree in Anthropology.

² This program is administered by the Graduate College. See "Graduate College" on pages 282–292.

³ Ph.D. students in Justice Studies are able to acquire a joint J.D./Ph.D. with concurrent admission to the College of Law at ASU and fulfillment of joint requirements.

academic unit of the student's major area of study. Questions on advising should be directed to the student's academic advisor or to the college Student Services Office, WILSN 203.

Mandatory Advising. The following categories of students are required to receive advising and to be cleared on the Mandatory Advising Computer

System before they may register for classes:

1. all freshmen;
2. transfer students in their first semester at ASU;
3. students with admissions competency deficiencies;
4. students with special admissions status;

5. students on probation;
6. students who have been disqualified;
7. students with a cumulative GPA less than 2.00; and
8. readmitted students.

Course Load. A normal course load per semester is 15–16 semester hours. The maximum number of hours for

which a student can register is 18 semester hours unless an overload petition has been filed and approved by the Department/School Standards Committee and the Academic and Student Affairs Committee of the college. Semester course loads may be further limited for students in mandatory advising.

Petitions for overload are not ordinarily approved for students who have a cumulative GPA less than 3.00 and who do not state valid reasons for the need to register for the credits. Students who register for semester hours in excess of 18 and do not have an approved overload petition on file have courses randomly removed through an “administrative drop” action.

Specific degree requirements are explained in detail under the respective college, school, and department sections.

DEGREES

The faculty in the College of Public Programs offer academic instruction in four areas. Successful completion of a four-year program of 120 semester hours is specified by the respective academic unit.

GRADUATE PROGRAMS

Master’s degree programs are offered by five academic units of the College of Public Programs.

For more information on courses, faculty, and programs, see the *Graduate Catalog*.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

First-Year Composition Requirement

Students must demonstrate reasonable proficiency in written English by achieving a grade of “C” or higher in both ENG 101 and 102 (or ENG 107 and 108 for international students), or in ENG 105 or its equivalent (see page 79). Should a student receive a grade lower than “C” in any of the courses, it must be repeated until the specified proficiency is demonstrated. Composition courses transferred from out-of-state institutions must be evaluated and approved by the advisor in the major, or by other advisors specifically designated for this purpose.

General Studies Requirement

All undergraduate students in the College of Public Programs are required to complete the university General Studies requirement in order to be eligible for graduation in any of the undergraduate curricula offered by the college.

General Studies courses are regularly reviewed. To determine whether a course meets one or more General Studies course credit requirement, see the listing of courses, pages 87–108 in the *General Catalog* following the section on “General Studies,” and the *Schedule of Classes*, published each semester. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

General Studies courses are also identified following course descriptions according to the “Key to General Studies Credit Abbreviations,” page 87.

COLLEGE DEGREE REQUIREMENTS

In addition to the university General Studies requirement, the College of Public Programs also has requirements in communication, computer science, humanities and fine arts, social and behavioral sciences, and writing competence.

Communication Requirement

All undergraduate majors are required to take one of the following courses:

COM 100	Introduction to Human Communication <i>SB</i>	3
COM 225	Public Speaking <i>LI</i>	3
COM 230	Small Group Communication <i>SB</i>	3
COM 241	Introduction to Oral Interpretation <i>LI/HU</i>	3
COM 259	Communication in Business and the Professions	3

These courses present an overview of human communication and help the student to develop oral presentation skills and competence. The course may be included within the university General Studies requirement, the College of Public Programs requirements, or the department/school degree program, where appropriate. Journalism and Broadcasting majors are limited to COM 225 or 241. Recreation majors are limited to COM 225, 241, or 259.

Computer Requirement

A computer course is required for all undergraduate majors. Any numeracy (N3) course from the university General Studies list is acceptable. It may be included within the numeracy requirement or department or school degree program, where appropriate.

Foreign Language Requirement

The Walter Cronkite School of Journalism and Telecommunication requires proficiency in a language, other than English, for majors in Journalism and Broadcasting. Communication majors have the choice of demonstrating proficiency in a foreign language under one of the B.A. options. Proficiency is defined as completing the second semester intermediate level, or higher, of a foreign language.

Humanities and Fine Arts Requirement

Nine hours are required from the university General Studies list from departments other than the student’s major.

Social and Behavioral Sciences Requirement

Fifteen hours are required from the university General Studies list from departments other than the student’s major.

Although many courses offered in the units in the College of Public Programs have the university General Studies designations of Humanities and Fine Arts and Social and Behavioral Sciences, students must choose courses from outside their major to satisfy these areas.

Writing Competence Requirement

In addition to ENG 101 and 102 First-Year Composition or their equivalent, one of the following courses in advanced written expository composition is required of all undergraduate majors:

BUS 301	Fundamentals of Management Communication <i>LI</i>	3
ENG 215	Strategies of Academic Writing <i>LI</i>	3
ENG 216	Persuasive Writing on Public Issues <i>LI</i>	3
ENG 217	Personal and Exploratory Writing <i>LI</i>	3
ENG 218	Writing about Literature <i>LI</i> ...	3
ENG 301	Writing for the Professions <i>LI</i>	3
JRN 201	Journalism Newswriting <i>LI</i> ...	3

The writing competence course may be counted as fulfilling the university General Studies literacy and critical inquiry (L1) requirement if it is on the university-approved list.

Pass/Fail Option

The College of Public Programs does not offer any courses for pass/fail credit. Courses completed for pass/fail credit outside the College of Public Programs may count only as elective credit in meeting degree requirements.

Limitation on Physical Education Activity Hours

No more than eight hours of physical education activity courses may be counted within the minimum 120 hours required for graduation.

MAJOR REQUIREMENTS

Students should refer to the respective department or school section of the catalog and to department or school advising documents for more information on requirements.

Undergraduate Credit for Graduate Courses. To enable undergraduate students to enrich their academic development, the Graduate College and the individual academic units of the College of Public Programs allow qualified students to take graduate-level courses for undergraduate credit. To qualify for admission to a graduate-level course, the student must have senior status (87 or more semester hours successfully completed) and a cumulative GPA of 3.00 or higher. In addition, permission to enroll must be given before registra-

tion and must be approved by the instructor of the course, the student's advisor, the department chair or school director, and the dean of the college in which the course is offered.

ACADEMIC STANDARDS AND RETENTION

Good Standing. Any premajor or major student of the respective academic units of the college is considered in good standing for the purpose of retention if the student maintains a cumulative GPA of 2.00 or higher in all courses taken at ASU.

Probation. Any student who does not maintain good standing status is placed on probation. A student on academic probation is required to observe any limitations or rules the college may impose as a condition for retention.

Disqualification. A student who is on probation becomes disqualified if (1) the student has not returned to good standing or (2) the student has not met the required semester GPA.

Disqualification is exercised at the discretion of the college and becomes effective on the first day of the fall or spring semester following college action. A disqualified student is notified by the Office of the Registrar and/or the dean of the college and is not allowed to register for a fall or spring semester at the university until reinstated. A student who is disqualified may not attend as a nondegree student.

Reinstatement. Students seeking reinstatement after disqualification should

contact the College Student Services Office regarding procedures and guidance for returning to good standing. When reinstatement includes readmission, application must be made to the Readmissions Section of the Office of the Registrar.

All academic discipline action is the function of the College Student Services Office, WILSN 203, under the direction of the dean of the college. Students having academic problems should contact this office for advising at 602/965-1034.

SPECIAL PROGRAMS

University Honors College

The College of Public Programs cooperates with the University Honors College, which affords superior undergraduates opportunities for special classes taught by selected faculty. Honors students receive special advising, priority preregistration, and complete a senior honors thesis. Participating students can major in any academic program. A full description of the requirements and the opportunities offered by the University Honors College can be found on pages 293-295.

For more information, students should contact the College Student Services Office, WILSN 203 (602/965-1034), and the University Honors College.

College of Public Programs Council

The College of Public Programs Council is a unit of ASASU and serves as the coordinating body of student activities in the college. The council fosters communication, cooperation, and understanding among undergraduate students, graduate students, faculty, and staff. As the official representative student organization to the dean and college administration, the council appoints student members to faculty committees, cosponsors events with the college alumni association, and represents students at college and university functions.

ASIAN PACIFIC AMERICAN STUDIES (APA)

APA 194, 294, 394, 494 Special Topics.

APA 484 Internship.

APA 498 Pro-Seminar.

APA 499 Independent Study.

**COLLEGE OF PUBLIC PROGRAMS
(CPP)**

CPP 194, 294, 394, 494 Special Topics.
 CPP 484 Internship.
 CPP 498 Pro-Seminar.
 CPP 499 Independent Study.
 CPP 580 Practicum.
 CPP 583 Field Work.
 CPP 584 Internship.
 CPP 590, 690 Reading and Conference.
 CPP 591, 691 Seminar.
 CPP 593 Applied Project.
 CPP 594 Conference and Workshop.
 CPP 598 Special Topics.

**Department of
Communication**

Jess K. Alberts
Chair

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www.asu.edu/copp/communication

PROFESSORS

ARNOLD, BANTZ,
 JAIN, KASTENBAUM,
 PETRONIO, VALENTINE

ASSOCIATE PROFESSORS

ALBERTS, BULEY, CARLSON,
 COREY, CORMAN, CRAWFORD,
 DAVEY, MARTIN, MAYER,
 McPHEE, NAKAYAMA, TROST

ASSISTANT PROFESSORS

FLORES, GUERRERO,
 HASIAN, TRETHERWAY

**ASSOCIATE INSTRUCTIONAL
PROFESSIONAL**

OLSON

PURPOSE

The Department of Communication exists to advance the understanding of message-related human behavior for the purpose of improving communicative interactions. Teaching, research, and service are directed to the continued development of knowledge and application of principles of communication. Courses of study are designed to provide students with relevant programs adapted to individual academic and professional goals.

GENERAL INFORMATION

A minimum GPA of 2.50 is required for enrollment in all upper-division courses and COM 207. A minimum GPA of 2.25 is required for enrollment in COM 110, 241, 250, and 263.

Communication Major Requirements. Undergraduate students may be admitted to major status after meeting all of the following requirements:

1. College of Public Programs major status admission requirements (see page 405); and
2. completion of 12 semester hours of Department of Communication core course requirements (COM 100, 207, 225, 308) with a minimum grade of "C" in each.

DEGREE REQUIREMENTS

B.A. and B.S. Degrees

The B.A. Option 1 degree requires a minimum of 50 semester hours. The B.A. Option 2 and B.S. degrees require a minimum of 51 semester hours each. The minimum hours include 12 semester hours of departmental core courses plus 38 (or 39) semester hours of required and optional courses. Of the minimum required hours for each degree, at least 21 semester hours must be 300- or 400-level courses.

Of the required and optional 38 (or 39) semester hours, 15 semester hours must consist of two pairs from the following list of five sets of courses and one additional introductory course from a third set.

COM 110	Elements of Interpersonal Communication <i>SB</i>	3
	or COM 310 Relational Communication (3) and COM 410 Interpersonal Communication Theory and Research <i>SB</i> (3)	
COM 241	Introduction to Oral Interpretation <i>L1/HU</i>	3
	and COM 441 Performance Studies <i>HU</i> (3)	
COM 250	Introduction to Organizational Communication <i>SB</i>	3
	and COM 450 Theory and Research in Organizational Communication <i>SB</i> (3)	
COM 263	Elements of Intercultural Communication <i>SB, C, G</i>	3
	and COM 463 Intercultural Communication Theory and Research <i>SB, G</i> (3)	

COM 321	Rhetorical Theory and Research <i>L2/HU, H</i>	3
	and COM 421 Rhetoric of Social Issues <i>HU</i> (3)	

Of the minimum 38 (or 39) semester hours, another 15 semester hours must be communication electives, only three hours of which may be 100- or 200-level courses. A minimum grade of "C" is required in each course except for a maximum of six semester hours of "Y" credit available to qualified students in COM 281, 382, and/or 484.

Of the minimum 38 (or 39) semester hours, for students seeking the B.A. degree either intermediate competency (typically eight semester hours) in a foreign language or COM 407 and six semester hours of upper-division related courses are required. For students seeking the B.S. degree, COM 408, three semester hours of General Studies N2 (statistics), and three semester hours of General Studies SB courses beyond the College of Public Programs' requirement are required.

To assure the breadth and depth of their education, all Communication undergraduates must complete the university General Studies requirements prescribed by the College of Public Programs and the Department of Communication. For descriptive information on these requirements, refer to "General Studies" on pages 84-108 and "University Graduation Requirements" on pages 79-83. Students in the College of Public Programs are required to take an advanced composition course (which will meet the General Studies L1 requirement), and additional courses in the humanities and fine arts, and social and behavioral sciences (see pages 407-408). Although many Communication courses meet the university General Studies requirements for L1, humanities and fine arts, and the social and behavioral sciences, students must take an advanced composition course *from the list provided by the College of Public Programs* for their L1; a total of nine hours of humanities and a total of 15 hours of social and behavioral sciences from disciplines *other than* Communication.

Students should consult their advisors for current information concerning College of Public Programs and Department of Communication lists of

courses applicable to General Studies requirement and for information concerning differences in requirements for the B.A. and B.S. degrees.

SECONDARY EDUCATION— B.A.E.

Communication. An academic specialization in communication is offered to students pursuing the Bachelor of Arts in Education degree with a major in Secondary Education. As the major teaching field, the academic specialization in communication consists of a minimum of 40 semester hours in communication (including COM 480 Methods of Teaching Communication). Students must complete all courses required by the university and the College of Public Programs. Students must complete the following Department of Communication core courses:

COM 100	Introduction to Human Communication <i>SB</i>	3
COM 207	Introduction to Communication Inquiry	3
COM 225	Public Speaking <i>L1</i>	3
COM 281	Communication Activities	1–3
COM 308	Empirical Research Methods in Communication <i>L2</i>	3
COM 480	Methods of Teaching Communication	3
Two pairs of the five pairs of courses plus one additional introductory course from a third set listed under “B.A. and B.S. Degrees”		15
Minimum total		31

Students must also take three of the following courses:

COM 222	Argumentation <i>L1</i>	3
COM 230	Small Group Communication <i>SB</i>	3
COM 312	Communication, Conflict, and Negotiation	3
COM 319	Persuasion and Social Influence	3
COM 325	Advanced Public Speaking <i>L1</i>	3

Students should consult the College of Education to ascertain the General Studies requirement for this degree.

As the minor teaching field, the academic specialization in communication consists of a minimum of 28 semester

hours in communication. Students must take the following courses:

COM 100	Introduction to Human Communication <i>SB</i>	3
COM 225	Public Speaking <i>L1</i>	3
COM 281	Communication Activities	1–3
COM 480	Methods of Teaching Communication	3
Minimum total		10

Students must also take two of the following courses:

COM 110	Elements of Interpersonal Communication <i>SB</i>	3
or COM 310 Relational Communication (3)		
COM 241	Introduction to Oral Interpretation <i>L1/HU</i>	3
COM 263	Elements of Intercultural Communication <i>SB, C, G</i>	3
COM 321	Rhetorical Theory and Research <i>L2/HU, H</i>	3

Students must also take three of the following courses:

COM 222	Argumentation <i>L1</i>	3
COM 230	Small Group Communication <i>SB</i>	3
COM 312	Communication, Conflict, and Negotiation	3
COM 319	Persuasion and Social Influence	3
COM 325	Advanced Public Speaking <i>L1</i>	3

In addition, COM 207 Introduction to Communication Inquiry may be taken, since it is a prerequisite for many COM courses.

Communication Internships

Internships consist of supervised field experiences and are available to upper-level undergraduate students with major status and a GPA higher than 2.50 (COM 484) and to graduate students (COM 584). An application for internship must be completed in the semester before the intended term for an internship. Contact the department for specific deadline dates. Internships must receive prior approval from the departmental coordinator of Internship Programs *before* student registration for the course. Internships may be taken once or repeated for credit up to a total of 12 semester hours, but not more than six semester hours may be applied toward the major.

MINOR IN COMMUNICATION

The minor in Communication consists of required courses COM 100 plus COM 225 or 259, and nine additional semester hours, at least six of which must be upper-division. Nine of the total 15 semester hours must be ASU Main resident credits. No pass/fail, “Y” credit, or credit/no-credit courses will be allowed. Communication courses which are required for one’s major may not also count for the minor. All prerequisite and GPA requirements must be met. The “C” minimum requirement must be met for each class.

GRADUATE PROGRAMS

In addition to offering a Master of Arts degree program, the Department of Communication also administers the interdisciplinary Doctor of Philosophy degree program in Communication. Consult the *Graduate Catalog* for the requirements and areas of concentration.

COMMUNICATION (COM)

COM 100 Introduction to Human Communication. (3) F, S, SS

A topics-oriented introduction to basic theories, dimensions, and concepts of human communicative interaction and behavior. *General Studies: SB.*

COM 110 Elements of Interpersonal Communication. (3) F, S, SS

Demonstration and practice of communicative techniques in establishing and maintaining interpersonal relationships. *General Studies: SB.*

COM 207 Introduction to Communication Inquiry. (3) F, S, SS

Bases of inquiry into human communication, including introduction to notions of theory, philosophy, problems, and approaches to the study of communication. Prerequisite: COM 100.

COM 222 Argumentation. (3) F, S

Philosophical and theoretical foundations of argumentation, including a comparison of models of advocacy and evidence. *General Studies: L1.*

COM 225 Public Speaking. (3) F, S, SS

Verbal and nonverbal communication in platform speaking. Discussion and practice in vocal and physical delivery and in purposeful organization and development of public communication. *General Studies: L1.*

COM 230 Small Group Communication. (3) F, S, SS

Principles and processes of small group communication, attitudes, and skills for effective participation and leadership in small groups, small group problem solving, and decision making. *General Studies: SB.*

COM 241 Introduction to Oral Interpretation. (3) F, S, SS

The communication of literary materials through the mode of performance. Verbal and nonverbal behavior, interface of interpreter with literature and audience, and rhetorical and dramatic analysis of literary modes. *General Studies: L1/HU.*

COM 250 Introduction to Organizational Communication. (3) F, S, SS

Introduction to the study of communication in organizations, including identification of variables, roles, and patterns influencing communication in organizations. *General Studies: SB.*

COM 251 Interviewing. (3) N

Principles and techniques of interviewing, including practice through real and simulated interviews in informational, persuasive, and employee-related situations. Not open to freshmen.

COM 259 Communication in Business and the Professions. (3) F, S, SS

Interpersonal, group, and public communication in business and professional organizations. Not open to freshmen and not available for credit toward the major.

COM 263 Elements of Intercultural Communication. (3) F, S, SS

Basic concepts, principles, and skills for improving communication between persons from different minority, racial, ethnic, and cultural backgrounds. *General Studies: SB, C, G.*

COM 271 Voice Improvement. (3) N

Intensive personal and group experience to improve normal vocal usage, including articulation and pronunciation.

COM 281 Communication Activities. (1–3) F, S, SS

Nongraded participation in forensics or interpretation cocurricular activities. Maximum 3 semester hours each semester. Prerequisite: instructor approval.

COM 294 Special Topics. (3) F, S, SS
Prerequisite: instructor approval.**COM 308 Empirical Research Methods in Communication.** (3) F, S, SS

Examination of empirical research methods in communication, including experimental, survey, descriptive, and other quantitative approaches. Prerequisites: COM 207; MAT 114 (or 117). *General Studies: L2.*

COM 310 Relational Communication. (3) F, S

Exploration of communication issues in the development of personal relationships. Current topics concerning communication in friendship, romantic, and work relationships. Prerequisite: COM 100 or instructor approval.

COM 312 Communication, Conflict, and Negotiation. (3) F, S

Theories and strategies of communication relevant to the management of conflicts and the conduct of negotiations. Prerequisite: COM 100 or instructor approval.

COM 316 Gender and Communication. (3) F, S

Introduction to gender-related communication. Verbal, nonverbal, and paralinguistic differences and similarities are examined within social, psychological, and historic perspectives. *General Studies: SB, C.*

COM 317 Nonverbal Communication. (3) F, S

The study of communication using space, time, movement, facial expression, touch, appearance, smell, environment, objects, voice, and gender/cultural variables. Not open to students with credit in COM 294 ST: Beyond Words.

COM 319 Persuasion and Social Influence. (3) F, S, SS

Variables that influence and modify attitudes and behaviors of message senders and receivers, including analysis of theories, research, and current problems. Prerequisites: COM 207 (or equivalent) and POS 401 and PSY 230 and QBA 221 and SOC 395 and STP 226 or instructor approval. *General Studies: SB.*

COM 320 Communication and Consumerism. (3) A

Critical evaluation of messages designed for public consumption. Perceiving, evaluating, and responding to political, social, and commercial communication. *General Studies: SB.*

COM 321 Rhetorical Theory and Research. (3) F, S

Historical development of rhetorical theory and research in communication, from classical antiquity to the present. Prerequisite: COM 207 (or equivalent) and POS 401 and PSY 290 and SOC 391 or instructor approval. *General Studies: L2/HU, H.*

COM 323 Communication Approaches to Popular Culture. (3) F, S, SS

Critical analysis of popular culture within social and political contexts; emphasis on multicultural influences and representations in everyday life. Lecture, discussion. Prerequisite: COM 100 or instructor approval. *General Studies: C.*

COM 325 Advanced Public Speaking. (3) F, S

Social and pragmatic aspects of public speaking as a communicative system: strategies of rhetorical theory and the presentation of forms of public communication. Prerequisite: COM 225 or instructor approval. *General Studies: L1.*

COM 341 Social Contexts for Performance. (3) N

Adaptation and performance of literature for the community outside the university. Research into the practical uses of performed literature.

COM 344 Performance of Oral Traditions. (3) N

Cultural beliefs and values studied through ethnographic research and performance of personal narratives, folklore, myths, legends, and other oral traditions. Lecture, fieldwork, research paper. *General Studies: HU, C.*

COM 357 Communication Technology and Information Diffusion. (3) F

Study effects of new communication technology on society, organizations, and individuals. Hands-on experience plus critical analysis of theory and research. Prerequisites: COM 250 (or JRN 310 or MGT 301 or PGS 430 or SOC 301) and CSE 180 (or equivalent) or instructor approval. *General Studies: SB.*

COM 371 Language, Culture, and Communication. (3) F, S

Cultural influences of language on communication, including social functions of language, bilingualism, biculturalism, and bidialectism. Prerequisite: COM 263 or instructor approval. *General Studies: SB, C, G.*

COM 382 Classroom Apprenticeship. (1–3) F, S, SS

Nongraded credit for students extending their experience with a content area by assisting with classroom supervision in other COM courses (maximum 3 semester hours each semester). Prerequisite: instructor approval.

COM 394 Special Topics. (1–4) F, S, SS
Prerequisite: instructor approval.

COM 404 Research Apprenticeship. (3) F, S
Direct research experience on faculty projects. Student/faculty match based on interests. Lecture, apprenticeship. Prerequisite: COM 308 or instructor approval.

COM 407 Advanced Critical Methods in Communication. (3) S

Examination of critical approaches relevant to communication, including textuality, social theory, cultural studies, and ethnography. Lecture, discussion. Prerequisite: COM 308.

COM 408 Quantitative Research Methods in Communication. (3) F, S

Advanced designs, measurement techniques, and methods of data analysis of communication research. Prerequisites: COM 308 and POS 401 (or PSY 230 or QBA 221 or SOC 395 or STP 226) or instructor approval.

COM 410 Interpersonal Communication Theory and Research. (3) F, S, SS

Survey and analysis of major research topics, paradigms, and theories dealing with message exchanges between and among social peers. Prerequisites: COM 110 and 308 or instructor approval. *General Studies: SB.*

COM 411 Communication in the Family. (3) A

A broad overview of communication issues found in marriage and family life, focusing on current topics concerning communication in the family. Prerequisites: COM 110 and 207 or instructor approval. *General Studies: SB.*

COM 414 Crisis Communication. (3) N

Role of communication in crisis development and intervention. Prerequisite: instructor approval.

COM 417 Communication and Aging. (3) N

Critical study of changes in human communicative patterns through the later adult years, with attention on intergenerational relationships and self-concept functions. Prerequisite: instructor approval.

COM 421 Rhetoric of Social Issues. (3) F, S

Critical rhetorical study of significant speakers and speeches on social issues of the past and present. Prerequisites: COM 308 and 321 or instructor approval. *General Studies: HU.*

COM 422 Advanced Argumentation. (3) N

Advanced study of argumentation theories and research as applied to public forum, adversary, scholarly, and legal settings. Prerequisite: COM 222 or instructor approval.

COM 426 Political Communication. (3) F
Theories and criticism of political communication; including campaigns, mass persuasion, propaganda, and speeches. Emphasis on rhetorical approaches. *General Studies: SB.*

COM 430 Leadership in Group Communication. (3) N
Theory and process of leadership in group communication, emphasizing philosophical foundations, contemporary research, and applications to group situations. Prerequisite: COM 230 or instructor approval.

COM 441 Performance Studies. (3) F, S, SS
Theory, practice, and criticism of texts in performance. Emphasis on the interaction between performer, text, audience, and context. Prerequisites: COM 241 and 308 or instructor approval. *General Studies: HU.*

COM 445 Narrative Performance. (3) N
Theory and practice of performing narrative texts (e.g., prose fiction, oral histories, diaries, essays, letters). Includes scripting, directing, and the rhetorical analysis of story telling. Prerequisite: COM 241 or instructor approval. *General Studies: HU.*

COM 446 Interpretation of Literature Written by Women. (3) N
Students explore, through performance and critical writing, literature written by women. *General Studies: HU, C.*

COM 450 Theory and Research in Organizational Communication. (3) F, S, SS
Critical review and analysis of the dominant theories of organizational communication and their corollary research strategies. Prerequisites: COM 250 and 308 or instructor approval. *General Studies: SB.*

COM 453 Communication Training and Development. (3) A
Examination of the procedures and types of communication training and development in business, industry, and government. Prerequisite: COM 250 or instructor approval.

COM 463 Intercultural Communication Theory and Research. (3) F, S, SS
Survey and analysis of major theories and research dealing with communication between people of different cultural backgrounds, primarily in international settings. Lecture, discussion, small group work. Prerequisites: COM 263 and 308 or instructor approval. *General Studies: SB, G.*

COM 465 Intercultural Communication Workshop. (3) N
Experientially based study of communication between members of different cultures designed to help students improve their intercultural communication skills. Prerequisite: instructor approval.

COM 480 Methods of Teaching Communication. (3) N
Analysis, organization, and presentation of textual and other classroom materials. Prerequisite: instructor approval.

COM 484 Communication Internship. (1–12) F, S, SS
Prerequisites: COM 225, 308.

COM 494 Special Topics. (1–3) F, S, SS
Prerequisite: instructor approval.

COM 501 Research Methods in Communication. (3) F
Critical analysis of systems of inquiry in communication, focusing on the identification of variables and approaches to conducting research in communication. Prerequisite: instructor approval.

COM 504 Theories and Models in Communication. (3) F
Theory construction, metatheoretical concerns, models, construct definition, and comparative analysis of current theories in communication. Prerequisite: instructor approval.

COM 508 Quantitative Research Methods in Communication. (3) F
Empirical research designs, measurements, and statistical strategies and techniques in analyzing and evaluating experimental and descriptive research in communication. Prerequisites: COM 501 and 504 or instructor approval.

COM 509 Qualitative Research Methods in Communication. (3) S
Qualitative research methods, including interviewing, field methods, and other nonquantitative techniques for analyzing communication. Prerequisites: COM 501 and 504 or instructor approval.

COM 510 Interpersonal Communication Theory and Research. (3) A
Contemporary theories and research in interpersonal communication. Prerequisites: COM 501 and 504 or instructor approval.

COM 512 Death, Society, and Human Experience. (3) N
Examines dying, death, bereavement, and suicide from both individual and sociocultural perspectives in terms of options for communication and action in death-related situations. Prerequisite: instructor approval.

COM 521 Rhetorical Criticism of Public Discourse. (3) N
History and significance of rhetorical theory and criticism in the analysis of public discourse. Prerequisites: COM 501 and 504 or instructor approval.

COM 529 Theories of Persuasion. (3) A
Analysis of representative theories and models of persuasive processes and their implications for communicative behavior. Prerequisites: COM 501 and 504 or instructor approval.

COM 531 Theories of Small Group Communication. (3) N
Theory and research in small group interaction and decision making, focusing on communicational variables which affect small group output. Prerequisites: COM 501 and 504 or instructor approval.

COM 541 Research in Performance Studies. (3) N
Supervised research in the historical and contemporary relationships between the performer, the text, and the audience. Prerequisites: COM 501 and 504 or instructor approval.

COM 555 Communicative Processes in Organizations. (3) N
Systematic analysis of communicative interactions between organizational structure, information flow, and human behaviors in the organizational setting. Prerequisites: COM 501 and 504 or instructor approval.

COM 563 Intercultural Communication. (3) A
Analysis of contemporary theory and research concerning the effects of a variety of cultural variables on communication between people. Prerequisites: COM 501 and 504 or instructor approval.

COM 575 Language and Message Systems. (3) N
Sign/symbol systems; personal, functional, and contextual aspects of message systems; measurement of "meaning." Prerequisites: COM 501 and 504 or instructor approval.

COM 584 Communication Internship. (1–12) F, S, SS

COM 596 Pro-Seminar in Communication. (0) F
Discussion of research projects with the faculty. Prerequisite: admission to the graduate program.

COM 601 Multidisciplinary Perspectives in Research in Communication. (3) F
Critical review of approaches, aspects, concepts, and issues associated with research in communication. Prerequisite: instructor approval.

COM 604 Theory Construction in Communication. (3) F
Review and analysis of philosophical problems inherent in communicative research and of metatheories designed to deal with these problems. Prerequisite: COM 504 or instructor approval.

COM 607 Contemporary Rhetorical Methods. (3) S
Analysis of issues in the practice of rhetorical communication research, including criticism and scholarship. Seminar.

COM 608 Multivariate Statistical Analysis of Data in Communication. (3) S
Statistical analysis of communication research data. Multivariate procedures used in communication research and methods of causal analysis. Prerequisites: COM 501 and 508 or equivalents.

COM 609 Advanced Qualitative Research Methods in Communication. (3) F
Analysis of issues in the practice of qualitative communication research, including data gathering, fieldwork issues, analysis strategies, and reporting results. Prerequisite: COM 509 or instructor approval.

COM 691 Seminar. (1–12) F, S
Seminar topics such as the following may be offered:

- (a) Current Organizational Approaches to Communication
 - (b) Examination of Privacy and Disclosure
 - (c) Intercultural Aspects of Communication
 - (d) Interpersonal and Relational Communication
 - (e) Issues in Feminist Perspectives in Communication
 - (f) Rhetorical Issues
 - (g) Social Influence
- Prerequisite: instructor approval.

COM 780 Practicum: Research in Communication. (3) N
Guided practice in the conduct of communication research. Topic identification; procedures, formats, and ethics of publishing. Prerequisites: COM 601, 604.

**Walter Cronkite School
of Journalism and
Telecommunication**

Douglas A. Anderson
Director
(STAUF A231) 602/965-5011
cronkite.pp.asu.edu

PROFESSORS

ANDERSON, CRAFT, CRONKITE,
DOIG, GODFREY, HALVERSON,
MERRILL, SYLVESTER,
WATSON, YOUIM

ASSOCIATE PROFESSORS

ALLEN, BRAMLETT-SOLOMON,
GALICIAN, HOY, LENTZ,
MATERA, RUSSELL

ASSISTANT PROFESSORS

BARRETT, GORMLY, RUSSOMANNO

**CLINICAL ASSOCIATE
PROFESSORS**

ITULE, LEIGH

LECTURERS

CASAVANTES, NASH

PURPOSE AND PHILOSOPHY

The primary purpose of the Walter Cronkite School of Journalism and Telecommunication is to prepare students to enter positions in media fields. The school strives to meet its mission through a three-pronged approach:

1. classroom instruction in a blend of conceptual courses, such as media law, media ethics, media history, and media management and skills courses, such as writing, editing, reporting, and production techniques;
2. on-campus media work opportunities, such as the *State Press*, the independent daily newspaper; KASR radio; KAET-TV; KAET-TV/Cactus State Poll; and "Newswatch," a weekly student-produced cable television news magazine program; and
3. off-campus media work opportunities, including internships in print, broadcast, public relations, and visual journalism.

In addition to preparing students to assume positions in the media and media-related enterprises, the school provides courses that lead to a better understanding of the role and responsibility of the media in society's public and private sectors.

ADMISSION

Preprofessional Admission

Students admitted to ASU also may be admitted to the Walter Cronkite School of Journalism and Telecommunication with preprofessional status. Preprofessional admission to the school does not guarantee admission to the upper-division professional program. All preprofessional students enrolling in courses in the school must complete a minimum of 30 semester hours with at least a 2.50 GPA before they are permitted to enroll in school courses at the 200-level. All preprofessional students who intend to take courses beyond the 100-level must pass an English proficiency examination administered by the school.

Professional Program Admission

Admission to the Walter Cronkite School of Journalism and Telecommunication professional program, which enrolls students in their junior and senior years, is competitive and based on available resources. Once a student is granted admission, the upper-division professional program requires a minimum of two years to complete.

A separate application procedure is required for entry to the upper-division professional program. To be eligible to apply for admission to the professional program, students must meet the following requirements:

1. be admitted to ASU as a classified student;
2. have completed at least 56 semester hours by the close of the semester in which the application is submitted;
3. have completed lower-division courses or their equivalents, as specified below;
4. have completed, with a passing score, the English proficiency examination administered by the school; and

5. College of Public Programs major status admissions requirements.

As described above, students must have completed specified lower-division courses. Broadcasting preprofessionals must complete the following courses:

TCM 200	Fundamentals of Radio- Television	3
TCM 201	Radio-Television Writing <i>L1</i> *	3
TCM 235	Production Techniques*	3
Total		9

* TCM 235 may be in progress at the time of application but must be completed to enroll in the professional program courses.

Journalism preprofessionals must complete the following courses:

JRN 201	Journalism Newswriting <i>L1</i> ...	3
MCO 110	Introduction to Communication	3
	or MCO 120 Media and Society <i>SB</i> (3)	
Total		6

To be considered for admission to the school's upper-division professional program, students must obtain an application form from the school office in STAUF A231. Precise application procedures and submission deadlines are outlined on the form. Completion of the minimum requirements for eligibility does not guarantee admission to the upper-division professional program. The admissions committee considers a variety of criteria, including cumulative GPA, media experience, writing ability, and commitment to the field.

ADVISING

Students should follow the sequence of courses outlined on school curriculum check sheets and the advice of the school's academic advisers. All students who enroll as preprofessionals or who seek and ultimately gain professional status should meet regularly with Walter Cronkite School of Journalism and Telecommunication academic advisers. Conscientious, careful planning and early advising are crucial to students who desire to progress through the program in a timely fashion.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84-108. For graduation requirements, see pages 79-83. For omnibus courses offered but not listed in this catalog, see pages 56-57.

DEGREES

The faculty in the school offer programs leading to two undergraduate degrees: the B.A. degree in Broadcasting and the B.A. degree in Journalism. Students select one of two areas of curricular emphasis in the broadcasting program: broadcast journalism or business/management. Students select one of three areas of curricular emphasis in the journalism program: news-editorial, public relations, or visual journalism.

The school offers a program leading to the graduate degree Master of Mass Communication.

TRANSFER STUDENTS

Transfer students must be admitted formally to ASU and must adhere to the admission procedures to be considered for admission to the professional program in the Walter Cronkite School of Journalism and Telecommunication.

Students completing their first two years of course work at a community college or four-year institution other than ASU should consult the school's academic advisors at least three months before they hope to be considered for admission to the school's professional program. Transfer student admission to ASU does not guarantee admission to the upper-division professional program.

PROGRAM REQUIREMENTS

Because the Walter Cronkite School of Journalism and Telecommunication is accredited by the Accrediting Council on Education in Journalism and Mass Communication, its students are required to take a minimum of 90 semester hours in courses outside the major of broadcasting or journalism, with no fewer than 65 semester hours in liberal arts and sciences. This requirement ensures that students receive a broad academic background.

At least 18 semester hours of major courses required by the school, including one writing course, must be taken at ASU. A student must receive a grade of "C" or higher in all courses taken in the major and in the required related field area. Specific areas that may be used to fulfill the related field requirement are listed on the curriculum check sheets for each major available in the

school. Courses elsewhere in the university that duplicate or are closely related to school subject matter may be restricted by the school.

B.A. REQUIREMENTS

All students are required to complete 16 semester hours of courses in a foreign language or the equivalent through the intermediate level.

Broadcasting. The major in Broadcasting consists of a minimum of 30 semester hours in Walter Cronkite School of Journalism and Telecommunication courses. Students must take the following courses:

MCO 110	Introduction to Communication	3
	or MCO 120 Media and Society <i>SB</i> (3)	
MCO 402	Communications Law <i>L2</i>	3
TCM 200	Fundamentals of Radio-Television	3
TCM 201	Radio-Television Writing <i>L1</i>	3
TCM 235	Production Techniques	3
Total		15

The student also must choose one major professional emphasis area from the following: broadcast journalism or business/management.

These courses are in addition to other degree requirements. See "University Graduation Requirements," pages 79–83.

Journalism. The major in Journalism consists of a minimum of 30 semester hours in Walter Cronkite School of Journalism and Telecommunication courses. Students must take the following required school courses:

JRN 201	Journalism Newswriting <i>L1</i> ...	3
JRN 301	Reporting <i>L2</i>	3
JRN 313	Introduction to Editing	3
MCO 110	Introduction to Communication	3
	or MCO 120 Media and Society <i>SB</i> (3)	
MCO 402	Communications Law <i>L2</i>	3
MCO 418	History of Communications <i>SB, H</i>	3
	or MCO 421 News Problems (3)	
	or MCO 430 International Communication <i>G</i> (3)	
	or MCO 450 Visual Communication <i>HU</i> (3)	
Total		18

The student also must choose one major professional emphasis area from the following three: news-editorial, public relations, or visual journalism.

These courses are in addition to other degree requirements. See "University Graduation Requirements," pages 79–83.

Related Field. Each student is required to complete a 12-semester-hour related field to complement the courses taken in the major emphasis areas.

See the curriculum check sheets for each major for the full details and approved related field areas.

SECONDARY EDUCATION—B.A.E.

Journalism. The academic specialization in journalism as a major teaching field consists of 45 semester hours. The following courses are required:

JRN 201	Journalism Newswriting <i>L1</i> ...	3
JRN 301	Reporting <i>L2</i>	3
JRN 313	Introduction to Editing	3
JRN 351	Photojournalism I	3
MCO 110	Introduction to Communication	3
	or MCO 120 Media and Society <i>SB</i> (3)	
MCO 402	Communications Law <i>L2</i>	3
Approved elective		3
Total		21

An additional 24 semester hours, including 12 semester hours in school course offerings, must be taken on approval by the advisor in consultation with the student. The remaining courses may be in closely related fields.

The academic specialization in journalism as a minor teaching field consists of 24 semester hours. The following courses are required:

JRN 201	Journalism Newswriting <i>L1</i> ...	3
JRN 301	Reporting <i>L2</i>	3
JRN 313	Introduction to Editing	3
JRN 351	Photojournalism I	3
MCO 110	Introduction to Communication	3
	or MCO 120 Media and Society <i>SB</i> (3)	
Approved elective		3
Total		18

The remaining courses are to be selected in consultation with a journalism advisor.

GENERAL STUDIES REQUIREMENTS

The students must satisfy the university General Studies requirement found on pages 87–108 and the College of Public Programs course requirements found on pages 407–408. The school requires the student to accumulate a total of 51 semester hours in General Studies. The student is advised to review carefully the appropriate school curriculum check sheet to be sure courses taken move the student toward graduation with the least amount of delay and difficulty. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

General education requirements for the Walter Cronkite School of Journalism and Telecommunication follow.

Humanities and Fine Arts. Three to six semester hours are required for a total of nine semester hours when combined with university General Studies.

Social and Behavioral Sciences. Six to nine semester hours are required for a total of 15 when combined with university General Studies.

Additional courses may be taken in each of the groups and from the electives listed to complete the total of 51 semester hours required by the school.

Within the program there are specific course requirements. Students are required to take one course in each of the following areas: communication (applied speech), computer science, economics, English composition (beyond the freshman level), English literature, history, mathematics (numeracy requirement), two natural science lab courses, philosophy, political science (either POS 110 or 310), psychology, and statistics.

MINOR IN MASS COMMUNICATION

The faculty in the School of Journalism and Telecommunication offer a minor in Mass Communication consisting of required course MCO 120 Media and Society, and 12 additional semester hours of upper-division Main campus resident credit taken from a list of approved courses. The following courses are included:

MCO 418	History of Communications <i>SB, H</i>	3
MCO 430	International Communication <i>G</i>	3

MCO 450	Visual Communication <i>HU</i> ...	3
MCO 456	Political Communi- cation <i>SB</i>	3
MCO 460	Race, Gender, and Media <i>C</i> ...	3
MCO 494	Special Topics	3

The student must be at least a sophomore (25 semester hours) to take upper-division courses, must maintain a minimum 2.00 overall GPA to pursue the minor in Mass Communication, and must obtain a minimum “C” grade in each course in the minor.

GRADUATE PROGRAM

Master of Mass Communication.

The curriculum for the M.M.C. degree is designed to help students achieve intellectual and professional growth, to prepare students for positions in the mass media, and to provide a background to enable those currently in the media to advance their careers. Information on the Master of Mass Communication program is detailed in the *Graduate Catalog*.

JOURNALISM (JRN)

JRN 201 Journalism Newswriting. (3) F, S, SS

Writing news for the print media. Prerequisites: MCO 110 (or 120); successful completion of English proficiency requirement; demonstrated typing ability of 30 words per minute. *General Studies: L1*.

JRN 301 Reporting. (3) F, S

Fundamentals of news gathering, interviewing, and in-depth reporting. Prerequisites: JRN 201; major. *General Studies: L2*.

JRN 313 Introduction to Editing. (3) F, S

Copyediting and headline writing. Electronic editing on personal computer terminals. Prerequisites: JRN 301; major.

JRN 351 Photojournalism I. (3) F, S

Taking, developing, and printing pictures for newspapers and magazine production on a media deadline basis. Students should have their own cameras. Prerequisite: JRN 201 or instructor approval.

JRN 401 Public Relations Techniques. (3) F, S

Theory and practice of publicity, public relations, and related techniques and procedures. Prerequisites: JRN 301 (or TCM 315); major.

JRN 412 Editorial Interpretation. (3) N

The press as an influence on public opinion. The role of the editorial in analyzing and interpreting current events. Prerequisite: JRN 301.

JRN 413 Advanced Editing. (3) F, S

Theory and practice of newspaper editing, layout and design, picture, and story selection. Prerequisite: JRN 313.

JRN 414 Business and Industrial Publications. (3) F, S

Theory and practice of layout, typography, and design for magazines, brochures, and industrial publications. Prerequisite: JRN 401.

JRN 415 Writing for Public Relations. (3) F, S

Development of specific writing techniques for the practitioner in public relations agencies and divisions of major organizations. Prerequisite: JRN 401.

JRN 417 Public Relations Campaigns. (3) F

Theory, principles, and literature of public relations and how they relate to audiences, campaigns, and ethics. Prerequisites: JRN 401, 415; instructor approval.

JRN 420 Reporting Public Affairs. (3) F, S

Instruction and assignments in reporting the courts, schools, government, city hall, social problems, and other areas involving public issues. Prerequisite: JRN 301.

JRN 440 Magazine Writing. (3) F, S

Writing and marketing magazine articles for publication. Prerequisite: JRN 301 or instructor approval.

JRN 451 Photojournalism II. (3) F, S

Theory and practice of photojournalism with emphasis on shooting, lighting, and layout for the media. Prerequisite: JRN 351.

JRN 452 Photojournalism III. (3) F, S

Advanced theory and practice of photojournalism with emphasis on the photo essay and illustrations in black and white and color. 2 hours lecture, 2 hours lab. Prerequisite: JRN 451.

JRN 465 Precision Journalism. (3) S

An advanced writing course with focus on reporting polls and surveys and other numerically-based stories as well as on understanding the concepts that underlie polls and surveys. Lecture, lab. Prerequisite: JRN 301 or instructor approval.

JRN 470 Depth Reporting. (3) F, S

The course is designed to introduce students to strategies for writing in-depth newspaper or magazine articles. Lecture, lab. Prerequisites: JRN 301; professional status; instructor approval.

MASS COMMUNICATION (MCO)

MCO 110 Introduction to Communication.

(3) F, S, SS

Organization, function, and responsibilities of the media and adjunct services. Primary emphasis on newspapers, radio, television, and magazines. Not open to students with credit for MCO 120.

MCO 120 Media and Society. (3) F, S

Role of newspapers, magazines, radio, television, and motion pictures in American society. Not open to students with credit for MCO 110. Designed for nonmajors. *General Studies: SB*.

MCO 402 Communications Law. (3) F, S, SS

Legal aspects of the rights, privileges, and obligations of the press, radio, and television. Prerequisite: 70 earned semester hours. *General Studies: L2*.

MCO 418 History of Communications. (3) F, S

American journalism from its English and colonial origins to the present day. Development and influence of newspapers, magazines, radio, television, and news gathering agencies. *General Studies: SB, H*.

MCO 421 News Problems. (3) S

Trends and problems of the news media, emphasizing editorial decisions in the processing of news. Prerequisite: 9 hours of mass communication/journalism/telecommunication courses or instructor approval.

MCO 430 International Communication. (3) F, S

Comparative study of communication and media systems. Information gathering and dissemination under different political and cultural systems. *General Studies: G.*

MCO 450 Visual Communication. (3) F, S, SS

Theory and tradition of communication through the visual media with emphasis on the continuity of traditions common to modern visual media. *General Studies: HU.*

MCO 456 Political Communication. (3) F, S

Theory and research related to political campaign communication. The persuasive process of political campaigning, the role of the media, the candidate, and image creation. *General Studies: SB.*

MCO 460 Race, Gender, and Media. (3) S

Readings seminar designed to give students a probing examination of the interface between AHANA Americans and the mass media in the United States. *General Studies: C.*

MCO 463 Introduction to Media Statistics. (3) F, S

An introduction to statistical analysis as applied to the mass media. Prerequisite: professional status in Broadcasting or Journalism.

MCO 501 Newswriting and Reporting. (3) F

Designed for graduate students in the MMC program who have undergraduate degrees in nonjournalism areas. Objective is to teach fundamentals of writing and reporting. Lecture, lab. Prerequisite: acceptance into M.M.C. graduate program.

MCO 503 Press Freedom Theory. (3) S

Examination of philosophical and legal aspects of press freedom. Emphasis on First Amendment theory evolution from 1791 to present.

MCO 510 Research Methodology in Mass Communication. (3) F, S

Identification of research problems in mass communication. Overview of questionnaire construction. Attention to survey, historical, content analysis, experimental, and legal research methods.

MCO 520 Mass Communication Theories and Process. (3) F

Analysis of various theoretic models of mass communication with emphasis on the applications of these theories to various professional communication needs.

MCO 522 Mass Media and Society. (3) S

Mass media as social institutions, particularly interaction with government and public. Emphasis on criticism and normative statements.

MCO 530 Media Ethics. (3) F

Ethical conventions and practices of print and electronic media as they relate to the government and private sectors of the society.

TELECOMMUNICATION (TCM)**TCM 200 Fundamentals of Radio-Television.** (3) F, S, SS

Structure of telecommunications in the United States: history, regulation, organization, with emphasis on broadcasting. Relationship to advertising, research, and government agencies. Prerequisites: MCO 110 (or 120); successful completion of English proficiency requirement.

TCM 201 Radio-Television Writing. (3) F, S, SS

Writing for electronic media, news, and continuity. Prerequisites: MCO 110 (or 120); successful completion of English proficiency requirement; demonstrated typing ability of 30 words per minute. *General Studies: L1.*

TCM 235 Production Techniques. (3) F, S, SS

Introduction to basic concepts of audio and video production. Operation of portable cameras, recorders, microphones, lights, editing, and postproduction equipment will be introduced. Prerequisites: TCM 200; successful completion of English proficiency requirement.

TCM 300 Advanced Broadcast Newswriting. (3) F, S

Technique and practice in newswriting for broadcast and cable applications. Prerequisite: TCM 201.

TCM 315 Broadcast News Reporting. (3) F, S

News and information practices of networks, stations, and industry. Practice in writing, reporting, and editing with emphasis on audio. Prerequisite: TCM 201. *General Studies: L2.*

TCM 330 Advanced Broadcast Reporting. (3) F, S

News and information practices of networks, stations, and industry. Advanced practice in writing, reporting, and editing with emphasis on video. Prerequisite: TCM 300.

TCM 332 Broadcast Programming. (3) F, S, SS

Programming theory and evaluation, regulation, ethics, and responsibilities and basics of audience psychographics and effects. Prerequisite: TCM 200.

TCM 336 TV Studio Production. (3) N

Introduction of multicamera production in the studio. Teamwork and group production are emphasized through lab assignments covering a variety of program types. Prerequisites: TCM 235; major in the Walter Cronkite School of Journalism and Telecommunication.

TCM 433 Broadcast Sales and Promotion. (3) F, S

Basics of electronic media marketing practices, including commercial time sales techniques and radio/TV promotion fundamentals. Prerequisite: TCM 200.

TCM 435 Cable TV and Emerging Telecommunication Systems. (3) F, S

Structures and utilization of cable, industrial, and instructional television, satellite, and videocassettes. Prerequisite: TCM 200.

TCM 437 Advanced TV Production. (3) F, S
Emphasis on individual production projects of the student's own conception and design utilizing studio, field, and postproduction techniques. Prerequisite: TCM 235.

TCM 472 Broadcast Station Management.

(3) F, S, SS

Management principles and practices, including organization, procedures, policies, personnel problems, and financial aspects of station management. Prerequisite: TCM 332.

TCM 475 Television Newscast Production.

(3) F, S

Writing, reporting, and production of the television newscast. The course serves as the capstone of the broadcast journalism emphasis. Prerequisite: instructor approval.

School of Justice Studies

David Theo Goldberg

Director

(WILSN 331) 602/965-7682

www.asu.edu/copp/justice

REGENTS' PROFESSORS

ALTHEIDE, PALUMBO

PROFESSORS

CAVENDER, FIGUEIRA-McDONOUGH, GOLDBERG, HAYNES, HEPBURN, JOHNSON, JURIK, LAUDERDALE, MUSHENO, SCHNEIDER, ZATZ

ASSOCIATE PROFESSORS

BORTNER, LUJAN, SCHADE

ASSISTANT PROFESSORS

BERNSTEIN, LYNCH, MENJIVAR, RIDING IN

MISSION STATEMENT

Students pursuing the B.S. in Justice Studies will find an interdisciplinary classroom experience emphasizing ideas from the social sciences, philosophy, and legal studies. The degree is designed for students interested in studying issues of justice and those desiring justice related careers, including law. Students will develop an understanding of the meaning of justice and injustice, both descriptive and normative, and analyze often controversial issues through critical inquiry and social science investigation. The faculty primarily focuses on theories of justice and injustice. Students accordingly learn about conflict and its negotiation, crime and violence, adolescents and delinquency, punishment and alternatives to punishment, and differential institutional and socioeconomic treatment of populations based on gender, race,

class, and ethnic identities, including American Indian peoples.

The heart of any university program is its faculty. The School of Justice Studies boasts a faculty with strong scholarly credentials. Faculty members include national and local award recipients in research, teaching, and public service. The faculty is committed to challenging students to develop their own understandings of justice, to analyze critically, and to propose possible solutions to a wide variety of contemporary issues concerning social justice.

While completing the Justice Studies curriculum, students will encounter opportunities to develop transferable skills, including critical thinking, oral and written discourse, computer literacy, and problem solving. Faculty encourage students to practice justice through various experiential approaches, including volunteer work, service learning, and internships. Students actively engage in their education via discussion, cooperative learning, field trips, and case-based classroom formats.

ADMISSION

The B.S. degree in Justice Studies is an upper-division program. Upon admission to the university, Justice Studies students are classified as premajors. Justice Studies students must earn major status before taking 400-level JUS resident credit courses required for graduation.

Justice Studies students may achieve major status by:

1. meeting the College of Public Programs major status admission requirements (see page 405); and
2. completing all of the following classes with a 2.50 minimum average GPA and a minimum grade of “C” in each:

ENG	101, 102	First-Year Composition	6
		or ENG 105	
		Advanced First-Year Composition (3)	
JUS	105	Introduction to Justice Studies	3
		or JUS 305 Principles of Justice Studies (3)	
JUS	301	Research in Justice Studies	3
JUS	302	Basic Statistical Analysis in Justice Studies N2	3
JUS	303	Justice Theory	3
		College of Public Programs writing competence requirement	3

For Justice Studies students to take a non-required 300-level JUS course, they must have at least a “C” in each of the JUS required courses—JUS 105 (or 305), 301, 302, and 303—and a minimum average GPA of 2.50 for these four classes.

For non-Justice Studies students to take a 300-level JUS course, they must have a minimum of 56 earned semester hours (junior status) and a minimum cumulative GPA of 2.00. Non-Justice Studies students are ineligible to take JUS 301, 302, and 303.

For non-Justice Studies students to take a 400-level JUS course, they must have a minimum of 56 earned semester hours (junior status) and a minimum cumulative GPA of 2.50.

ADVISING

Justice Studies students admitted as premajors are advised by the school’s academic advisor. All students are encouraged to seek advising in order to formulate an appropriate educational plan. Justice Studies majors may also be advised by the school’s faculty.

Upon admission to the university, every Justice Studies undergraduate receives the *Undergraduate Advisement Guide* and an evaluation of transfer work, if any. For further information, contact the school’s advising office at 602/965-7727.

DEGREES

Justice Studies—B.S.

The curriculum for the B.S. degree in Justice Studies provides interdisciplinary social science courses relevant to law and justice for students working in the justice field, students anticipating justice-related careers (including the legal profession), and interested non-Justice Studies students.

JUSTICE STUDIES MINOR

The minor is designed for students interested in developing an understanding of meanings of justice and injustice and analyzing often controversial issues through critical inquiry and social science investigation.

Fifteen hours of course work in Justice Studies is required, including JUS 105 or 305 and JUS 303. A minimum of nine hours must be resident credit at ASU Main Campus, six hours of which must be upper division credit. Students must receive a minimum grade of “C” for all courses in the minor and meet all

course eligibility requirements, including prerequisites. Please consult the minor verification form available in the school office.

DEGREE REQUIREMENTS

The faculty in the School of Justice Studies awards a B.S. degree upon the successful completion of a curriculum consisting of a minimum of 120 semester hours including the university General Studies requirement, College of Public Programs requirements, justice studies courses, and electives. Additionally, the student must:

1. earn major status;
2. earn a minimum of 45 semester hours of upper-division courses;
3. complete the school’s minimum residency requirement of 24 semester hours (see the *Undergraduate Advisement Guide*);
4. earn a grade of “C” or higher in all justice studies courses taken at ASU that apply to the justice studies component of the curriculum (i.e., nonelectives); and
5. meet the university’s residency and scholarship requirements.

GENERAL STUDIES REQUIREMENTS

To assure the breadth and depth of their education, all Justice Studies undergraduates must complete the university General Studies requirement and additional fundamental requirements prescribed by the College of Public Programs and the School of Justice Studies. For descriptive information on these requirements, refer to “General Studies” on pages 84–87 and “University Graduation Requirements” on pages 79–83. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

MAJOR REQUIREMENTS

Justice Studies students are required to take one sociology course, one behavioral psychology course, and one political science course dealing with the American government system chosen from POS 110, POS 270, POS 310, or equivalent. These courses apply to the social and behavioral sciences core area of the general studies requirement.

The required justice studies component consists of 51 semester hours, of which 15 must be taken in a related

field approved by the school. The following courses are required for all degree candidates. Equivalent courses may be substituted when appropriate.

JUS 105	Introduction to Justice Studies	3
	or JUS 305 Principles of Justice Studies (3)	
JUS 301	Research in Justice Studies	3
JUS 302	Basic Statistical Analysis in Justice Studies N2	3
JUS 303	Justice Theory	3
Total	.....	12

Through advising, a group of justice studies courses may be recommended to ensure a comprehensive exposure appropriate to the student's interests.

Electives. Students are encouraged to utilize the unique opportunities afforded by the university to pursue personal and educational interests, whether in the form of a broad sampling of other disciplines or the deeper probing of a single field.

Transfer of Community College Credits.

Credits transferred from accredited community colleges are accepted as lower-division credits up to a maximum of 64 semester hours. The acceptance of credits is determined by the director of Undergraduate Admissions and the utilization of credits toward degree requirements is determined by the faculty of the School of Justice Studies.

American Indian Justice Studies Certificate Program.

The American Indian Justice Studies Certificate Program is a cooperative effort between the School of Justice Studies and other ASU departments. This interdisciplinary program is designed to provide a comprehensive and practical program of study for undergraduate students who want to study and work with American Indians.

The program recognizes the need for training American Indian and non-Indian students for employment and leadership roles in American Indian government, in state and federal agencies, in education programs, and in urban and Indian community programs.

To earn the certificate, students must complete four required and two elective courses and an internship. The program is open to all ASU undergraduate students. For more information, call 602/965-7682.

GRADUATE PROGRAMS

The faculty in the School of Justice Studies offer a M.S. degree in Justice Studies, and Concurrent M.A. in Anthropology and a M.S. in Justice Studies. For more information on courses, faculty, or programs see the *Graduate Catalog*.

JUSTICE STUDIES (JUS)

JUS 100 The Justice System. (3) F, S, SS Overview of the justice system. Roles of law enforcement personnel, the courts, and correctional agencies. Philosophical and theoretical views in historical perspective. *General Studies: SB*.

JUS 105 Introduction to Justice Studies. (3) F, S, SS

Introductory overview to the study of justice from a social science perspective. Primary topics include justice theories and justice research. Not open to students with credit in JUS 305. This course is appropriate for freshmen and sophomores. Lecture, discussion.

JUS 180 Introduction to American Indian Justice Studies. (3) F 1999

Introduction to the study of American Indian justice issues from an interdisciplinary perspective. Primary topics include sovereignty, law, and culture. *General Studies: C*.

JUS 200 Topics in Concepts and Issues of Justice. (3) F, S, SS

Use of critical thinking skills to analyze and comprehend controversial social issues (e.g., abortion, affirmative action, capital punishment, the flat tax, and immigration). May be repeated for credit with different titles. Lecture, discussion. *General Studies: SB*.

JUS 280 American Indian Law and Society. (3) F, S, SS

Examines the sovereign status of American Indians and legal relationships between the tribes and the U.S. government. Lecture, studio, televised presentation. *General Studies: C*.

JUS 294 Special Topics. (1-3) F, S, SS Topics chosen from various fields of justice studies.

JUS 301 Research in Justice Studies. (3) F, S, SS

Focus is on developing and evaluating research designs, data collection, and the relationship between validity and reliability. Methods for conducting research are also stressed. Prerequisite: Justice Studies student.

JUS 302 Basic Statistical Analysis in Justice Studies. (3) F, S, SS

Introduction to the fundamentals and application of descriptive and inferential statistics, with emphasis in the justice area. Prerequisite: intermediate algebra or higher. *General Studies: N2*.

JUS 303 Justice Theory. (3) F, S, SS

An examination of classic and contemporary philosophies and theories of justice, including legal, social, and criminal justice. Prerequisite: refer to eligibility statements on page 417.

JUS 305 Principles of Justice Studies. (3) F, S, SS

Introductory overview to the study of justice from a social science perspective. Primary topics include justice theories and justice research. Not open to students with credit in JUS 105. This course is appropriate for juniors and seniors. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 306 Police and Society. (3) F, S, SS Focuses on community policing; critical inquiry of administrative decision making; perspectives on police-citizen violence; street practices; urban policing. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 308 Courts and Society. (3) F, S, SS History and development of courts. Relationship between dispute resolution mechanisms and cultural/social structure/processes in which they are embedded. Lecture, discussion, cooperative learning, case analysis. Prerequisite: refer to eligibility statements on page 417.

JUS 310 Corrections and Justice. (3) F, S, SS

Examines the United States prison condition; types of offenders; issues including drugs, gangs, drunk driving, racial discrimination, and "intermediate" punishments. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 311 Crime, Prevention, and Control. (3) F, S, SS

Prevention and control of crime is examined by a review of contemporary theories, justice agency procedures, and social policies. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 320 Community and Social Justice. (3) F, S, SS

Definitions of community will be discussed and analyzed; impact of environment on behavior; promises of community organization for local empowerment. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 321 Wealth Distribution and Poverty. (3) F

Examination of wealth and income distribution in the United States and analysis of ideological and political forces producing an increasing unequal society. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417. *General Studies: C*.

JUS 329 Domestic Violence. (3) F, S, SS Legal, historical, theoretical, and treatment aspects of domestic violence, including child abuse, woman battering, incest, and marital rape. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 335 Organized Crime. (3) F, S

The nature of organized crime and its illegal activities, theories of containment, and efforts by justice agencies to counter its dominance in society. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 345 White Collar Crime. (3) F, S, SS Basic white collar concepts and categories; causes and effects; mechanisms and contexts of operation; social and criminological responses. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 360 Law and Social Control. (3) F, S, SS

Resolution of social issues through the application of law as an agent of social control. Nature, sanctions, and limits of law. Categories of law and schools of jurisprudence. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417. *General Studies: SB.*

JUS 365 Substantive Criminal Law. (3) F, S, SS

Crimes against persons, property, and society; legislative analysis; primary appellate judicial opinions; substantive criminal law issues; trial court determinations. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 368 Procedural Criminal Law. (3) F, S, SS

Due process with respect to individual liberty; privacy and government power; emphasis on broad ideas of political and social theory. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 375 Crime and the Mass Media. (3) F, S, SS

A survey of the impact of mass media and popular culture on crime, police actions, and social policy. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 380 Contemporary Issues of American Indian Nations. (3) F, S, SS

Examines the unique status of American Indian governments focusing on issues of sovereignty and legal jurisdiction. Prerequisite: refer to eligibility statements on page 417. *General Studies: C.*

JUS 394 Special Topics. (1–3) F, S, SS

Topics chosen from various fields of justice studies. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 404 Imperatives of Proof. (3) F, S, SS

Issues of evidence, rules of proof, establishing fact and identity in the justice system. Lecture, case analysis, cooperative learning, discussion. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2.*

JUS 410 Punishment: Logic and Approach. (3) S

Analyzes forms of punishment, how and why they have changed. Areas include philosophy, history, and social structure of punishment. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 415 Gender and International Development. (3) F, S, SS

Examines the ways in which international development is gendered as well as women's rights as human rights in both national and international arenas. Lecture, seminar. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2, G.*

JUS 420 Women, Work, and Justice. (3) F, S, SS

Examination of gender inequality in the workplace, including the nature of women's work, theoretical issues, and models for promoting gender justice at work. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 422 Women, Law, and Social Control. (3) F, S, SS

An examination of social, economic, and legal factors that are relevant to mechanisms of social control of women, including formal legal control and informal control through violence. Prerequisite: refer to eligibility statements on page 417.

JUS 425 Race, Gender, and Crime. (3) F, S, SS

Critically examines major theories, research findings, policies, and controversies concerning race, ethnicity, gender, and crime. Lecture, discussion, cooperative learning. Prerequisite: refer to eligibility statements on page 417.

JUS 440 Administration and Justice. (3) F, S, SS

Diversity issues; procedural justice and service delivery; relationships between state and economic forces, including processes of regulation; state administrative apparatuses. Lecture, case analysis, cooperative learning, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 450 Alternatives to Incarceration. (3) F, S, SS

Investigation of various alternatives to incarceration; advantages/disadvantages; major issues including net widening, cost effectiveness, risk assessment, community crime prevention. Lecture, research. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2.*

JUS 460 Feminism and Justice. (3) F, S, SS

Explores feminist thought and critiques traditional political theories. Examines issues of racism, sexuality, and the law. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 463 Discretionary Justice. (3) F, S, SS

Use/abuse, key issues/manifestations of discretion in legal system and other societal institutions. Theoretical/empirical linkages between discretion and discrimination, based on race, ethnicity, and gender. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417. *General Studies: SB.*

JUS 469 Political Deviance and the Law. (3) F, S, SS

An examination of the controversies created by political and deviant behavior, including a critical view of law as an agent of social control. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2/SB, C.*

JUS 470 Alternative Dispute Resolution. (3) F, S, SS

Critical examination of the tenets of alternative dispute resolution movement; exposure to the programs of ADR, including community and court-based. Lecture, cooperative learning, field research. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2.*

JUS 474 Legislation of Morality. (3) F, S, SS

Addresses historical and contemporary issues related to social justice movements, law, and morality in a pluralistic society. Issues include AIDS, burial rights, homosexuality, poverty, prostitution, and racial discrimination. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2.*

JUS 477 Youth and Justice. (3) F, S, SS

A critical examination of youth-related justice issues, including economic justice, violence against youth, delinquency, and the juvenile justice system. Lecture, group work, film. Prerequisite: refer to eligibility statements on page 417. *General Studies: L2/SB.*

JUS 480 Law, Policy, and American Indians. (3) F, S, SS

In-depth study of how non-Indian laws and policies have impacted American Indian culture, land tenure, and sovereignty. Prerequisite: refer to eligibility statements on page 417. *General Studies: C.*

JUS 484 Internship. (3–6) F, S, SS

Assignments in a justice-related placement designed to further the student's integration of theory and practice. Internships are arranged through consultation of students with placements. Students must consult with the school for appropriate application and registration procedures. May be taken for a total of 12 semester hours, of which a maximum of 6 are applied to the major. Prerequisites: major status; Justice Studies student.

JUS 494 Special Topics. (1–3) F, S, SS

Topics chosen from various fields of justice studies. Lecture, discussion. Prerequisite: refer to eligibility statements on page 417.

JUS 498 Pro-Seminar. (1–3) F, S, SS

Small group study and research for advanced students. May be repeated for credit up to a maximum of 9 hours, no more than 3 applied to the major. Prerequisites: major status; minimum cumulative GPA of 3.00; instructor approval.

JUS 499 Independent Study. (1–3) F, S, SS

Original study or investigation in the advanced student's field of interest under the supervision of a faculty member. May be repeated for credit up to a maximum of 6 hours, all applicable to the major. Readings, conferences, tutorials. Prerequisites: major status; minimum GPA in JUS courses of 3.00; senior standing; instructor approval.

JUS 500 Justice Research Methods. (3) F, S, SS

Theories and methods of research with emphasis on development of designs most relevant to justice data and problems.

JUS 501 Justice Theory. (3) F

Theories and philosophies of social, economic, political and criminal justice. Applications of theories to contemporary justice issues. Lecture, discussion.

JUS 503 Crime and Social Causation. (3) S

Theories of deviance and crime as they relate to social policies and specific response of the justice complex.

JUS 509 Statistical Problems in Justice Research. (3) F, S

Methodological problems of research design and statistical methods specific to justice studies.

JUS 510 Understanding the Offender. (3) F

Survey of learning, personality, and biological theories of causation and their relevance to understanding criminal and delinquent behavior.

JUS 514 Justice Policy. (3) F

Assessment of the politics of justice policy as well as an understanding of the basic tools available to social scientists for analyzing the formulation, implementation, and evaluation of justice policy.

JUS 515 Comparative Justice. (3) F, S

Focuses on justice, legality, and human rights cross-culturally, examining both theoretical and methodological issues. Seminar.

JUS 520 Qualitative Theory and Data Collection. (3) F

The basic theoretical rationale and perspectives for justice related qualitative research, e.g., symbolic interactionism. Techniques for data collection, e.g., ethnography and depth interviewing.

JUS 521 Qualitative Data Analysis and Evaluation. (3) S

Analysis of qualitative data, e.g., field notes, depth interview transcripts, document analysis, coding, and retrieval with a microcomputer; qualitative evaluation.

JUS 542 American Indian Justice. (3) F, S, SS

Designed to provide a broad overview of American Indian and Alaskan Native issues of justice and injustice in contemporary society.

JUS 547 Program Evaluation. (3) F, S, SS

Nature/role of program evaluation; types, program monitoring, impact and process assessment, evaluability assessment, methods, utilization, and politics of evaluation. Lecture, lab. Cross-listed as PAF 541. Pre- or corequisite: JUS 500 recommended.

JUS 550 Alternatives to Incarceration. (3) F, S, SS

Investigation of various alternatives to incarceration; advantages/disadvantages; major issues including net widening, cost effectiveness, risk assessment, community crime prevention. Lecture, research.

JUS 560 Women, Law, and Social Control. (3) F

Gender issues in the exercise of formal and informal mechanisms of social control, including economic, social, legal factors, both violent and nonviolent.

JUS 570 Juvenile Delinquency. (3) F

Study of delinquency, including causation theories. Alternative definitions of delinquency, official statistics, and the critique and analysis of the interaction between social institutions and youth.

JUS 571 Juvenile Justice System. (3) S

Graduate-level introduction to juvenile justice system, including historical development, philosophical orientation, organizational structure, and contemporary controversies.

JUS 579 Political Deviance. (3) F

The seminar examines the politics of deviance by integrating the study of conflict with aspects of social organization, especially state formation.

JUS 584 Internship. (3 or 6) F, S, SS

Assignments in a justice agency designed to further the student's integration of theory and practice. Placements are arranged through consultation with students and agencies.

JUS 588 Justice and the Mass Media. (3) F, S, SS

An analysis of the nature and impact of mass media messages about justice concerns for social order. Lecture, discussion.

JUS 591 Seminar. (1–3) F, S, SS

Topics chosen from various fields of justice studies. May be repeated for credit.

JUS 610 Law and the Social Sciences. (3) S

Analysis of the theoretical grounds underlying diverse studies of law and society; creation and administration of law; and jurisprudence and politics.

JUS 620 Justice Research and Methods. (3) F

Concept development, research design, data collection strategies, legal research, and building computer databases relevant to the study of justice.

JUS 630 Data Analysis for Justice Research. (3) F

Bivariate and multivariate techniques of data analysis and hypothesis testing for justice-related research and use of information and statistical programs.

JUS 640 Theoretical Perspectives on Justice. (3) F

Analysis of philosophical perspectives of justice; linkages between social science theory and justice constructs; application of justice to social issues.

JUS 669 Political Trials and Indigenous Justice. (3) S

Focuses upon research on political trials, deviance, and conceptions of indigenous and contemporary justice. Lecture, discussion.

School of Public Affairs

Dickinson McGaw

Director

(WILSN 208) 602/965-3926

www.asu.edu/copp/publicaffairs

PROFESSORS

CAYER, COOR, HALL, MANKIN,
McGAW, MONTIEL,
PERRY, WESCHLER

ASSOCIATE PROFESSORS

ALOZIE, BROWN, DeGRAW,
LAN, VINZANT

ASSISTANT PROFESSORS

CAMPBELL, McCABE

DISTINGUISHED RESEARCH

FELLOW

PFISTER

GRADUATE PROGRAM

The faculty in the School of Public Affairs offer a 42-semester-hour professional Master of Public Administration (M.P.A.) degree. The M.P.A. degree is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA). The school also offers an interdisciplinary degree leading to the Doctor of Public Administration (D.P.A.). Consult the *Graduate Catalog* for information about these programs.

PUBLIC AFFAIRS (PAF)**PAF 401 Statistics.** (3) F, S

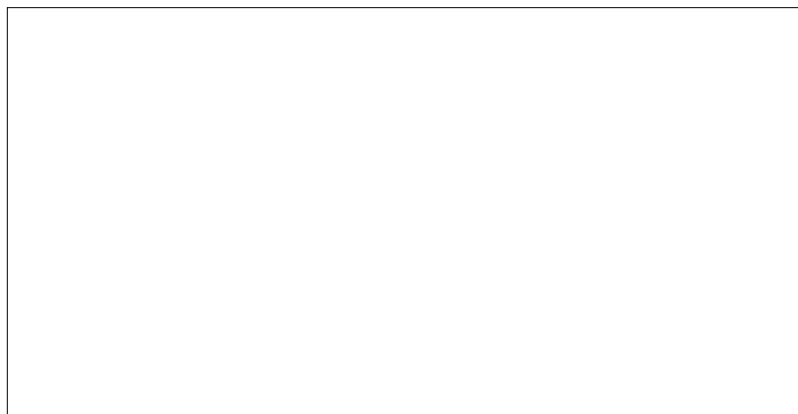
Survey of statistical concepts and techniques with application to public administration. Does not count toward program of study. Satisfies statistics prerequisite requirement for PAF 501 and 502.

PAF 501 Public Service Research. (3) F, S
Philosophy, scope, methods, design values, and ethics of public service research. Prerequisite: an approved course in statistics.

PAF 502 Public Program Analysis. (3) F, S
Application of research methods and techniques to evaluate the implementation of decisions in public organizations. Prerequisite: PAF 501.

PAF 503 Public Affairs. (3) F, S
The development and context of American public administration and policy, the role of administration in governance, and values and ethics in administration.

PAF 504 Public Affairs Economics. (3) F, S
The basics of public sector economics, microeconomic and macroeconomic concepts applied to public sector decisions and policies.



PAF 505 Public Policy Analysis. (3) F, S
Institutional and formal analysis of policy processes, decision making, and problem solving; values, ethics, and the uses of policy analysis.

PAF 506 Public Budgeting and Finance. (3) F, S

The legal, social, economic, political, institutional, and ethical foundations of governmental finance, budgets, and budgeting. Prerequisite: PAF 504.

PAF 507 Public Human Resource Management. (3) F, S

Personnel systems, behavior and management of people in public organizations, collective behavior, unionism, conflict management, motivation, productivity, and ethics.

PAF 508 Public Service. (3) F, S

Capstone application of core course knowledge, skills, and abilities required for public service. Prerequisites: PAF 501, 502, 503, 504, 505, 506, 507.

PAF 510 Governmental Budgeting. (3) N

Theories, applications, and consequences of budget decision making. Prerequisite: PAF 504.

PAF 511 Governmental Finance. (3) N

Sources of funding, management of funds and debts, and general pattern of expenditures in states, counties, cities, and districts. Prerequisite: PAF 504.

PAF 520 Public Management. (3) A

The management process in government and public agencies, with emphasis on the executive leadership within the public sector.

PAF 521 Organization Theory. (3) N

Organization theory and current research emphasis with application to public administrative organizations.

PAF 522 Public Labor Relations. (3) N

Rise of public unionism, managerial policy toward unionism, conflict resolution, impact of unionism on budgets, personnel policies, and public policy.

PAF 523 The City and County Manager. (3) N

The manager's role and resources in the differing forms of administrative, legislative, and community sectors.

PAF 525 Public Program Management. (3) N

Governmental service programming: formulating, financing, operating, evaluating, and reporting. Analysis of interagency relationships and the role and conduct of research in the programming process.

PAF 526 Public Sector Human Resource Development. (3) N

Concepts and techniques of organizational development in the public sector, including staffing, supervisor training, executive development, resource planning, and employee training.

PAF 529 Organization Change and Development. (3) N

Exploring the nature and management of change and development as a tool to achieve organizational goals; effecting planned change.

PAF 530 Management of Urban Government. (3) N

Administrative practices and behavior within the urban political administrative environment. Functional areas such as citizen participation, urban planning, urban transportation, and the conflicts between urban politics and administrative efficiency.

PAF 531 Community Conflict Resolution. (3) N

Interdisciplinary approach to understanding the dynamics of community conflict. Strategic considerations in policy design and advocacy; potential reaction to conflict. Relevant models and research findings generated by both case studies and comparative methods.

PAF 532 Urban Planning Administration. (3) N

Historical and present day uses of urban planning and procedures for its implementation. Basic principles and practices.

PAF 533 Urban Growth Administration. (3) N

Examines the process of urban growth and change. Partnership roles played by public and private sectors in management are emphasized.

PAF 535 Urban Housing Policy. (3) N

Comprehensive consideration of the revitalization of American cities with major emphasis upon the housing process and related institutions and services.

PAF 536 Urban Policy Making. (3) N

Analysis of the opportunities and costs of influencing public policy and the roles of officials and bureaucracies in decision making.

PAF 540 Advanced Policy Analysis. (3) A

Emphasizes the structure of policy problems, forecasting policy alternatives, optimizing resources, and reducing uncertainty in policy making. Prerequisite: PAF 505 or instructor approval.

PAF 541 Program Evaluation. (3) N

Various methodologies available for the evaluation of public policies and programs. Cross-listed as JUS 547. Prerequisite: PAF 501 or instructor approval.

PAF 546 Environmental Policy and Management. (3) N

Analysis of environmental policy and planning issues and principles related to the analysis and management of natural and urban/regional resources.

PAF 547 Science, Technology, and Public Affairs. (3) N

The influence of science and technology on governmental policy making, scientists as administrators and advisors, governmental policy making for science and technology, government as a sponsor of research and development.

PAF 548 Women, Politics, and Public Policy. (3) N

Explores how political philosophy, politics, and public policy affect and are affected by women.

PAF 549 Diversity Issues and Public Policy. (3) N

Examination of public policy issues concerning or affecting women, black, Latino, Asian, and American Indian communities, as well as those groups' impact on the policy process.

PAF 550 Information Management. (3) N

Concepts and theory of information and information technology in public sector organizations.

PAF 551 Computers in Administration. (3) N

Experience in use of computer technology for public administration problem solving.

PAF 552 Public Information Systems. (3) N

Systems analysis concepts and theory as applied to administration. Alternative modes of information organization and their impact on public decision making.

PAF 555 Research Data Management. (3) N

Techniques and problems associated with data management in a research environment. Database management systems, security and integrity, accessibility, and cost.

PAF 556 Database Management Systems. (3) N

Concept and use of modern database management systems in an administrative organization. Advantages and disadvantages of this approach.

PAF 561 Comparative Administration. (3) N

Literature on comparative public administration theory. Bureaucracies and their impact on the political development process. Selected nations are studied.

PAF 562 Intergovernmental Relations. (3) N

Evolution, growth, present status, and characteristics of the U.S. federal system of government. Federal-state relations, state-local relations, regionalism, councils of government, interstate cooperation, grants-in-aid, and revenue sharing.

PAF 563 Report Preparation. (3) N

Intensive practice in written and oral presentation of reports to conferences with problems in public administration. Visual aid techniques.

PAF 564 Political Economy. (3) S

Classical and contemporary literature and historical development of governmental and economic arrangements, with special emphasis on the role of the state.

PAF 591 Seminar. (1–12) F, S

Topics may include but are not limited to the following:

- (a) Business and Government
- (b) Emergency Management
- (c) General Public Administration
- (d) Information Management
- (e) Public Finance Administration
- (f) Public Management
- (g) Public Policy Analysis
- (h) Urban Affairs and Urban Planning

PAF 600 Research Design and Methods. (3) A

Advanced methods of research design and analysis. Prerequisites: formal graduate-level course work in statistics and in research methods.

PAF 601 Seminar: Policy Analysis and Program Evaluation. (3) A

Normative and conceptual issues of policy formulation, implementation, and evaluation; empirical approaches and methods of program evaluation and policy analysis.

PAF 602 Seminar: Foundation of Public Administration. (3) A

Ethical, social, legal, and philosophical foundations of public administration.

PAF 603 Seminar: Organization and Behavior in the Public Sector. (3) A

Structure, organization, conduct, and performance of public sector institutions in the administration of public policy. Prerequisite: PAF 602.

Department of Recreation Management and Tourism

Carlton F. Yoshioka
Chair

(MOEUR 131) 602/965-7291
www.asu.edu/copp/recreation

PROFESSORS

ALLISON, HALEY, YOSHIOKA

ASSOCIATE PROFESSORS

TEYE, VIRDEN

ASSISTANT PROFESSORS

ASHCRAFT, BAKER, SCHNEIDER,
SONMEZ, VOGT

DEPARTMENTAL MAJOR REQUIREMENTS

To be officially admitted with professional status to the B.S. degree program in Recreation, students must:

1. meet the College of Public Programs major status admission requirements (see page 405);
2. complete REC 120 and 210 with a grade of "C" or higher;
3. complete either COM 225, 241, or 259; and
4. tourism students must also have a "C" or higher in ECN 112

Transfer students who have completed 56 semester hours or more at another institution must remove any of the above course or scholastic deficiencies before being admitted with professional status to the B.S. degree in Recreation.

Students must complete the university General Studies requirement and the College of Public Programs course requirements in addition to major requirements. General Studies courses may not be used concurrently toward the General Studies requirement and related requirements within the major core.

RECREATION—B.S.

The B.S. degree program in the Department of Recreation Management and Tourism centers upon the systematic study of leisure-related phenomena, including human behavior and development, resource use, environmental and social issues, and public policy. It is a professional program that features full exposure of students to a multifaceted concept of leisure and the quality preparation of these students for professional-level entry into leisure service occupations.

This multidisciplinary degree program is designed to provide the student with the competencies necessary for employment in management and program delivery positions in diverse leisure agencies such as municipal recreation and park departments, county park departments, YMCAs, YWCAs, Boys and Girls Clubs of America, and other nonprofit agencies, visitor and convention bureaus, senior centers, retirement communities, resorts, and other components of the tourism/commercial recreation industry. Graduates have also been employed by state offices of tourism, state parks departments, and various federal recreation resource agencies.

PROGRAM REQUIREMENTS

The 63-semester-hour B.S. degree program in Recreation includes 33 semester hours of major core courses (see below). Students may select from two concentrations: (1) recreation management and (2) tourism. Students pursuing the recreation management concentration can further specialize in therapeutic recreation, community and urban recreation, outdoor recreation, or nonprofit/youth agency administration (American Humanics). In addition to the core, these concentrations consist of 15 semester hours of recreation-related

courses and 15 semester hours of related-areas courses. REC 330, 462, and 482 require professional status and must be taken in sequence. REC 463 is the final capstone course taken in the department.

Recreation Major Core Courses

REC 120	Leisure and the Quality of Life <i>SB</i>	3
REC 210	Leisure Delivery Systems	3
REC 330	Programming of Recreation Services <i>L2</i>	3
REC 350	Promoting and Marketing Recreation Services	3
REC 364	Foundations of Therapeutic Recreation	3
REC 462	Management of Recreation Services	3
REC 463	Senior Internship	12
REC 482	Assessment and Evaluation of Recreation Services	3
Total		33

The tourism concentration consists of 33 semester hours of major core courses, nine semester hours of tourism-related requirements, nine semester hours of tourism options, and 12 semester hours of nonmajor related course work.

Tourism students may choose to follow either the marketing and community development track or the services track for their related course work. Information on both of these tracks is available from the academic advisor.

In both the recreation management and tourism concentrations, the related areas and directed electives course work must be selected from a departmental list of approved university courses.

Nonprofit/Youth Agency Administration: American Humanics Certificate Program.

In addition to the two concentrations within the B.S. degree program in Recreation, a certificate program is offered in the area of Nonprofit/Youth Agency Administration: American Humanics. This certificate program features professional affiliation with and certification by American Humanics, Inc., the national leader in education for youth and human service agency administration. American Humanics collaborates with such agencies as the American Red Cross, Big Brothers/Big Sisters, Boys and Girls Clubs of America, the Boy

Scouts of America, Camp Fire, the Girl Scouts of the USA, Habitat for Humanity, Junior Achievement, the United Way, YMCA, and YWCA.

This program provides an academic approach featuring unique issues of voluntary, not-for-profit agency management and includes active participation by agency professionals who offer workshops, seminars, field trips, and experiential education experiences.

REC 220	Introduction to Nonprofit Youth and Human Service Agencies	3
REC 300	Fund Raising	3
REC 310	Volunteerism	3
REC 320	Youth and Human Service Workshops	4
REC 420	American Humanics Institute	1-2
REC 430	Managing Not-for-Profit Agencies	3
Minimum total		17

Additional Department Requirements. Two hundred hours of recreation leadership experience (volunteer hours) are required before enrollment in REC 463 Senior Internship. Students are not permitted to take additional course work during their senior internship placement period. Approval of internships for main campus students must be received from the Department of Recreation Management and Tourism office on the main campus.

A student must attain a grade of "C" or higher in all courses within the major, including the related area. Specific courses that may be used to fulfill the related requirements are listed in a brochure available through the department.

MINORS IN RECREATION MANAGEMENT AND TOURISM

The faculty in the Department of Recreation Management and Tourism offer two minors; one in Recreation Management and one in Tourism, consisting of REC 120 Leisure and Quality of Life, and 12 additional hours of upper-division ASU Main credits taken from a list of approved courses. Please consult the minor verification form available in the department office.

GRADUATE PROGRAM

M.S. in Recreation. The curriculum for the M.S. degree in Recreation is designed to help students achieve both academic and professional goals. Areas of concentration include outdoor recreation, recreation administration, social/

psychological aspects of leisure, and tourism and commercial recreation. Students may complete a thesis or an applied project option. Information on the M.S. in Recreation is detailed in the *Graduate Catalog*.

RECREATION (REC)

REC 120 Leisure and the Quality of Life. (3) F, S, SS

Conceptual foundations for understanding the role of leisure in the quality of life. Social, historical, psychological, cultural, economic, and political foundations of play, recreation, and leisure. *General Studies: SB.*

REC 150 Outdoor Pursuits. (3) SS
Theories and practical applications related to outdoor recreation pursuits. Interdisciplinary approach to wilderness issues and philosophies, culminating in an outdoor experience. Field trip required.

REC 160 Leisure and Society. (3) A
Analysis of the human relationship to leisure. Historical survey of philosophical, psychological, and socioeconomic bases for development of systems that provide leisure programs. Non-Recreation majors only. *General Studies: SB.*

REC 210 Leisure Delivery Systems. (3) F, S
Introduction to development, management, and organization of the public, not-for-profit, and private sectors of the leisure services profession. The course is organized into five modular units which study the delivery of services in the recreation and tourism professions. Lecture, team taught. Prerequisite: Recreation professional status.

REC 220 Introduction to Nonprofit Youth and Human Service Agencies. (3) F, S
Introduction to the not-for-profit youth and human service sector and its role in United States society, the economy, and service delivery systems.

REC 300 Fund Raising. (3) A
Methods, techniques, and directed experience in fund raising for voluntary youth and human services agencies. Budget control and accountability.

REC 305 Introduction to Travel and Tourism. (3) F, S
An examination of the components of the travel and tourism industry at the state, national, and global levels. *General Studies: G.*

REC 310 Volunteerism. (3) A
Administration of volunteer service programs. Study and analysis of the volunteer personnel process.

REC 315 Community Recreation Systems. (3) S
Explores and assesses community recreation delivery systems in the United States. Prerequisite: REC 210.

REC 320 Youth and Human Service Workshop. (1) F, S
Forum for exchange between students and professional agency personnel. Variable topics, guest speakers. Prerequisite: instructor approval.

REC 325 Tourism Accommodations. (3) A
Local, national, and international overview of the lodging and food service industries. Prerequisites: REC 305; Recreation major or minor.

REC 330 Programming of Recreation Services. (3) F, S
Foundations for effective program planning in varied leisure delivery systems. Prerequisite: Recreation professional status. *General Studies: L2.*

REC 340 Outdoor Survival. (3) A
Interdisciplinary approach to outdoor survival, including attitudes, psychological stress, physiological stress, preparation, hypothermia, navigation, flora, and wildlife. Field trips required.

REC 345 Meeting and Convention Planning. (3) A
Basic aspects and skills in planning meetings and conventions. Industry and market overview of certified meeting planners. Prerequisite: REC 305.

REC 350 Promoting and Marketing Recreation Services. (3) F, S
Basic principles of promoting recreation services and strategies focusing on promoting and marketing concepts as they apply to recreation/tourism settings. Prerequisite: Recreation professional status.

REC 360 Recreation Resource Management and Policy. (3) N
Management and decision making in recreation resource agencies. Policy analysis and use conflicts. Prerequisite: Recreation major.

REC 364 Foundations of Therapeutic Recreation. (3) F, S
Introduction to special recreation and therapeutic recreation services for persons with disabilities. Offers both a community and clinical perspective on specialized services. Prerequisite: Recreation professional status or instructor approval.

REC 370 Outdoor Recreation Systems. (3) F
Introduction to outdoor recreation resource delivery systems; history of wilderness and outdoor recreation resources; the role of outdoor recreation in society; outdoor recreation agencies; related environmental issues. Prerequisite: junior standing or instructor approval.

REC 372 Tourism Planning. (3) F, S
Application of economic and regional development concepts and theories to destination product development. Prerequisites: REC 305; Recreation major or minor.

REC 380 Wilderness and Parks in America. (3) S
An examination of the American Conservation Movement and the relationships between the environment and recreation behavior. *General Studies: SB, H.*

REC 390 Adaptive Aquatics. (3) SS
Focuses on delivery of aquatic programs for the mentally and physically challenged. Lecture, lab.

REC 400 Processes and Techniques in Therapeutic Recreation. (3) A
In-depth analysis of theoretical and philosophical approaches to therapeutic recreation practice with emphasis on various facilitation techniques used in therapy. Prerequisite: REC 364 or instructor approval.

REC 401 Program Design and Evaluation in Therapeutic Recreation. (3) F, S
In-depth analysis of assessment, treatment planning, program implementation, documentation, and evaluation strategies employed in therapeutic recreation practice. Prerequisites: REC 364 and 400 or instructor approval.

REC 415 Tourism Transportation Systems.

(3) A

Examination of the role of various modes of transportation in domestic and international tourism development. Prerequisites: REC 305; Recreation major or minor.

REC 420 American Humanics Institute. (1–2) F, S

Mini-intensive national management institute for preparation of youth development and non-profit management staff. Lecture, out-of-state conference. May be repeated for credit. Prerequisite: instructor approval.

REC 430 Managing Not-for-Profit Agencies.

(3) S

Analysis of administrative structure, decision making, and program delivery with not-for-profit youth and human service agencies.

REC 440 Recreation Areas and Facilities Development and Management. (3) A

Survey of development and management of public, private, and commercial recreation areas and facilities with a focus on meeting program needs.

REC 450 Leisure and Aging. (3) N

An exploration of the role of leisure in later maturity and the influence of the aging process on leisure behavior. Lecture, off-campus lab. Prerequisites: REC 210 and 364 or instructor approval.

REC 458 International Tourism. (3) F, S

A global examination of international tourism and its significance as a vehicle for social and economic development. *General Studies: G.*

REC 460 Clinical Issues in Therapeutic Recreation. (3) A

An exploration of contemporary problems/issues confronting the therapeutic recreation field; includes philosophical, historical, practice, management, research, and educational issues. Lecture, off-campus lab. Prerequisites: REC 364 and 400 or instructor approval.

REC 462 Management of Recreation Services. (3) F, S

Basic principles of administration and their application in successful administrative situations. Analysis of administrative function, structure, and policies. Prerequisites: REC 330; Recreation professional status.

REC 463 Senior Internship. (6 or 12) F, S, SS

Supervised guided experience in selected agencies. Prerequisites: REC 462; Recreation major; senior standing.

REC 470 Environment Interpretation and Education. (3) F

Introduction to park interpretation and environmental education which includes theories, principles, and techniques.

REC 480 Natural Resource Tourism. (3) S

Examines the interaction of tourism with culture, natural environment, as well as the impacts of tourism on the environment.

REC 482 Assessment and Evaluation of Recreation Services. (3) F, S

Introduction to applied leisure research with an emphasis on program evaluation, research design, data collection techniques, and data analysis. Prerequisites: REC 330, 350; Recreation professional status.

REC 494 Special Topics. (1–3) F, S

Special topics selected by department faculty.

REC 500 Research Methods I. (3) A

Introduction to recreation research methods, with emphasis on methodological questions, research issues, and techniques relevant to contemporary social research. Prerequisite: 500-level or higher approved statistics course.

REC 501 Research Methods II. (3) N

Advanced treatment of methodological issues, analysis of data, computer applications, and thesis proposal development. Prerequisite: REC 500.

REC 540 Recreation Services for the Aged. (3) N

An applied orientation to the social/psychological theories of recreation and the aged.

REC 552 Historical and Philosophical Foundations of Leisure. (3) A

An analysis of the fundamental historical and philosophical concepts, issues, and problems confronting the leisure studies profession.

REC 555 Social and Psychological Aspects of Leisure Behavior. (3) A

An empirical and theoretical analysis of social, cultural, and psychological foundations of leisure behavior.

REC 558 Integrative Seminar. (3) A

Advanced exploration and assessment of current trends within the leisure studies profession. This course has variable topics, including, but not limited to: cross-cultural analysis of leisure, urban recreation, planning and resources, sociocultural dimensions of tourism development, wilderness management. Prerequisite: REC 552.

REC 569 Current Issues in Tourism. (3) A

General survey of the tourism literature with an emphasis on relevant theories, concepts, and current research.

REC 570 Social Aspects of Outdoor Recreation Management. (3) A

An analysis of the social aspects of natural resource recreation management and planning. Prerequisite: REC 370 or equivalent.

The exercise bicycles in the Student Recreation Complex provide not only a great workout but a place to study as well.

Tim Trumble photo

School of Social Work

Emilia E. Martinez-Brawley, Ed.D.
Dean

PURPOSE

The purpose of the School of Social Work is to prepare professional social work practitioners who are committed to the enhancement of individual family and group problem-solving capacities and the creation of a more nurturing, just, and humane social environment.

The mission of the School of Social Work is the training of professional social workers for beginning-level generalist practice (B.S.W.) and for clinical, administrative, and community practice (M.S.W.). The focus is on those populations who are most oppressed and most in need of social services. A special emphasis is placed on working with ethnic and racial minorities of the Southwest.

The school is committed to the university's mission to be competitive with the best public research universities in the country. Faculty members have active research agendas under way that venture into a wide variety of topics, including work with children, with drug and alcohol abusers, with the developmentally disabled, in human services planning, and in many other areas of interest.

ORGANIZATION

The School of Social Work is organized around three program areas:

1. Bachelor of Social Work (B.S.W.);
2. Master of Social Work (M.S.W.); and
3. Doctor of Philosophy (Ph.D.) with a major in Social Work.

The M.S.W. program has two concentrations in the second year: (1) direct practice (DP) and (2) planning, administration, and community practice (PAC). In considering the PAC concentration, students need to be aware that, because of space availability, preference is given to individuals with significant previous experience.

For more information regarding the Masters and Ph.D. programs, see the *Graduate Catalog*.

ADMISSION

Bachelor of Social Work

The B.S.W. degree program is divided into the pre-Social Work major and the Social Work major.

The pre-Social Work major consists of freshman and sophomore students who have been admitted to the university and have declared Social Work as their major, as well as students transferring to the School of Social Work from other colleges within the university and other universities or junior colleges who have not completed the admission requirements to the program. Students transferring from other universities or community colleges as premajors should follow the procedure outlined on pages 63–64 of this catalog. Students transferring from other colleges within the university must obtain a Change of College form from the School of Social Work, Academic Services, WHALL 135.

Admission Procedure for Social Work Majors.

This admission procedure is for students who have 54 semester hours or more and have taken SWU 271 Introduction to Social Work, 291 Social Service Delivery Systems, 301 Human Behavior in the Social Environment I, and 310 Social Work Practice I. Students wishing to enter the Social Work major are required to apply for admission to the program in addition to obtaining an official Certificate of Admission to the university. Students are eligible to apply for admission to the Social Work major during the last semester of the sophomore year. It is expected that applicants have completed 54 semester hours and the required social work courses by the end of the semester in which they are applying. Students are admitted to the major at the beginning of the term following the semester during which they apply.

Students may obtain a Social Work major application packet at the School of Social Work, Academic Services, WHALL 135, or request that one be mailed to their home address by calling 602/965-6081.

Applicants are reviewed for admission for the fall and spring semesters. Students applying must have a Certificate of Admission to the university in their files by November 1 for spring admission and March 1 for fall admission. All other application materials (i.e., application form, additional statement, and two letters of reference) must be returned to

SCHOOL OF SOCIAL WORK
ACADEMIC SERVICES
ARIZONA STATE UNIVERSITY
PO Box 871802
TEMPE AZ 85287-1802

Materials must be received by November 1 for spring admission or March 1 for fall admission. Failure to meet these deadlines may result in the applicant having to wait for the next admissions period. Applicants are notified by mail of the committee's decision. Those applicants who have been denied admission may request a conference with the program director to discuss the decision and to obtain guidance in the development of future plans.

Criteria for Admission. Admissions are based on the following criteria:

1. A minimum cumulative GPA of 2.00 is required.
2. A minimum cumulative GPA of 2.75 in core social work courses (SWU 271, 291, 301, and 310) and a grade of "C" or higher in all social work courses are required.
3. Lower-division General Studies requirements described by the university and as part of the B.S.W. program must be completed.
4. The applicant's educational and career goals must be compatible with the educational objectives of the school.
5. Before admission to the major, applicants are required to have a minimum of 240 hours of social work experience in human services. Voluntary, paid, and/or equivalent family personal experiences are acceptable.

6. References are required for each applicant. Two references from persons who have known the applicant in a professional capacity are to be submitted by the applicant. Additionally, a third reference is later requested by the school from the applicant's SWU 310 instructor. This reference is used in the field placement process.

Admission is selective and based on available resources. Not all students who meet minimum requirements are admitted to the program.

Leave of Absence. Occasionally, for health or personal reasons, Social Work majors find it necessary to interrupt their studies. Students considering such requests meet with an academic advisor to look at alternatives and then submit a written request to the Social Work program director. A student may request a leave of absence from the Social Work program for a period of one year. (This leave applies only to the Social Work program and not to the university. No leave of absence is granted from the university.) Except when recommended by the Committee on Academic and Professional Standards, the student must be in good standing in the program at the time the request is made. Students should be aware that nonattendance at the university for one or more semesters requires reapplication to the university. Failure to request a leave of absence by Social Work majors results in removal from the program.

Readmission. Undergraduate students (premajor and major) who have previously attended ASU but have not been

enrolled at this institution for one or more semesters are required to apply for readmission following university procedures as outlined on pages 69-70. Students who were previously Social Work majors may, in addition, be required to reapply for major status.

Transfer Students. The university standards for evaluation of transfer credit are listed on pages 63-64. Community college students planning to transfer at the end of their first or second year should plan their community college courses to meet the requirements of the ASU curriculum selected. Students attending Arizona community colleges are permitted to follow the degree requirements specified in the ASU catalog in effect at the time they begin their community college work, providing their college attendance is continuous. See pages 80-81, "Guidelines for Determination of Catalog Year."

Arizona students are urged to refer to the *Arizona Higher Education Course Equivalency Guide* for the transferability of specific courses from Arizona community colleges. Copies of the guide are available from Academic Services, WHALL 135. Courses transferred from community colleges are accepted as lower-division only. Students are urged to choose their community college courses carefully, in view of the fact there is a minimum number of hours of work taken at the university that must be upper-division credit (see "Credit Requirements," page 79).

Direct transfer of courses from other accredited institutions to the School of Social Work is subject to the existence of parallel and equal courses in the school's curriculum. Transfer credit is not given for courses in which the lowest passing grade ("D") or a failing grade ("E" or "F") was received.

Credit for "life experience" is not given in lieu of course requirements. A minimum of 30 semester hours earned in resident credit courses at ASU is required for graduation.

ADVISING

Students are responsible for meeting the degree requirements and seeking advising regarding their program status and progress. Upon admission to the Social Work major, each student is as-

signed a faculty advisor who assists with career planning. The academic advisor assists students with program planning, registration, preparation of needed petitions, verification of graduation requirements, and referrals to university and/or community resources. Students must meet with an academic advisor before any registration transaction.

DEGREES

The school’s undergraduate curriculum leads to a Bachelor of Social Work (B.S.W.) degree. The B.S.W. degree program is accredited by the Council of Social Work Education (CSWE). The principal objective of the undergraduate curriculum is to prepare students for beginning-level generalist practice in social work. The program is also designed to prepare students for culturally sensitive practice and to provide preparation for graduate training in social work. During the freshman and sophomore years, students concentrate on obtaining a strong background in liberal arts and sciences and are classified as premajors until they are officially admitted to the major. Entrance into the Social Work major from the premajor is not automatic (see “Admission,” pages 425–426).

Junior and senior Social Work majors focus on social work courses in research, social policy and services, social work practice, human behavior in the social environment, and field instruction in community agencies. In addition, majors take elective courses in related areas.

The B.S.W.-level practitioner is seen as a generalist. The curriculum focuses on such roles as advocacy, case management, problem-solving, and referral functions with individuals, groups, families, organizations, and the community.

GRADUATE PROGRAM

The faculty in the School of Social Work offer a Master of Social Work (M.S.W.) and a Ph.D. in Social Work. For more information on courses, faculty, and programs, see the *Graduate Catalog*.

UNIVERSITY GRADUATION REQUIREMENTS

In addition to fulfilling college and major requirements, students must meet all university graduation requirements. For more information, see pages 79–83.

General Studies Requirements

All students enrolled in a baccalaureate degree program must satisfy a university requirement for a minimum of 35 semester hours of approved course work in General Studies, as described on pages 84–87.

Note that all three General Studies awareness areas are required. Consult your academic advisor for an approved list of courses.

COLLEGE DEGREE REQUIREMENTS

All students enrolled in a baccalaureate degree program must satisfy School of Social Work degree requirements with additional course work chosen from among those courses that satisfy the General Studies requirement. General Studies courses are listed on pages 87–108 in the *General Catalog* following the section on “General Studies,” in the course descriptions, in the *Schedule of Classes*, and in the *Summer Sessions Bulletin*.

A well-planned program of study may enable students to complete many General Studies and School of Social Work degree requirements concurrently. Students are encouraged to consult with an academic advisor in planning a program to ensure that they comply with all necessary requirements.

Specific courses from the following areas must be taken to fulfill the college degree requirements.

Numeracy. School of Social Work students must complete a statistical analysis course (N2).

Humanities and Fine Arts. School of Social Work students must complete PHI 101 Introduction to Philosophy or PHI 306 Applied Ethics.

Social and Behavioral Sciences. The following courses are required:

- ECN 111 Macroeconomic Principles 3
- PGS 101 Introduction to Psychology 3

POS 110	Government and Politics	3
	or POS 310 American National Government (3)	
SOC 101	Introduction to Sociology	3
	or SOC 301 Principles of Sociology (3)	
Total		12

Natural Sciences. School of Social Work students must complete a course in either human biology or anatomy and physiology.

MAJOR REQUIREMENTS

The School of Social Work awards a Bachelor of Social Work degree upon the successful completion of a curriculum consisting of a minimum of 120 semester hours. This includes all university requirements (see pages 79–83), including the General Studies requirement (see pages 84–87), as well as the School of Social Work degree requirements.

Course Load. A normal course load per semester is 15–16 semester hours. The maximum number of hours for which a student can register is 18 semester hours, unless an overload petition has been filed with and approved by the director of the undergraduate program.

Overload petitions are not ordinarily granted to students who have a cumulative GPA of less than 3.00 and who do not state valid reasons for the need to register for the credits. Students who register for semester hours, in excess of 18 and do not have an approved overload petition on file have courses randomly removed through an “administrative drop” action.

Social Work Core Requirement

SWU 271	Introduction to Social Work <i>H</i>	3
SWU 291	Social Service Delivery Systems	3
SWU 301	Human Behavior in the Social Environment I <i>L2/SB</i>	3
SWU 310	Social Work Practice I	3
SWU 320	Research Methods in Social Work	3
SWU 340	Human Behavior in the Social Environment II <i>SB</i>	3
SWU 374	Diversity and Oppression in a Social Work Context <i>C</i>	3

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

SWU 410	Social Work Practice II	3
SWU 411	Social Work Practice III	3
SWU 412	Field Instruction I	5
SWU 413	Field Instruction Seminar I	1
SWU 414	Field Instruction II	5
SWU 415	Field Instruction Seminar II... 1	1
SWU 432	Social Policy and Services	3
SWU 442	Introduction to Practice with Children and Families in Child Welfare	3
	or SWU 444 Issues in School Social Work (3)	—
Total		45

SWU 412 and 414 each require 16 hours weekly per semester in the field. Students must file an application for field work before registering for the courses.

No credit is granted toward fulfilling major core requirements in any course in the student's major unless the grade in that course is at least a "C."

Electives

Students are required to take 37 semester hours of courses in areas related to social work. The practice model of the program is a social work generalist.

Each student is encouraged to consult with an academic advisor in selecting electives. Economics, education, psychology, and sociology are only a few of the academic units offering knowledge of value to the professional social work practitioner.

Undergraduate Student Enrollment in Graduate Classes.

Undergraduate students at ASU in their senior year may enroll in a maximum of nine graduate semester hours in the School of Social Work, providing they have an overall GPA of 3.00 or higher at the time of enrollment and have secured the required signatures for approval. If a course is not used to meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by a nondegree graduate student (see the *Graduate Catalog*).

Field Instruction. Field instruction for the B.S.W. program is offered concurrently with classroom study. Students are assigned to a social service agency and work under the supervision of a School of Social Work-approved social

work professional. Field instruction permits testing theory in practice and provides a base of experience for class discussions. Qualified agencies in several Arizona communities are utilized for field instruction.

B.S.W. students work in one placement for 16 hours a week, for a total of 480 hours over two semesters. In assigning the placement, the school takes into account the student's educational needs and career goals. Generalist social workers need to be familiar with the methods of working with individuals, families, and groups, as well as in organizations and communities and with all ages and ethnic groups. The faculty are committed to establishing the capabilities necessary for high quality, social work generalist practice.

B.S.W. field instruction agencies are located primarily in the Phoenix metropolitan area. Specially arranged, more distant placements may require up to a two-hour drive. Although car pools are possible, personal transportation is strongly recommended while attending school.

ACADEMIC STANDARDS

To remain in good academic standing, the student must maintain a minimum overall GPA of 2.00 (B.S.W.) at the end of each semester. Most courses in the program are sequential; successful completion of each course in the sequence is required to enroll in the following course.

Retention and Disqualification

The following policies govern retention and disqualification.

Probationary Status. A student must maintain a minimum overall cumulative GPA of 2.00 (B.S.W.). A student is placed on probationary status automatically when (1) the GPA is less than the minimum at the end of any semester or (2) a grade of "D" or "E" is received for any major core requirement, regardless of the GPA.

Students may also be put on probation for reasons other than grades.

Probationary status requires completion of a plan—written and signed by the student and faculty advisor, with copies for the student, faculty advisor, program director, field director, and

file—that indicates when and how deficiencies will be met. This plan must contain a provision to bring the GPA up to minimum standards by the end of the succeeding semester or at the completion of 12 hours of letter-graded course work, whichever comes later. Probationary students may be denied registration in the absence of such a plan.

Once a Social Work student is on academic probation, the student remains in that status until the overall GPA reaches the retention level (2.00 [B.S.W.]) or until the student is disqualified from the university.

Termination from the Program. A student is terminated from the program under any one of the following circumstances:

1. A student fails to carry out the plan developed during a probationary semester.
2. A B.S.W. student receives an "E" grade (failure) in field practicum.
3. A B.S.W. student does not accept or is not accepted by three or more field agencies if, in the judgment of faculty and field staff, the placements can provide appropriate field experiences without undue inconvenience to the student.
4. The student does not adhere to professional expectations and standards (see the *ASU Student Code of Conduct*, *National Association of Social Workers Code of Ethics*, and *CSWE Curriculum Policy Statement*).
5. A student appears to lack the degree of physical or mental health necessary to function successfully as a social worker. Such a student may be required to undergo a medical examination and make the results available to the Committee on Academic and Professional Standards of the School of Social Work. The responsibility for reviewing and determining the qualification of students whose behavior or performance are in question is vested in this committee. The committee's decision may require the dismissal or disqualification of a student from the program.

Reinstatement. A disqualified student who desires to be reinstated may submit an application for reinstatement. A disqualified student normally is not reinstated until at least one semester has elapsed from the date of disqualification. The burden of establishing fitness is on the disqualified student, who may be required to take aptitude tests and submit to other examinations before being readmitted.

Continuous Evaluation. While students are subject to the university's general retention policy, they are evaluated in the school on broader criteria than mere GPA. Students are reviewed for evidence of competency in social work and are continuously evaluated as they progress in the program. Prospective Social Work candidates who do not meet the established criteria are guided toward a program that is compatible with their interests and abilities.

Appeal Procedures

Students who believe they have been unjustly treated in an arbitrary, capricious, or discriminatory fashion in academic or other matters relating to their career as students may appeal by following the guidelines set forth in the *Policies and Procedures Manual* for the School of Social Work, available in Academic Services, WHALL 135.

STUDENT RESPONSIBILITIES

Students are expected to support and maintain the highest professional standards as spelled out in the *ASU Student Code of Conduct* and the *National Association of Social Workers Code of Ethics*.

Regular attendance is expected in all classes and in field education and is a critical factor in evaluation of performance.

Students' rights are protected through appeal to the Committee on Academic and Professional Standards or through consultation with the school's ombudsperson.

SPECIAL PROGRAMS

Tucson Component. The School of Social Work offers a part-time, cohort driven B.S.W. Program in Tucson in conjunction with the College of Extended Education.

For more information about the B.S.W. program, contact the Tucson Component at 520/884-5507.

University Honors College. The School of Social Work participates with the University Honors College, which affords undergraduates opportunities for enhanced educational experiences. A description of the requirements and the opportunities offered by the University Honors College can be found on pages 293-295 of this catalog.

School of Social Work

Emilia E. Martinez-Brawley
Dean
(WHALL 135) 602/965-3304
www.asu.edu/socialwork

PROFESSORS

ASHFORD, COUDROGLOU,
DALEY, KETTNER,
LeCROY, MacEACHRON,
MARTINEZ-BRAWLEY, MORONEY

ASSOCIATE PROFESSORS

FAUSEL, GUSTAVSSON,
LEYBA, MONTERO, NICHOLS, PAZ,
SEGAL, WALLER

ASSISTANT PROFESSORS

BELL, BRZUZY, CARTER,
GERDES, HURDLE, MARSIGLIA,
NAPOLI, RISLEY-CURTISS,
STEINER, STROMWALL,
VILLERREAL, ZORITA

ACADEMIC PROFESSIONALS

GONZALEZ-SANTIN, JOHNSTON,
KNUTSON-WOODS

SOCIAL WORK (SWG)

See the *Graduate Catalog* for the SWG courses.

SOCIAL WORK (SWU)

SWU 271 Introduction to Social Work. (3) F, S

Descriptive and analytical historical perspective of the profession of social work, social problems, and the social welfare system. Designed for freshmen and sophomores considering this major. Prerequisites: PGS 101; SOC 101. *General Studies: H.*

SWU 291 Social Service Delivery Systems. (3) F, S

Knowledge and skills necessary to utilize community resources to be a competent case manager. Includes 40 hours of observational experience in local agencies. Pre- or corequisite: SWU 271.

SWU 301 Human Behavior in the Social Environment I. (3) F, S

Impact of the social environment on the behavior of individuals, family systems, communities, and organizations. Prerequisites: PGS 101; SOC 101; human biology course. Pre- or corequisites: SWU 271, 291. *General Studies: L2/SB.*

SWU 302 Human Biology for Social Workers. (3) F, S

Overview of human anatomy and physiology, and the reciprocal relationship between physical and social environments. Lecture, discussion. Pre- or corequisites: SWU 271, 291.

SWU 310 Social Work Practice I. (3) F, S
Introduction to social work methods, emphasizing the following skills: communication patterns, cross-cultural interviewing, recording, role-playing, and video training. Prerequisite: SWU 291. Pre- or corequisite: SWU 301.

SWU 320 Research Methods in Social Work. (3) F, S

Application of scientific principles to field practice, impact assessment, intervention procedures, and problem formulation in social work. Lecture, cooperative learning. Prerequisites: SWU 310 and an approved course in data analysis techniques or instructor approval.

SWU 321 Statistics for Social Workers. (3) F, S

Teaches social work students how to use and interpret descriptive and inferential statistics in social work practice. Lecture, small group work. Prerequisites: MAT 114, 117. Pre- or corequisite: SWU 320. *General Studies: N2.*

SWU 340 Human Behavior in the Social Environment II. (3) F, S

Theories of human development across the life span. Emphasis is placed on individuals, families, and small groups. Lecture, discussion. Prerequisite: SWU 301. Pre- or corequisites: SWU 302, 310. *General Studies: SB.*

SWU 410 Social Work Practice II. (3) F, S
Knowledge and skills in social work practice with individuals and families. Prerequisites: PHI 101 (or 306); SWU 310; Social Work major. Corequisites: SWU 412, 413.

SWU 411 Social Work Practice III. (3) F, S

Knowledge and skills in social work practice with groups, communities, and organizations. Prerequisites: SWU 413; Social Work major. Corequisites: SWU 414, 415.

SWU 412 Field Instruction I. (5) F, S

Sixteen hours a week of supervised practice in an approved placement. Prerequisite: Social Work major. Corequisites: SWU 410, 413.

SWU 413 Field Instruction Seminar I. (1) F, S

Field-focused seminar, including practice evaluation. 1.5 hours a week. Prerequisite: Social Work major. Corequisites: SWU 410, 412.

SWU 414 Field Instruction II. (5) F, S

Sixteen hours a week of supervised practice in an approved placement. Prerequisites: SWU 413; Social Work major. Corequisites: SWU 411, 415.

SWU 415 Field Instruction Seminar II. (1) F, S

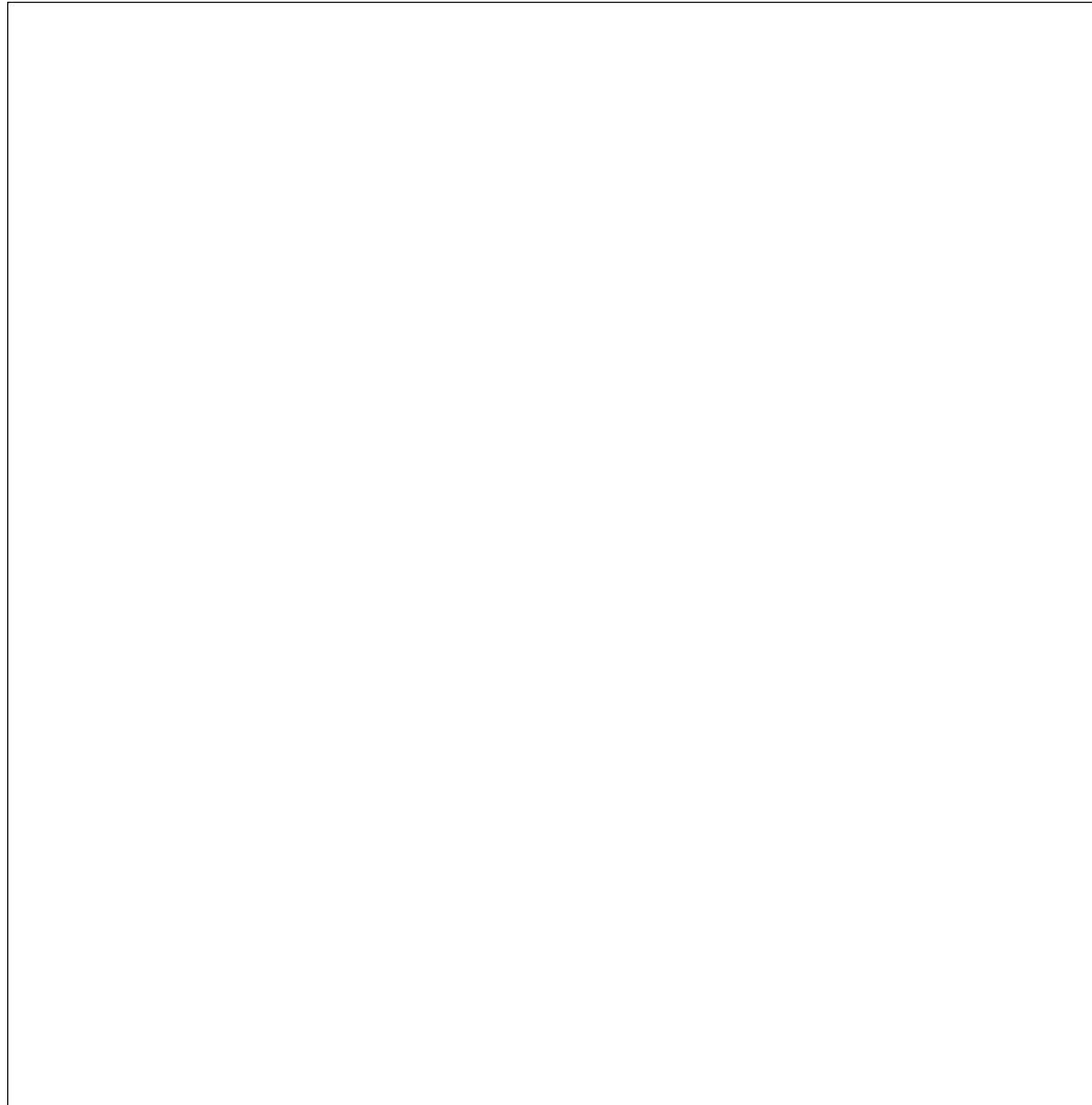
Field-focused seminar, including practice evaluation. 1.5 hours a week. Prerequisite: Social Work major. Corequisites: SWU 411, 414.

SWU 432 Social Policy and Services. (3) F, S
Contemporary social, political, and economic issues. Special emphasis on poverty and inequality in the Southwest. Analysis and development of social welfare policies and programs. Prerequisites: ECN 111; POS 110 (or 310); Social Work major. Pre- or corequisites: SWU 410, 412, 413.

SWU 442 Introduction to Practice with Children and Families in Child Welfare. (3) F, S
Focuses on the characteristics, strengths, and service needs of families and children in the Child Welfare System. Lecture, cooperative learning. Prerequisites: SWU 410, 413; Social Work major.

SWU 444 Issues in School Social Work. (3) F, S
Demonstrates how community, family, and school are interdependent using an ecological metaphor, and introduces school social work. Lecture, cooperative learning. Prerequisites: SWU 413; Social Work major.

SWU 474 Ethnic/Cultural Variables in Social Work. (3) F, S
A basic conceptual approach to understanding ethnic/cultural variables of southwestern ethnic minorities and how these factors influence social work practice. Prerequisite: instructor approval. *General Studies: C.*

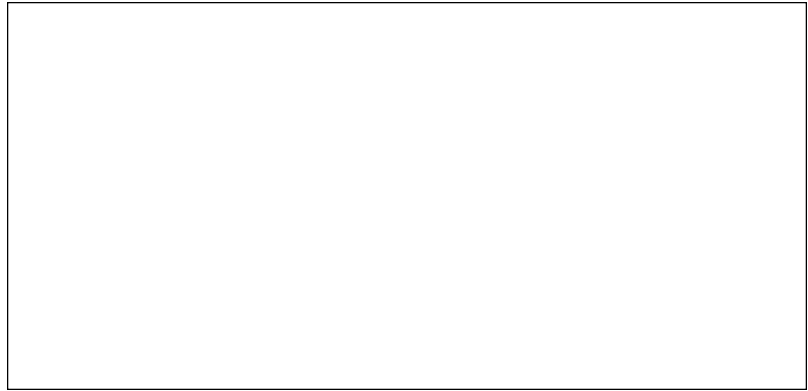


School of Social Work intern Damien Pena introduces fellow intern Bradley Wasserman to kindergarten students at M.C. Cash Elementary School.

Jim Painter photo

Summer Sessions

Carol Switzer, M.S.
Director



Campus fountains and tree-lined pedestrian malls provide an escape from the hot summer sun.

Jeff Havir photo

The summer sessions, offering more than 2,000 fully accredited courses, provide an opportunity for students to begin or continue academic work on a year-round basis. Summer courses are equivalent to fall and spring courses in content, credit awarded, and expected standard of performance. All ASU Main courses (except some EPE courses) are held in air-conditioned classrooms or laboratories. A limited number of courses are offered at off-campus locations.

There are three regular sessions, one of eight weeks and two of five weeks. The eight-week session and the first five-week session begin the same date.

During the summer, ASU also offers students the opportunity to earn graduate or undergraduate credit while studying in foreign countries through various Summer Study Programs. These programs are directed by ASU faculty and have been approved by the appropriate academic unit. For more information, visit the Summer Sessions Web site at www.asu.edu/ssc.

Admission and Registration. The admission and registration process for summer sessions begins when the *Summer Sessions Bulletin* is distributed.

Admission. All students must be admitted to ASU for the summer as a nondegree student before enrolling, except for continuing students attending ASU during the spring semester preceding the current summer. New ASU students admitted for the fall semester following the current summer must process the summer nondegree admission form before enrolling.

Nondegree graduate or undergraduate. An application form is provided in the *Summer Sessions Bulletin*. The submission of transcripts or test scores is not required for this status.

Readmission. ASU students not enrolled during the spring semester preceding the current summer must be readmitted. See "Readmission to the University," pages 69–70.

Conditional admission before graduation from high school may be granted. See "Admission before Graduation from High School," page 62.

Advising. All students are strongly encouraged to seek academic advising before enrolling in summer courses. See "Academic Advising," page 69.

Fees and Expenses. Summer sessions students pay for the actual number of semester hours enrolled, the Financial Aid Trust Fee, and the Student Recreation Complex fee. See the current *Summer Sessions Bulletin*.

Food Services. Meal plans are available. For more information, phone 602/965-3464 or write to

MARRIOTT FOOD SERVICE
ARIZONA STATE UNIVERSITY
PO Box 870901
TEMPE AZ 85287-0901

Housing. Air-conditioned dormitories are available for ASU Main students. For more information, phone 602/965-3515 or write to

RESIDENTIAL LIFE
ARIZONA STATE UNIVERSITY
PO Box 870801
TEMPE AZ 85287-0801

Immunization. Students born after December 31, 1956, are not permitted to register without proof of measles (rubeola) immunity or immunization given after January 1, 1980. See "Immunization Requirements," pages 59–60.

Parking. A decal is required to park at ASU. For more information, phone 602/965-6124 or write to

PARKING SERVICES
ARIZONA STATE UNIVERSITY
PO Box 870704
TEMPE AZ 85287-0704

Registration. Registration may be completed in person or by using In-Touch. See the current *Summer Sessions Bulletin*.

A maximum of seven semester hours in each five-week session or nine semester hours in the eight-week session may be taken. Hours of enrollment in any other institution or independent learning course are included in the maximum allowable course load during any given session.

Summer Sessions Bulletin. The *Summer Sessions Bulletin*, which contains the class schedule, the nondegree admission form, and the registration procedure, is available the last week of January at the Office of Summer Sessions, ADM B167, and all registrar sites.

To request the *Summer Sessions Bulletin*, summer study abroad brochures, or other summer information, phone 602/965-6611 or write to

OFFICE OF SUMMER SESSIONS
ARIZONA STATE UNIVERSITY
PO Box 873003
TEMPE AZ 85287-3003

International Programs

Donald McTaggart, Ph.D.
Director

In a world of increasing interdependence, Arizona State University seeks to interact with intellectual and educational cultures throughout the world. International Programs endeavors to develop a global competence for students, faculty, and ASU as a whole. International Programs encourages students to study abroad, faculty to teach and conduct research in contact with scholars around the world, and the institution to develop fruitful forms of collaborative work with a variety of higher learning entities abroad.

The university, in its endeavors to fulfill these functions, takes cognizance of the rapidly changing world of the late 20th century. Canada and Mexico hold a special relationship as a result of proximity and membership in the North American Free Trade Agreement (NAFTA). Europe is rapidly developing as a supranational unit in the form of the European Community with an ethos of its own. The Pacific Rim constitutes one of the most dynamic economic regions of the world. All of these regions are interconnected through swiftly developing information channels, whose power is quickly changing the contours of higher education.

The International Programs office is administratively part of the Office of the Senior Vice President and Provost. Its functions include developing and administering university programs abroad, encouraging faculty participation in exchanges, and pursuing relationships with foundations and agencies intent on furthering the international character of ASU.

Academic Programs

ASU has a number of programs intended to enhance international perspectives in the student population. They are broadly of two kinds—study abroad programs and student exchange programs.

Study Abroad Programs. Study abroad programs are arrangements with educational institutions abroad such that ASU students can study in these institutions and, at the completion of their period of study—normally either a semester or a full academic year—earn ASU resident credit for the courses taken. Outgoing ASU students are charged a program fee, and arrangements are usually made for accommo-

dations and other student needs. ASU registration fee and tuition waivers are not normally applicable toward the costs of study abroad programs. Financial aid such as scholarships, grants, and loans may, in most cases, be applied to program costs. Once on site, ASU students may be placed in special classes created for them, or they may study alongside students from other countries.

Study abroad programs generally fall into one of three categories: language immersion programs, “island” programs, and programs in which courses are offered in English. ASU immersion programs, in which students learn the language of the host country with little or no previous language knowledge, include programs in Germany, Israel, Italy, Mexico, and Portugal. “Island” programs are those in which students take courses taught in the host country language and frequently live with host families. The courses are designed to be offered to foreign (not host country) students. ASU offers such programs in France and Spain. Programs in which students can take courses taught in English are offered in the United Kingdom but may also be offered in certain institutions in non-English speaking countries.

Exchange Programs. Exchange programs are those in which a small number of ASU students may study at a foreign institution, in return for which students from that institution have a reciprocal opportunity to study at ASU. ASU students pay their normal registration fees and tuition at ASU even though they attend the institution with which they are being exchanged. In general, ASU registration fees and tuition may be paid by scholarships or waivers. Financial aid may, in most cases, be applied to the costs of exchange programs. As in the case of study abroad programs, ASU students earn ASU resident credit on these exchange programs. Exchange programs offer students the chance to enter the mainstream of university life in the country of their choice. Normal participation in an exchange program is dependent on prior attainment of an adequate level of language competence to be able to function in classes in the host country.

In several instances, students may have the opportunity to undergo advanced-level intensive language instruction for approximately one month in the host country before the start of the academic year. The costs of these intensive language programs are not included in tuition and registration fees paid to ASU for an exchange.

ASU has exchange agreements in several countries, including Bolivia, Canada, France, Germany, Japan, Mexico, the Netherlands, Norway, and United Kingdom. These and other possible locations are under constant review.

Non-ASU Programs Abroad. ASU students may participate in non-ASU programs abroad. For cases in which ASU has a consortium-type agreement, resident credit may be obtained under conditions approved by Undergraduate Admissions. Financial aid may be applicable to meet the costs of these programs.

Area Studies Programs. International Programs maintains close liaison with area studies programs, such as the Center for Asian Studies, the Center for Latin American Studies, and the Program for Southeast Asian Studies, among others.

Related Programs. Close relationships are maintained with a number of academic units on campus. The University Honors College cooperates in the creation of special programs for the benefit of its students. The Department of Languages and Literatures assists in the staffing and management of a number of study abroad programs, especially those related to language acquisition. The College of Business maintains an advising service for the College of Business students intending to study abroad.

Procedures. Students interested in participating in such programs should identify their interests as soon as possible—in the freshman year if language learning is to be involved. Students should express their interests to the International Programs office in MOEUR 124; if need be, students are directed to other offices from there. It is essential to consult with a departmental program advisor, since the return of credits ultimately depends on the concurrence of the faculty advisors. Students on an official study abroad or exchange pro-

gram retain the catalog status they held at the time of their departure.

Information on the status of programs can be obtained from the International Programs office in MOEUR 124 or from the International Programs World Wide Web home page at www.asu.edu/ipo.

Before participating in a study abroad or an exchange program, students are required to complete an information package. An interview is conducted, and students are also required to attend an orientation that may last more than one day. Program fees as applicable have to be paid and deadlines met. Students should keep themselves informed of any applicable re-

fund procedures, noting that, since study abroad and exchange arrangements sometimes commit the university, refunds are not always possible in full or in part. ASU fee refund schedules do not apply.

Other Activities

International Programs seeks to encourage a wide range of other academic activities. These activities include exchanges of faculty members and the development of institutional relationships with universities overseas to encourage joint research projects. The office also assumes responsibility for a considerable number of visitors who come from overseas to visit the ASU campus.



ASU student Fredrika Lonnie (mixing paint) and Department of Management employee Virginia Gallegos (in background on right) help paint a mural of Mexican history located in the Zapata study lounge in Hayden Hall.

Tim Trumble photo

ASU East Full-page Photo

ASU East

Charles E. Backus, Ph.D.
Provost

Arizona State University's third campus, ASU East, opened at the Williams Campus in the fall of 1996, serving more than 1,000 students in degree programs offered by the College of Technology and Applied Sciences and School of Agribusiness and Resource Management. These unique "get down to business" programs are offered at no other Arizona campus, and they are tailored to help students develop knowledge and skills specifically needed in the businesses and industries of the 21st century. In 1997, East College was created to provide support courses for existing programs and to generate new degree programs at ASU East.

Students admitted to ASU East programs can take courses at ASU Main and ASU West. They can also take advantage of an exciting educational innovation at the Williams Campus. ASU East has joined with Chandler-Gilbert Community College (CGCC) in the New Partnership in Baccalaureate Education that allows students to graduate in four years with an ASU baccalaureate degree earned entirely at the Williams Campus.

Benefits of the partnership include:

1. CGCC provides lower-division general education, general interest, and major prerequisite courses, which transfer automatically to ASU East each semester as direct equivalents of ASU courses;
2. ASU East provides both lower- and upper-division courses in the major and upper-division general interest courses;
3. all students in the partnership have the status and all the privileges of ASU students. A no-cost/no-credit course, JAC 001, is used to maintain ASU status for ASU East students enrolled solely in CGCC courses;
4. ASU East students never pay more than ASU tuition and may pay less, depending on the combination of ASU and CGCC classes they are taking;
5. ASU East students can participate in an innovative first-year curriculum combining introductory courses in the major with required general studies courses in an efficient, integrated "block schedule";
6. ASU East and CGCC have a single registration form, a unified payment system, and financial aid agreement; and
7. ASU East and CGCC together provide advising, tutoring, library services, and a computing center as well as residence life, shared student life activities and recreation.

The New Partnership in Baccalaureate Education combines the proven strengths of ASU East and Chandler-Gilbert Community College into a powerful student-centered educational experience.

ASU East, a residential campus, is transforming the facilities inherited from Williams Air Force Base into an academic village. The campus includes excellent educational facilities: modern classrooms and laboratories, a 21st century electronic library, and state-of-the-art computer equipment. ASU East offers unique residential opportunities. Faculty, staff, and students live, teach, work, and learn together in a growing, diverse academic community offering a choice of traditional residence halls or two- to five-bedroom homes. ASU students may live on East, Main, or off campus while attending classes at any of the campuses. Other amenities include a dining hall, bookstore, campus union, free parking, and abundant recreational facilities.

ASU East is a student-centered campus that offers many of the features of a small college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area. A shuttle service provides transportation between ASU East and ASU Main. An additional shuttle is available for transportation from ASU Main to ASU West. The 600-acre ASU East campus is easily accessible via major interstate routes. Please see map on page 459.

For more information, call 602/727-EAST (3278) or check the Web site, www.east.asu.edu.

Accreditation

The North Central Association of Colleges and Schools accreditation of ASU Main includes ASU East. In addition, ASU East programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET).

Academic Organization and Administration

The chief operating and academic officer of ASU East is the provost. There are two colleges and one school at ASU East administered by deans. These academic units develop and implement the teaching, research, and service programs of the institution. Additional support for the academic mission of the campus is provided by Library Services and Information Technology, each administered by a director. See “Administrative and Academic Personnel,” (ASU East) page 461 and “Academic Organization,” page 9.

ADMISSION

Nondegree Students. Nondegree students may take courses at ASU East according to the special provisions on page 62.

Degree-Seeking Students. Degree-seeking students must meet the university admissions standards set by the Arizona Board of Regents (ABOR). Any student admitted to ASU may take courses at ASU East. To be admitted to an ASU East degree program, the student must meet undergraduate admissions requirements and the specific admission requirements of the ASU East program. A student who is admitted to an ASU East degree program is defined as an ASU East student.

For more admissions information and applications to ASU East degree

programs, call 602/727–EAST (3278) or visit or write

UNDERGRADUATE ADMISSIONS
ARIZONA STATE UNIVERSITY
PO BOX 870112
TEMPE AZ 85287–0112

Transfer Among ASU Campuses

Degree-seeking students currently enrolled at either ASU Main or ASU West who want to relocate to an ASU East degree program should contact the OASIS at ASU East, the Registrar’s Office at ASU Main, or the Admissions and Records Office at ASU West for appropriate procedures. All credit earned at any ASU campus automatically transfers to ASU East. Students should consult with their ASU East major advisor to determine how this credit will apply to their major and graduation requirements. Students should be aware that certain requirements (e.g., the minimum number of upper-division semester hours to graduate) may differ among campuses.

Transfer Credit

Courses taken from Chandler-Gilbert Community College through the New Partnership in Baccalaureate Education are automatically transferred to ASU East each semester. These courses and courses taken at other Arizona public community colleges will transfer according to equivalencies established in the current *Arizona Higher Education Course Equivalence Guide*. The accept-

ability and applicability of courses transferred from other universities and community colleges is determined by the ASU Main Undergraduate Admissions Office in consultation with the faculty or academic advisor of the student’s choice of major.

ADVISING

Students are encouraged to take advantage of the skill and knowledge of the advising professionals available to them in the academic units and to seek academic advising early.

For more information or to schedule an advising session, contact an academic advisor (see the “Academic Advising” table on this page).

Degree Programs

Bachelor of Applied Science. ASU East offers the B.A.S. degree for students who have completed an A.A.S. degree. For further information contact Dale Palmgren at 602/727–1874.

Bachelor of Science, Master of Science, Master of Technology. Refer to the “ASU East Degrees, Majors, and Concentrations” table, page 437.

JOINT ADMISSION CONTINUOUS ENROLLMENT (JAC)

JAC 001 Joint Admission Continuous Enrollment. (0–12) F, S, SS

For use by ASU East to track undergraduate students admitted to East Campus degree programs who are concurrently enrolled or solely enrolled in courses offered by Chandler-Gilbert Community College.

Academic Advising

College or School	Location	Telephone	Days	Hours
College of Technology and Applied Sciences	CNTR 10	602/727–1252	Mon.–Fri.	8:00–5:00 Appointments are recommended.
East College	CNTR 30	602/727–1041	Mon.–Fri.	8:00–5:00 Appointments are recommended.
School of Agribusiness and Resource Management	CNTR 20	602/727–1585	Mon.–Fri.	8:00–5:00 Appointments are recommended.
University Honors College	MCL 112*	602/965–2359	Mon.–Fri.	8:00–5:00 Appointments are recommended.

* The University Honors College is located at ASU Main.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

East College

David E. Schwalm, Ph.D.
Dean
(CNTR 30) 602/727-1028
www.asu.edu/east/ecollege/eastcoll.html

PURPOSE

East College was created by the Arizona Board of Regents in February 1997, to serve four purposes:

1. to offer an array of upper-division General Studies and general interest courses for students enrolled in agribusiness and technology programs;

2. to coordinate the New Partnership in Baccalaureate Education with Chandler-Gilbert Community College to provide lower-division General Studies and major prerequisite courses for ASU East students;
3. to offer an academic home for students who choose the unique social and academic environment of ASU East but do not wish to declare a major immediately; and
4. to be the home for all new degree programs developed at ASU East outside of agribusiness and technology. The first new programs should be available in the fall of 1998.

Through the New Partnership in Baccalaureate Education, ASU East students take First-Year Composition

courses and lower-division courses that meet ASU General Studies requirements in mathematics, science, social and behavioral sciences, arts and humanities, and literacy, along with the awareness areas: historical awareness, global awareness, and cultural diversity. These courses are available in an innovative integrated first-year curriculum designed to foster student academic success. Students can take major prerequisite courses, introductory foreign language courses, and other lower-division courses of general interest through the partnership. East College also offers popular upper-division courses in anthropology, art, communication, economics, English, history, mathematics, music, philosophy, political science, psychology, religious studies, sociology, and women's studies.

ASU East Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Aeronautical Engineering Technology	B.S.	Department of Manufacturing and Aeronautical Engineering Technology
Aeronautical Management Technology* Options: airway science flight management, airway science management	B.S.	Department of Aeronautical Management Technology
Agribusiness Concentrations: general agribusiness, preveterinary medicine	B.S.	School of Agribusiness and Resource Management
Applied Science	B.A.S.	Bachelor of Applied Science Advisory Committee
Electronics Engineering Technology* Options: computer systems, electronic systems, microelectronics, telecommunications	B.S.	Department of Electronics and Computer Engineering Technology
Industrial Technology* Options: environmental technology management, industrial technology management, information technology	B.S.	Department of Information and Management Technology
Manufacturing Engineering Technology* Emphases: manufacturing engineering technology, mechanical engineering technology	B.S.	Department of Manufacturing and Aeronautical Engineering Technology
Graduate Degrees		
Agribusiness Concentrations: agribusiness management and marketing, food quality assurance	M.S.	School of Agribusiness and Resource Management
Technology Concentrations: aeronautical engineering technology, aeronautical management technology, electronics and computer engineering technology, graphic communications technology, industrial management and supervision, manufacturing engineering technology, mechanical engineering technology, welding engineering technology	M.Tech.	College of Technology and Applied Sciences

* This major requires more than 120 semester hours to complete.

College of Technology and Applied Sciences

Albert L. McHenry, Ph.D.
Dean
 (CNTR 10) 602/727-1874
www.asu.edu/east/tech

PURPOSE

The College of Technology and Applied Sciences (CTAS) helps students develop knowledge and skill in technological fields which qualify them for career positions and leadership responsibility in industry, government and commercial enterprise. Each student is guided to select a major which addresses short-term employment goals through state-of-the-art technological preparation. Long-term career aspirations are supported through the development of a strong base in mathematics, science, engineering, and technical principles coupled with a solid foundation in liberal arts and a commitment to lifelong learning.

Engineering technology programs offer professional preparation through a B.S. degree that stresses state-of-the-art technological applications. Special emphasis is placed on the development of knowledge and skill in applied mathematics, natural sciences, and engineering principles with formal laboratory experiences. This mixed educational approach provides the basis for both employment and a long-term career evolution.

The other CTAS technology programs provide the opportunity for students to develop knowledge and skill in solving broad scale industrial problems, operating modern technological systems, and managing personnel in the implementation of processes and production. Programs of study focus on the latest technologies in areas such as aviation flight training and management, environmentally hazardous waste management, graphic communications, interactive computer graphics, and industrial management.

Each student is encouraged to participate in creative activities through a close relationship with a faculty mentor. Learning through execution of the

scientific method, using both inductive and deductive processes in applied research activities, is essential for both faculty and students.

ORGANIZATION

The College of Technology and Applied Sciences is composed of the following four academic units:

- Department of Aeronautical Management Technology
- Department of Electronics and Computer Engineering Technology
- Department of Information and Management Technology
- Department of Manufacturing and Aeronautical Engineering Technology

DEGREES

The College of Technology and Applied Sciences offers several programs leading to the B.S. degree (see table on page 437). The college also offers the Master of Technology (M.Tech.) degree. For more information on courses, faculty, and programs in the M.Tech. degree see the *Graduate Catalog*.

ACCREDITATION

Undergraduate programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. For additional information, call 410/347-7700 or write

TECHNOLOGY ACCREDITATION
 COMMISSION OF THE
 ACCREDITATION BOARD FOR
 ENGINEERING AND
 TECHNOLOGY, INC.
 111 MARKET PLACE, SUITE 1050
 BALTIMORE MD 21202

ADMISSION

The College of Technology and Applied Sciences admits first-year students who meet the undergraduate admission requirements of Arizona State University. See "Undergraduate Admission" on pages 59-66. High school precalculus, physics, and chemistry are recommended. Transfer applicants must meet the university requirements

for transfer students as specified on page 62 with the exception that Arizona resident transfer students must have a 2.25 GPA. Students admitted to CTAS begin study under one of two student classifications, professional or preprofessional.

Professional Status

First-year students (new freshmen) are admitted to CTAS with professional status if they meet the general aptitude criteria for admission and have no deficiencies in the basic competency requirements for admission. First-year students admitted upon completion of the GED will be admitted with professional status if they have also achieved the minimum ACT or SAT scores required for undergraduate admission to the university.

Students transferring from other ASU colleges are admitted to CTAS with professional status if they have no remaining admissions deficiencies and are in good standing in the university.

Transfer students from other institutions must meet the minimum admission requirements for college transfer students as described on page 62. The CTAS, in addition, requires resident transfer students to have a cumulative GPA of 2.25.

All international students must have a minimum 500 TOEFL score to be admitted with professional status.

Preprofessional Status

All other students are admitted with preprofessional status and may apply for professional status after they have removed the deficiency which disallows awarding professional status. Students with preprofessional status may not register for 300- and 400-level courses in the college until they have been awarded professional status. See an advisor for details.

Transfer Credit

Credit for courses taken at a community college or another four-year institution will be awarded according to the guidelines on page 63. Students who are transferring from an Arizona community college and have been in continuous residence may continue under the catalog in effect at the time of their entrance into the community college. Students should be aware that some

course work that transfers to ASU may not be applicable toward CTAS degree requirements. Students should confer with an advisor.

Courses taken more than five years before admission to a CTAS degree program are not normally accepted for transfer credit at the option of the department in which the applicant wishes to enroll. Courses completed within the five years preceding admission are judged as to their applicability to the student's curriculum.

ADVISING

New incoming and transfer students should seek initial advising from the academic advisor in the Dean's Office. CTAS students are then assigned faculty advisors in the department of their major who assist them with planning a program of study. The college requires that students consult with advisors before registering each semester. Advisors should be made aware of any employment obligations or special circumstances that may affect a student's ability to successfully handle a full course load. CTAS students may register for a maximum of 19 semester hours per semester. Any student wishing to take more than the maximum must petition the CTAS Standards Committee and have an approval on file before registering for an overload.

GRADUATION REQUIREMENTS

Students must meet all university graduation requirements (see pages 79–83) as well as degree requirements of their major in the College of Technology and Applied Sciences. For detailed information on the degree requirements of a major in CTAS, refer to that department's individual description.

COLLEGE STANDARDS

Pass/Fail Grades

The College of Technology and Applied Sciences does not offer pass/fail grades. Courses graded on a pass/fail basis do not count toward degree credit in CTAS. Students may request credit for pass/fail courses by petitioning the CTAS Standards Committee.

Entry into Upper-Division Courses

Before enrolling in courses at the 300 level and above, CTAS students must be in good academic standing within the college and have the ap-

proval of their advisors. Students who are not in good academic standing must secure approval from their advisor and the dean's office. Students enrolled in another ASU college may not register for any 300- and 400-level CTAS courses unless those courses are required in their degree program and the students have the proper course prerequisites.

ACADEMIC STANDARDS

Retention. A student is expected to make satisfactory progress toward completion of degree requirements in order to continue enrollment in the College of Technology and Applied Sciences. Any one of the following conditions is considered unsatisfactory progress and results in the student's being placed on probationary status:

1. a semester or summer session with a GPA less than or equal to 1.50; or
2. two successive semesters with GPAs less than 2.00; or
3. an ASU cumulative GPA less than 2.00.

A student on probation is subject to disqualification if:

1. a semester GPA of 2.25 is not attained and the cumulative GPA is below 2.00 at the end of the probationary semester; or
2. the student is placed on probation for two consecutive semesters and is unable to achieve the standard GPAs stated in number one.

Students on academic probation are not allowed to register for more than 13 semester hours. Probationary students may not register for the semester following the semester in which they were declared probationary without a special permit from an advisor in the dean's office. Special permits are given only after the registrar records grades for the current semester.

Disqualification. During a semester on academic probation, a student who fails to meet the retention standards is disqualified. Students may request a review of their disqualification status by contacting the CTAS associate dean in the Academic Center Building (CNTR), Room 10. Any disqualified student who is accepted by another college at ASU may not register for courses in CTAS unless the courses are required in the new major. Disqualified

students who register for courses in CTAS may be withdrawn from these courses any time during the semester.

Reinstatement. The College of Technology and Applied Sciences does not accept an application for reinstatement until the disqualified student has remained out of the college for at least a 12-month period. Merely having remained in disqualified status for this period of time does not, in itself, constitute a basis for reinstatement. Proof of ability to do satisfactory college work in the chosen discipline is required; for example, completing pertinent courses in the discipline at a community college with higher than average grades.

STUDENT RESPONSIBILITIES

Course Prerequisites. Students should consult the *Schedule of Classes* and the catalog for course prerequisites. Students who register for courses without the designated prerequisites may be withdrawn without their consent at any time before the final examination. The instructor, the chair of the department, or the dean of the college, may initiate such withdrawals. In such cases, students will not receive monetary reimbursement. Such withdrawals are considered to be unrestricted as described on page 73 and do not count against the number of restricted withdrawals allowed.

SPECIAL PROGRAMS

Academic Recognition. Students completing baccalaureate degree requirements receive the appropriate honors designations on their diplomas consistent with the requirements specified by the university.

Students in the College of Technology and Applied Sciences are encouraged to seek information concerning entry into honor societies that enhance their professional stature. Tau Alpha Pi is the engineering technology honor society, and Alpha Eta Rho is available for aeronautical management technology students.

Transfer Programs. The College of Technology and Applied Sciences maintains a cooperative agreement with most Arizona community colleges and with selected out-of-state colleges and universities to structure programs that are directly transferable into the technology programs at ASU East.

University Honors College. The College of Technology and Applied Sciences participates in the programs of the University Honors College, which provides enhanced educational experiences to academically superior undergraduate students. Participating students can major in any academic program. A description and the opportunities offered by the University Honors College can be found on pages 293–295.

Scholarships. Information and applications for academic scholarships for continuing students may be obtained by contacting departmental offices. Other scholarships may be available through the university Student Financial Assistance Office.

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC programs are required to take from 12 to 20 semester hours in the Department of Aerospace Studies or Department of Military Science courses. To preclude excessive overloads, these students should plan on at least one additional semester to complete degree requirements. Because of accreditation requirements, aerospace studies (AES) or military science (MIS) courses are not accepted in the engineering technology majors.

ENGINEERING TECHNOLOGY CORE (ETC)

ETC 100 Languages of Technology. (4) F, S
Introduction to computer-aided design, programming, modeling, and technical documentation. Lecture, lab. *General Studies: N3.*

ETC 101 Languages of Technology Lab. (0) F, S
Introduction to computer-aided design, programming, modeling, and technical documentation.

ETC 200 Impact of Communications Technology on Society. (3) F, S
Organizational issues and development of technical communication. Activities include research, evaluations, and presentation of oral arguments in support of positions. Prerequisite: ENG 102. *General Studies: L1.*

ETC 201 Applied Electrical Science. (4) F, S, SS
Principles of electricity, passive elements, and AC/DC circuit analysis. Laboratory exploration of circuits using instrumentation and the computer as tools. Lecture, lab. Prerequisites: ETC 100; MAT 170; PHY 112, 114.

ETC 211 Applied Engineering Mechanics: Statics. (3) F, S
Vectors, forces and moments, force systems, equilibrium, analysis of basic structures and structural components, friction, centroids, and moments of inertia. Prerequisites: MAT 260; PHY 111, 113.

ETC 340 Applied Thermodynamics and Heat Transfer. (3) F, S
Thermodynamic systems and processes, first and second laws of thermodynamics, properties of pure substances, and applications to heat engines and special systems. Fundamentals of conduction, radiation, and convection. Prerequisites: MAT 261; PHY 112, 114.

ETC 400 Technical Communications. (3) F, S, SS
Planning and preparing technical publications and oral presentations based on directed library research related to current technical topics. Prerequisites: completion of first-year English requirements; L1 course; senior standing as a CTAS major. *General Studies: L2.*

Department of Aeronautical Management Technology

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PROFESSOR
GESELL

ASSOCIATE PROFESSOR
MCCURRY

ASSISTANT PROFESSORS
JACKSON, KARP

LECTURERS
BORRMANN, O'BRIEN, SPENCE

PURPOSE

Graduates are prepared for entry into the aviation and aerospace industry in productive, professional employment or, alternatively, for graduate study. Curricula emphasize principles underlying the application of technical knowledge as well as current technology, preparing the graduate to adapt to the rapid and continual changes in aviation and aerospace technology.

ADMISSION

New and transfer students who have been admitted to the university and who meet the requirements for admis-

sion to the College of Technology and Applied Sciences are admitted without separate application to the Department of Aeronautical Management Technology. Transfer credits are reviewed by department faculty advisors. To be acceptable for department credit, transfer courses must be equivalent in both content and level of offering.

DEGREES

The faculty in the Department of Aeronautical Management Technology offer a B.S. degree in Aeronautical Management Technology and includes options in airway science flight management and airway science management.

A Master of Technology degree is offered for graduate study. For more information about the graduate program, see the *Graduate Catalog*.

AERONAUTICAL MANAGEMENT TECHNOLOGY—B.S.

The Aeronautical Management Technology curricula are designed to provide a thorough technical background combined with an interdisciplinary general university education. The graduate is prepared to assume responsibilities in a wide area of managerial and technically related areas of aviation. The student gains a background in aircraft structures, reciprocating and turbine engines, aircraft performance, design, management skills, business principles, systems analysis, and a variety of course work specific to aircraft flight, airport operations, and air transportation systems. The degree offers two options: airway science flight management and airway science management, both of which have the approval of the Federal Aviation Administration as Airway Science programs. The options are described separately below.

All degree requirements are shown on curriculum check sheets for the options that are available through the department. Requirements include First-Year Composition, university General Studies (see pages 84–108), and the Aeronautical Management Technology Core. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of

courses. Refer to individual option degree requirements for additional required courses. Students must complete each Aeronautical Management Technology course with a grade of "C" or higher.

Aeronautical Management Technology Core

AMT 101	Introduction to Aeronautical Management Technology	1
AMT 182	Private Pilot Ground School	3
AMT 201	Air Traffic Control	3
AMT 220	Aviation Meteorology	3
AMT 280	Aerospace Structures, Materials, and Systems	4
AMT 287	Aircraft Powerplants	4
AMT 308	Air Transportation G	3
AMT 396	Aviation Professional	1
AMT 410	Aviation Safety and Human Factors	3
AMT 442	Aviation Law/Regulations	3
ETC 100	Languages of Technology N3	4
ETC 201	Applied Electrical Science	4
Total	.....	36

Airway Science Flight Management Option

Flight training is certified by the Federal Aviation Administration.

Airway science flight management combines academic studies and flight training to prepare graduates for a wide variety of positions within the air transportation industry, including general, airline, and military aviation. Ground school and flight training are available, allowing the student to obtain private pilot, commercial pilot, and flight instructor certificates and also the instrument pilot, instrument instructor, and multiengine pilot ratings. Type rating in the Boeing 737 airliner is an available option.

This curriculum concentrates on flying plus the technical management and computer-related applications necessary to operate in the high-density environment of modern airspace. The program also emphasizes critical thinking, analytical skills, and oral and written communication skills. A career in airway science flight management leads to the development, administration, and enforcement of safety regulations, including airworthiness and operational standards in civil aviation. The airway science flight management option is approved by the Federal Aviation Administration as an airway science program.

While enrolled at ASU students do not receive college credit for flight activity or instruction received at flight schools other than those entities with which the university has currently contracted for such instruction. Consideration is given for flight experience received before enrollment at the university.

Flight instruction costs are not included in university tuition and fees. The estimated cost of flight training is \$35,000 in addition to normal university costs.

Degree Requirements

Airway science flight management students are required to complete 128 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses. All degree requirements are shown on the student's curriculum check sheet.

Course Requirements

In addition to the required courses for First-Year Composition, university General Studies (see pages 84–108), and the Aeronautical Management Technology core, the following additional courses are required for the airway science flight management option:

AET 300	Aircraft Design I	3
AMT 100	Flight Safety I	1
AMT 200	Flight Safety II	2
AMT 222	Instrument Pilot Ground School	3
AMT 300	Flight Safety III	2
AMT 314	Commercial Pilot Ground School	3
AMT 382	Air Navigation	3
AMT 385	Flight Instructor Ground School	3
AMT 387	Multiengine Pilot Ground School	1
AMT 392	Flight Instructor Instrument Ground School	2
AMT 400	Flight Safety IV	1
AMT 408	National Aviation Policy	3
AMT 444	Airport Management and Planning	3
AMT 482	Airline Instrument Procedures	3
AMT 489	Airline Administration	3
AMT 496	Airline Aircraft Systems Capstone	3
IMC 346	Management Dynamics	3
Technical electives	.....	6
Total	.....	48

Suggested Course Pattern for Freshmen

First Semester

AMT 101	Introduction to Aeronautical Management Technology	1
AMT 182	Private Pilot Ground School	3
AMT 220	Aviation Meteorology	3
ENG 101	First-Year Composition	3
MAT 170	Precalculus N1	3
Total	.....	13

Second Semester

AMT 100	Flight Safety I	1
AMT 222	Instrument Pilot Ground School	3
ENG 102	First-Year Composition	3
ETC 100	Languages of Technology N3	4
MAT 260	Technical Calculus I N1	3
PHY 111	General Physics S1/S2*	3
PHY 113	General Physics Laboratory S1/S2*	1
Total	.....	18

* Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

Airway Science Management Option

The airway science management option is designed to prepare graduates for managerial and supervisory positions throughout the air transportation industry. An in-depth technical education is included along with broad exposure to business and management courses. This program of study is interdisciplinary in nature and prepares the aeronautical career-oriented student for positions such as air traffic control specialist, air carrier manager, airport manager, and general aviation operations manager.

Degree Requirements

Airway science management students are required to complete 128 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses. All degree requirements are shown on the student's curriculum check sheet.

Course Requirements

In addition to the required courses for First-Year Composition, university General Studies (see pages 84–108), and the Aeronautical Management Technology core, the following additional courses are required in the airway science management option:

ACC 230	Uses of Accounting Information	3
AMT 408	National Aviation Policy	3
AMT 444	Airport Management and Planning	3
AMT 489	Airline Administration	3
AMT 491	Aviation Management Capstone	3
IMC 346	Management Dynamics	3
ITM 343	Occupational Safety and Ergonomics	3
ITM 430	Ethical Issues in Technology	3
ITM 452	Industrial Human Resource Management	3
ITM 456	Introduction to Organized Labor	3
ITM 480	Organizational Effectiveness	3
Technical electives		15
Total		48

Suggested Course Pattern for Freshmen

First Semester

AMT 101	Introduction to Aeronautical Management Technology	1
AMT 182	Private Pilot Ground School	3
AMT 220	Aviation Meteorology	3
ENG 101	First-Year Composition	3
MAT 170	Precalculus <i>NI</i>	3
Total		13

Second Semester

ENG 102	First-Year Composition	3
ETC 100	Languages of Technology <i>N3</i>	4
MAT 260	Technical Calculus <i>INI</i>	3
PHY 111	General Physics <i>S1/S2*</i>	3
PHY 113	General Physics Laboratory <i>S1/S2*</i>	1
General Studies elective		3
Total		17

* Both PHY 111 and 113 must be taken to secure S1 or S2 credit.

STUDENT ORGANIZATIONS

The department hosts the local chapter of Alpha Eta Rho, an international professional aviation fraternity open to all students with an interest in aviation. The American Association for Airport Executives (AAAE) is open to all students with an interest in airport management. The Precision Flight Team competes in regional and national flying safety competitions.

AERONAUTICAL MANAGEMENT TECHNOLOGY (AMT)

Flight instruction costs are not included in university tuition and fees.

AMT 100 Flight Safety I. (1) F, S, SS Supervised private pilot flight training and flight safety briefings. Continuous enrollment until completion of the FAA Private Pilot Certificate. Lecture, lab. Prerequisites: AMT 182 and 220 or equivalents.

AMT 101 Introduction to Aeronautical Management Technology. (1) F, S Facilitates entry into Aeronautical Management Technology programs. Emphasizes general catalog and specialization requirements, registration, careers, and ASU East facilities.

AMT 182 Private Pilot Ground School. (3) F, S Ground school preparation for Private Pilot Certificate. Aerodynamics, navigation, performance, and regulations. Lecture, lab. Corequisite: AMT 220.

AMT 200 Flight Safety II. (2) F, S, SS Supervised commercial instrument flight training and safety briefings. Continuous enrollment required until completion of FAA Commercial Pilot Certificate with Instrument Rating. Lecture, lab. Prerequisites: AMT 100; Private Pilot Certificate. Pre- or corequisite: AMT 222 or 314.

AMT 201 Air Traffic Control. (3) F Ground and air operations; weather services communications and routing; flight plans, IFR operations, departures and arrivals; and airport conditions and emergencies. Prerequisite: AMT 182.

AMT 220 Aviation Meteorology. (3) F, S Evaluation, analysis, and interpretation of atmospheric phenomena. Low- and high-altitude weather from the pilot's viewpoint. Corequisite: AMT 182.

AMT 222 Instrument Pilot Ground School. (3) S Ground school leading to the FAA Instrument Pilot Rating. 10 hours ground trainer included. Lecture, lab. Pre- or corequisites: AMT 182, 220.

AMT 280 Aerospace Structures, Materials, and Systems. (4) F Basic aerodynamics, aerospace vehicle structures, materials, and systems. Inspection requirements and methods. Lecture, lab. Prerequisites: PHY 111, 113.

AMT 287 Aircraft Powerplants. (4) S Theory and performance analysis of gas turbine and reciprocating aircraft engines. Engine accessories, systems, and environmental control. Lecture, lab. Prerequisite: AMT 280.

AMT 300 Flight Safety III. (2) F, S, SS Supervised instructor flight training and safety briefings. Continuous enrollment required until completion of FAA Flight Instructor Certificate with Instrument Instructor Rating. Lecture, lab. Prerequisite: AMT 200. Pre- or corequisite: AMT 385.

AMT 308 Air Transportation. (3) F Study of the historical and international development of air transportation and its social, political, and economic impact upon global interrelationships. Prerequisite: junior standing. *General Studies: G.*

AMT 314 Commercial Pilot Ground School. (3) F Ground school leading to FAA Commercial Pilot Certificate. 10 hours ground trainer included. Lecture, lab. Prerequisite: Private Pilot Certificate. Pre- or corequisite: AMT 222.

AMT 360 Introduction to Helicopter Technology. (3) N Introduction to the working functions of modern rotary wing aircraft, rotary wing flight theory, aerodynamics, controls, flight, and power requirements. Prerequisites: PHY 111, 113.

AMT 382 Air Navigation. (3) S Theory and application of modern advanced navigation and flight instrument systems. Introduction to crew resource management in multiplace cockpits. Lecture, lab. Prerequisite: AMT 222.

AMT 385 Flight Instructor Ground School. (3) S Ground school in preparation for the FAA Flight Instructor Certificate. Lecture, lab. Pre- or corequisite: AMT 300.

AMT 387 Multiengine Pilot Ground School. (1) S Ground school preparation for the FAA Multiengine Rating. Lecture, lab. Pre- or corequisite: AMT 200 or instructor approval.

AMT 391 Multiengine Instructor Ground School. (2) N Ground school preparation for the FAA Multiengine Flight Instructor Rating. Lecture, lab. Prerequisites: AMT 300, 387, 400.

AMT 392 Flight Instructor Instrument Ground School. (2) F Ground school preparation for the FAA Instrument Flight Instructor Rating. Prerequisite: AMT 300.

AMT 395 Multiengine Land, Airplane Flight Instructor Rating. (1) N Normal and emergency flight operations. Instruction techniques and procedures for light multiengine land, airplane. CFIAME Rating required for course completion. Lecture, lab. Prerequisite: AMT 391.

AMT 396 Aviation Professional. (1) F Career focus for management and flight students, including internships, résumé writing, interviews, and employment search in aviation industry. Prerequisite: junior standing.

AMT 400 Flight Safety IV. (1) F, S, SS Multiengine and crew training and safety briefings. Continuous enrollment required until completion of rating and multicrew training. Lecture, lab. Prerequisite: AMT 300. Pre- or corequisite: AMT 387.

AMT 408 National Aviation Policy. (3) F Examination of aviation and airspace policies and policy process, including agencies involved in formulation, implementation, and evaluation of aviation policy. Prerequisite: AMT 308.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

AMT 409 Nondestructive Testing and Quality Assurance. (1) N

Purpose of inspection and quality assurance. Theory and application of nondestructive inspection methods. Application of pertinent standards, specifications, and codes. Lecture, lab. Cross-listed as AET 409. Prerequisite: AMT 280 or MET 230.

AMT 410 Aviation Safety and Human Factors. (3) F

Aviation accident prevention, human factors, life support, fire prevention, accident investigation, and crash survivability. Development and analysis of aviation safety programs. Prerequisites: junior standing; completion of 1 semester of literacy and critical inquiry (L1) requirement.

AMT 442 Aviation Law/Regulations. (3) F

Aviation within context of U.S. Common Law system. Public law, administrative rule making, sovereignty, enforcement, and case law analysis. Prerequisite: junior standing.

AMT 444 Airport Management and Planning. (3) S

Orientation to administration and management of modern public airports, including overview of planning, funding, and development of airport facilities. Prerequisite: AMT 308.

AMT 482 Airline Instrument Procedures. (3) F

Advanced instrument flight using airline instrument procedures and airline crew and cockpit resource management. Lecture, lab. Prerequisites: AMT 222, 382.

AMT 484 Aeronautical Internship. (1–12) F, S, SS

Work experience assignment with aerospace industry commensurate with student's program. Special project guidance by industry with university supervision. Prerequisites: advisor approval; junior standing.

AMT 489 Airline Administration. (3) S

Administrative organizations, economics of airline administration, operational structure, and relationship with federal government agencies. Prerequisites: AMT 308; instructor approval.

AMT 491 Aviation Management Capstone. (3) S

Integration and overview of management tools, current business problems and topics related to aviation industry. Group project with industry and government and business partners. Prerequisite: senior standing.

AMT 496 Airline Aircraft Systems Capstone. (3) S

Commercial airline aircraft systems and flight procedures. Includes theoretical education for large, commercial passenger aircraft. Lecture, lab. Prerequisite: senior standing.

AMT 521 Air Transportation Regulation. (3) N

Reviews evolutionary history of government regulations. Explores alternatives for economic, safety, social, and administrative regulatory reform in air transportation. Prerequisite: AMT 444 or 489 or equivalent.

AMT 523 Aviation Systems Management. (3) N

Systems theory applied to intermodal transportation networks. Survey of air and ground transportation infrastructure, institutional frameworks, and intermediaries promoting connections between modes. Prerequisite: AMT 444 or 489 or equivalent.

AMT 525 Airport Planning and Design. (3) N

Students complete various phases of airport master planning process. Provide guidance for logical and timely development of airports. Project work groups assigned. Prerequisite: AMT 444 or 489 or equivalent.

AMT 527 Airline Management Strategies. (3) N

Since deregulation, airlines have undergone profound changes through mergers, consolidation, and acquisition. In-depth look at airline management strategies for the 21st century. Prerequisite: AMT 444 or 489 or equivalent.

AMT 528 International Aviation. (3) N

Major issues of international aviation, historical review of institutional framework. Bilateral route agreements, freedom versus sovereignty, current legal and political arrangements. Prerequisite: AMT 444 or 489 or equivalent.

AMT 529 Fixed-Base Operations Management. (3) N

Examination of FBO role in the national aviation system. Organization of flight line operations, aircraft maintenance, and administration for multiple aircraft types. Prerequisite: AMT 444 or 489 or equivalent.

AMT 541 Aviation Physiology. (3) N

Survey of human physiology and human performance principles related to modern aircraft and aircraft systems operating in multiple environments. Prerequisite: AMT 410 or equivalent.

AMT 543 Ergonomics in High-Technology Environments. (3) N

Examination of ergonomic design principles regarding man-machine interface requirements of high-technology workstations. Emphasis on computer workstation design issues. Prerequisite: AMT 410 or equivalent.

AMT 545 Human Factors in Aviation. (3) N

Overview of human role in aviation. Issues, problems of unsafe acts and attitudes in human behavior. Human engineering capabilities and limitations. Prerequisite: AMT 410 or equivalent.

AMT 546 Crew Resource Management / Line-Oriented Flight Training. (3) N

Evaluation of in-depth, multicrew coordination issues for commercial aviation pilots. Stresses importance of critical thinking, decision making, integrated resource utilization. Prerequisite: AMT 410 or equivalent.

AMT 547 Modern Human Factors Design Issues. (3) N

Research and discussion of current human factors issues. State-of-the-art analyses of information regarding rapidly evolving designs and applications. Prerequisite: AMT 410 or equivalent.

AMT 549 Human Factors Research. (3) N
Aviation human factors research principles applied and tested in operational settings. Group projects assigned in conjunction with industry partners. Prerequisite: AMT 410 or equivalent.

Department of Electronics and Computer Engineering Technology

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PROFESSORS

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ASSOCIATE PROFESSORS

FORDEMWALT, MACIA,
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LIPARI, PETERSON, SUNDARARAJAN

PURPOSE

Electronics engineering technology is a technological field of specialization that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of electrical/electronics engineering activities. The electronics engineering technologist is a member of the electronics engineering team that consists of electronics engineers, electronics engineering technologists, and electronics engineering technicians.

The electronics engineering technologist is applications oriented, and builds upon a background of applied science and mathematics including the concepts and applications of calculus. Using state-of-the-art technology, the electronics engineering technologist is able to produce practical, workable, and safe results quickly and economically, to install and operate technical systems, to configure hardware for unique applications, to develop and produce products, to service machines and systems, to manage manufacturing processes, and to provide customer support to technical products and systems.

DEGREES

The faculty in the Department of Electronics and Computer Engineering Technology offer the B.S. degree in Electronics Engineering Technology

(B.S./EET). Four options are available: computer systems, electronic systems, microelectronics, and telecommunications.

The *computer systems* option combines applied electronics and computer hardware-software concepts and applications. It has been formulated to meet the needs of persons who wish to engage in digital and computer systems applications as a career focus.

The *electronic systems* option is aimed at preparing persons for careers in instrumentation, control, and power systems applications. This option allows a student to develop a broad-based knowledge of electrical/electronic fundamentals with an applications perspective. The Department of Electronics and Computer Engineering Technology has had a concentration in electronic systems or instrumentation and systems control for many years. The course patterns in support of these emphasis areas have been well developed and continue to provide strong support for the electronic systems option under the B.S./EET program.

The *microelectronics* (UET) option combines applied electronics, monolithic and hybrid integrated circuit processing and applications, device and component fabrication, and manufacturing. The objective of this option is to prepare persons to assume positions in the area of microelectronics manufacturing with immediately applicable knowledge as well as to develop a strong foundation of electronic fundamentals and methods. Students should be interested in the design, fabrication, and manufacture of imprinted circuitry, monolithic integrated circuits (bipolar and MOS), and hybrid thick film and thin film circuitry, components, and systems. The continuing explosion in semiconductor and related technologies and their applications to electronic and computer-related products offers unique and challenging opportunities. Graduates of this program option secure positions in processing, manufacturing operations, and applications areas in industry as members of the diverse scientific engineering team.

The *telecommunications* option has been structured to take advantage of the recent changes in the telecommunications industry. The program encompasses the fundamentals of information

and signal processing, modern bandwidth-efficient digital radio analysis with RF and microwave circuits and systems. Applications include telephone pulse code modulation, cable TV, fiber optic links, and satellite transmission circuits and systems.

A Master of Technology degree program with a concentration in electronics engineering technology is available for qualified B.S. graduates. The undergraduate program options are supported as emphasis areas in the master's degree program. See the *Graduate Catalog* for more information.

Electronics Engineering Technology—B.S.

The departmental curriculum is organized into two categories, technical studies and General Studies. Technical studies consist of core areas and the option specialty area. General Studies consist of courses selected to meet the university General Studies requirement (see pages 84–108) as well as the math/science requirement of TAC of ABET. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses.

A minimum of 50 upper-division hours is required, including at least 24 semester hours of EET, CET, or UET upper-division hours to be taken at ASU. A minimum of 128 semester hours with a 2.00 cumulative GPA is required for graduation. Complete program of study guides with typical four-year patterns are available from the department.

The General Studies portion of the B.S./EET curriculum has been carefully structured to meet the specific requirements of the university and to include the content required by TAC of ABET, the professional accrediting agency for such curricula.

DEGREE REQUIREMENTS

In addition to the courses listed for First-Year Composition and university General Studies, the following courses are required.

Engineering Technology Core

The following courses are required as part of the engineering technology core:

ETC	100	Languages of Technology <i>N3</i>	4
ETC	211	Applied Engineering Mechanics: Statics	3
ETC	340	Applied Thermodynamics and Heat Transfer	3
Total			10

Electronics Engineering Technology Core Requirements

CET	150	Digital Systems and Microprocessors <i>N3</i>	3
CET	256	"C" Programming for Engineering Technology	3
CET	354	Microprocessor Principles	4
EET	208	Electric Circuit Analysis I	4
EET	301	Electric Circuit Analysis II	4
EET	310	Electronic Circuits I	4
EET	372	Communication Systems	4
EET	396	Professional Orientation*	1
EET	407	Electrical Power Systems	4
EET	410	Electronic Circuits II	3
UET	331	Electronic Materials	3
UET	415	Electronic Manufacturing Engineering Principles	3
Total			40

* Students must take EET 396 the semester in which they are enrolled in the 87th hour of credit (ASU plus transfer hours). If this occurs in summer session, students should take EET 396 the prior spring semester.

Electronics Engineering Technology Options

Computer Systems

CET	452	Digital Logic Applications	4
CET	456	Assembly Language Applications	3
CET	457	Microcomputer Systems Interfacing	4
CET	473	Digital/Data Communications	4
CET	483	UNIX Utilities Using "C" Language	3
Approved technical electives			5
Total			23

Electronic Systems

CET	483	UNIX Utilities Using "C" Language	3
EET	406	Control System Technology	4
EET	430	Instrumentation Systems	4
EET	460	Power Electronics	4
Approved technical electives			8
Total			23

Microelectronics

CHM	116	General Chemistry <i>S1/S2</i>	4
UET	416	Monolithic Integrated Circuit Devices	3

UET 417	Monolithic Integrated Circuit Laboratory	2
UET 418	Hybrid Integrated Circuit Technology	4
UET 421	Applied Device Physics	3
UET 432	Semiconductor Packaging and Heat Transfer	3
	Approved technical electives	4
Total	.....	23

Telecommunications

CET 473	Digital/Data Communications	4
EET 304	Transmission Lines and Waveguides	4
EET 401	Digital Filters and Applications	3
EET 470	Communication Circuits	4
	Approved technical electives	8
Total	.....	23

**Electronics Engineering Technology
Typical First- and Second-Year
Sequence
First Year**

First Semester

CET 150	Digital Systems and Microprocessors <i>N3</i>	3
ENG 101	First-Year Composition	3
MAT 170	Precalculus <i>NI</i>	3
PHY 111	General Physics <i>S1/S2</i> ¹	3
PHY 113	General Physics Lab <i>S2/S2</i> ¹	1
Total	.....	13

Second Semester

ENG 102	First-Year Composition	3
ETC 100	Languages of Technology <i>N3</i>	4
MAT 260	Technical Calculus I <i>NI</i>	3
PHY 112	General Physics <i>S1/S2</i> ²	3
PHY 114	General Physics Laboratory <i>S1/S2</i> ²	1
HU, SB, and awareness area course	.....	3
Total	.....	17

Second Year

First Semester

CET 256	"C" Programming for Engineering Technology	3
CHM 113	General Chemistry <i>S1/S2</i>	4
ECN 111	Macroeconomic Principles <i>SB</i>	3
EET 208	Electric Circuit Analysis I	4
MAT 261	Technical Calculus II	3
Total	.....	17

Second Semester

EET 301	Electric Circuit Analysis II	4
ETC 200	Impact of Communications Technology on Society <i>L1</i>	3

ETC 211	Applied Engineering Mechanics: Statics	3
MAT 262	Technical Calculus III	3
HU, SB, and awareness area course	.....	3
Total	.....	16

- ¹ Both PHY 111 and 113 must be taken to secure S1 or S2 credit.
- ² Both PHY 112 and 114 must be taken to secure S1 or S2 credit.

STUDENT ORGANIZATIONS

The department hosts one of the local chapters of the Institute of Electrical and Electronics Engineers (IEEE), the International Society for Hybrid Microelectronics (ISHM), and the Instrument Society of America (ISA). Students may also be elected to membership in Tau Alpha Pi, the national honor society for engineering technology.

COMPUTER ENGINEERING TECHNOLOGY (CET)

CET 150 Digital Systems and Microprocessors. (3) F, S

Fundamentals of digital systems and microprocessors, with Boolean Algebra and combinational logic. Microprocessor programming and applications. Lecture, lab. Prerequisite: freshman standing. *General Studies: N3.*

CET 256 "C" Programming for Engineering Technology. (3) F, S, SS

Applied and practical problem solving using the "C" programming language. Prerequisite: ETC 100.

CET 336 Programming in Visual BASIC. (3) S

Introduction to BASIC and programming in the Visual BASIC environment. Prerequisite: CET 256.

CET 350 Digital Logic Principles. (4) F, S

Combinational and sequential logic analysis, design concepts, and applications. Lecture, lab. Prerequisite: CET 150.

CET 354 Microprocessor Principles. (4) F, S

Microprocessor organization, programming, and interfacing. Prerequisite: CET 150.

CET 386 Operating Systems Principles. (3) S

Fundamentals of operating systems, process management, scheduling and synchronization techniques, memory and file management, protection and security issues. Prerequisite: CET 256.

CET 426 Software Tools for the Semiconductor Industry. (3) S

Introduction to software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Cross-listed as UET 426. Prerequisite: UET 331.

CET 452 Digital Logic Applications. (4) S
Design of sequential machines using system design techniques and complex MSI/LSI devices with lab. Prerequisite: CET 350.

CET 454 Microcontrollers. (4) S
Microcontroller interfacing, organization, programming, and structure. Lecture, lab. Prerequisite: CET 354.

CET 456 Assembly Language Applications. (3) F

Programming using BIOS and DOS routines. High-level language interfacing. Disk operations, TSR routines, and device drivers. Prerequisite: CET 354.

CET 457 Microcomputer Systems Interfacing. (4) S

Applications of microcomputer hardware and software. Special purpose controllers, interface design. Lecture, lab. Prerequisites: CET 354; CSE 183; EET 310.

CET 458 Digital Computer Networks. (3) A

Network technology, topologies, protocols, control techniques, reliability, and security. Prerequisite: CET 354.

CET 473 Digital/Data Communications. (4) F, S

Signals, distortion, noise, and error detection/correction. Transmission and systems design. Interface techniques and standards. Lecture, lab. Prerequisites: CET 354; EET 372.

CET 483 UNIX Utilities Using "C" Language. (3) S

Applications of "C" language to the development of practical programs for the UNIX operating system. Prerequisite: senior standing in technology or equivalent.

CET 485 Digital Testing Techniques I. (3) A

Hardware/software aspects of digital testing technology; systems, board, and logic testing and equipment. Lecture, lab. Cross-listed as UET 485. Prerequisites: CET 350; EET 310.

CET 486 Electronics Computer-Aided Design. (3) F

CAD/EHDL for digital logic simulations and electronic circuit designs. Various software packages will be used. Prerequisites: CET 350; EET 310.

CET 487 Hardware Description Languages: VERILOG. (3) F

Introduction to hardware description languages, digital modeling, and simulation techniques using the VERILOG HDL. Prerequisites: CET 350, 354.

CET 520 Computer Architecture. (3) F

The basics of computer architecture. RTN, RISC, CISC concepts; computer arithmetic; ALUs; memory systems; I/O. Prerequisite: CET 354.

CET 552 Digital Systems Design. (3) S

Digital system design techniques and applications. Prerequisite: CET 452 or instructor approval.

CET 556 Windows Programming. (3) F

Programming techniques in the MS Windows and X Window environments. Prerequisite: CET 256 or equivalent.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

CET 557 Microcomputers and Applications. (3) F

Applications of small computer systems, mini- and microcomputer hardware and software. Prerequisites: CET 354; CSE 100 (or 183); EET 310.

CET 583 UNIX Utilities Using "C" Language II. (3) S

"C" language applications using the UNIX operating system. Also Fourth Generation languages and other UNIX utilities. Prerequisite: graduate standing in technology.

CET 585 Digital Testing Techniques II. (3) F
Testing technology as applied to digital systems, boards, and chips. Lecture, lab. Prerequisite: CET 354.

CET 586 Digital Modeling Techniques. (3) S
Digital system modeling and simulation using hardware description languages. Prerequisites: CET 350, 354.

ELECTRONICS ENGINEERING TECHNOLOGY (EET)

EET 205 Electronic Devices and Circuits. (4) F, S

Active device characteristics, models, and basic circuit analysis. Lecture, lab. Prerequisite: ETC 201.

EET 208 Electric Circuit Analysis I. (4) F, S
Electrical models, AC/DC steady-state analysis of first and second order systems. Circuit theorems. Three-phase circuits. Lecture, lab. Pre- or corequisite: MAT 261.

EET 301 Electric Circuit Analysis II. (4) F, S
Analysis of continuous-time signals and linear systems of using Laplace and Fourier response of circuits. Lecture, lab. Prerequisite: EET 208. Pre- or corequisite: MAT 262.

EET 304 Transmission Lines and Waveguides. (4) S

Theory and application of transmission lines, waveguides, antennas, microwave components, and impedance matching techniques. Lecture, lab. Prerequisite: EET 301.

EET 310 Electronic Circuits I. (4) F, S
Multistage amplifier, analysis, and design using models and computer simulation. Lecture, lab. Prerequisite: EET 208.

EET 372 Communication Systems. (4) F, S
Systems analysis and design of AM, FM, PCM, and SSB communication systems. Noise and distortion performance of communication systems. Lecture, lab. Pre- or corequisites: EET 301, 310.

EET 396 Professional Orientation. (1) F, S
Technical, professional, economic, and ethical aspects of electronics/computer engineering technology practice and industrial organization. Lecture, projects. Prerequisite: junior standing.

EET 401 Digital Filters and Applications. (3) S

Analysis and design of digital filters. Time frequency and Z-transform techniques and waveform analysis. Computer applications. Prerequisites: EET 301; MAT 262.

EET 406 Control System Technology. (4) S
Control system components, analysis of feedback control systems, stability, performance, and application. Lecture, lab, computer simulations. Prerequisites: EET 301; MAT 262.

EET 407 Electrical Power Systems. (4) F
Electrical power systems analysis, generation, transmission, distribution, and utilization, including system protection. Lecture, lab. Prerequisite: EET 208.

EET 410 Electronic Circuits II. (3) F, S
Analysis and design of OP-amps, power amplifiers, and digital logic families. Feedback design using frequency response. Computer analysis and design. Prerequisites: EET 301, 310.

EET 420 Analog Filters and Applications. (3) A

Active and passive analog filter design. Frequency domain approximations, computer simulations using PSPICE. Lecture, lab. Prerequisites: EET 301, 410.

EET 422 Electronic Switching Circuits. (4) A

Analysis and design of electronic circuits operating in a switching mode. Waveshaping, timing, and logic. Computer simulation. Lecture, lab. Prerequisites: CET 350; EET 301, 310.

EET 430 Instrumentation Systems. (4) F
Measurement principles and instrumentation, techniques. Signal and error analysis. Lecture, lab. Prerequisites: EET 301, 310.

EET 440 Electrical Power Systems Technology. (4) S

Principles and analysis of rotating machines, transformers, and related control equipment. Lecture, lab. Prerequisite: EET 407.

EET 460 Power Electronics. (4) S

Analysis of circuits for control and conversion of electrical power and energy. Lecture, lab. Prerequisites: EET 301, 310, 407.

EET 470 Communication Circuits. (4) S
Analysis and design of passive and active communication circuits. Coupling networks, filters, and impedance matching. Modulation and demodulation techniques. Computer solutions. Lecture, lab. Prerequisites: EET 372; MAT 262.

EET 478 Digital Communication Systems. (3) S

Theory, design, and application of digital, data, and fiber optics communication systems. Prerequisites: EET 304, 372; MAT 262.

EET 482 Industrial Practice: Internship/Coop. (1-4) F, S, SS

Specially assigned or approved activities in electronic industries or institutions. Report required. May be repeated for up to a maximum of 10 credits. Prerequisites: Electronics Engineering Technology major; junior or senior standing.

EET 490 Electronics Project. (1-4) F, S, SS
Individual or small group projects in applied electronics, with emphasis on laboratory practice or hardware solutions to practical problems. Prerequisite: instructor approval.

EET 500 Research/Writing. (2) F, S

Designed to help master's students develop their projects and write the first three chapters of their projects. Lecture, seminar. Prerequisite: instructor approval.

EET 501 Digital Signal Processing and Applications I. (3) F

Applications of discrete-time signals and systems, design of IIR and FIR filters using computer-aided design techniques. Prerequisites: EET 401 (or instructor approval); MAT 262.

EET 502 Digital Signal Processing and Applications II. (3) S

Application of FFT, fundamentals of probability theory and random processes, and quantization effects in digital filters. Prerequisite: EET 501.

EET 506 System Dynamics and Control. (3) S

Time, frequency, and transform domain analysis of physical systems. Transfer function analysis of feedback control systems performance and stability. Compensation. Prerequisites: EET 301, 501 (or MAT 262).

EET 508 Digital Real-Time Control. (3) A
Sample data control techniques and applications to process control. Prerequisites: CET 354; EET 406.

EET 510 Linear Integrated Circuits and Applications. (3) F

Analysis, applications, and design of linear integrated circuits and systems. Prerequisites: CET 350; EET 301, 310.

EET 522 Digital Integrated Circuits and Applications. (3) S

Analysis, applications, and design of integrated circuits and systems. Prerequisites: CET 350; EET 301, 310.

EET 530 Electronic Test Systems and Applications. (3) F

Analysis, applications, and design of electronic test equipment, test systems, specifications, and documentation. Prerequisites: CET 354; EET 301, 310.

EET 540 Electrical Power Systems. (3) S
Electrical power system analysis, transmission, distribution, instrumentation, protection and related system components. Prerequisites: EET 301, 407.

EET 560 Industrial Electronics and Applications. (3) S

Analysis, design, and application of special electronic devices and systems to industrial control, power, communications, and processes. Prerequisites: CET 350; EET 301, 310, 407.

EET 574 Microwave Amplifier-Circuits Design. (3) F

Analysis and design of microwave amplifier-circuits using s-parameter theory and computer-aided design. Prerequisites: EET 304, 470.

EET 576 Modern Telecommunication Systems. (3) F

Applied design and integration of microwave and satellite communication systems. Prerequisites: CET 473 and MAT 262 or instructor approval.

EET 578 Digital Filter Hardware Design. (3) S

Hardware design of FIR and IIR filters, including adaptive filters, based on DSP chips. Develop new applications using DSP microprocessor systems. Prerequisites: CET 354; EET 401.

EET 579 Digital Image Communication. (3) S

Image capture, transform, compression, storage, and transmission. Computer environment (software and hardware) is provided to emphasize the practical aspect. Prerequisite: EET 401 or instructor approval.

**MICROELECTRONICS
ENGINEERING TECHNOLOGY (UET)**

UET 331 Electronic Materials. (3) F, S
Physical, chemical, electromagnetic, and mechanical properties of electronic materials. Solid-state device characteristics and their material properties. Prerequisites: CHM 113; EET 205; PHY 112, 114.

UET 411 Applied Vacuum Technology. (3) S
Fundamentals, applications, and practical aspects of vacuum systems and their uses in semiconductor fabrication. Prerequisite: UET 331.

UET 415 Electronic Manufacturing Engineering Principles. (3) F, S
Electronic equipment design and fabrication principles and practice. Completion of electronics hardware design project and report. Lecture, lab. With lab fee. Prerequisite: EET senior standing (113 hours).

UET 416 Monolithic Integrated Circuit Devices. (3) F
Physics and electronics of bipolar and MOS devices used in integrated circuits. Prerequisite: UET 331. Corequisite: UET 417.

UET 417 Monolithic Integrated Circuit Laboratory. (2) F
Laboratory practice in the fabrication of integrated circuits. Lab. Prerequisite: UET 331. Corequisite: UET 416.

UET 418 Hybrid Integrated Circuit Technology. (4) S
Layout, fabrication, design, and manufacture of thin and thick film hybrid circuits. Lecture, lab. Prerequisites: EET 310; UET 331.

UET 421 Applied Device Physics. (3) F
Band structures of solids, physics of current carriers in solids, pn junctions, MOS and bipolar transistors. Prerequisite: senior standing in the department.

UET 424 Integrated Circuit Mask Making Technology. (3) F
Fundamentals, applications, and techniques for the fabrication of integrated circuit masks. Prerequisite: UET 331.

UET 426 Software Tools for the Semiconductor Industry. (3) S
Introduction to software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Cross-listed as CET 426. Prerequisite: UET 331.

UET 432 Semiconductor Packaging and Heat Transfer. (3) S
Packaging theory and techniques; hermetic and plastic assembly; thermal management; electrical characteristics and reliability. Prerequisites: ETC 340 and UET 331 or equivalents.

UET 437 Integrated Circuit Testing. (3) S
Principles, techniques, and strategies employed at wafer level and final product testing, both destructive and nondestructive. Prerequisite: UET 416.

UET 485 Digital Testing Techniques I. (3) F
Hardware/software aspects of digital testing technology systems, board and logic testing equipment. Lecture, lab. Cross-listed as CET 485. Prerequisites: CET 350; EET 310.

UET 513 VLSI Circuit Design and Layout. (3) F
Techniques and practice for the design and layout of very large-scale integrated (VLSI) circuits. Emphasis on "system on silicon" using tools for computer-aided design layout. Seminar. Prerequisite: UET 416.

UET 516 Semiconductor Process Simulation and Integration. (3) S
Modern IC processes and process integration; design of modern IC processes using SUPREM. Lecture, lab. Prerequisite: UET 416.

UET 518 Hybrid IC Technology and Applications. (3) S
Theory, processing, fabrication, and manufacturing of hybrid microelectronics devices and products. Applications. Prerequisite: UET 331 or equivalent or instructor approval.

UET 521 Device Physics. (3) F
Band structure of solids, electron hole-pairs, mobility, lifetime, fermilevel, pn junctions, diodes, and bipolar and MOS transistors. Prerequisite: graduate standing in the department.

**Department of
Information and
Management Technology**

**Thomas E. Schildgen
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PROFESSORS

DUFF, HILD,
HOROWITZ, SCHILDGEN

ASSOCIATE PROFESSORS

BARCHILON, GROSSMAN, HIRATA,
HUMBLE, MATSON, OLSON

LECTURERS

LESTAR, WILSON

PURPOSE

The mission of the department is to prepare graduates who are able to develop and communicate technological solutions to industrial problems, to manage systems operations, to improve and evaluate products, to provide customer support, and to facilitate technology transfer in industry and government. Increased complexity and sophistication have created great demand for those individuals who possess a working knowledge of the technical phases of planning, testing, production, and fabrication of consumer and industrial

products and equipment. Technology includes the application of science, systematic methods, procedures, machines, communication protocols, and materials control for the development, improvement, and implementation of state-of-the-art solutions to industrial problems.

DEGREES

The faculty in the Department of Information and Management Technology offer the B.S. degree in Industrial Technology with options in the following areas: information technology, environmental technology management, and industrial technology management.

A Master of Technology degree is offered for graduate study. For more information about the graduate program, see the *Graduate Catalog*.

Degree Requirements

The curriculum consists of First-Year Composition, university General Studies (see pages 84–108), and technical courses. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. The technical part of the curriculum includes a required Information and Management core, program option course work, and technical electives selected with approval of an advisor. Information and Management Technology students are required to complete a minimum of 128 semester hours with a 2.00 cumulative GPA, including a minimum of 50 semester hours of upper-division courses to graduate.

Information and Management Core

Required courses follow:

ETC	100	Languages of Technology N3	4
IMC	233	Desktop Publishing and Infographics	3
IMC	331	Quality Assurance	3
IMC	346	Management Dynamics	3
IMC	396	Professional Orientation	1
IMC	470	Project Management	3
Total			17

Information Technology Option. The information technology option prepares students for positions in the communication and information technology

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industry. Students are prepared in technical/digital media production; information management; printing and publishing; operations management; quality assurance; customer service and marketing; digital imaging; computer graphics; 3D modeling, technical graphics and illustration, rendering and animation/special effects; Internet/Intranet operations; and computer-based training. Graduates understand seamless communications from traditional print to digital/multimedia, Web design and development, database management, and corporate communications. The information technology option has three areas of emphasis: graphic communications, interactive computer graphics, and technical communications.

Graphic Communications Emphasis Area. The purpose of the graphic communications emphasis is to prepare students for a wide variety of professional positions in the printing and graphic communications industry. This area of emphasis offers a blend of technological and managerial knowledge and skills. The program has been specifically designed to produce graduates with a complete understanding of graphic image processing, image presentation, and the use of electronic image manipulation and storage techniques. Graduates have the skills to address the requirements of the print and image manipulation environments. They also are prepared to exploit opportunities and competitive challenges taking place in the digital information industry. Each graduate is also prepared to manage the turbulent economic and human relations concerns associated with modern business. Each student is exposed to practical and effective problem-solving techniques currently used in industry. As a prerequisite for graduation, students are expected to acquire job-related industry experience. Typical career paths may include operations management, sales and marketing, and technology.

Interactive Computer Graphics Emphasis Area. The purpose of the interactive computer graphics emphasis is to prepare students for entry into the diverse field of computer graphics. The emphasis is on computer applications as a foundation in technological processing and dissemination of information. Modern information management in-

cludes discipline-specific applications of graphic analysis, communication, databases, design, documentation, image generation, modeling, programming, visualization, and multimedia presentation. Graduates are qualified computer graphics technologists who have acquired extensive knowledge and technical competency, thereby preparing them to advance into professional positions in the industry. The courses are industry responsive and evolve at the fast pace of the technology. Typical career paths may include: animation and multimedia creation, applications management, and supervision; information process design (specialty areas such as electronics, advertising/graphics design, process simulation, rendering and illustration, and computer-aided design and drafting); graphics systems and database analysis; technical graphics and publication; and testing and implementation.

Technical Communications Emphasis Area. The purpose of the technical communications emphasis is to prepare students for a variety of professional positions in technical writing and corporate communications. Proposal writing, publication design, database management, and online publications provide diverse opportunities for career employment.

Environmental Technology Management Option. The environmental technology management option provides graduates entering the field of industrial and hazardous waste management with the abilities and skills required to address environmental challenges. Graduates are prepared to conduct site assessments, select technologies for soil and ground water remediation, and design solutions to environmental problems for industries, regulatory agencies, and consulting firms.

Certificate Program in Hazardous Materials and Waste Management. The Certificate Program in Hazardous Materials and Waste Management is designed to provide current and prospective employees of industry and government with a comprehensive and practical curriculum of study in hazardous materials management. The certificate program features instruction by ASU faculty, attorneys, and professionals who work in the specific area in which they teach. Participation in the certifi-

cate program is available in three options: a certificate program for nondegree students, a B.S. degree in Industrial Management with a Certificate in Hazardous Materials and Waste Management, and a Master of Technology with a Certificate in Hazardous Materials and Waste Management. Students must complete seven selected courses (five required and two electives) and earn a grade of "C" or higher to receive the certificate. Except for the introductory course, ETM 501 Principles of Hazardous Materials and Waste Management, the remainder of the courses may be taken in any sequence.

Industrial Technology Management Option. The industrial technology management option prepares students for supervisory and administrative positions in industry, manufacturing, and public service organizations. Course work includes accounting, data analysis, economics, effective decision making, finance, international business, legal and ethical studies, marketing, operations management, and safety. Emphasis is placed on health and safety within the workplace.

The industrial technology management program may be articulated with a broad range of community college technical courses. Community college specializations in areas such as aeronautics, construction, electronics, fire science, police science, graphic communications, hazardous materials and waste management, computer graphics, safety and health, human resource management, mortuary science, production management, and manufacturing may form a technical specialty area within the industrial technology management option. Consultation with an advisor is required to coordinate the course selection for transfer to this option.

COMPUTER GRAPHIC COMMUNICATIONS (CGC)

CGC 135 Graphic Communications. (3) F, S Introduction to the technologies involved in the design, image generation, transmission, and industrial production of multiple images for consumer utilization. Lecture, lab, field trips.

CGC 210 Creative Thinking and Design Visualization. (3) F Fundamental methods, concepts, and techniques of creative thinking, design visualization, and problem solving. Also includes communication, cultural, and societal influences. Lecture, lab. Prerequisite: ETC 100.

CGC 211 Digital Imaging Video and Audio Technologies. (3) F

Digital video and audio technology systems, standards, procedures, and techniques for capturing, editing, mixing, and producing creative nonlinear media. Lecture, lab. Prerequisite: ETC 100.

CGC 212 Computer-Aided Design and Drafting (CADD). (3) S

CADD for product design, representation, and documentation; includes projection theory, descriptive geometry, graphics analysis, drafting standards, and precision dimensioning techniques. Lecture, lab. Prerequisite: ETC 100 or instructor approval. *General Studies: N3.*

CGC 213 Digital Media Technologies: Hardware, Software, and Peripherals. (3) S

The study of the computer technology systems, hardware, software, and peripherals used in the computer graphics and digital media environments. Lecture, lab. Prerequisite: ETC 100 or instructor approval.

CGC 237 Design for Digital Imaging. (3) S Introduction to design principles, typography, and document development of graphic images for printing, CD-ROM databases, and World Wide Web applications. Lecture, lab. Prerequisite: CGC 135 or equivalent.

CGC 310 Computer Graphics Programming (C++). (3) F, S

Computer graphics software programming techniques and Windows applications in C++. 2D and 3D graphics: object-oriented programming, transformations, scaling, and database concepts. Lecture, lab. Prerequisite: ETC 100 or equivalent "C" language programming course or instructor approval. *General Studies: N3.*

CGC 311 Communication and Media Ethics, Law, and Copyright. (3) F

Study and analysis of copyright and intellectual property laws, regulations, and ethical standards, including ownership, piracy, security, and distribution issues. Lecture, lab. Prerequisite: ETC 200.

CGC 312 3D Computer Graphics Modeling and Representation. (3) F

3D solid modeling applications: concepts, techniques, database structures, modeling strategies, assemblies, mass-properties analysis, kinematics, data file exchange specifications, and representation. Lecture, lab. Prerequisite: CGC 212 or instructor approval. *General Studies: N3.*

CGC 313 Technical Illustration and Photorealistic Rendering. (3) F

Computer-generated graphics for technical illustration and design presentation: axonometric and perspective drawing; shading, shadowing, texture mapping; and photorealistic rendering. Lecture, lab. Prerequisite: CGC 312 or instructor approval.

CGC 314 Multimedia Design, Planning, and Storyboards. (3) S

Studying the creative and conceptual process of content selection, planning, designing, flow-charting, storyboarding, proposing, configuring, prototyping, and presenting multimedia projects. Lecture, lab. Prerequisites: CGC 210 and 237 and 311 or instructor approval.

CGC 332 Image Assembly and Plate Preparation. (3) F

Imposition of film or digital images for reproduction using various image carriers direct-to-press technology. Lecture, lab, field trips. Prerequisite: CGC 135.

CGC 333 Offset Press Technology. (3) S Function of offset printing equipment. Dynamics of offset-lithography for both sheetfed and web systems. Lecture, lab. Prerequisite: CGC 332 or instructor approval.

CGC 334 Image Capture and Conversion. (3) F

Theory and application of image capture techniques used for all copy formats and conversion processes required for reproduction or dissemination. Lecture, lab. Prerequisite: CGC 135.

CGC 335 Printing and Finishing Technology. (3) N

Analysis of production bindery and finishing procedures in combination with the theory flexography and screen process printing. Prerequisite: CGC 135.

CGC 336 Color Theory and Reproduction. (3) S

Analysis of color theory and separation techniques used for the reproduction of color originals. Lecture, lab. Prerequisite: CGC 334.

CGC 339 Estimating and Cost Analysis. (3) S

Management decision-making and cost-finding procedures for reproduction processes, includes analysis of equipment, labor, and material costs. Prerequisite: CGC 135.

CGC 351 Technical Writing and Editing. (3) F, S

Effective style, format, and organization of technical material; editing principles and practices; copyediting versus substantive editing; and document management. Prerequisite: ENG 102.

CGC 352 Technical Presentations and Visual Literacy. (3) S

Planning, technology, and delivery of individual and group presentations for impromptu, informative, and persuasive applications. Prerequisite: ENG 102.

CGC 410 Graphics User Interfaces and Database Programming (C++). (3) F, S

GUI design and programming: Window standards, protocols, tools and files; use of project managers, database components, visual libraries and OOPS. Lecture, lab. Prerequisites: CGC 310 (or equivalent C++ language programming course) and 314 or instructor approval.

CGC 411 Computer Animation and Special Effects (FX). (3) F

2D and 3D computer animation principles and methods: project planning, scripting; character generation; storyboards; and modeling, lighting, rendering, special effects, and plug-in techniques. Lecture, lab. Prerequisites: CGC 313 and 314 or instructor approval.

CGC 412 Multimedia Authoring, Scripting, and Production. (3) F

Production of multimedia projects using authoring software applications, including project management, client considerations, interactive navigation, cross-platforming, testing, and documentation issues. Lecture, lab. Prerequisites: CGC 314 and 336 and 352 and 411 or instructor approval.

CGC 413 Professional Portfolio Design and Presentation. (3) S

Digital media portfolio: planning, targeted audience(s), design appearance, authoring, packaged media formats, media presentation formats, production, marketing, and copyright considerations. Lecture, lab, field trips. Prerequisites: CGC 411 and 412 or instructor approval.

CGC 414 Web Site Design and Internet/ Web Technologies. (3) S

Web site design, authoring, standards, protocols, tools, and development techniques; HTML, CGI and Perl coding; Web servers, browsers, interfaces and URLs. Lecture, lab. Prerequisites: CGC 311 and 314 or instructor approval.

CGC 415 Computer Graphics: Business Planning and Management Issues. (3) S

Implementation planning: feasibility and application studies; needs assessment and operational analysis techniques; organization, managerial and technology considerations; business plan development. Lecture, lab, field trips. Prerequisite: CGC 412 or instructor approval.

CGC 416 Emerging Computer Graphics and Digital Media Technologies. (3) S

Emerging computer graphics and digital media technologies and databases: VR/VRML; inverse kinematics; FX plug-ins; hybrid modeling; Web intermedia; GIS/mapping. Lecture, lab, field trips. Prerequisites: CGC 410 and 411 or instructor approval.

CGC 417 JavaScript, VBScript, HTML, and ActiveX Programming. (3) S

Use of JavaScript, VBScript, HTML, and ActiveX software programs and standards to create customized, interactive, Internet/Web site applications. Lecture, lab. Prerequisites: CGC 410 and 412 and 414 or instructor approval.

CGC 433 Graphic Production Processes. (3) N

Systematic production planning experience involving a mock enterprise and defined management responsibilities. Lecture, lab. Prerequisites: CGC 333, 334.

CGC 436 Gravure Technology. (3) S

In-depth study of the market profile and production sequences related to the gravure method of printing. Prerequisite: CGC 135 or instructor approval.

CGC 437 Color Reproduction Systems. (3) F

Scientific analysis for the engineering of color reproduction systems used in industry. Prerequisite: CGC 336.

CGC 438 Graphic Arts Techniques and Processes. (3) N

Survey of production sequences and profile of the printing and publishing industry. Lecture, lab. Prerequisite: junior standing.

CGC 439 Digital Prepress. (3) N

The study of digital prepress systems, hardware, software, networks, and direct imaging technology. Lecture, lab. Prerequisite: IMC 233.

CGC 510 Computer Graphics Programming: Design, Customization, and Development. (3) N

Advanced design, development, and documentation of Windows application programs, including GUIs, OOP, RAD, API, DLLs, and GDI in C++ and Java. Lecture, lab. Prerequisites: CGC 310 and 410 (or equivalent GUI/OOP course) or instructor approval.

CGC 511 Procedural and Physically Based Character Animation. (3) N

Creative and aesthetic design, storyboarding, planning, development, and documentation of constraint-based, procedural, and interactive character, avatar-actor, and product animations/simulations. Lecture, lab. Prerequisites: CGC 411 and 510 (or equivalents) or instructor approval.

CGC 512 Multimedia-Based Education and Training. (3) F, SS

Creative design, planning, development, documentation, and production of technology-based learning and multimedia-based education and training materials and programs. Lecture, lab. Prerequisites: CGC 412 and 413 (or equivalents) or instructor approval.

CGC 513 Computer Graphics Systems Design and Development. (3) N

Research, design, and development of computer graphics systems; involves project proposal, scheduling, management, production, analysis, testing, evaluation, documentation, and implementation. Lecture, lab, field trips. Prerequisites: CGC 414 and 415 or instructor approval.

CGC 514 Interactive Virtual Reality Environments and Technologies. (3) N

Research and development of passive, exploratory, and interactive VR environments in education and training, infotainment, Internet/Web, and VRML programming and simulation arenas. Lecture, lab, field trips. Prerequisites: CGC 510 and 511 and 513 (or equivalents) or instructor approval.

CGC 537 Current Issues in Quality Assurance. (3) N

Directed group study of selected issues relating to quality assurance in the printing, publishing, and information industry.

CGC 538 Personnel Development for the Graphics Industry. (3) N

Employee training and development specific to production and management in the graphics industry.

ENVIRONMENTAL TECHNOLOGY MANAGEMENT (ETM)

ETM 301 Environmental Management. (3) F
Focuses on knowledge and skills necessary to manage environmental programs. Perspectives include regulatory, individual, corporate, and consulting. Pre- or corequisites: CHM 113; MAT 170.

ETM 302 Water and Wastewater Treatment Technology. (3) F

Explores the development of treatment technologies. Addresses regulatory standards. Emphasizes theory and practice of system design. Pre- or corequisite: ETM 301.

ETM 303 Environmental Regulations. (3) F, S

Exploration of environmental laws, regulations, and directives. Air, land, and water are addressed. Prerequisite: ETM 301.

ETM 401 Hazardous Waste Management. (3) F, S

Definition of hazardous waste, RCRA classification, and OSHA criteria. Overview of requirements and methods of waste management. Prerequisite: ETM 301.

ETM 402 Unit Treatment Technologies. (3) S

Addresses various treatment technologies for contaminated air, water, and soil. Emphasizes design based upon medium, type of contamination, and concentration. Prerequisite: ETM 302.

ETM 406 Environmental Chemistry. (3) F, S

Examines reactions, transport, and fates of hazardous chemicals in water, soil, air, and living organisms. Prerequisites: CHM 113 and 115 or CHM 114; MAT 170.

ETM 407 Occupational Hygiene. (3) S

Overview of occupational health hazards, including recognition, evaluation, and control. Includes regulatory status and health standards. Prerequisites: CHM 101 (or 113 or 114); MAT 170.

ETM 424 Comprehensive Emergency Management. (3) SS

Addresses theory and management techniques for emergency preparedness, including mitigation, preparedness, response, and recovery. Pre- or corequisite: ETM 301.

ETM 426 Environmental Issues. (3) S

Exploration of the science and policy implications of contemporary problems that threaten the environment. Pre- or corequisites: CHM 113; MAT 170.

ETM 428 International Environmental Management. (3) SS

Emphasis on technological and economic pressures experienced by developing countries. Prerequisite: ETM 301.

ETM 501 Principles of Hazardous Materials and Waste Management. (3) F

Foundation for courses in curriculum. Topics include definitions of toxic and hazardous substances and wastes, RCRA classification, and OSHA criteria. Pre- or corequisites: CHM 113 and 115 or CHM 114.

ETM 502 Regulatory Framework for Toxic and Hazardous Substances. (3) F

Examination of federal, state, and local regulations for hazardous materials and wastes. Includes history and trends in regulatory development. Prerequisite: ETM 501.

ETM 503 Principles of Toxicology. (3) S

Interaction of chemicals with life and environment. Mechanisms of toxic action, dose-response relationships, toxicity testing models, predictive toxicology, and epidemiology. Prerequisites: CHM 113 and 115 or CHM 114.

ETM 504 Technology for Storage, Treatment, and Disposal of Hazardous Materials. (3) F

Current and state-of-the-art technologies and future trends for storage, treatment, and disposal of hazardous materials and waste. Prerequisites: CHM 113 and 115 or CHM 114; ETM 501.

ETM 505 Quantitative Analysis and Practical Laboratory Techniques. (3) F, S

EPA methodologies for sampling and analysis of soils and water. Includes quality assurance and regulatory requirements. Lab will be arranged off site. Prerequisites: CHM 113 and 115 (or CHM 114), 231; MAT 170.

ETM 506 Chemistry of Hazardous Materials. (3) F

Chemistry and toxicology of hazardous chemicals. Topics include proper handling, storage, transportation, and disposal. Prerequisites: CHM 113 and 115 (or CHM 114); MAT 170. Corequisite: CHM 231.

ETM 507 Industrial Hygiene. (3) N

Emphasis on chemical hazards in industrial settings. Topics include recognizing and measuring hazards, control techniques, and regulatory standards. Prerequisites: CHM 113 and 115 (or CHM 114); MAT 170.

ETM 522 Air Pollution and Toxic Chemicals. (3) F

Examines issues in the measurement analysis and control of toxic chemicals in air pollution. Prerequisites: CHM 113 and 115 (or CHM 114); ETM 501; MAT 170.

ETM 523 Soils and Groundwater Contamination. (3) F

Theoretical and practical hydrogeology as it applies to cleaning up contamination. Investigative techniques, monitoring, risk assumptions, and assessment methodology. Prerequisites: CHM 113 and 115 (or CHM 114); ETM 501; MAT 170. Corequisite: CHM 231.

ETM 524 Emergency Preparedness, Response, and Planning for Hazardous Materials. (3) SS

In-house or on-site emergency response contingency planning. Pre-emergency assessment, resources for cooperation, equipment requirements, and coordination with other agencies. Prerequisites: CHM 113 and 115 (or CHM 114); ETM 501; MAT 170.

ETM 525 Risk Assessment for Hazardous Materials. (3) S

Application of the risk assessment process in situations ranging from hazardous facilities regulation to toxic substances in the environment. Prerequisites: CHM 113 and 115 (or CHM 114); ETM 501; MAT 170.

ETM 526 Current Issues: Radon, Asbestos. (3) F

Topics of current interest in environmental technology and management. Prerequisites: CHM 113 and 115 (or CHM 114); ETM 501; MAT 170.

ETM 527 Environmental/Resources Regulations Concepts. (3) S

Development of environmental regulations from common law to statutory requirements. Emphasis on Superfund, hazardous materials, toxics, and liability contracts. Pre- or corequisite: ETM 501.

INFORMATION AND MANAGEMENT CORE (IMC)

IMC 233 Desktop Publishing and Infographics. (3) F, S

Introduction to software and hardware used for desktop publishing and infographics. Lecture, lab.

IMC 331 Quality Assurance. (3) S

Instrumentation and methodologies for materials testing and quality control in various manufacturing processes. Lecture, field trips.

IMC 346 Management Dynamics. (3) F, S
Management challenges and the leadership skills needed to achieve organizational objectives in the changing industrial and technical environments. Prerequisite: junior standing.

IMC 396 Professional Orientation. (1) F, S
Senior advisement, industry presentations, and career counseling.

IMC 470 Project Management. (3) S
Introduction to techniques for managing small groups within larger organizations, including team building, motivating, planning, tracking activities, and computer tools. Prerequisites: ECN 111; IMC 346; ITM 344.

INDUSTRIAL TECHNOLOGY MANAGEMENT (ITM)

ITM 343 Occupational Safety and Ergonomics. (3) F

Health and safety movement, accident theories and effects, OSHA standards and liability, safeguarding, hazards, workers' compensation, ergonomics, and safety. Prerequisite: junior standing.

ITM 344 Industrial Organization. (3) S
Industrial organization concepts. Topics relate to industrial relations, governmental regulations, organizational structure, labor relations, human factors, and current industrial practices. Prerequisite: IMC 346.

ITM 402 Industrial Laws, Contracts, and Regulations. (3) F

Review of city, state, county, and federal laws that affect industrial and construction operations, materials, supplies, and acquisition procedures. Prerequisite: IMC 346.

ITM 430 Ethical Issues in Technology. (3) S
Topics in social responsibility for industrial technology and engineering. Prerequisite: IMC 346.

ITM 440 Introduction to International Business. (3) S

International business principles and operations, including partnerships, trade agreements, currency issues, international sales, and cultural differences between countries. Prerequisite: IMC 346.

ITM 445 Industrial Internship. (1-10) F, S, SS

Work experience assignment in industry commensurate with student's program. Specialized instruction by industry with university supervision. Pass/fail. Prerequisites: advisor approval; junior standing; 2.50 GPA.

ITM 451 Materials Control. (3) N
Activities of material handling, including purchasing, receiving, warehousing, traffic, plant layout, inventory, and production control and shipping relating to technical procedures. Prerequisites: IMC 346; ITM 343.

ITM 452 Industrial Human Resource Management. (3) F

Concepts and practices of human resource management in a global industrial environment. Prerequisite: IMC 346.

ITM 453 Safety Management. (3) N

Development and management of safety programs, education and training, and relationships within an organization. Prerequisite: ITM 343 or instructor approval.

ITM 455 Industrial Marketing Concepts. (3) N

Customer and sales strategies for industrial organizations, including current practice and future planning. Prerequisites: ECN 111; IMC 346; junior standing.

ITM 456 Introduction to Organized Labor. (3) S

Introduction to labor relations, unions, federations, collective bargaining, grievances, and labor legislation. Prerequisites: IMC 346; ITM 344.

ITM 461 Operations Management. (3) F

Introduction to supervisory principles as applied to production of goods and services. Prerequisites: IMC 346; ITM 344.

ITM 480 Organizational Effectiveness. (3) S

Human aspects of supervisory behavior in the industrial setting and how they influence efficiency, morale, and organizational practices. Prerequisite: IMC 346.

ITM 501 Managerial Economics. (3) N

Basic managerial economic tools and techniques applied to unique concerns of scientifically intensive firms operating in rapidly evolving industrial sectors.

ITM 502 Financial Management. (3) N

Examination of corporate financial and managerial accounting systems, budgeting, and financial policy, using microcomputers to analyze, forecast, and report information.

ITM 503 Marketing Management. (3) N

Modern methods and industrial case studies of planning, pricing, promoting and distributing, goods and services in the global marketplace. Prerequisites: ITM 480 (or equivalent); instructor approval.

ITM 504 Law and Ethics for Technical Professionals. (3) N

Analysis of legal and ethical framework for making managerial decisions in the corporate environment of engineering- and technology-related industries.

ITM 520 Strategic Management of Technology. (3) N

Analysis of entrepreneurial dynamics and technology development, methods of research and development management, new technology implementation, and start-up organization. Prerequisites: ITM 480 (or equivalent); instructor approval.

ITM 540 International Management. (3) N
Practices and procedures for effective management of multinational business organizations, including partnerships, joint ownerships, and global subsidiaries.

ITM 548 Quantitative Research Methods. (3) F, S

Use of statistical techniques to analyze and interpret data. Concentration on computerized statistical software and practical applications. Prerequisite: STP 420.

ITM 549 Research Techniques and Applications. (3) F, S

Selection of research problems, analysis of literature, individual investigations, preparing reports, and proposal writing. Prerequisite: STP 420 or equivalent.

ITM 550 Industrial Training and Development. (3) N

Training techniques and learning processes. Planning, developing, evaluating, and managing industrial and governmental programs. Prerequisite: ITM 480.

ITM 552 Global Management Philosophies. (3) N

Analysis and comparison of significant supervision philosophies developed in various industrial nations and their potential application in the United States.

ITM 560 Managerial Decision Making. (3) F

Analysis of common decision-making bias and techniques to overcome them. Uses both subjective quantitative decision tools and computerized decision aids.

ITM 570 Advanced Project Management. (3) S

Planning, organizing, coordinating, and controlling staff and project groups to accomplish the project objective.



Charles Brownson, ASU East's director of library services, demonstrates the capabilities of the virtual library to East Campus students Matt Cochran (center) and Anja Hassell (right).

Tim Trumble photo

Department of Manufacturing and Aeronautical Engineering Technology

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LECTURER
OKONKWO

PURPOSE

The mission of the Department of Manufacturing and Aeronautical Engineering Technology is to emphasize the application of applied engineering practice in the manufacturing and aerospace fields through four-year degree programs in Manufacturing Engineering Technology and Aeronautical Engineering Technology. This is accomplished by the intense application of math and science principles to the solution of technical problems in a lecture/laboratory environment. The goal of the Manufacturing Engineering Technology program is to prepare students for employment in areas such as materials, mechanics, design, manufacturing processes, automation, and quality control. The department actively supports the student chapter of the Society of Manufacturing Engineers. The purpose of the Aeronautical Engineering Technology program is to prepare students for employment in areas such as aircraft and aerospace vehicle design, applied thermodynamics, fluid mechanics and aerodynamics, propulsion, aerospace manufacturing and wind tunnel testing.

ACCREDITATION

The programs of Manufacturing Engineering Technology and Aeronautical Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET).

DEGREES

The Department of Manufacturing and Aeronautical Engineering Technology offers two baccalaureate degrees: the B.S. degree in Manufacturing Engineering Technology and the B.S. degree in Aeronautical Engineering Technology.

A Master of Technology degree is offered for graduate study. See the *Graduate Catalog* for more information about the graduate programs.

Degree Requirements

All degree requirements for the program are shown on curriculum check sheets. Requirements include First-Year Composition, university General Studies (see pages 84-108), and the Engineering Technology core. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. To graduate students are required to complete a minimum of 128 semester hours with a 2.00 cumulative GPA, including at least 50 semester hours of upper division courses.

Manufacturing Engineering Technology—B.S.

The B.S. degree in Manufacturing Engineering Technology requires 128 semester hours as specified below:

Engineering Technology Core	14
First-Year Composition	6
General Studies/Department Requirements	45
Manufacturing Engineering Technology Major	52
Selected Emphasis Area	11
Total	128

The following courses constitute the manufacturing engineering technology major and are required of all manufacturing engineering technology students. Refer to the specific emphasis areas for additional requirements.

Manufacturing Engineering Technology Major

EET 406	Control System Technology	4
MET 231	Manufacturing Processes	3
MET 300	Applied Material Science	4
MET 302	Welding Survey	3
MET 313	Applied Engineering Mechanics: Materials	4
MET 331	Design for Manufacturing I ...	3
MET 341	Manufacturing Analysis	3
MET 344	Casting and Forming Processes	3
MET 345	Advanced Manufacturing Processes	3

MET 346	Numerical Control Point to Point and Continuous Path Programming	3
MET 396	Manufacturing Professional Orientation	1
MET 401	Statistical Process Control	3
MET 416	Applied Computer Integrated Manufacturing	3
MET 444	Production Tooling	3
MET 451	Introduction to Robotics	3
MET 460	Manufacturing Capstone Project I	3
MET 461	Manufacturing Capstone Project II	3
Total	52	

A student participating in the Manufacturing Engineering Technology program may select from two areas of emphasis: manufacturing engineering technology or mechanical engineering technology.

Manufacturing Engineering Technol- ogy Emphasis.

This emphasis area is designed to prepare technologists with both conceptual and practical applications of processes, materials, and products related to metalworking industries. Accordingly, this emphasis area is intended to prepare students to meet the responsibilities in planning the processes of production, developing the tools and machines, and integrating the facilities of production or manufacturing.

Students may select course work that focuses on the implementation of design and manufacturing strategies that favorably impact the environment before manufacturing and during manufacturing. Students address design, materials, and manufacturing problems with a focus on the environment. Concepts like design for recyclability, manufacturing fluids, and air quality control during manufacturing are addressed.

Required courses follow:

MET 438	Design for Manufacturing II	4
MET 442	Specialized Production Processes	3
	Technical electives	4
Total	11	

Mechanical Engineering Technology Emphasis.

The primary objective of the mechanical engineering technology emphasis area is to prepare students for entry-level work in mechanical design and testing, either in engineering or manufacturing departments in product-oriented industries. Major emphasis is

placed on reducing the amount of time required by industry to make the graduate productive in any area of work. Students obtain a well-rounded academic background with an emphasis in mechanics and thermal sciences.

Required courses follow:

AET 415	Gas Dynamics and Propulsion	3
MET 434	Applied Fluid Mechanics	3
MET 438	Design for Manufacturing II	4
	Approved technical elective	1
Total	.....	11

All degree requirements for the program are shown on curriculum check sheets. Requirements include First-Year Composition, university General Studies (see pages 84–108), and the Engineering Technology Core. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. To graduate students are required to complete a minimum of 128 semester hours with a 2.00 cumulative GPA, including at least 50 semester hours of upper-division courses.

Aeronautical Engineering Technology—B.S.

The B.S. degree in Aeronautical Engineering Technology degree requires 128 semester hours as specified below:

Aeronautical Engineering Technology	
Major	63
Engineering Technology Core	14
First-Year Composition	6
General Studies/Department Requirements	45
Total	128

The following courses constitute the Aeronautical Engineering Technology major and are required of all Aeronautical Engineering Technology students.

Aeronautical Engineering Technology Major

AET 150	Introduction to Aeronautical Engineering Technology	1
AET 210	Measurement and Testing	3
AET 215	Mechanics of Aerospace Systems	3
AET 300	Aircraft Design I	3
AET 312	Applied Engineering Mechanics: Dynamics	3
AET 396	Aerospace Professional Orientation	1

AET 415	Gas Dynamics and Propulsion	3
AET 417	Aerospace Structures	3
AET 420	Applied Aerodynamics and Wind Tunnel Testing	4
AET 432	Applied Heat Transfer	3
AET 487	Aircraft Design II	3
CET 483	UNIX Utilities Using "C" Language	3
	(Or other language program)	
EET 406	Control System Technology	4
MET 230	Engineering Materials and Processing	3
MET 300	Applied Material Science	4
MET 313	Applied Engineering Mechanics: Materials	4
MET 331	Design for Manufacturing I ...	3
MET 432	Thermodynamics II	3
MET 434	Applied Fluid Mechanics	3
MET 438	Design for Manufacturing II	4
	Technical elective	2
Total	.....	63

AERONAUTICAL ENGINEERING TECHNOLOGY (AET)

Flight instruction costs are not included in university tuition and fees.

AET 150 Introduction to Aeronautical Engineering Technology. (1) F Introduction to the fields of aeronautical engineering and engineering technology.

AET 210 Measurements and Testing. (3) F Measurement systems, components, system response, and the characteristics of experimental data. Lecture, lab. Prerequisites: MET 230; PHY 112, 114.

AET 215 Mechanics of Aerospace Systems. (3) S Basic physics of flight. Principles and design of aircraft systems and powerplants. Lecture, lab. Prerequisite: AET 210.

AET 300 Aircraft Design I. (3) F, S Basic applied aerodynamics, propeller performance, and airplane performance analysis. Prerequisites: AET 210 and 215 (or AMT 280 and 287); ETC 100; MAT 260; PHY 112, 114.

AET 310 Instrumentation. (3) F Measurement systems, components, system response, and the characteristics of experimental data. Methods of collecting and analyzing data. Lecture, lab. Prerequisites: ETC 201; MAT 261. Pre- or corequisite: MET 313.

AET 312 Applied Engineering Mechanics: Dynamics. (3) F, S Masses; motion kinematics; dynamics of machinery. Prerequisites: ETC 211; MAT 261.

AET 396 Aerospace Professional Orientation. (1) F Career focus for Aeronautical Engineering Technology students. Familiarization with the aerospace industry. Prerequisite: junior standing.

AET 409 Nondestructive Testing and Quality Assurance. (1) N Purpose of inspection and quality assurance. Theory and application of nondestructive inspection methods. Application of pertinent standards, specifications, and codes. Lecture, lab. Cross-listed as AMT 409. Prerequisite: AMT 280 or MET 230.

AET 415 Gas Dynamics and Propulsion. (3) F Introduction to compressible flow, internal and external flow, and aerothermodynamic analysis of propulsion systems. Prerequisites: ETC 340; MAT 262.

AET 417 Aerospace Structures. (3) F Analysis and design of aircraft and aerospace structures. Shear flow. Semimonocoque structures. Effects of dynamic loading. Prerequisites: AET 300, 312, 420; MAT 262; MET 313.

AET 420 Applied Aerodynamics and Wind Tunnel Testing. (4) F Introduction to viscous and inviscid flow and their relationship to aircraft lift and drag. Wind tunnel design and testing. Lecture, lab. Prerequisites: AET 300; MAT 262.

AET 432 Applied Heat Transfer. (3) F Steady-state and transient conduction, heat transfer by convection and radiation. Applications of heat transfer. Prerequisite: MET 434 or instructor approval.

AET 487 Aircraft Design II. (3) S Basic aerodynamics and airplane performance analysis methods applied to practical design project. Prerequisite: AET 300.

AET 490 Advanced Applied Aerodynamics. (3) N Study of fluid motion and aerodynamics. Essentials of incompressible aerodynamics and computational fluid dynamics. Elements of laminar and turbulent flows. Prerequisites: AET 312; ETC 100; MAT 262.

AET 524 Application of Heat Transfer. (3) F Energy conservation, steady-state and transient conduction, convection transfer, free and forced convection Reynolds analogy, blackbody and environmental radiation. Prerequisite: MET 434 or instructor approval.

AET 525 Advanced Propulsion. (3) S Mechanics and thermodynamics of propulsion systems. Solid, liquid propellant rocket design performance. Electrical nuclear propulsion systems. Space missions. Prerequisites: AET 420 (or MET 434) and 415 or instructor approval.

AET 531 Experiments and Design in Aeronautics. (3) N Advanced measurement techniques for fluid flows, wind tunnel testing, and treatment of experimental data. Automatic control systems.

AET 560 Numerical Methods in Engineering Technology. (3) N Analyzing problems in physical sciences, modeling of physical problems, perturbation techniques, curvefitting, data analysis, numerical solutions, ordinary and partial differential equations.

NOTE: For the General Studies requirement, codes (such as L1, N3, C, and H), and courses, see pages 84–108. For graduation requirements, see pages 79–83. For omnibus courses offered but not listed in this catalog, see pages 56–57.

MANUFACTURING ENGINEERING TECHNOLOGY (MET)

MET 230 Engineering Materials and Processing. (3) F, S, SS

Materials, their structures, properties, fabrication characteristics, and applications. Material forming, joining, and finishing processes. Automation and quality control.

MET 231 Manufacturing Processes. (3) F
Metal removal processes, emphasizing drilling, milling, and lathe processes, including tool bit grinding. Emphasis on production speeds and feeds. Lecture, lab.

MET 300 Applied Material Science. (4) F
Principles of materials science emphasizing concepts relevant to manufacturing and use. Discuss metals, polymers, ceramics, and composites. 3 hours lecture, 1 hour lab. Prerequisite: MET 231 or instructor approval.

MET 302 Welding Survey. (3) F
Theory and application of industrial welding processes; introductory welding metallurgy and weldment design; SMAW, GTAW, GMAW, Oxyacetylene, and brazing experiences. Lecture, lab. Prerequisite: upper-class standing.

MET 303 Machine Control Systems. (3) S
Theory and application of electromechanical, hydraulic, pneumatic, fluidic, and electrical control systems for manufacturing. Lecture, lab. Prerequisites: ETC 201 (or PHY 112); MAT 260.

MET 313 Applied Engineering Mechanics: Materials. (4) F, S, SS
Stress, strain, relations between stress and strain, shear, moments, deflections, and combined stresses. 3 hours lecture, 1 hour lab. Prerequisite: ETC 211.

MET 321 Engineering Evaluation of Welding Processes. (3) N
Theory and application of the arc welding processes and oxy-fuel cutting; fixturing, procedures, safety, codes, and experimental techniques are covered. Lecture, lab. Prerequisites: MET 302; PHY 112.

MET 322 Engineering Evaluation of Nontraditional Welding Processes. (3) N
Theory and applications of EBW, LBW, solid-state bonding, brazing, and soldering. Lecture, lab. Prerequisites: MET 302; PHY 112.

MET 325 Electrical Power Source Analysis. (4) S
Design and operating characteristics of electrical power sources and related equipment. Equipment selection, setup, and troubleshooting procedures covered. Lecture, lab. Prerequisites: ETC 201; MET 302; PHY 112, 114.

MET 331 Design for Manufacturing I. (3) S
Introduction to design of machines and structures, with emphasis on layout design drawing. Basics of gears, cams, fasteners, springs, bearing linkages, cylindrical fits, flat pattern development, and surface finish requirements emphasized. Prerequisite: MET 313.

MET 341 Manufacturing Analysis. (3) S
Introduction to the organizational and functional requirements for effective production. Includes writing production operation plans. Prerequisite: MET 231.

MET 343 Material Processes. (4) S
Industrial processing as applied to low, medium, and high volume manufacturing. Basic and secondary processing, fastening and joining, coating, and quality control. Lecture, lab.

MET 344 Casting and Forming Processes. (3) S

Analysis of various forming processes to determine load requirements necessary for a particular metal forming operation. This information is used to select equipment and design tooling. Metal casting processes and design of castings. Introduction to powder metallurgy. Prerequisites: MET 300 and 313 or instructor approval.

MET 345 Advanced Manufacturing Processes. (3) S

Metal removal processes, emphasizing milling, grinding, turret and tracer lathe, and cutter sharpening. Application of machinability theory to practice. Production feeds, speeds, and tool wear measurement. Lecture, lab. Prerequisites: MET 231 and 300 or instructor approval.

MET 346 Numerical Control Point to Point and Continuous Path Programming. (3) N
Methods of programming, set up, and operation of numerical control machines, emphasizing lathe and mill systems. Lecture, lab. Prerequisite: MET 231.

MET 354 Mechanics of Materials. (4) F
Vectors, force systems, friction, equilibrium, centroids, and moment of inertia. Concepts of stress, strain, and stress analysis as applied to beams, columns, and combined loading. Prerequisites: MAT 170; PHY 111; nonmajor.

MET 396 Manufacturing Professional Orientation. (1) F
Career focus for Manufacturing Engineering Technology students. Familiarization with the manufacturing industry. Prerequisite: junior standing.

MET 401 Statistical Process Control. (3) S
Introduction to statistical quality control methods as applied to tolerances, process control, sampling, and reliability. Prerequisite: MAT 117 or 170.

MET 416 Applied Computer-Integrated Manufacturing. (3) F
Techniques and practices of computer-integrated manufacturing, with an emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 346 or instructor approval. *General Studies: N3.*

MET 420 Welding Metallurgy I. (4) N
Metallurgical principles applied to structural and alloy steel and aluminum weldments; laboratory emphasis on welding experiments, metallography, and mechanical testing. Lecture, lab. Prerequisites: MET 300, 302.

MET 421 Welding Metallurgy II. (3) N
Metallurgical principles as applied to stainless steel, super alloy, titanium, and other refractory metal weldments and braze joints. Prerequisite: MET 300.

MET 425 Welding Codes. (2) N
Familiarization with and application of the various codes, standards, and specifications applicable to weldments. Prerequisite: MET 302 or equivalent.

MET 432 Thermodynamics II. (3) S
Thermodynamics of mixtures. Combustion process. Applications of thermodynamics to power and refrigeration cycles. Prerequisite: ETC 340.

MET 433 Thermal Power Systems. (4) N
Analysis of gas power, vapor power, and refrigeration cycles. Components of air conditioning systems. Direct energy conversion. Psychrometry. Analysis of internal combustion engines and fluid machines. Lecture, lab. Prerequisite: MET 432 or instructor approval.

MET 434 Applied Fluid Mechanics. (3) N
Fluid statics. Basic fluid flow equations. Viscous flow in pipes and channels. Compressible flow. Applications to fluid measurement and flow in conduits. Prerequisite: ETC 340.

MET 435 Alternate Energy Sources. (3) F
Alternate energy systems, energy use and its impact on the environment, and demonstrating practical alternative energy sources to fossil fuels. Prerequisite: instructor approval.

MET 436 Turbomachinery Design. (3) N
The application of thermodynamics and fluid mechanics to the analysis of machinery design and power cycle performance predictions. Prerequisite: MET 432 or instructor approval.

MET 438 Design for Manufacturing II. (4) F
Application of mechanics in design of machine elements and structures. Use of experimental stress analysis in design evaluation. Lecture, lab. Prerequisite: AET 312 or MET 331 or instructor approval.

MET 442 Specialized Production Processes. (3) F
Nontraditional manufacturing processes, emphasizing EDM, ECM, ECG, CM, PM, HERF, EBW, and LBW. Prerequisite: MET 231.

MET 443 N/C Computer Programming. (3) F
Theory and application of computer-aided N/C languages with programming emphasis with APT and suitable postprocessors. Lecture, lab. Prerequisite: MET 346 or instructor approval.

MET 444 Production Tooling. (3) F
Fabrication and design of jigs, fixtures, and special industrial tooling related to manufacturing methods. Lecture, lab. Prerequisite: MET 345.

MET 448 Expert Systems in Manufacturing. (3) F
Introduction to expert systems through conceptual analysis, with an emphasis on manufacturing applications. Prerequisite: MET 231.

MET 451 Introduction to Robotics. (3) F
Introduction to industrial robots. Topics included are robot geometry, robot workspace, trajectory generation, robot actuators and sensors, design of end effectors, and economic justification. Prerequisite: MET 303 or instructor approval.

MET 452 Implementation of Robots in Manufacturing. (3) N
Robotic workcell design, including end effectors, parts presenters, and optimum material flow. Prerequisite: MET 451 or instructor approval.

MET 453 Robotic Applications. (3) S
Lab course utilizing robots and other automated manufacturing equipment to produce a part. Students are required to program robots, as well as interface the robots with other equipment. Prerequisite: MET 303 or 325 or instructor approval.

MET 460 Manufacturing Capstone Project I. (3) F

Small-group projects to design, evaluate and analyze components, assemblies, and systems. Lecture, lab. Prerequisite: MET 303 or instructor approval.

MET 461 Manufacturing Capstone Project II. (3) S

Small-group projects applying manufacturing techniques, with an emphasis on demonstrating state-of-the-art technology. Lecture, lab. Prerequisite: MET 460 or instructor approval.

MET 462 Capstone Project/Weldment Design. (3) S

Design of welded structures and machine elements in terms of allowable stresses, joint configurations, process capabilities, and cost analysis; welding procedures emphasized. Prerequisites: MET 302, 313.

MET 501 Statistical Quality Control Applications. (3) S

SPC problem-solving techniques for implementation in industrial setting, design and analysis of experiments. Prerequisite: instructor approval.

MET 502 Specialized Production Processes. (3) F

Specialized production processes, including lasers,; electronic beam,; abrasive and water jet; and chemical and thermal processes. Prerequisite: instructor approval.

MET 504 Applications of Production Tooling. (3) F

Design and fabrication of fixtures, jigs, templates, and specialized industrial tooling for manufacturing. Lecture, lab. Prerequisite: instructor approval.

MET 507 Manufacturing Enterprise. (3) F, S
Organization and project management of cellular manufacturing methods, including IIT and lean manufacturing. Prerequisite: instructor approval.

MET 512 Introduction to Robotics. (3) N
Introduction to industrial robots. Topics include: robot workspace, trajectory generation, robot actuators and sensors, design of end effectors, and economic justification. Application case studies. Prerequisite: MET 303 or instructor approval.

MET 513 Advanced Automation. (3) F
Analysis and design of hard and flexible automation systems. Particular attention to material handling technology. Prerequisite: instructor approval.

MET 514 N/C Computer Programming. (3) S
Point-to-point and continuous path control system programming emphasizing metal removal procedures and processes. Lecture, lab. Prerequisite: instructor approval.

MET 517 Applied Computer-Integrated Manufacturing. (3) F

Techniques and practices of computer-integrated manufacturing, with an emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 346 or instructor approval.

MET 560 Fundamentals of Security Engineering. (3) F

Definitions of threats, fundamentals of design of physical protection systems, computer modeling and analysis of security systems.

MET 571 Waste Minimization and Waste Prevention. (3) S

Life cycle analysis, selection of environmentally compatible materials, design of waste minimization equipment and operation, economics of waste minimization and prevention. Prerequisite: ETC 340 or instructor approval.

School of Agribusiness and Resource Management

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Dean

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RACCACH, SEPERICH

ASSISTANT PROFESSORS

PATTERSON, RICHARDS, STANTON

PURPOSE

The School of Agribusiness and Resource Management (SABR) provides academic programs that combine business and technology. It is the business of food and fiber production and the technology necessary to change a raw material (a commodity) or an idea into a new product or business for the world's consumers. Producing, financing, marketing, and providing food and fiber for the world amounts to more than one-half of the Earth's global economy.

Agribusiness focuses on the basics of agriculture management, marketing, and finance to provide a sustainable system for the needs of future generations. Courses in the School of Agribusiness and Resource Management are designed to prepare students for the wide range of job opportunities that exist in the agricultural industries and governmental agencies. More than 20 percent of all jobs in the United States are agribusiness related, and the industry is even more important internationally, with more than half of all jobs in emerging countries related to food and fiber products. Population increases

worldwide have led forecasters to predict that more than 11 billion food and fiber consumers will be part of the global agribusiness system by the year 2020. Forecasts also estimate that, at that time, more than 20,000 agribusiness jobs will go unfilled due to a lack of skilled professionals.

The academic programs in agribusiness are especially designed to meet the needs of the urban student who has little or no previous agriculture experience. An interest in plants, animals, or food can be the starting point for career development in agricultural industries or resource management. The undergraduate programs also provide the necessary training for students preparing to enter graduate degree programs.

Center for Agribusiness Policy Studies

The Center for Agribusiness Policy Studies (CAPS) carries out research and development relating to agribusiness, rural development, multiple use of scarce resources, and public policy. The center addresses regional, national, and international development in the context of global and competitive markets for agricultural products and inputs. For more information, contact the director of the Center for Agribusiness Policy Studies at 602/727-1583.

National Food and Agricultural Policy Project

The National Food and Agricultural Policy Project (NFAPP) constructs a 10-year baseline forecast for the fruit and vegetable produce industry and specific commodities, responds to congressional inquiries concerning policies affecting the fruit and vegetable industry, and publishes a monthly newsletter highlighting research efforts. Current areas of study include domestic and international promotion of fruits and vegetables, trade and the impact of trade agreements, crop insurance and risk management, and the use of neural network models in forecasting. For more information, contact the director of the National Food and Agricultural Policy Project at 602/727-1334.

DEGREES

The faculty in the School of Agribusiness and Resource Management offer the B.S. degree in Agribusiness with concentrations in general agribusiness (with options in food industry/food science and international agribusiness) and preveterinary medicine.

An M.S. degree in Agribusiness is also offered by the school. The program includes research and preparation of a thesis. A minimum of 30 semester hours of graduate-level course work is required for the degree. Additional details for this degree are given in the *Graduate Catalog*.

ADMISSION

The School of Agribusiness and Resource Management admits students who meet the undergraduate admission requirements of Arizona State University (see "Admission Requirements" on pages 60–62).

GRADUATION REQUIREMENTS

The completion of a minimum of 120 semester hours—including First-Year Composition, university General Studies (see pages 84–108), and the school and major requirements—leads to the B.S. degree. Note that all three General Studies awareness areas are required. Consult your advisor for an approved list of courses. An overall GPA of 2.00 is required. Of the semester hours required for graduation, a minimum of 45 semester hours must be upper division. Also see special graduation requirements under the "Preveterinary Concentration Requirements" described on this page.

First-Year Composition

Most students will meet the First-Year Composition requirement by completing ENG 101 and 102 First-Year Composition (6 semester hours). International students from non-English speaking countries may take ENG 107 and 108 English for Foreign Students (6 semester hours) instead. Students who place into ENG 105 Advanced First-Year Composition (3 semester hours) may complete the requirement with that course alone.

Prerequisite Courses

Students who wish to major in Agribusiness should take the following courses, which can also be used to meet General Studies requirements (as indicated in italics):

BIO	100	The Living World <i>SI/S2</i> 4 or BIO 181 General Biology <i>SI/S2</i> (4)
CHM	101	Introductory Chemistry <i>SI/S2</i> 4 or CHM 113 General Chemistry <i>SI/S2</i> (4)
ECN	111	Macroeconomic Principles <i>SB</i> 3
ECN	112	Microeconomic Principles <i>SB</i> 3
ENG	301	Writing for the Professions <i>L1</i> 3
MAT	210	Brief Calculus <i>N1</i> 3
		A course in statistics <i>N2</i> 3
		A course in computer literacy <i>N3</i> 3
		Total 26

General Agribusiness Concentration.

A student selecting the general agribusiness concentration may focus on general agribusiness or choose an option in food industry and food science or in international agribusiness.

Food Industry/Food Science. A student studying agribusiness could be preparing for a career in the food industry as a food technologist. Students will learn to develop the world's food products and ensure their safety through mastery of courses in food design, food manufacturing processes, and food safety.

International Agribusiness. A student studying agribusiness could be preparing for a career in international agribusiness. This option requires a mastery of courses in domestic and global economics, commodity trading and financing, international monetary exchange, and other global business subjects.

General agribusiness concentration requirements include:

SABR Core

AGB	300	Livestock Management 3
AGB	310	Crop Management 3
		Total 6

Agribusiness Concentration Core

AGB	312	Agribusiness Marketing 3
AGB	332	Agribusiness Finance I 3
AGB	342	Agribusiness Management I 3

AGB	364	Agribusiness Technology 3
AGB	390	Agribusiness Accounting 3 or ACC 230 Accounting I (3)
AGB	444	Agribusiness Analysis <i>L2</i> 3
		Total 18

An additional 15 semester hours of upper-division agribusiness courses are required for all agribusiness degrees. See the curriculum check sheet in the department for a selection of courses. Faculty advisor approval is required.

Fifteen semester hours of departmental electives are also required. See faculty or departmental advisor for approved courses.

Preveterinary Medicine Concentration.

A student studying agribusiness could also be preparing for admission to a professional veterinary school. While the student is completing the courses needed for acceptance into veterinary school he or she is broadening his or her career potential with agribusiness courses. The major reason for lack of success of a professional veterinarian is rarely bad medicine or science. It is often a lack of knowledge of how to run a business or practice. In addition, should a preveterinary student decide not to apply to a veterinary school, this major provides alternative career paths into human or veterinary pharmaceutical industries or the food industry.

Selection of this concentration permits students to complete the preveterinary requirements for entrance to professional veterinary medical schools in the United States and Canada. The curriculum permits the student to obtain some course work in agribusiness as it relates to professional practice and industry.

Preveterinary Concentration Requirements

SABR Core

AGB	300	Livestock Management 3
AGB	310	Crop Management 3
		Total 6

Preveterinary Core. Students who wish to major in Agribusiness with a preveterinary concentration should take the following courses, some of which may also be used to meet General Studies requirements (as indicated in italics).

BIO	181, 182	General Biology S1/S2	8
CHM	113	General Chemistry S1/S2	4
CHM	115	General Chemistry with Qualitative Analysis S1/S2	5
CHM	231	Elementary Organic Chemistry S1/S2 ¹	4
		or CHM 331 General Organic Chemistry, and CHM 335 General Organic Chemistry Laboratory, and CHM 332 General Organic Chemistry, and CHM 336 General Organic Chemistry Laboratory (8)	
MAT	117	College Algebra <i>NI</i>	3
		or MAT 210 Brief Calculus (3)	
MIC	206	Microbiology Laboratory S2 ²	1
MIC	220	Biology of Microorganisms ...	3
		Additional agribusiness courses	15
Total			43

¹ Both CHM 231 and 235 must be taken to secure S1 or S2 credit.

² Both MIC 205 and 206 must be taken to secure S2 credit.

Veterinary College Acceptance

Some schools of veterinary medicine will admit students who have completed the entrance requirements but have not completed their baccalaureate degree. Prevetterinary students can use the first year of veterinary school toward a B.S. in Agribusiness if that course work combined with course work taken at ASU or elsewhere meets all ASU graduation requirements. Students must receive a written statement from the Dean of the School of Agribusiness and Resource Management giving senior-in-absentia privileges.

A student is eligible to receive the B.S. degree after the Office of the Registrar receives a recommendation from the dean of the veterinary medicine school and a transcript of credit indicating the student has completed a total of 120 semester hours with a cumulative GPA of 2.00 or higher. Students should see an advisor in the School of Agribusiness and Resource Management for further information.

AGRIBUSINESS (AGB)

AGB 101 Global Resources. (3) F, S
Dependence of the quality, quantity, and cost of national food supplies on technology, marketing, and world agricultural policies.

AGB 150 Animal Science. (3) F
Comparative growth, development, and propagation of farm animals. Lecture, lab.

AGB 160 Veterinary Medicine Today. (3) S
Introduction to the role of the veterinarian as related to the fields of food supply and veterinary medicine.

AGB 250 World Food Dynamics. (3) S
Transition and development of raw agricultural commodities into nutritional food products. Emphasis given to food expansion in developing countries. *General Studies: G.*

AGB 258 International Agribusiness. (3) F
Identification and analysis of methods, problems, and future of international agribusiness operations. Emphasizes special problems associated with international agribusiness systems. *General Studies: G.*

AGB 300 Livestock Management. (3) F
Methods of managing livestock enterprises, economics, loss prevention, and marketing. Prerequisite: BIO 100.

AGB 302 Introduction to Agribusiness. (3) N
Impact of national policy and world agriculture on the cost, quantity, and quality of the U.S. food resources.

AGB 305 Cultural Diversity in Agribusiness. (3) S
Promotes the awareness and appreciation of cultural diversity within the U.S. through the study of cultural and social contributions in agribusiness of women and minorities.

AGB 310 Crop Management. (3) S
Crop production, management principles, and their application to crop growth and development.

AGB 312 Agribusiness Marketing. (3) F
Marketing arrangements for agricultural products. Prerequisite: ECN 111.

AGB 332 Agribusiness Finance. (3) F
Agribusiness investment management and financial institutions that serve agriculture. Prerequisite: ACC 230 or AGB 390.

AGB 335 Establishing an Agribusiness. (3) F
Establishing entrepreneurship in agriculture, including legal status, financing, planning, marketing, and management.

AGB 342 Agribusiness Management I. (3) F
Principles of management, including planning, organizing, integrating, measuring, and developing people in agribusiness organizations.

AGB 353 Wildlife and Domestic Animal Nutrition. (3) S
Feedstuffs, feeding standards, and their application in meeting nutritional needs of animals producing food and fiber.

AGB 364 Agribusiness Technology. (3) F
Biotechnology and other technologies of the three sectors of agribusiness, including input, production, and commodity and food processing and distribution. Prerequisite: BIO 100.

AGB 368 Food Processing. (3) N
An introduction to processed food quality assurance, statistical sampling, and inspection procedures. Prerequisite: AGB 364.

AGB 369 Food Analysis. (3) N
Processing control and scientific instrumentation used in food quality assurance laboratories. Lecture, lab. Prerequisite: CHM 101.

AGB 390 Agribusiness Accounting. (3) N
Introduction to managerial accounting for agribusiness using computerized accounting systems for the development of financial data required for management decision making. Prerequisite: computer literacy.

AGB 402 Agricultural Cooperatives. (3) N
Organization, operation, and management of agricultural cooperatives.

AGB 404 Sales and Merchandising in Agribusiness. (3) SS
The principles and techniques of selling and commodity merchandising in the agricultural industries.

AGB 412 Agricultural Commodities. (3) F
Trading on futures markets. Emphasis on the hedging practices with grains and meats. Prerequisite: AGB 312 or 1 marketing or finance course.

AGB 413 Agribusiness Finance II. (3) S
Advanced agribusiness investment management and financial practices.

AGB 414 Advanced Commodity Trading. (3) N
Advanced analysis of trading techniques, with emphasis on hedging in the futures markets. Prerequisite: AGB 412 or 413.

AGB 423 Food and Industrial Microbiology. (3) N
Food- and industrial-related microorganisms; deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: MIC 205 or 206 or instructor approval.

AGB 424 Food and Industrial Fermentations. (4) N
Management, manipulation, and metabolic activities of industrial microbial cultures and their processes. Lecture, lab. Prerequisite: AGB 423 or instructor approval.

AGB 425 Food Safety. (3) N
Control, prevention, and prediction of microbial and chemical food-borne diseases. Prerequisite: AGB 423 or instructor approval.

AGB 426 Food Chemistry. (4) N
The biochemical and chemical interactions that occur in raw and processed foods. Lecture, lab. Prerequisites: CHM 115, 231.

AGB 428 Comparative Nutrition. (3) N
Effects of nutrition on animal systems and metabolic functions. Prerequisite: CHM 231.

AGB 433 Diseases of Domestic Animals. (3) S
Control and prevention of infectious and non-infectious diseases of domestic animals. Prerequisite: MIC 206 or 220.

AGB 435 Animal Physiology I. (3) N
Control and function of the nervous, muscular, cardiovascular, respiratory, and renal systems of domestic animals. Prerequisites: BIO 181; CHM 113.

AGB 439 Veterinary Practices. (3) F, S
Observation of and participation in veterinary medicine and surgery supervised by local veterinarians. Prerequisite: advanced preveterinary student.

AGB 440 Food Marketing. (3) S
Food processing, packaging, distribution, market research, new food research and development, and social implications. Prerequisite: AGB 312.

AGB 443 Agribusiness Management II. (3) S
Principles of human resource management, with emphasis on the special problems of agribusiness systems.

AGB 444 Agribusiness Analysis. (3) S

Analysis of agribusiness firm decisions in the ecological, economic, social, and political environments. Special emphasis on ethical issues surrounding food production and consumption. *General Studies: L2.*

AGB 450 International Agricultural Development. (3) S

Transition of developing countries from subsistence to modern agriculture. Technology transfer and food improvement programs are emphasized. *General Studies: G.*

AGB 453 World Agricultural Resources. (3) SS

World production and consumption of agricultural products, international relationships, and agencies concerned with world agricultural development problems. *General Studies: G.*

AGB 454 International Agricultural Trade.

(3) S

Dimensions, locations, mix, methods, and changes of international trade in agricultural products. Prerequisite: AGB 312.

AGB 455 Agricultural Marketing Channels.

(3) F

Operational stages of agricultural commodities in normal distribution systems and implementation of marketing strategies. Prerequisite: AGB 312.

AGB 460 Agribusiness Management Systems.

(4) S

The development and use of decision support systems for agribusiness management and marketing. Lecture, lab.

AGB 474 Agribusiness Policy and Government Regulations. (3) F

The development and implementation of government food, drug, pesticide, and farm policies and regulations that affect the management of agribusiness.

AGB 490 Recent Advances in Agribusiness. (1) F, S

Reports and discussions of current topics and problems associated with agribusiness. May be repeated for credit.

AGB 505 Commodity Analysis. (3) N

Analysis of commodity markets. Prerequisite: 1 year of economics or marketing.

AGB 508 Advanced Agribusiness Marketing. (3) F

Theory and analysis of marketing farm commodities, risks, and the effect of future trading on cash prices.

AGB 509 Advanced Agribusiness Marketing Channels. (3) S

Analysis of agribusiness market channel systems. Formulation of marketing strategies.

AGB 510 Advanced Agribusiness Management I. (3) F

Managing and financing agribusiness emphasizing environmental and economic sustainability in a global economy undergoing radical change. Prerequisite: AGB 342.

AGB 511 Advanced Agribusiness Management II. (3) S

Analysis of organization behavior, change, and resource requirements within agribusiness systems. Prerequisite: AGB 342.

AGB 512 Food Industry Management. (3) S

Operations and management of food-processing factories, food distribution centers, and retail food-handling firms.

AGB 516 International Agricultural Techniques. (3) N

Coordination of production and marketing techniques to consumption objectives with agricultural products in foreign countries.

AGB 518 World Agricultural Development.

(3) N

Factors that influence production, processing, and marketing of agricultural products in developing countries.

AGB 520 Advanced Agribusiness Analysis I. (4) S

Vertical integration and differentiation in food and agricultural industries. Lecture, recitation. Prerequisite: AGB 508 or 510.

AGB 521 Agribusiness Coordination. (4) N

Organizational alternatives for agribusiness, with emphasis on cooperatives and trading companies. Lecture, recitation. Prerequisite: AGB 508 or 510.

AGB 525 Advanced Agribusiness Management Systems. (3) N

Development and use of decision support systems for agribusiness management decision making. Prerequisite: AGB 510.

AGB 527 Agribusiness Research Methods.

(3) N

The use of model building, hypothesis testing, and empirical analysis in solving agribusiness problems. Prerequisite: basic statistics course.

AGB 530 Advanced Agribusiness Policy.

(3) N

Policy-making history, structure, and process. Prerequisite: AGB 342.

AGB 532 Advanced Agribusiness Finance.

(3) F

Financial management of agribusiness firms; agribusiness financial analysis, investment analysis, agricultural risk management, and introduction to agricultural financial intermediaries. Prerequisites: computer literacy and 1 finance course or instructor approval.

AGB 535 Advanced Food Science. (3) N

Chemical and physical nature of processed foods. Emphasis on food product development. Prerequisite: AGB 364.

ASU East Map

ASU East Directory

For the "ASU Main Directory," see pages 528–530.
For the "ASU West Directory," see page 537.
Unless otherwise stated, the area code is 602.

Academic Units

Agribusiness and Resource Management, School of	CNTR 20	727–1585
East College	CNTR 30	727–1028
Technology and Applied Sciences, College of	CNTR 10	727–1874
Aeronautical Management Technology, Department of	SIM Bldg–201	727–1775
Electronics and Computer Engineering Technology, Department of	ELAB–LAB	727–1191
	CLRB 157	727–1137
Information and Management Technology, Department of	CNTR 92	727–1781
Manufacturing and Aeronautical Engineering Technology, Department of	SIM Bldg–295B	727–1584

Administrative

General Information	CNTR Garden Level	727–3278
American Indian Programs	CNTR 52	727–1161
Bookstore	CNTR 102	727–1146
Campus Union	CU	727–1116
Cashiering Services	CNTR 81	727–1081
Computer Commons, ASU East	CNTR 150	727–1184
Copy Center	CNTR 147	727–1175
Educational Opportunity Center	CNTR Garden Level	727–1153
Housing, Williams Campus	WCHO Bldg. 7	988–9160
Library Services	CNTR 110	727–1037
OASIS	CNTR ASU Sun Cards Garden Level	727–3278
Office of the Registrar		
Student Business Services		
Student Financial Assistance		
Undergraduate Admissions		
Williams Campus Parking Decals		
Physical Education Center, Williams Campus	WCFC Bldg.	988–8400
Provost, Office of the	CNTR 30	727–1028
Student Health Services	Veterans Administration Clinic	222–6568
Vice Provost, Academic Programs and Services	CNTR 30	727–1028

ASU East Administrative and Academic Personnel

Academic Administration

Provost	Charles E. Backus
Vice Provost, Academic Programs and Dean, East College	David E. Schwalm
Associate Vice President, Student Affairs	Leon G. Shell
Dean, College of Technology and Applied Sciences	Albert L. McHenry
Associate Dean, College of Technology and Applied Sciences	Lakshmi V. Munukutla
Interim Assistant Dean, College of Technology and Applied Sciences	Dale E. Palmgren
Chair, Department of Aeronautical Management Technology	William K. McCurry
Chair, Department of Electronics and Computer Engineering Technology	Robert W. Nowlin
Chair, Department of Information and Management Technology	Thomas E. Schildgen
Chair, Department of Manufacturing and Aeronautical Engineering Technology	Dale E. Palmgren
Project Director, International Projects Institute	Gary M. Grossman
Dean, School of Agribusiness and Resource Management	Raymond A. Marquardt
Assistant Dean, School of Agribusiness and Resource Management	Philip G. Stiles
Director, Academic Services	Vinette Cowart
Director, Administrative Services	Terry C. Isaacson
Director, American Indian Programs	Marigold L. Linton
Director, Campus Life Services	Gary L. Kleemann
Director, Center for Agribusiness Policy Studies	Eric P. Thor
Director, Institutional Advancement	Wanda L. Kay
Director, Library Services	Charles W. Brownson
Director, Research and Sponsored Projects	Jean N. Humphries

ASU East Faculty and Academic Professionals

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B

Barchilon, Marian G. (1989), Associate Professor of Information and Management Technology; B.S., State University of New York, Binghamton; M.S., Northeastern University

Barrett, Thomas W. (1950), Professor Emeritus of Agribusiness and Resource Management; B.S., Brigham Young University; M.S., Ph.D., Cornell University

Biekert, Russell G. (1993), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Southern Illinois University; Ed.D., Arizona State University

Borrmann, David W. (1996), Lecturer of Aeronautical Management Technology; B.S., Drexel University; M.A., Arizona State University

Brown, Walter C. (1966), Professor Emeritus of Technology; B.S., Northwest Missouri State University; M.Ed., Ed.D., University of Missouri, Columbia

Brownson, Charles W. (1980), Librarian, ASU East Library Services; Director, ASU East Library Services; B.A., South Dakota State University; M.F.A., University of Oregon; M.L.S., University of California, Berkeley

Burdette, Walter E. (1956), Professor Emeritus of Technology; B.S., M.S., Kansas State College of Pittsburg; Ed.D., University of Missouri, Columbia

Burk, Karl W. (1949), Professor Emeritus of Technology; B.A., M.A., Arizona State University; Ed.D., Bradley University

C

Carlsen, Paul A. (1978), Professor Emeritus of Technology; B.A.E., M.N.S., Ed.D., Arizona State University

Cavaliere, William A. (1946), Professor Emeritus of Technology; B.A., M.A., Arizona State University

Chalquest, Richard R. (1971), Professor of Agribusiness and Resource Management; B.S., D.V.M., Washington State University; M.S., Ph.D., Cornell University

Collins, Donald G. (1989), Professor of Manufacturing and Aeronautical Engineering Technology; B.Arch., Virginia Polytechnic Institute and State University; M.S., Ph.D., University of Illinois

Cox, Frank E. (1972), Professor Emeritus of Technology; B.S.M.E., Purdue University; M.S.E., Arizona State University

D

Daneke, Gregory A. (1982), Professor of Technology and Applied Sciences; B.A., M.A., Brigham Young University; Ph.D., University of California, Santa Barbara

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Fordemwalt, James N. (1987), Associate Professor of Electronics and Computer Engineering Technology; B.S., M.S., University of Arizona; Ph.D., Iowa State University of Science and Technology

G

Gesell, Laurence E. (1984), Professor of Aeronautical Management Technology; B.A., Upper Iowa University; M.P.A., University of San Francisco; Ph.D., Arizona State University

Gordon, Richard S. (1980), Professor of Agribusiness and Resource Management; A.B., University of Rochester; M.A., Harvard University; Ph.D., Massachusetts Institute of Technology

Grossman, Gary M. (1994), Associate Professor of Information and Management Technology; B.A., University of the Pacific; M.S., Ph.D., Purdue University

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Hefner, Stephen P. (1973), Instructional Professional of Agribusiness and Resource Management; Academic Professional, School of Agribusiness and Resource Management; B.S., Illinois State University; M.S., Arizona State University

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Hirata, Ernest T. (1974), Associate Professor of Information and Management Technology; B.A., San Diego State College; Ed.D., Arizona State University

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Jackson, Andrew E. (1995), Assistant Professor of Aeronautical Management Technology; B.A., University of Louisville; M.B.A., Embry-Riddle Aeronautical University; Ph.D., University of Central Florida

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Kagan, Albert (1992), Professor of Agribusiness and Environmental Resources; B.S., M.S., Ph.D., Iowa State University of Science and Technology

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L

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M

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Maisel, James E. (1985), Professor of Electronics and Computer Engineering Technology; B.Eng.Sci., B.E.E., Fenn College; M.S.E.E., Ohio State University

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McBrien, Edward F. (1986), Professor Emeritus of Electronic/Computer Technology; B.S.E., Fenn College; M.S.E.E., Cleveland State University

McCurry, William K. (1995), Associate Professor of Aeronautical Management Technology; Chair, Department of Aeronautical Management Technology; B.S., Purdue University; M.S., Troy State University; Ph.D., University of Kansas

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R

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Richardson, Grant L. (1953), Professor Emeritus of Agribusiness and Resource Management; B.S., M.S., University of Arizona; Ph.D., Oregon State University

Robinson, Daniel O. (1950), Professor Emeritus of Agribusiness and Resource Management; A.B., Brigham Young University; M.S., University of Arizona; Ph.D., Ohio State University

Roe, Keith B. (1979), Professor Emeritus of Technology; B.S., Wisconsin State College; M.A., University of Michigan

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Rook, Fern H. (1969), Professor Emeritus of Technology; B.A., University of Colorado; M.A., Arizona State University

Roper, Devon J. (1966), Professor Emeritus of Aeronautical Technology; B.S., Utah State University; M.S., Arizona State University

S

Salmirs, Seymour (1981), Professor Emeritus of Technology; B.A.E., M.S.A.E., Georgia Institute of Technology

Schildgen, Thomas E. (1981), Professor of Information and Management Technology; Chair, Department of Information and Management Technology; B.S., M.S., Illinois State University; Ed.D., Northern Arizona University

Schmidt, Peter A. (1978), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., Northern Illinois University; M.A., Ed.D., Arizona State University

Schwalm, David E. (1986), Associate Professor of English; Dean of East College, Vice Provost ASUE; B.A., Carlton College; M.S., Ph.D., University of Chicago

Schoen, Robert A. (1966), Professor Emeritus of Technology; B.S., M.S., Arizona State University

Seperich, George J. (1976), Associate Professor of Agribusiness and Resource Management; B.S., Loyola University, Chicago; M.S., Ph.D., Michigan State University

Sheller, Don (1986), Professor Emeritus of Manufacturing Technology; B.M.E., Ohio State University; M.S., Arizona State University

Spence, Gary L. (1994), Lecturer of Aeronautical Management Technology; B.S., University of West Florida; M.S., Embry-Riddle Aeronautical University

Stanton, Julie V. (1996), Assistant Professor of Agribusiness; B.A., Georgetown University; Ph.D., University of Maryland, College Park

Stiles, Philip G. (1969), Professor of Agribusiness and Resource Management; B.S., University of Arkansas; M.S., University of Kentucky; Ph.D., Michigan State University

Sundararajan, Rajeswari (1996), Assistant Professor of Electronics and Computer Engineering Technology; B.S., University of Madras (India); M.S., Indian Institute of Science (India); Ph.D., Arizona State University

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Wood, Billy G. (1977), Associate Professor of Electronics and Computer Engineering Technology; A.B., University of California; B.S., Eastern Illinois University; M.S., University of Arizona

Z

Zeng, Guoliang (1991), Associate Professor of Electronics and Computer Engineering Technology; B.S., Chengdu Telecommunication Institute (China); M.S., University of California, San Diego; M.N.S., Ph.D., Arizona State University



East Campus students Deborah Syden (right), Eric Green (center), and LaRae Kendrick take a break in the Oasis, the new student lounge at ASU East.

Tim Trumble photo

ASU Main Faculty and Academic Professionals

The faculty and academic professionals listed are involved in undergraduate and graduate instruction and research. The year of first appointment follows the name. Emeriti are included.

A

- Aannestad, Per** (1975), Associate Professor of Physics and Astronomy; B.S., University of Oslo (Norway); Ph.D., University of California, Berkeley
- Abele, Deborah** (1990), Faculty Associate of Planning and Landscape Architecture; B.A., Vassar College
- Aberle, James T.** (1989), Associate Professor of Electrical Engineering; B.S., M.S., Polytechnic Institute of New York; Ph.D., University of Massachusetts, Amherst
- Abraham, Willard** (1953), Professor Emeritus of Special Education; B.S., Illinois Institute of Technology; M.Ed., Chicago Teachers College; Ph.D., Northwestern University
- Abston, Deborah** (1990), Associate Librarian; Access Services, Hayden Reference Service; B.S., M.S.L.S., Wayne State University
- Acevedo, Roberto M.** (1964), Professor Emeritus of Spanish; B.A., University of California, Berkeley; M.A., Ph.D., University of Arizona
- Acharya, Raghunath** (1976), Associate Professor of Physics and Astronomy; B.Sc., M.Sc., University of Delhi (India); Ph.D., University of Rochester
- Acker, Barbara** (1991), Associate Professor of Theatre; B.F.A., University of Texas, Austin; M.A., Case Western Reserve University; Ph.D., Wayne State University
- Acker, William J.** (1970), Professor Emeritus of Geography; B.S., Purdue University; M.S., University of Kansas; M.A., Ph.D., Syracuse University
- Adams, Donna** (1983), Associate Professor of Nursing; B.S.N., University of Missouri, Columbia; M.S., Arizona State University; D.N.Sc., University of San Diego
- Adams, Karen L.** (1984), Associate Professor of English; B.A., M.A., Ph.D., University of Michigan
- Adelson, Roger D.** (1974), Professor of History; B.A., George Washington University; B.Litt., University of Oxford (England); M.A., Ph.D., Washington University
- Agadjanian, Victor** (1995), Assistant Professor of Sociology; B.A., Moscow State University; M.S., Ph.D., University of Southern California
- Aguiar, John L.** (1976), Associate Professor of Anthropology; B.A., University of California, Los Angeles; M.A., California State University, Los Angeles; Ph.D., University of California, San Diego
- Ahn, Seung C.** (1990), Associate Professor of Economics; B.A., Sogang University (Korea); M.A., Ph.D., Michigan State University
- Aiken, Leona S.** (1985), Professor of Psychology; B.S., Virginia Commonwealth University; M.S., Ph.D., Purdue University
- Akins, William H.** (1975), Professor Emeritus of Theatre; B.A., Duke University; M.A., Ph.D., University of Denver
- Alarcon, Ricardo O.** (1989), Associate Professor of Physics and Astronomy; B.S., M.S., University of Chile (Chile); Ph.D., Ohio University
- Alberts, Jess K.** (1989), Associate Professor of Communication; Chair, Department of Communication; B.S.Ed., M.A., Abilene Christian University; Ph.D., University of Texas, Austin
- Alcock, John** (1972), Regents' Professor of Biology; B.A., Amherst College; Ph.D., Harvard University
- Alcorn, Marianne S.** (1981), Law Librarian, Reference; B.A., University of Washington; M.L.S., University of Southern California
- Aldama, Arturo** (1996), Assistant Professor of Chicana and Chicano Studies; B.A., Evergreen State University; M.A., Ph.D., University of California, Berkeley
- Aldrich, Frank T.** (1969), Associate Professor of Geography; B.A., University of Texas, Austin; M.S., Ph.D., Oregon State University
- Alexander, Robert J.** (1975), Professor of German; B.A., Macalester College; M.A., Ph.D., University of Wisconsin, Madison
- Alford, Terry L.** (1993), Assistant Professor of Engineering; B.S., M.S., North Carolina State University, Raleigh; Ph.D., Cornell University
- Alisky, Marvin** (1957), Professor Emeritus of Political Science; B.A., M.A., Ph.D., University of Texas, Austin
- Allee, David R.** (1991), Associate Professor of Electrical Engineering; B.S.E.E., University of Cincinnati; M.S.E.E., Ph.D., Stanford University
- Allen, Craig M.** (1991), Associate Professor of Journalism and Telecommunication; B.A., Linfield College; M.S., University of Oregon; Ph.D., Ohio University
- Allen, James P.** (1989), Associate Professor of Chemistry and Biochemistry; B.S., Saint Joseph's University; M.S., Ph.D., University of Illinois
- Allison, Maria T.** (1984), Professor of Recreation Management and Tourism; B.S., M.S., University of New Mexico; Ph.D., University of Illinois
- Alozie, Nicholas O.** (1991), Associate Professor of Public Affairs; B.A., M.P.A., Texas Southern University; M.A., Ph.D., University of Texas, Dallas

- Allstot, David J.** (1998), Professor of Electrical Engineering; B.S.E.S., University of Portland; M.S.E.E., Oregon State University; Ph.D., University of California, Berkeley
- Alpers, Rojann** (1995), Assistant Professor of Nursing; B.S.N., M.S., Arizona State University; Ph.D., University of Iowa
- Alquist, Lewis R.** (1984), Professor of Art; B.F.A., Florida Atlantic University; M.F.A., Cranbrook Academy of Art
- Altheide, David L.** (1973), Regents' Professor of Justice Studies; B.A., Central Washington State College; M.A., University of Washington; Ph.D., University of California, San Diego
- Alvarado, Ronald H.** (1974), Professor Emeritus of Biology; B.A., University of California, Riverside; M.S., Ph.D., Washington State University
- Alvarez, Robert R. Jr.** (1989), Associate Professor of Anthropology; B.A., Northern Arizona University; M.A., San Diego State University; M.A., Ph.D., Stanford University
- Ames, James G.** (1985), Senior Research Associate, Manufacturing Institute; B.S., San Diego State University
- Amin, Omar M.** (1994), Adjunct Faculty of Biology; B.S., M.S., Cairo University (Egypt); Ph.D. Arizona State University
- Amundson, Susan** (1995), Assistant Professor of Accountancy and Information Management; B.S., Moorhead State University; M.B.A., College of St. Thomas; Ph.D., University of Minnesota
- Anderson, Douglas A.** (1979), Cronkite Endowment Board of Trustees Professor of Journalism and Telecommunication; Director, Walter Cronkite School of Journalism and Telecommunication; B.A., Hastings College; M.S., Kearney State College; Ph.D., Southern Illinois University, Carbondale
- Anderson, Edward F.** (1993), Adjunct Professor of Plant Biology; B.A., Pomona College; M.A., Ph.D., Claremont Graduate School and Rancho Santa Ana Botanic Garden
- Anderson, Gary** (1975), Associate Professor of Reading and Library Science; Academic Program Coordinator, Reading and Library Science; B.S., M.Ed., Edinboro State College; Ph.D., University of Pittsburgh
- Anderson, James R.** (1984), Associate Research Scientist of Chemistry and Biochemistry; B.A., Williams College; Ph.D., California Institute of Technology
- Anderson, Karen** (1987), Faculty Associate of Nursing; B.S., M.S., Arizona State University
- Anderson, Marcia L.** (1986), Librarian; Head, Acquisitions/Bibliographic Records; B.A., University of Michigan; M.L.S., Wayne State University
- Anderson-Rowland, Mary R.** (1974), Associate Professor of Industrial and Management Systems Engineering; Associate Dean, Student Affairs and Special Programs; B.A., Hope College; M.S., Ph.D., University of Iowa
- Anderson, Melvin S.** (1967), Professor Emeritus of Finance; B.S., M.S., Oklahoma State University; Ed.D., University of Arkansas
- Andress, Barbara L.** (1972), Professor Emeritus of Music; B.A., M.A., Arizona State University
- Andrews, Johnester, SSG.** (1996), Instructor of Military Science
- Angell, C. Austen** (1989), Regents' Professor of Chemistry and Biochemistry; B.S., M.S., Melbourne University (Australia); Ph.D., University of London (England)
- Appleton, Nicholas R.** (1972), Professor of Educational Policy Studies; Director, Division of Curriculum and Instruction; Interim Associate Dean for Teacher Education; B.A., San Francisco State University; M.A., California State University, Northridge; Ed.D., University of Massachusetts, Amherst
- Aranda, Luis** (1975), Associate Professor of Legal and Ethical Studies; B.M., M.Ed., University of Arizona; J.D., Arizona State University
- Arciniega, G. Miguel** (1979), Associate Professor of Counselor Education; B.S., M.A., New Mexico State University; Ph.D., University of Arizona
- Arias, M. Beatriz** (1989), Associate Professor of Multicultural Education; B.A., M.A., Occidental College; Ph.D., Stanford University
- Armbruster, Charlotte** (1997), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University
- Armbruster, Dieter** (1989), Professor of Mathematics; Associate Chair, Graduate Studies; Abitur, Zeppelin Gymnasium (Germany); Diplom, Ph.D., University of Tübingen (Germany)
- Armendt, Brad** (1989), Associate Professor of Philosophy; Chair, Department of Philosophy; B.A., Rice University; Ph.D., University of Illinois, Chicago
- Armstrong, Robert L.** (1967), Professor Emeritus of Secondary Education; B.A., State Teachers College of Iowa; M.S., University of Iowa; Ed.D., University of Arizona
- Arner, Douglas G.** (1959), Professor Emeritus of Philosophy; B.S., Creighton University; M.A., Ph.D., University of Michigan
- Arnold, William E.** (1973), Professor of Communication; Director, Gerontology Program; B.S., M.A., Northern Illinois University; Ph.D., Pennsylvania State University
- Arntzen, Charles J.** (1997), Adjunct Professor of Plant Biology; B.S., M.S., University of Minnesota; Ph.D., Purdue University
- Aronson, Jerome M.** (1966), Professor Emeritus of Plant Biology; B.A., Ph.D., University of California, Berkeley
- Arreola, Daniel** (1990), Professor of Geography; B.A., University of California, Los Angeles; M.A., California State University, Hayward; Ph.D., University of California, Los Angeles
- Arrowsmith, Ramon** (1995), Assistant Professor of Geology; B.A., Whittier College; Ph.D., Stanford University
- Arterian, Hannah** (1979), Professor of Law; Associate Dean, College of Law; B.A., Elmira College; J.D., University of Iowa
- Ashcraft, Robert F.** (1995), Assistant Professor of Recreation Management and Tourism; B.A., University of Arizona; M.A., Northern Arizona University; Ph.D., Arizona State University
- Ashcroft, Edward A.** (1988), Professor of Computer Science and Engineering; B.A., Cantab (England); Ph.D., Imperial College of London (England)
- Ashe, Robert W.** (1955), Professor Emeritus of Education; A.B., M.A., Arizona State University; Ed.D., University of Southern California
- Ashford, Jose B.** (1984), Professor of Social Work; B.A., Loyola University, New Orleans; M.S.W., Ohio State University; Ph.D., Bowling Green State University
- Ashforth, Blake** (1996), Associate Professor of Management; B.Comm., Ph.D., University of Toronto (Canada)
- Ashley, Richard** (1981), Associate Professor of Political Science; B.A., University of California, Santa Barbara; M.A., Ph.D., Massachusetts Institute of Technology
- Atsumi, Takayori P.** (1968), Professor of Music; B.F.A., Kunitachi Music College (Japan); M.M., New England Conservatory of Music
- Aulerich, Christopher E.** (1989), Faculty Associate, Del E. Webb School of Construction
- Autore, Donald D.** (1959), Professor Emeritus of Technology; B.S.E., University of Michigan; M.S.E., Arizona State University

Ax, Leland S. (1959), Professor Emeritus of Engineering; B.S.E., B.S.R.E., Tri-State College; M.S., Kansas State College

Axelrod, Morris (1972), Professor Emeritus of Sociology; B.A., Ph.D., University of Michigan

Axford, Roger W. (1975), Professor Emeritus of Secondary Education; B.A., Nebraska Wesleyan University; M.A., Ph.D., University of Chicago

Ayres, James E. (1982), Adjunct Professor of Anthropology; B.A., Fresno State University; M.A., University of Arizona

B

Backhaus, Ralph A. (1977), Professor of Plant Biology; B.S., Rutgers, The State University of New Jersey; M.S., Ph.D., University of California, Davis

Backus, Charles E. (1968), Professor of Electrical Engineering; Provost, ASU East; B.S.M.E., Ohio University; M.S., Ph.D., University of Arizona

Bacon, Catherine K. (1990), Clinical Associate Professor of Speech and Hearing Science; B.A., University of California, Santa Barbara; M.A., University of Minnesota

Bacon, Sid P. (1988), Professor of Speech and Hearing Science; B.G.S., M.A., University of Kansas; Ph.D., University of Minnesota, Twin Cities

Bacon, Thomas (1993), Professor of Music; B.S., Oakland University

Badger, William W. (1985), Professor of Construction; Director, Del E. Webb School of Construction; B.S.M.E., Auburn University; M.S.C.E., Oklahoma State University; Ph.D., Iowa State University

Baer, Steven M. (1988), Associate Professor of Mathematics; B.S., M.S., Ph.D., University of Illinois

Bagwell, Marilyn (1972), Associate Professor of Nursing; B.S.N., University of California, Los Angeles; M.A., Arizona State University; Ph.D., Texas Woman's University

Bahr, Donald M. (1967), Professor of Anthropology; A.B., M.A., Ph.D., Harvard University

Baier, Leslie (1990), Adjunct Faculty of Microbiology; B.A., Lawrence University; Ph.D., University of Michigan

Bailey, James E. (1974), Professor of Industrial and Management Systems Engineering; B.S.I.E., M.S.I.E., Ph.D., Wayne State University

Baker, Dale R. (1989), Associate Professor of Secondary Education; B.A., University of Oklahoma; M.A.T., Trenton State College; Ed.D., Rutgers, The State University

Baker, Aaron (1992), Assistant Professor of Interdisciplinary Humanities; B.A., Hobart College; M.A., Ph.D., Indiana University

Baker, Dwayne A. (1997), Assistant Professor of Recreation Management and Tourism; B.S., University of Saskatchewan (Canada); M.S., University of Illinois; Ph.D., Texas A&M University

Baker, Georgianne R. (1971), Professor Emeritus of Family Resources and Human Development; B.S., Marygrove College; M.S., Ohio State University; Ph.D., Michigan State University

Baker, Lawrence A. (1992), Assistant Professor of Civil and Environmental Engineering; B.S., Pennsylvania State University; M.S., Utah State University; Ph.D., University of Florida

Balanis, Constantine A. (1983), Regents' Professor of Electrical Engineering; Director, Telecommunications Research Center; B.S.E.E., Virginia Polytechnic Institute and State University; M.E.E., University of Virginia; Ph.D., Ohio State University

Balasubramanian, Krishnan (1983), Professor of Chemistry and Biochemistry; M.Sc., Birla Institute of Technology Science (India); M.A., Ph.D., Johns Hopkins University

Balcasar, Hector (1989), Associate Professor of Family Resources and Human Development; B.S., Iberoamericana University (Mexico); M.S., Ph.D., Cornell University

Baldini, Pier Raimondo (1978), Professor of Italian; B.A., San Francisco State University; M.A., University of British Columbia (Canada); Ph.D., University of California, Los Angeles

Ballew, Tad (1998), Assistant Professor of Interdisciplinary Humanities; B.A., University of California, Santa Barbara; M.A., Hunter College, City University of New York

Balling, Robert C. (1987), Associate Professor of Geography; Director, Climatology Laboratory; A.B., Wittenberg University; M.A., Bowling Green State University; Ph.D., University of Oklahoma

Ballon-Aguirre, Enrique (1992), Professor of Spanish; Bachiller en Letras, Bachiller en Derecho, University of Arequipa (Peru); Doctor en Literatura, The National University of San Marcos (Peru); Doctorat en Études Iberiques, University of Paris III (France)

Bantz, Charles R. (1986), Professor of Communication; Vice Provost, Office of the Senior Vice President and Provost; B.S., M.A., University of Minnesota, Twin Cities; Ph.D., Ohio State University

Barcelo, Hélène (1990), Associate Professor of Mathematics; Ms.C., University of Quebec (Canada); Ph.D., University of California, San Diego

Barchilon, Marian G. (1989), Associate Professor of Information and Management Technology; B.S., State University of New York, Binghamton; M.S., Northeastern University

Bardewyck, Loretta A. (1957), Professor Emeritus of Nursing; Dean Emeritus, College of Nursing; P.H.N., B.S., University of Minnesota, Twin Cities; M.S., Cornell University

Bardrick, Richard A. (1956), Professor Emeritus of Psychology; A.B., Ph.D., University of California, Los Angeles

Barker, David (1983), Professor of Theatre; B.S.E., Duquesne University; M.F.A., Rutgers, The State University

Barkley, Margaret V. (1963), Professor Emeritus of Family Resources and Human Development; B.S., Millikin University; M.S., Ed.D., University of Illinois

Barkson, Joseph A. (1958), Professor Emeritus of Engineering; B.S.E.E., University of Michigan; M.S., Ph.D., University of Illinois

Barlow, Richard B. (1964), Professor Emeritus of History; B.A., M.A., Ph.D., University of Pennsylvania

Barnard, John P. (1991), Associate Learning Resources Specialist, Library Instruction, Systems, and Technology; B.S., State University of New York; M.Ed., Arizona State University

Barnes, Andrew (1996), Associate Professor of History; B.A., Wesleyan University; M.A., Ph.D., Princeton University

Barona, Andrés (1986), Professor of Education; B.S., M.Ed., Texas A&M University; Ph.D., University of Texas, Austin

Barone, Thomas (1990), Professor of Curriculum and Instruction and Educational Leadership and Policy Studies; B.A., Loyola University, New Orleans; M.A., University of New Orleans; Ed.D., Stanford University

Barrera, Manuel (1977), Professor of Psychology; B.S., University of Wisconsin, Eau Claire; M.A., Ph.D., University of Oregon

Barrett, Marianne (1994), Assistant Professor of Journalism and Telecommunication; B.S., Kutztown University; M.P.S., Syracuse University; Ph.D., Michigan State University

Barrett, Thomas W. (1950), Professor Emeritus of Agribusiness and Resource Management; B.S., Brigham Young University; M.S., Ph.D., Cornell University

Barroll-Aschaffenburg, Rayna (1980), Associate Professor of Music; B.M., University of Texas; D.M.A., University of Maryland, College Park

- Bartels, Robert D.** (1981), Professor of Law; B.A., University of Michigan; J.D., Stanford University
- Barto, Michelle L.** (1996), Instructor of Speech and Hearing Science; B.A., Arizona State University
- Barton, C. Michael** (1987), Associate Professor, Anthropology; Collections Administrator; B.A., University of Kansas; M.A., Ph.D., University of Arizona
- Bartz, Donna R.** (1968), Professor of Theatre; B.F.A., M.A., University of Colorado
- Bashford, Howard H.** (1997), Associate Professor of Construction; B.S., M.S., University of Wyoming; Ph.D., Brigham Young University
- Batalden, Stephen K.** (1976), Professor of History; Coordinator of Russian, East European Studies Consortium; B.A., Augsburg College; M.A., Ph.D., University of Minnesota
- Bates, Dawn W.** (1989), Associate Professor of English; B.A., Ph.D., University of Washington
- Bates, Mary** (1996), Professor of Art; B.F.A., Colorado State University; M.F.A., Indiana University
- Baty, Wayne M.** (1962), Professor Emeritus of General Business; B.S., Southwest Missouri State College; M.A., Northwestern University; Ph.D., University of Southern California
- Bauer, Ernst** (1990), Distinguished Research Professor of Physics and Astronomy; Diplom., Dr. rer. nat., University of Munich (Germany)
- Baxter, Harry R.** (1982), Professor Emeritus of Engineering; B.A., New York University; M.B.A., Fairleigh Dickinson University; M.Tech., Arizona State University
- Bazzi, Rida** (1996), Assistant Professor of Computer Science and Engineering; B.E., American University of Beirut (Lebanon); M.S., Ph.D., Georgia Institute of Technology
- Beakley, George C. Jr.** (1956), Professor Emeritus of Engineering; Dean Emeritus, College of Engineering and Applied Sciences; B.S.M.E., Texas Tech University; M.S.M.E., University of Texas, Austin; Ph.D., Oklahoma State University; P.E.
- Beal-Gevarter, Alana** (1996), Instructor of Speech and Hearing Science; B.A., Gallaudet University
- Beals, Stephen P.** (1996), Adjunct Professor of Speech and Hearing Science; B.S., Calvin College; M.D., Wayne State University College of Medicine
- Beardmore, Gary D.** (1979), Associate Research Technologist of Geology; B.A., Arizona State University
- Bearup, Wylie K.**, Lt. Col. (1997), Professor of Military Science; Chair, Department of Military Science; B.S., M.S., University of Arizona; Ph.D., University of Illinois
- Beaudoin, Diane L.** (1996), Lecturer of Chemical, Bio, and Materials Engineering; B.S., University of Texas, Austin; Ph.D., North Carolina State University
- Beaudoin, Stephen P.** (1995), Assistant Professor of Chemical, Bio, and Materials Engineering; B.S., Massachusetts Institute of Technology; M.S., University of Texas, Austin; Ph.D., North Carolina State University
- Beck, Lasca** (1984), Clinical Associate Professor of Nursing; B.S.N., Texas Woman's University; M.S., East Texas State University
- Becker, R. James** (1965), Professor Emeritus of Public Affairs; B.S., M.A., Bradley University; Ph.D., University of Illinois
- Beckman, James R.** (1980), Associate Professor of Engineering; B.S., M.S., University of Wisconsin; Ph.D., University of Arizona
- Bedard, Roger L.** (1990), Professor of Theatre; B.A., University of Northern Iowa; M.F.A., University of Oregon; Ph.D., University of Kansas
- Bedgood, Dan** (1997), Lecturer of Chemistry and Biochemistry; B.S., George Mason University; Ph.D., Montana State University
- Bedient, Jack D.** (1963), Professor Emeritus of Mathematics; A.B., Albion College; M.B.S., Ed.D., University of Colorado
- Bedworth, David D.** (1963), Professor Emeritus of Industrial and Management Systems Engineering; B.S.I.E., Lamar College of Technology; M.S.I.E., Ph.D., Purdue University
- Behrens, John T.** (1994), Associate Professor of Psychology in Education; Academic Program Coordinator, Measurement, Statistics, and Methodological Studies; B.A., University of Notre Dame; M.A., Ph.D., Arizona State University
- Bell, George H.** (1976–82; 1989), Librarian, Noble Science Reference Service; B.A., William Paterson College; M.L.S., Pratt Institute
- Bell, James W.** (1966), Professor Emeritus of Secondary Education; A.B., Washburn University of Topeka; M.Ed., Ed.D., University of Kansas
- Bell, Janet L.** (1994), Assistant Professor of Social Work; B.A., Queens College, City University of New York; M.S.W., Arizona State University; Ph.D., Case Western Reserve University
- Bell, John E.** (1965), Professor Emeritus of Secondary Education; B.S., University of Nebraska, Lincoln; M.A., Ed.D., University of Wyoming
- Bell, Mary E.** (1970), Professor Emeritus of Education; B.S., Indiana State Teachers College; M.S., Butler University; Ed.D., Indiana University, Bloomington
- Bell, Shirley** (1988), Clinical Associate Professor of Nursing; B.S., University of Cincinnati; M.S., Wayne State University; Ed.D., West Virginia University
- Bellamy, Lynn** (1976), Associate Professor of Engineering; B.S., Texas A&M University; M.S., Ph.D., Tulane University
- Belok, Michael V.** (1959), Professor Emeritus of Education; B.S., Indiana University, Bloomington; M.A., Arizona State University; Ph.D., University of Southern California
- Benavides, Alfredo H.** (1988), Associate Professor of Multicultural Education; Academic Program Coordinator, Multicultural Education; B.A., Texas A&I University; M.A., Ph.D., Michigan State University
- Bender, Bert A.** (1971), Professor of English; B.A., University of Washington; Ph.D., University of California, Irvine
- Bender, Gordon L.** (1953), Professor Emeritus of Biology; B.S., Iowa State College; M.S., University of Wisconsin; Ph.D., University of Illinois
- Bender, Paul** (1984), Professor of Law; A.B., LL.B., Harvard University
- Benedict, Joel A.** (1946), Professor Emeritus of Education; B.A., M.A., Arizona State University; Ed.D., Stanford University
- Benin, David B.** (1970), Associate Professor of Physics and Astronomy; A.B., Cornell University; M.A., Ph.D., University of Rochester
- Benin, Mary B.** (1979), Associate Professor of Sociology; B.A., Vanderbilt University; M.A., Ph.D., University of Nebraska, Lincoln
- Bennett, ElDean** (1970), Professor Emeritus of Journalism and Telecommunication; B.A., Brigham Young University; M.A., Ph.D., Michigan State University
- Bennett, Peter A.** (1984), Professor of Physics and Astronomy; B.A., University of Minnesota, Duluth; Ph.D., University of Wisconsin, Madison
- Benzinger, Robert P.** (1970), Professor Emeritus of Design; B.S.M.E., University of Wisconsin, Madison; M.A.E., Chrysler Institute of Engineering
- Berch, Michael A.** (1969), Professor of Law; B.A., J.D., Columbia University
- Berens, Michael E.** (1995), Adjunct Faculty of Biology; B.S., Arizona State University; Ph.D., University of Arizona
- Berkheiser, Mary E.** (1995), Visiting Clinical Professor of Law; B.A., J.D., University of Arizona

- Berliner, David C.** (1987), Regents' Professor of Educational Leadership and Policy Studies and Psychology in Education; Dean, College of Education; B.A., University of California, Los Angeles; M.A., California State University, Los Angeles; Ph.D., Stanford University
- Berman, David R.** (1966), Professor of Political Science; B.A., Rockford College; M.A., Ph.D., American University
- Berman, Neil S.** (1964), Professor of Engineering; B.S., University of Wisconsin; M.S., M.A., Ph.D., University of Texas
- Bernal, Martha E.** (1986), Professor Emeritus of Psychology; B.A., University of Texas, El Paso; M.A., Syracuse University; Ph.D., Indiana University, Bloomington
- Bernard, Stephen Z.** (1994), Faculty Associate of Construction; B.S., Arizona State University
- Bernardi, Jose** (1995), Associate Professor of Design; B.Arch., National University of Cordoba; M.S., University of Cincinnati
- Bernier, Allen** (1995), Lecturer of Spanish; B.A., University of Wisconsin, Oshkosh; M.A., Arizona State University
- Bernstein, Bianca L.** (1987), Professor of Counseling Psychology and Counselor Education; Dean, Graduate College; B.A., University of California, Berkeley; M.Ed., Ph.D., University of California, Santa Barbara
- Bernstein, Mary** (1997), Assistant Professor of Justice Studies; B.A., Middlebury College; M.A., Ph.D., New York University
- Berry, David** (1987), Adjunct Professor of Geography; B.A., Syracuse University; M.A., Ph.D., University of Pennsylvania
- Bertelsen, Wendle R.** (1964), Professor Emeritus of Architecture; B.Arch., University of Michigan; M.Arch., University of Arizona
- Bessembinder, Hendrik** (1989), Associate Professor of Finance; B.S., Utah State University; M.B.A., Washington State University; Ph.D., University of Washington
- Bessom, Richard M.** (1968), Professor Emeritus of Marketing; A.B., Cornell University; M.B.A., Stanford University; Ph.D., University of Washington
- Betz, M. Austin** (1974), Associate Professor of Education; B.S., Lock Haven State College; M.Ed., Pennsylvania State University; M.A.T., Brown University; M.A., Ph.D., University of Illinois
- Betz, Mathew J. III** (1961), Professor Emeritus of Engineering; B.S., M.S., Ph.D., Northwestern University
- Bhattacharya, Sourav** (1996), Associate Professor of Computer Science and Engineering; B.E., Jadavpur University (India); M.Tech., Indian Institute of Technology (India); M.S., University of Southwestern Louisiana; Ph.D., University of Minnesota
- Biblarz, Dora** (1980), Librarian; Associate Dean, TQS/CI; B.A., M.L.S., University of California, Los Angeles; M.A., University of California, Davis
- Bickford, William B.** (1966), Professor of Engineering; B.S., M.S., Kansas State University; Ph.D., University of Illinois
- Bieber, Allan L.** (1963), Professor of Chemistry and Biochemistry; Director, Interdisciplinary Committee on Molecular and Cellular Biology; B.S., M.S., North Dakota State University; Ph.D., Oregon State University
- Biekert, Russell G.** (1993), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Southern Illinois University; Ed.D., Arizona State University
- Bigwood, Allie** (1994), Instructor of Speech and Hearing Science; B.A.E., Arizona State University
- Bird, Jonathan Paul** (1997), Associate Professor of Electrical Engineering; Bs.C., D.Phil., University of Sussex (England)
- Bingham, Scott** (1989), Associate Research Scientist of Plant Biology; B.S., Brown University; Ph.D., Brandeis University
- Birge, Edward A.** (1972), Associate Professor of Microbiology; Chair, Department of Microbiology; B.A., Ph.D., University of Wisconsin, Madison
- Birk, James P.** (1973), Professor of Chemistry and Biochemistry; B.A., Saint John's University; Ph.D., Iowa State University
- Birtcher, Craig R.** (1987), Assistant Research Specialist, Electrical Engineering; B.S.E., M.S., Arizona State University
- Bitner, Mary Jo** (1987), Professor of Marketing; B.A., M.B.A., Ph.D., University of Washington
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- Wiesel, Avi** (1995), Assistant Professor of Construction; B.Sc.C.E., Polytechnic Institute of Timisoara (Romania); M.Sc.C.E., Ph.D., Technion-Israel Institute of Technology (Israel)
- Wiggins, Harry B.** (1987), Senior Lecturer Emeritus of Supply Chain Management; B.S., U.S. Merchant Marine Academy; B.S., University of Vermont; M.B.A., Harvard University

- Wilcox, M. Jeanne** (1990), Professor of Speech and Hearing Science; Chair, Department of Speech and Hearing Science; B.A., Kansas State; M.A., Ph.D., Memphis State University
- Wilcox, Sidney W.** (1955), Professor Emeritus of Engineering; B.A., Bethany-Peniel College; M.A., University of Oklahoma
- Wilkins, Barry J.** (1992), Research Specialist, Center for Solid-State Science; B.A., Columbia Union College; M.S., Rutgers, The State University
- Wilkins, Wendy K.** (1986), Professor of English; Associate Dean for Administration and Personnel, College of Liberal Arts and Sciences; B.A., M.A., Ph.D., University of California, Los Angeles
- Wilkinson, Christine K.** (1970), Associate Professor of Higher Education; Vice President for Student Affairs; B.A., Arizona State University; M.A., University of California, Berkeley; Ph.D., Arizona State University
- Wilkinson, Joseph W.** (1964), Professor Emeritus of Accountancy, School of Accountancy and Information Management; B.S., Carnegie Institute of Technology; M.B.A., Stanford University; D.B.A., University of Oregon
- Williams, Frank G.** (1975), Professor of Health Administration and Policy; Director, School of Health Administration and Policy; B.S., M.A., Oregon State University; M.A., Ph.D., University of Iowa
- Williams, Jenny L.** (1967), Associate Librarian, Original Cataloging; B.A., M.L.S., Indiana University
- Williams, Peter** (1981), Professor of Chemistry and Biochemistry; B.S., Ph.D., University of London (England)
- Williams, Philip F.C.** (1986), Associate Professor of Chinese; B.A., University of Arkansas; M.A., Ph.D., University of California, Los Angeles
- Williams, Robert C.** (1978), Professor of Anthropology; B.A., M.A., University of Cambridge (United Kingdom); B.A., M.A., Ph.D., University of Michigan
- Williams, Stanley N.** (1991), Professor of Geology; B.S., Beloit College; M.A., Ph.D., Dartmouth College
- Williamson, Madeline J.** (1976), Professor of Music, Interim Associate Dean, Graduate College; B.A., Ohio Wesleyan University; M.M., Western Michigan University, D.M.A., Arizona State University
- Willis, Wayne T.** (1989), Associate Professor of Exercise Science and Physical Education; A.B., University of California, Berkeley; M.A., San Francisco State University; Ph.D., University of California, Berkeley
- Wills, Barbara Salisbury** (1994), Senior Lecturer of Theatre; B.A., M.A., Ph.D., University of Washington
- Wills, J. Robert** (1994), Professor of Theatre; Dean, College of Fine Arts; B.A., College of Wooster; M.A., University of Illinois; Ph.D., Case Western Reserve University
- Willson, Loretta L.** (1947), Professor Emeritus of Communication; B.A., University of South Dakota; M.A., Northwestern University
- Wilson, Daniel** (1978), Senior Lecturer of Information and Management Technology; B.S., Drexel University; M.S.E., Ph.D., Arizona State University
- Wilson, Gail Eugene** (1972), Associate Professor of Music; B.S., Ohio State University; M.M., Arizona State University
- Wilson, Gloria N.** (1961), Associate Professor Emeritus of Educational Media and Computers; B.A., Montclair State College; M.A., Ed.D., Columbia University
- Wilson, Jeffrey R.** (1985), Associate Professor of Statistics; B.A., University of the West Indies (Trinidad and Tobago); M.S., Ph.D., Iowa State University
- Wilson, Lorna A.** (1968), Instructor Emeritus of French; B.Ed., University of Saskatchewan (Canada); M.A., Arizona State University
- Wilson, Patricia M.** (1987), Associate Professor of Family Resources and Human Development; B.S., M.Ed., Iowa State University; Ph.D., Oklahoma State University
- Wilt, Glenn A. Jr.** (1963), Associate Professor of Finance; A.B., Occidental College; M.B.A., Miami University; Ph.D., University of Michigan; C.F.A.
- Windhorst, Rogier A.** (1987), Professor of Physics and Astronomy; Associate Chair, Department of Physics and Astronomy; B.Sc., M.Sc., Ph.D., University of Leiden (Netherlands)
- Winer, Laurence H.** (1983), Professor of Law; B.A., M.A., Ph.D., Boston University; J.D., Yale University
- Winkelman, Michael** (1988), Senior Lecturer of Anthropology; B.A., Rice University; Ph.D., University of California, Irvine
- Winkelman, Richard D.** (1965), Associate Professor of Economics; B.A., Southern Illinois University; M.A., Ph.D., University of Illinois
- Wintergalen, Barbara A.** (1992), Professor Emeritus of Nursing; B.S.N., Loretto Heights College; M.S., Arizona State University
- Wirtz, Dorothy** (1959), Professor Emeritus of French; B.A., University of Iowa; M.A., Ph.D., University of Wisconsin
- Wiseman, Douglas E.** (1976), Professor Emeritus of Special Education; B.S., M.A., Eastern Michigan University; Ph.D., University of Illinois
- Wiseman, Greta** (1984), Faculty Associate of Nursing; B.S.N., Hamline University; M.S., Arizona State University
- Wiseman, Robert M.** (1991), Assistant Professor of Management; B.B.A., University of Wisconsin, La Crosse; M.B.A., University of Wisconsin, Milwaukee; Ph.D., University of Minnesota
- Withey, Michael B.** (1993), Faculty Associate of Law; B.A., Western Michigan University; J.D., University of Arizona
- Witt, Tom** (1975), Associate Professor of Design; B.A., M.A., M.F.A., University of California, Los Angeles
- Wixted, J. Timothy** (1978), Professor of Asian Languages; B.A., University of Toronto (Canada); A.M., Stanford University; D.Phil., University of Oxford (England)
- Wochner, Raymond E.** (1952), Professor Emeritus of Education; B.S., York College; M.A., University of Nebraska, Lincoln; Ph.D., University of Wyoming
- Wolchik, Sharlene** (1980), Professor of Psychology; B.A., Vassar College; M.S., Ph.D., Rutgers, The State University
- Wolf, Donald J.** (1969), Professor Emeritus of Political Science; B.A., M.A., Gonzaga University; S.T.M., University of Santa Clara; Ph.D., Georgetown University
- Wolf, George H.** (1986), Associate Professor of Chemistry and Biochemistry; B.A., University of California, San Diego; M.S., Ph.D., University of California, Berkeley
- Wolf, Robert Lee** (1985), Professor of Design; Director, School of Design; B.S., Southern Illinois University, Carbondale; M.A., University of Missouri; Cert. Konstindustriskolan, Goteborg (Sweden)
- Wolf, W. Shapard Jr.** (1983), Associate Research Administrator, Sociology; Director, Survey Research Laboratory, Sociology; B.F.A., Florida State University; M.Ed., University of Georgia
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- Wolfthal, Diane** (1995), Assistant Professor of Art; B.A., M.A., City University of New York; Ph.D., Institute of Fine Arts, New York University
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- Wong, Timothy.** (1995), Professor of Chinese; B.A., Saint Mary's College; M.A., University of Hawaii; Ph.D., Stanford University
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- Wood, Patricia** (1994), Law Librarian, Reference; B.A., A.M.L.S., University of Michigan
- Wood, Steven D.** (1975), Professor of Marketing; B.S., M.A., California State University, San Diego; Ph.D., University of Wisconsin, Madison
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- Woodman, Natalie J.** (1969), Professor Emeritus of Social Work; B.A., New York University; M.S.S., Smith College
- Woods, Roosevelt Jr.** (1965), Professor Emeritus of Art; B.S., M.A., Arizona State University
- Woodward, Mark R.** (1985), Associate Professor of Religious Studies; B.A., M.A., Ph.D., University of Illinois
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- Wooldridge, Mary C.** (1959), Professor Emeritus of Family Resources and Human Development; B.S., M.S., University of Kentucky; Ph.D., Purdue University
- Woolf, Charles M.** (1961–63; 1964), Professor Emeritus of Biology; Dean Emeritus, College of Liberal Arts and Sciences and Graduate College; B.S., M.S., University of Utah; Ph.D., University of California, Berkeley
- Wootten, William W.** (1959), Professor Emeritus of History; B.A., University of Chicago; M.A., University of Iowa; Ph.D., University of Minnesota, Twin Cities
- Wootton, Richard T.** (1964), Professor Emeritus of Education; B.S., M.S., Ed.D., University of Utah
- Wotring, Roxena A.** (1994), Clinical Assistant Professor of Nursing; B.S.N., M.S., Arizona State University
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Y

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- Yamaguchi, Gary T.** (1989), Associate Professor of Engineering; A.B., Occidental College; B.S., California Institute of Technology; S.M.M.E., Massachusetts Institute of Technology; Ph.D., Stanford University
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- Youm, Kyu Ho** (1991), Professor of Journalism and Telecommunication; B.A., Konkuk University (South Korea); M.A., Ph.D., Southern Illinois University, Carbondale
- Young, Bernard** (1988), Professor of Art; B.F.A., Temple University; M.F.A., Ph.D., Cornell University
- Young, Dennis L.** (1975), Professor of Mathematics; B.S., Saint Louis University; M.S., Ph.D., Purdue University
- Young, Hewitt H.** (1967), Professor Emeritus of Industrial and Management Systems Engineering; B.S.M.E., M.S.I.E., Case Institute of Technology; Ph.D., Arizona State University
- Young, Joseph E.** (1979), Professor Emeritus of Art; B.A., California State University at Los Angeles; M.A., University of California, Los Angeles
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Zuo, Jian-Min (1989), Assistant Research Scientist of Physics and Astronomy; B.S., Nanjing University (China); Ph.D. Arizona State University

Zwiebel, Imre (1979), Professor of Engineering; B.S., University of Michigan; M.S., Ph.D., Yale University

Zygas, K. Paul (1984), Associate Professor of Architecture; A.B., M.Arch., Harvard University; Ph.D., Cornell University

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To January 2002

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Judith Gignac

To January 2004

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To Be Appointed

To January 2006

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and Environmental Design John Meunier
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Director, Ph.D. program in Environmental
Planning in Design Michael D. Kroelinger
Director, School of Architecture Ron McCoy
Director, School of Design Robert Lee Wolf
Director, School of Planning
and Landscape Architecture Frederick Steiner

Director, Herberger Center
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Coordinator, Joint Urban Design Program John McIntosh
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College of Business

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Teacher Education Nicholas R. Appleton
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Programs and Personnel Gail Hackett
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Academic Program Coordinator, Educational
Media and Computers Gary Bitter
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Elementary Education *To Be Appointed*
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Multicultural Education Alfredo Benavides
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Reading and Library Science Gary Anderson
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Secondary Education Robert Gryder
Academic Program Coordinator,
Special Education Alfonso Prieto
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Leadership and Policy Studies Thomas H. Metos

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Educational Administration
and Supervision Thomas H. Metos
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Education Policy Studies Mary Lee Smith
Academic Program Coordinator,
Higher Education Howard L. Simmons
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Division of Psychology
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Academic Co-Program Coordinator,
Counselor Education Stafford Hood
Academic Co-Program Coordinator,
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School Psychology Raymond Kulhavy
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Engineering Research Frank Hoppensteadt
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and Culture Program Gailynn Valdés
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Continuing Education Regina L. R. Edwards



Night view of the Life Sciences E-wing.

Tim Trumble photo

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and Technology (LIST) Scott Herrington
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Reference Services Mara Pinckard
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 Administrative Services Sheila Woods Stokes
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 Construction Administration Vance Linden
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 Resources Susan M. Malaga
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 Assistant Director, Employment,
 Compensation, and
 Classification Services Christine Cervantes
 Assistant Director, Records,
 Payroll, and HRMS Sue Madden
 Director, Public Safety William Bess
 Chief of Police Lanny Standridge
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 Director, Purchasing and Business Services Ray Jensen
 Associate Director John Riley
 Director, ASU Bookstore Val Ross
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 Management Services Walter B. Silva
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 Basketball–Men *To Be Appointed*
 Basketball–Women Charli Turner Thorne
 Cross Country–Men Walt Drenth
 Cross Country–Women Walt Drenth
 Diving–Men Jane Figuereido
 Diving–Women Jane Figuereido
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 Golf–Men Randy Lein
 Golf–Women Linda Vollstedt
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 Softball–Women Linda Wells
 Swimming–Men Ernest Maglischo

Swimming–Women Tim Hill
 Tennis–Men Lou Belken
 Tennis–Women Sheila McInerney
 Track and Field–Men Greg Kraft
 Track and Field–Women Greg Kraft
 Volleyball–Women Patti Snyder-Park
 Wrestling–Men Lee Roy Smith

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ASU East

See page 461 for a list of ASU East administrators.

ASU West

See page 544 for a list of ASU West administrators.

ASU Main Directory

For the “ASU East Directory,” see page 460.
For the “ASU West Directory,” see page 537.
Unless otherwise stated, the area code is 602.

Admissions

Graduate	WILSN 101	965-6113
Law	LAW 101	965-1474
Readmissions (Undergraduate)	SSV B114	965-7440
Undergraduate	SSV C111	965-7788

Architecture and Environmental

Design, College of	ARCH 134	965-8169
Architecture, School of	AED 162	965-3536
Design, School of	AED 154	965-4135
Herberger Center for Design Excellence	ARCH 119	965-6693
Planning and Landscape Architecture, School of	AED 158	965-7167

ASU Alumni Association

African American and Asian Pacific Alumni Chapters	VIC	965-5330
ASU West Alumni Programs	FAB S361	543-2586
Career Programs, College Associations, Continuing Education and Reunions	VIC	965-2133
Communications	MARIP 257	965-8150
Homecoming, Founder’s Day and Student Relations	VIC	965-4282
Membership Marketing	MARIP 124	965-8346
Public Policy and Arizona Chapters	VIC	965-5074
Recruiting, Scholarships and National Chapters	VIC	965-5074
Sports	VIC	965-5357

ASU East (see page 441)

ASU/Phoenix Educational

Opportunity Center	894-8451
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ASU West (see page 509)

Bookstore, ASU	BKSTR	965-7928
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Business, College of	BA 123	965-4227
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Accountancy and Information Management, School of	BA 223	965-3631
Business Administration, Department of	BA 318	965-3231
Economics, Department of	BAC 659	965-3531
Finance, Department of	BAC 519	965-3131
Health Administration and Policy, School of	BAC 554	965-7778
Management, Department of	BA 323	965-3431
Marketing, Department of	BAC 460	965-3621

Campus Dining Services	MU 138	965-3464
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Career Services	SSV C359	965-2350
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Child and Family Services	MU 14C	965-9515
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Cocurricular Programs and

Service, Institute for	SSV A149	965-9600
Internships	SSV A149	965-2225
Residential Campus Communities	SSV A149	965-0336
Service Learning	SSV A149	965-2225

Disability Resources

for Students	MCENT first floor	
TTY		965-9000
Voice		965-1234

Drop/add and withdrawal information	SSV B114	965-3124	Dance, Department of	PEBE 107B	965-5029
Education, College of	EDB 104	965-3306	Music, School of	MUSIC 183	965-3371
Curriculum and Instruction, Division of	ED 409	965-1644	Theatre, Department of	GHALL 232	965-5359
Curriculum and Instruction, Graduate Program Office (Advising)	ED 412	965-4602	Graduate College	WILSN lobby ...	965-3521
Educational Leadership and Policy Studies, Division of	ED 108	965-6357	Admissions	WILSN 101	965-6113
Psychology in Education, Division of	EDB 301	965-3384	Advising Office	WILSN lobby	965-3521
Psychology in Education Admissions Information (recording; voice mail)		965-6420	Financial Assistance	WILSN 120	965-3521
Student Affairs (Undergraduate Advising)	EDB 7	965-3877	Graduation Section		
Educational Opportunity Center		894-8451	Commencement Office	ADM B167	965-6611
Engineering and Applied Sciences, College of	EC G100	965-3421	Graduate Division	SSV B113	965-6980
Chemical, Bio, and Materials Engineering, Department of	EC G202	965-3313	Undergraduate Division	SSV B113	965-3256
Civil and Environmental Engineering, Department of	EC G252	965-3589	Greek Life	MU N340	965-2249
Computer Science and Engineering, Department of	GWC 206	965-3190	Information Technology		
Construction, Del E. Webb School of	JWS 268	965-3615	COMPASS Computing Assistance Center	CPCOM 202	965-5939
Electrical Engineering, Department of	ERC 552	965-3424	Computer Accounts Office	CPCOM 105	965-1211
Engineering, School of	EC G104	965-1726	Computing Commons Site	CPCOM	
Industrial and Management Systems Engineering, Department of	GWC 502	965-3185	atrium		965-4459
Mechanical and Aerospace Engineering, Department of	EC G346	965-3291	Computing Consulting	CPCOM 202	965-6500
Equal Opportunity/ Affirmative Action	ADM B171	965-5057	Computing Site Hours		965-6500
TTY		965-0471	Geographic Information Systems Lab	CPCOM 235	965-4007
Extended Education, College of	ASUDC C319 ...	965-9696	Instruction Support Lab	CPCOM 216	965-6739
American English and Culture Program	IRISH 2D	965-2376	IT Help Desk	CPCOM 202	965-6500
ASU Downtown Center	ASUDC	965-3046	Visualization Center	CPCOM 235	965-9699
ASU Sun Cities	SUNDM B	546-9659	Interdisciplinary Programs		
Communications and Marketing	ASUDC C319	965-9696	Creative Writing (M.F.A.)	LL C346	965-7454
Computer Training Programs	ASUDC C250	965-9200	Curriculum and Instruction (Ph.D.)	ED 305	965-1644
Development and Outreach	ASUDC C319	727-5330	Exercise Science (Ph.D.)	PEBW M201	965-7664
Distance Learning Technology	RITT A129	965-6738	Gerontology (Certificate)	WHALL 116	965-3225
Extended Campus Programs	ASUDC C250	965-3046	Justice Studies (Ph.D.)	WILSN 316	965-7682
Independent Learning	RITT B132	965-6563	Public Administration (D.P.A.)	WILSN 208	965-3926
		or 1-800-533-4806	Science and Engineering of Materials (Ph.D.)	PS B135	965-2460
Instructional Programs	RITT B132	965-9797	Speech and Hearing Science (Ph.D.)	CMSC 146	965-2373
Lifelong Learning Programs	ASUDC C250	727-5264	Statistics (M.S.)	BAC 570	965-3531
Operations and Finance	ASUDC C319	965-9696	International Programs	MOEUR 124	965-5965
Professional and Continuing Education	ASUDC C250	965-3046	Summer International Programs	ADM B167	965-6611
Professional Programs and Institutes	ASUDC C250	965-3046	International Student Programs	SSV B225	965-7451
FASTT		968-4400	International Undergraduate Admissions	SSV C111	965-2688
Fine Arts, College of	GHALL 132	965-6536	Law, College of	LAW 201	965-6181
Art, School of	ART 102	965-3468	TTY		965-2048
			Learning Resource Center	SSV A361	965-6254
			Liberal Arts and Sciences, College of	SS 111	965-6506
			Aerospace Studies, Department of	MAIN 340	965-3181
			African American Studies	AG 201	965-4399
			Anthropology, Department of	ANTH A124	965-6213
			Biology, Department of	LS C226	965-3571
			Chemistry and Biochemistry, Department of	PS D102	965-3461
			Chicana and Chicano Studies, Department of	GHALL 212	965-5091

English, Department of	LL B504	965-3168	Readmissions	
Exercise Science and Physical Education, Department of	PEBW M212	965-3875	(Undergraduate)	SSV B114
Family Resources and Human Development, Department of	HEC 106	965-6978	Registrar	SSV B114
Geography, Department of	JWS 338	965-7533	InTouch	350-1500
Geology, Department of	PS F686	965-5081	TTY	965-3236
History, Department of	SS 204	965-5778	Voice	965-3124
Interdisciplinary Humanities Program	LL C352	965-6747	Residency Classification	SSV B115
Languages and Literatures, Department of	LL B404	965-6281	Residential Life	SSV A131
Mathematics, Department of	PS A216	965-7195	Social Work, School of	WHALL 135
Microbiology, Department of	LS E210	965-1457	Student Financial Assistance	SSV C219
Military Science, Department of	MAIN 240	965-3318	Student Health	SHS
Philosophy, Department of	PS A524	965-3394	Fax	965-2269
Physics and Astronomy, Department of	PS F470	965-3561	Measles verification information	965-1358
Plant Biology, Department of	LS E218	965-3414	Student ID	UASB 140
Political Science, Department of	SS 410	965-6551	Student Leadership Programs	MU N340
Psychology, Department of	PSY 237	965-3326	Student Life	SSV B228
Religious Studies, Department of	EC A377	965-7145	Student Organization	
Sociology, Department of	SS 321	965-3546	Resource Center	MU N340
Speech and Hearing Science, Department of	LL A145	965-2373	Student Publications	MCENT 15
Women's Studies Program	EC A209	965-2358	<i>State Press</i> Information	965-7572
			<i>State Press</i> Newsroom	965-2292
Memorial Union			Student Recreation Complex	
Activities Board	MU third level	965-6822	and Recreational Sports	SRC 220
Administration	MU first level	965-5309	Summer Sessions, Office of	ADM B167
Information Desk	MU first level	965-5728	Transcripts (outgoing)	SSV B113
Lost and Found	MU first level	965-5728	Undergraduate Academic	
Reservations	MU first level	965-3406	Services, Division of	UASB
Nursing, College of	NUR 322	965-3244	Bachelor of Interdisciplinary Studies	UASB 100
Continuing and Extended Education	NUR 470	965-7431	Campus Match	UASB 200
Student Service Office	NUR 108	965-2987	Cross-college Advising Services	UASB 100
Off-Campus Student			Degree Audit	UASB 100
Employment	SSV C222	965-6318	General Studies	UASB 100
On-Campus Student			Service Learning	UASB 100
Employment	SSV C222	965-5186	University 100/194	UASB 200
Operator, University		965-9011	Writing Across the Curriculum	UASB 100
Orientation, New Student	SSV A279	965-7788	Writing Centers	UASB 200
Parents Association	SSV A278	965-7788	University Honors College	MCL 112
Public Programs,			University Libraries	LIB
College of	WILSN 234	965-1034	Circulation	965-3605
Advanced Public Executive Program (APEP)	ASUDC C110	965-4006	Hours	965-3415
Communication, Department of	STAUF A412	965-5095	Information	965-6164
Journalism and Telecommunication, Walter Cronkite School of	STAUF A231	965-5011	Renewal by telephone	965-2595
Justice Studies, School of	WILSN 331	965-7682	University Testing Services	EDB 302
Morrison Institute for Public Policy	UVCM 203	965-4525	Upward Bound	SSV A279
Public Affairs, School of	WILSN 208	965-3926	Veterans Services Section	SSV B117
Recreation Management and Tourism, Department of	MOEUR 131	965-7291	Veterans Upward Bound	IRISH 7

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Student Financial Assistance www.asu.edu/fa
 Office of the Registrar www.asu.edu/registrar
 Residential Life www.asu.edu/reslife
 Undergraduate Admissions www.asu.edu/admissions

College Links

Architecture and Environmental Design, College of

Architecture, School of www.asu.edu/caed/Architecture
 Design, School of www.asu.edu/caed/Design
 Planning and Landscape
 Architecture, School of www.asu.edu/caed/Planning

Business, College of

Accountancy and Information
 Management, School of www.cob.asu.edu/acct
 Business Administration, Department of www.cob.asu.edu/ba
 Economics, Department of www.cob.asu.edu/ecn/index.html
 Finance, Department of www.cob.asu.edu/fin
 Health Administration and Policy,
 School of www.cob.asu.edu/hap
 Management, Department of www.cob.asu.edu/mgt
 Marketing, Department of www.cob.asu.edu/mkt

Education, College of

Curriculum and Instruction,
 Division of tikkun.ed.asu.edu/coe/candi
 Educational Leadership and
 Policy Studies, Division of tikkun.ed.asu.edu/elps
 Psychology in Education,
 Division of seamonkey.ed.asu.edu/~gail/division/divintro.htm

Engineering and Applied Sciences, College of

Chemical, Bio, and Materials Engineering,
 Department of www.eas.asu.edu/~cbme
 Civil and Environmental Engineering,
 Department of www.eas.asu.edu/~civil
 Computer Science and Engineering,
 Department of www.eas.asu.edu/~csdept
 Construction, Del E. Webb School of www.eas.asu.edu/dewsc
 Electrical Engineering, Department of www.eas.asu.edu/ee
 Industrial and Management Systems
 Engineering, Department of www.eds.asu.edu/~imse
 Mechanical and Aerospace Engineering,
 Department of www.eas.asu.edu/~mae

Extended Education, College of www.asu.edu/xed

Fine Arts, College of

Art, School of www.asu.edu/cfa/art
 Dance, Department of www.asu.edu/cfa/dance
 Music, School of www.asu.edu/cfa/music
 Theatre, Department of www.asu.edu/cfa/theatre

Graduate College www.asu.edu/graduate

Law, College of www.law.asu.edu

Liberal Arts and Sciences, College of

Aerospace Studies, Department of www.asu.edu/clas/afrotc
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 Exercise Science and Physical
 Education, Department of www.asu.edu/clas/espe
 Family Resources and Human
 Development, Department of www.asu.edu/clas/frhd
 Geography, Department of saguaro.la.asu.edu/geography
 Geology, Department of www.gig.la.asu.edu
 History, Department of www.asu.edu/clas/history
 Interdisciplinary Humanities
 Program www.asu.edu/clas/humanities
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 Department of www.asu.edu/clas/dll
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 Microbiology, Department of lsvl.la.asu.edu/microbiology
 Philosophy, Department of www.asu.edu/clas/philosophy
 Physics and Astronomy,
 Department of www.asu.edu/clas/dopa/dopa.html
 Plant Biology, Department of lsvl.la.asu.edu/plantbiology
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 Religious Studies,
 Department of www.asu.edu/clas/religious_studies
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 Speech and Hearing Science,
 Department of www.asu.edu/clas/shs
 Women's Studies Program www.asu.edu/clas/womens_studies

Nursing, College of www.asu.edu/nursing

Public Programs, College of

Communication,
 Department of www.asu.edu/copp/communication
 Journalism and Telecommunication,
 Walter Cronkite School of cronkite.pp.asu.edu
 Justice Studies, School of www.asu.edu/copp/justice
 Public Affairs, School of www.asu.edu/copp/publicaffairs
 Recreation Management and
 Tourism, Department of www.asu.edu/copp/recreation

Social Work, School of www.asu.edu/socialwork

Summer Sessions, Office of www.asu.edu/ssc

University Honors College www.asu.edu/honors

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ASU West Photo

ASU West

Elaine P. Maimon, Ph.D.
Vice President and Provost

ASU West was established in 1984 to meet the higher education needs of residents of western Maricopa County. It is a nonresidential campus of ASU that offers upper-division and graduate courses. ASU West offers baccalaureate degrees in 28 academic majors in the arts and sciences and selected professional fields. The campus also offers four certificate programs and master's degree programs in Business Administration, Educational Administration and Supervision, Elementary Education, and Secondary Education.

ASU West prepares students to be successful in the global society of the 21st century by engendering a responsiveness to change and an appreciation of intellectual, cultural, gender, and generational diversity. The campus is committed to encouraging the educational, economic, cultural, and social development of the metropolitan area.

Academic programs and support services are designed to meet the diverse needs of today's working adults, returning students, and continuing students. Academic programs, classes, and support services are innovative and focused on providing students with a high quality education. Classes are conveniently offered in the day and evening, as well as on weekends, through television (cable), and the Internet, and off-campus locations.

With an enrollment of about 5,000 students, ASU West provides a small-college atmosphere; yet, students have the advantage of all the on- and off-campus resources of a nationally recognized Research I and Pac 10 university. The ASU West campus, consisting of seven buildings totaling about 600,000 square feet, provides state-of-the-art facilities in a beautifully landscaped environment. The 300-acre campus is easily accessible via the interstate routes of I-10 and I-17.

Accreditation

ASU West is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools, 30 North LaSalle St., Chicago, IL 60602-2504. Professional programs in various academic areas are also accredited by the following agencies.

All Business and Accountancy degree programs in the School of Management are accredited by the Ameri-

can Assembly of Collegiate Schools of Business (AACSB), the official accrediting agency in the field of business administration.

In the College of Human Services, the Department of Recreation and Tourism Management is accredited by the National Recreation and Park Association/American Association for Leisure and Recreation (NRPA/AALR) and the undergraduate Social Work program is accredited by the Council on Social Work Education (CSWE).

See "Accreditation and Affiliation" on pages 18-21.

Academic Organization and Administration

As chief operating and academic officer of ASU West, the vice president and provost for ASU West provides executive leadership for the continuing development and management of the campus and reports directly to the president of Arizona State University. The vice president and provost is aided in the administration of the campus by vice provosts, deans, directors, department chairs, faculty and other officers. There are four schools and colleges at ASU West administered by deans and a Division of Collaborative Programs. These academic units develop and implement the teaching, research, and service programs of the institution, aided by the ASU West Library and other services.

The faculty and students of the institution play an important role in campus governance, with the Academic Senate, Student Forum, and numerous cross-campus and joint ASU West-ASU Main committees serving the needs of a rapidly growing institution.

See "ASU West Administrative and Academic Personnel," page 544 and "Academic Organization," page 9.

Admission and Advising

Nondegree Students. Nondegree students may take courses at ASU West according to the special provisions on page 62 of this catalog.

Degree-Seeking Students. Degree-seeking students must meet the university admissions standards set by the Arizona Board of Regents (ABOR). Any student admitted to ASU may take

courses at ASU West. To be admitted to an ASU West degree program, the student must meet ABOR admissions requirements and the specific admission requirements of the ASU West program. A student who is admitted to an ASU West degree program is defined as an ASU West student.

For more information on applying to ASU West degree programs, see the current *ASU West Catalog* or *ASU West Schedule of Classes*. For applications and admission information, call 602/543-8123 or visit or write

ADMISSIONS AND RECORDS OFFICE
UNIVERSITY CENTER BUILDING 120
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069-7100

Change of Major from ASU Main to ASU West

Currently enrolled ASU Main degree-seeking students who want to relocate to an ASU West degree program should contact the Admissions and Records Office at ASU West for the appropriate procedures. Acceptance to an ASU West degree program requires the student to meet the prerequisites for entry to the student's choice of major

as stated in the appropriate catalog. Students should be aware that certain requirements (e.g., the minimum number of upper-division semester hours to graduate) differ between ASU West and ASU Main.

Application of Course Credit. All courses completed on any ASU campus may fulfill the 120-semester-hour requirement for graduation with a baccalaureate degree. Every candidate for the baccalaureate degree is required to earn a minimum of 30 semester hours in resident credit courses at the ASU campus from which the student will gradu-

ASU West Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Accountancy	B.S.	School of Management
Administration of Justice	B.S.	College of Human Services
American Studies	B.A.	College of Arts and Sciences
Communication Studies	B.A., B.S.	College of Human Services
Elementary Education	B.A.E.	College of Education
Options: early childhood education, bilingual education, English as a second language, middle school education		
English	B.A.	College of Arts and Sciences
Global Business	B.S.	School of Management
Specializations: financial management, human resources management, international studies, marketing		
History	B.A.	College of Arts and Sciences
Integrative Studies	B.A.	College of Arts and Sciences
Interdisciplinary Arts and Performance	B.A.	College of Arts and Sciences
Life Sciences	B.S.	College of Arts and Sciences
Nursing	B.S.N.	College of Nursing (ASU Main)
Politics	B.A., B.S.	College of Arts and Sciences
Psychology	B.A., B.S.	College of Arts and Sciences
Recreation Tourism and Management	B.S.	College of Human Services
Secondary Education	B.A.E.	College of Education
Specializations or options: biological sciences, English, history, mathematics, middle school education, social studies		
Social and Behavioral Sciences	B.A., B.S.	College of Arts and Sciences
Social Work	B.S.W.	College of Human Services
Sociology	B.A., B.S.	College of Arts and Sciences
Spanish	B.A.	College of Arts and Sciences
Special Education	B.A.E.	College of Education
Women's Studies	B.A., B.S.	College of Arts and Sciences
Graduate Degrees		
Business Administration	M.B.A.	School of Management
Educational Administration and Supervision	M.Ed.	College of Education
Elementary Education	M.Ed.	College of Education
Secondary Education	M.Ed.	College of Education

ASU West Certificates

Certificate	Administered by
Accountancy, Postbaccalaureate Certificate in Gerontology, Postbaccalaureate Certificate in Women’s Studies, Certificate in Writing, Certificate in	School of Management College of Human Services College of Arts and Sciences College of Arts and Sciences

ate. Some degree programs have specific requirements that must be completed in the department of the major or through another department at the resident campus. The application of courses to the degree program is determined by the appropriate faculty or academic advisor of the student’s major. Because of these constraints, students should seek advice from the appropriate advisor for their major before registering for classes at another ASU campus.

Academic Advising

Effective academic advising is an essential aspect of the educational experience at ASU West. Prospective students should contact an admissions counselor as a first step in the admission process. Call 602/543-8123 or visit Admission Services in the Admissions and Records office in University Center Building 120 to make an appointment. An admissions counselor will review admission requirements and processes and make referrals to academic advisors as appropriate. A convenient alternative is to meet with an outreach advisor at an ASU West Transfer Center located on the campuses of local community colleges.

Degree Programs

Refer to the “ASU West Degrees, Majors, and Concentrations” and the “ASU West Certificates” tables.

The College of Education offers postbaccalaureate programs for teacher certification in elementary education and secondary education. Students who complete the approved program, including student teaching, are recommended for certification to the Arizona Department of Education.

The following academic specializations for the B.A.E. in Secondary Education require course work in the subject matter area not currently available at ASU West (but offered at ASU Main): business education; chemistry; family resources and human develop-

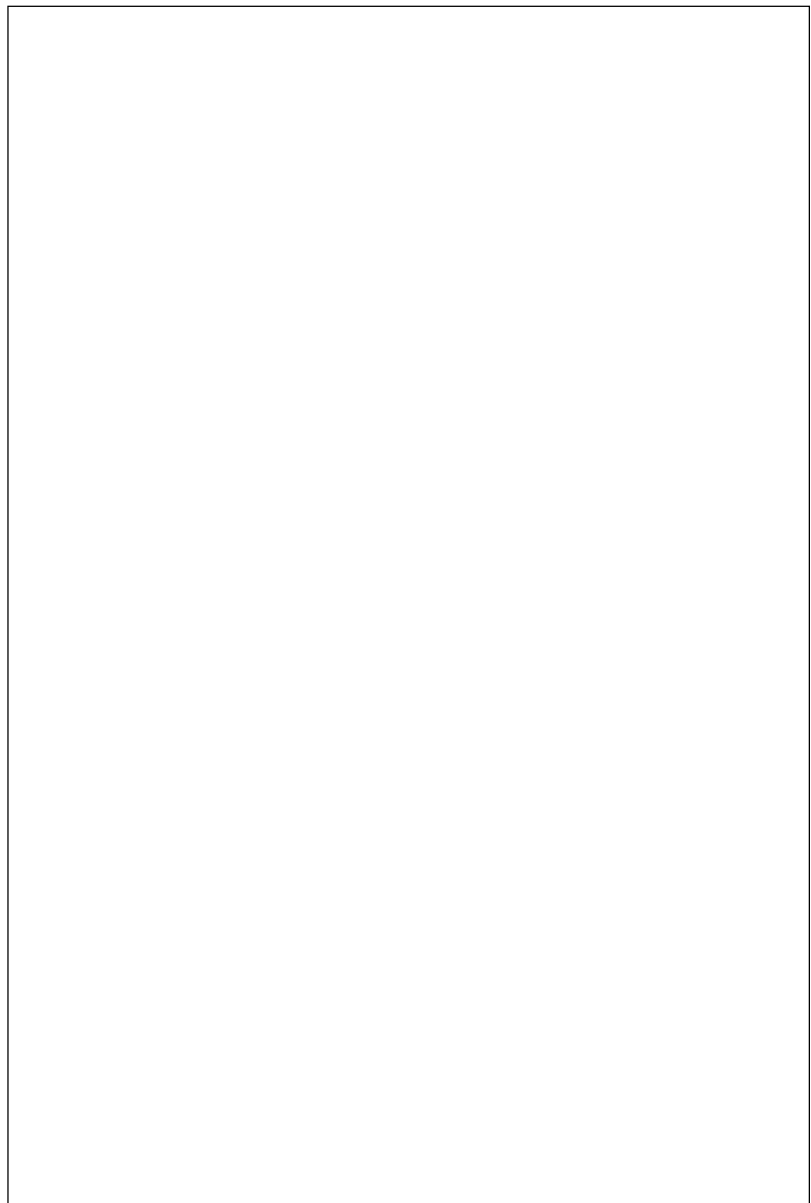
ment; physical education; physics; political science; and Spanish.

For more information on ASU West degree requirements, see the current *ASU West Catalog*.

ASU Main Programs Hosted at ASU West. Courses for the Bachelor of Science in Nursing (B.S.N.) degree are offered at ASU West. For specific information on requirements, refer to the “College of Nursing,” pages 396-404.

Course Information

For information on ASU West course offerings, see the current *ASU West Schedule of Classes*. For ASU West course descriptions and General Studies courses offered at ASU West, see the current *ASU West Catalog*.



ASU West Map

ASU West Directory

For the “ASU Main Directory,” see pages 528–530.
 For the “ASU East Directory,” see page 460.
 Unless otherwise stated, the area code is 602.

Academic Units (Administrative and Faculty Offices)

Arts and Sciences, College of	FAB N200L-3 ...	543-6000
American Studies, Department of	FAB N220B	543-6090
Integrative Studies, Department of	FAB N279	543-6003
Interdisciplinary Arts and Performance, Department of	FAB N230F	543-6057
Life Sciences, Department of	CLCC 210B	543-6059
Social and Behavioral Sciences, Department of	FAB N250	543-6058
Women’s Studies	FAB S115A	543-3300
Collaborative Programs, Division of	FAB S144	543-4600
Research Consulting Center	FAB S131	543-3410
University Honors College	FAB S151	543-4503
Writing Across the Curriculum, Center for	UCB 202	543-6151
Education, College of	FAB S200L-1 ...	543-6300
Human Services, College of	FAB N290	543-6600
Administration of Justice, Department of	FAB S270D	543-6607
Communication Studies, Department of	FAB S270-1	543-6606
Gerontology Program	FAB N290-2	543-6642
Nursing (ASU Main Program)	FAB S116-1	543-6605
Recreation and Tourism Management, Department of	FAB S277	543-6603
Social Work, Department of	FAB S272	543-6602
Library, Fletcher	FLHLB	543-8501
Circulation and Renewal		543-8520
Hours		543-8500
Information and Reference Services		543-8501
Management, School of	FAB N101	543-6200
Accountancy Program	FAB S178	543-6275
Master of Business Administration Program	FAB N151	543-6201
Undergraduate Global Business Program	FAB N101	543-6200

Other

Admissions and Records (Registration Services/ Student Records)	UCB 120	543-8123
Associated Students of ASU West	UCB 221	543-8186
Bookstore	UCB 140	543-6800
Career Services and Personal Counseling Center	UCB 320	543-8124
Disability Resource Center	UCB 130	543-8145
TDD		543-4327
Financial Aid Services	UCB 120	543-8178
Graduate Studies	FAB S301	543-4567
Information Desk	FAB Lobby	543-5500
Multicultural Services	UCB 221	543-8148
Parking Services (Decals, Appeals)	UCB 105	543-7275
Residency Classification	UCB 120	543-8123
Student Academic Support Services ...	UCB 220	543-8157
Student Employment	UCB 120	543-8178
Student Health Services	UCB 170	543-8019
Student Life	UCB 220	543-8200
Student Support Services Program	UCB 201	543-8121
Tutoring and Testing Services	UCB 201	543-8136
University-College Center	FAB S150	543-4222
University Transitions Program	UCB 220	543-8157
Veterans Services	UCB 120	543-8123
Vice President/Provost	FAB N303	543-7000
Vice Provost, Academic Affairs	FAB N301	543-4500
Women’s Resource Center	UCB 323	543-3421

ASU West Faculty and Academic Professionals

A

Achilles, Elayne R. (1986), Associate Professor of Education; B.M.Ed., Temple University; M.M., Ed.D., Arizona State University

Alarcón, Justo S. (1968), Visiting Professor of Spanish; B.A., M.A., Serafica (Spain); M.A., Laval University (Canada), Arizona State University; Ph.D., University of Arizona

Aleshire, Peter (1993), Senior Lecturer of Professional Writing; B.A., M.A., Stanford University

Allison, Jeanette (1994), Assistant Professor of Early Childhood Education; B.S., Warner Pacific College; M.A., California State University, Fresno; Ph.D., University of Illinois

Alvarez, Celia (1992), Assistant Professor of Women's Studies; B.A., Hampshire College; M.S., Ph.D., University of Pennsylvania

Andereck, Kathleen L. (1993), Associate Professor of Recreation and Tourism Management; B.S., University of Wisconsin, Stevens Point; M.S., Texas A & M University; Ph.D., Clemson University

Anders, Gary C. (1989), Professor of Economics; B.S., West Texas State University; M.A., Ph.D., University of Notre Dame

Anderson, Karen E. (1996), Assistant Librarian; B.A., Saint Olaf College; M.L.S., San Jose State University

Anderson, Laurel A. (1989), Associate Professor of Marketing; B.S.N., University of Minnesota, Twin Cities; M.N., University of Washington; Ph.D., Arizona State University

Atwater, Leanne E. (1993), Associate Professor of Management; Director, Faculty Development, School of Management; B.A., M.A., San Diego State University; Ph.D., Claremont Graduate School

Ávalos, Manuel (1990), Associate Professor of Political Science; B.A., M.A., University of Arizona; Ph.D., University of New Mexico

B

Baldwin, Bruce A. (1989), Professor of Accountancy; B.A., M.B.A., Michigan State University; Ph.D., Arizona State University

Beckett, E. Carol (1996), Assistant Professor of Bilingual Education; B.A., M.Ed., Ed.D., Arizona State University

Bellizzi, Joseph A. (1988), Professor of Marketing; B.S., M.A., Ph.D., University of Nebraska, Lincoln

Berezowski, Marc (1995), Visiting Assistant Professor of Dance; B.A., Simon Fraser University; M.F.A., Arizona State University

Berman, Tressa (1995), Assistant Professor of Anthropology; B.A., San Francisco State University; M.A., University of Colorado, Boulder; Ph.D., University of California, Los Angeles

Bernat, Frances P. (1993), Associate Professor of Administration of Justice; B.S., State University of New York College at Buffalo; M.A., J.D., State University of New York at Buffalo; Ph.D., Washington State University

Bettencourt, Lance (1997), Visiting Instructor of Marketing; B.S., California State University, Bakersfield

Bettis, Carr (1991), Assistant Professor of Accountancy; B.B.A., University of Guam; Ph.D., Indiana University, Bloomington

Bonakdarian, Mansour (1996), Visiting Assistant Professor of American Studies; B.A., M.A., Ph.D., University of Iowa

Braithwaite, Charles A. (1992), Assistant Professor of Communication Studies; B.A., University of California, Santa Barbara; M.A., Ph.D., University of Washington

Braithwaite, Dawn O. (1992), Associate Professor of Communication Studies; B.A., California State University, Fullerton; M.A., California State University, Long Beach; Ph.D., University of Minnesota

Brawley, E. Allan (1992), Professor of Social Work; Interim Chair, Department of Social Work; Special Advisor to the Provost; Certificate of Social Work, University of Strathclyde (United Kingdom); D.S.W., University of Pennsylvania

Bredbenner, Candice D. (1990), Associate Professor of American History; B.A., Russell Sage College; M.A., Ph.D., University of Virginia

Broaddus, Dorothy C. (1990), Associate Professor of English; B.A., Eastern Kentucky University; M.Ed., Ph.D., University of Louisville

Bryn, Sandra L. (1994), Assistant Professor of Curriculum and Instruction; B.S., Minot State College; M.A., Ed.D., Northern Arizona University

Burleson, Mary H. (1997), Assistant Professor of Psychology; B.A., M.S., New Mexico State University; Ph.D., Arizona State University

Buss, Ray R. (1990), Associate Professor of Educational Psychology; Assistant Dean, College of Education; B.S., M.S., Ph.D., University of Wisconsin, Madison

C

- Cardelle-Elawar, Maria** (1987), Associate Professor of Educational Psychology; B.A., Universidad Experimental Libertador (Venezuela); M.S., University of Southern California; Ph.D., Stanford University
- Cárdenas, Lupe** (1986), Associate Professor of Spanish; B.A., M.A., Ph.D., Arizona State University
- Carey, James** (1997), Visiting Assistant Professor of Management; B.S., M.B.A., Ph.D., Arizona State University
- Carey, Jane M.** (1988), Associate Professor of Management Information Systems; B.S., M.B.A., Eastern Illinois University; Ph.D., University of Mississippi
- Carlile, Barbara J.** (1993), Lecturer; Coordinator, Field Placement for Education; B.A., Immaculate Heart College; M.Ed., Arizona State University; Ed.D., Northern Arizona University
- Carter, Wendy** (1997), Assistant Professor of Sociology; B.A., Stanford University; M.S., Carnegie Mellon University; M.S., Ph.D., University of Wisconsin, Madison
- Cerveris, Michael E.** (1990), Professor of Music; Chair, Department of Interdisciplinary Arts and Performance; B.S., The Juilliard School; M.A., Catholic University; D.M.A., West Virginia University
- Chaffin, Nancy** (1994), Assistant Librarian; B.A., M.L.S., University of Arizona
- Chang, Stanley Y.** (1992), Associate Professor of Accountancy; B.B.A., National Taiwan University (Taiwan); M.A., University of Missouri; Ph.D., Texas Tech University
- Chisholm, Inés M.** (1991), Associate Professor of Bilingual Education; B.A., M.Ed., University of Puerto Rico; Ph.D., University of Florida
- Christie, Alice A.** (1995), Assistant Professor of Technology and Education; B.A., Denison University; M.Ed., Boston University; Ph.D., Arizona State University
- Cleland, Jo Ann V.** (1991), Assistant Professor of Reading/Language Arts; B.A., Saint Olaf College; M.A., Ed.D., Northern Arizona University
- Coles, Jerilyn W.** (1994), Assistant Professor of Management; B.S., Brigham Young University; Ph.D., University of Utah
- Collins-Chobanian, Shari C.** (1994), Assistant Professor of Philosophy; B.A., Colorado State University; M.A., Ph.D., Washington University
- Comprone, Joseph J.** (1992), Professor of English and American Studies; Dean, College of Arts and Sciences; B.A., Springfield College; M.A., Ph.D., University of Massachusetts, Amherst

Corrigan, John A. (1992), Associate Professor of Religion; B.A., University of Dayton; M.A., Miami University; Ph.D., University of Chicago

Craig, Timothy P. (1990), Associate Professor of Ecology; B.S., Kansas State University; M.S., Ph.D., Northern Arizona University

Crossman, Paula (1996), Assistant Librarian; B.A., M.L.S., Dalhousie University (Canada)

Cuádriz, Gloria H. (1994), Assistant Professor of American Studies; B.A., University of California, Santa Cruz; M.A., Ph.D., University of California, Berkeley

Cutrer, Emily F. (1990), Associate Professor of American Studies; Interim Director, Division of Collaborative Programs; B.A., M.A., Ph.D., University of Texas, Austin

Cutrer, Thomas W. (1992), Associate Professor of American Studies; Chair, Department of American Studies; B.A., M.A., Louisiana State University; Ph.D., University of Texas, Austin

D

Davidson, Ronald (1997), Associate Professor of Accountancy; B.Comm., University of Manitoba (Canada); M.B.A., York University (Canada); Ph.D., University of Arizona

De La Cruz, Yolanda (1991), Assistant Professor of Mathematics Education; B.A., M.A., California State University, Northridge; Ed.D., University of California, Berkeley

Delgado, Fernando (1994), Assistant Professor of Communication Studies; B.A., San Jose State University; M.A., Ph.D., University of Iowa

Di Mare, Lesley (1992), Associate Professor of Communication Studies; Chair, Department of Communication Studies; B.A., California State University, Chico; M.A., California State University, Hayward; Ph.D., Indiana University, Bloomington

Dix, Clarence L. (1979), Senior Lecturer of Social Work; Interim Associate Chair, Department of Social Work; B.S., Buena Vista College; M.S.W., University of Chicago

Dixon, Kevin A. (1995), Associate Research Scientist of Life Sciences; B.S., Brock University, St. Catharines, Ontario (Canada); M.S., University of Oklahoma; M.S., Ph.D., University of Chicago

Duncan, William A. (1991), Associate Professor of Accountancy; B.S., Portland State University; Ph.D., University of Texas, Austin

E

Elenes, C. Alejandra (1992), Assistant Professor of Women's Studies; Licenciada en Ciencias de la Información, University of Monterrey (Mexico); M.A., Ph.D., University of Wisconsin, Madison

Erfani, Julie A. Murphy (1989), Associate Professor of Political Science; B.A., Knox College; M.A., Ph.D., University of Minnesota, Twin Cities

F

Farest, Cynthia A. (1994), Assistant Professor of Reading Education; B.S., University of Texas, Austin; M.Ed., Houston Baptist University; Ph.D., University of Texas, Austin

Farrelly, Deg (1991), Associate Librarian; B.A., Illinois State University; M.L.S., Rutgers, The State University

Fedock, Patricia (1993), Assistant Professor of Science Education; B.A., M.A., Ph.D., Arizona State University

Feezor-Stewart, Barbara (1995), Assistant Professor of American Studies; B.A., University of California, Berkeley; M.A., Ph.D., University of California, Los Angeles

Firat, A. Fuat (1990), Professor of Marketing; Licencié en Economie, Istanbul University (Turkey); Ph.D., Northwestern University

G

Gallegos, Bee (1984), Associate Librarian; B.S., University of North Alabama; M.L.S., George Peabody College for Teachers

Garcia, Mildred (1997), Associate Professor of Social and Behavioral Sciences; Associate Vice Provost; Associate Director, Hispanic Research Center; B.S., Bernard M. Baruch College; M.A., New York University; M.A., Ed.D., Columbia University, Teachers College

Garrett, Judith N. (1996), Assistant Professor of Early Childhood Education/Special Education; B.S., State University of New York, Fredonia; M.A., University of Tennessee, Knoxville; Ph.D., George Mason University

Gater, Helen L. (1970), Associate Librarian; Dean, ASU West Library; B.A., Fort Hays State University; M.A., University of Denver

Georges-Abeyie, Daniel (1992), Professor of Administration of Justice; B.A., Hope College; M.A., University of Connecticut; Ph.D., Syracuse University

Gilkerson, John S. (1991), Associate Professor of History; A.B., Amherst College; M.A., University of Oklahoma; Ph.D., Brown University

Gitelson, Richard (1994), Associate Professor of Recreation and Tourism Management; Chair, Department of Recreation and Tourism Management; B.A., M.A.T., M.S., University of North Carolina, Chapel Hill; Ph.D., Texas A & M University

Glass, Ronald D. (1996), Assistant Professor of Professional Core; B.A., Harvard College; M.A., Ph.D., Stanford University; Ed.M., Harvard University; C.Phil., University of California, Berkeley

Gonzalez-Jensen, Margaret (1994), Associate Professor of Bilingual Education; B.A., Our Lady of the Lake University; M.A., Ed.D., Texas A & I University

Graves, Joseph L. (1994), Associate Professor of Evolutionary Biology; A.B., Oberlin College; Ph.D., Wayne State University

Greenhut, John G. (1989), Associate Professor of Finance and Economics; B.A., Ph.D., Texas A & M University

Griffin, Marie (1997), Assistant Professor of Administration of Justice; B.S., Santa Clare University; Ph.D., University of Arizona

Grober, Matthew S. (1995), Assistant Professor of Endocrinology; B.S., California State, Long Beach; Ph.D., University of California, Los Angeles

Gruber, Diane (1995), Lecturer of Communication Studies; B.A., Rutgers, The State University; M.A., Ph.D., Purdue University

Gutierrez, Sara E. (1990), Associate Professor of Psychology; B.S., M.A., Ph.D., Arizona State University

H

Haarr, Robin N. (1994), Assistant Professor of Administration of Justice; B.S., State University of New York, Brockport; M.S., Ph.D., Michigan State University

Haas, Nancy S. (1986), Associate Professor of Curriculum and Instruction; B.A., M.Ed., Ph.D., Arizona State University

Haladyna, Thomas M. (1986), Professor of Educational Research and Measurement; B.S., Illinois State University; M.A., San Jose State University; Ph.D., Arizona State University

Hammond, B. Randy Jr. (1996), Assistant Professor of Psychology; B.S., University of Oregon; M.A., Ph.D., University of New Hampshire

Harken, Henry R. Jr. (1986), Associate Librarian, B.A., Hofstra University; M.S.L.S., Long Island University

Harmon, W. Ken (1990), Associate Professor of Accountancy; Director, Accountancy Program; B.S., M.Acc., D.B.A., University of Tennessee, Knoxville

Harris, Kathleen C. (1990), Professor of Special Education; B.A., M.Ed., Rutgers, The State University; Ph.D., Temple University

Hattenhauer, Darryl (1988), Associate Professor of American Literature; B.A., M.A., California State University; Ph.D., University of Minnesota, Twin Cities

Hay, Victoria (1993), Senior Lecturer of Writing; B.A., University of Arizona; M.A., Ph.D., Arizona State University

Hayne, Stephen C. (1994), Assistant Professor of Management Information Systems; B.Com., University of Alberta; Ph.D., University of Arizona

Hernández, Anthony C.R. (1992), Assistant Professor of Psychology; B.A., University of California, Riverside; M.A., Ph.D., University of California, Los Angeles

Hess, Robert K. (1990), Associate Professor of Measurement and Evaluation; B.A., M.Ed., University of Georgia; Ph.D., University of South Carolina

Howard, Elizabeth C. (1994), Assistant Professor of Curriculum and Instruction; B.A., University of Texas, Austin; M.A.T., New Mexico State University; Ph.D., University of Texas, Austin

Hughes, Kimberly (1994), Assistant Professor of Genetics; B.A., Rice University; M.S., Ph.D., University of Chicago

Hultsman, John T. (1990), Professor of Recreation and Tourism Management; B.G.S., University of Kansas; M.S., University of Missouri; Re.D., Indiana University, Bloomington

Hultsman, Wendy Z. (1990), Associate Professor of Recreation and Tourism Management; B.S.E., State University of New York, Cortland; M.S., Indiana University, Bloomington; Ph.D., Pennsylvania State University

Hunter, Daniel (1997), Lecturer of Applied Business and Professional Ethics; M.A., Aquinas Institute

Hutt, Roger W. (1975), Associate Professor of Management; Director, Undergraduate Global Business Programs, School of Management; B.S., M.B.A., Ohio State University; Ph.D., Michigan State University

Hyman, Batya (1995), Assistant Professor of Social Work; B.A., Barnard College; M.S.W., Boston University; Ph.D., Brandeis University

Hyndman, Jennifer (1997), Assistant Professor of Geography; B.A., University of Alberta (Canada); M.A., Lancaster University (United Kingdom)

I

Irvin, Glenn W. (1997), Professor of English; Vice Provost for Academic Affairs; B.A., M.A., Ph.D., Arizona State University

Irwin, Leslie H. (1995), Assistant Professor of Professional Core; B.S., University of Wisconsin, Superior; B.Ed., M.Ed., University of Ottawa (Canada); Ed.D., Brigham Young University

Isbell, Dennis (1991), Associate Librarian; B.S., M.A., Northern Arizona University; M.L.S., University of Arizona

J

Jacquette, Barbara L. (1990), Lecturer of Curriculum and Instruction; B.S., Cornell University; M.A., Adelphi University; Ph.D., Arizona State University

Jeffers, George J. (1995), Assistant Professor of Educational Leadership; B.A., Saint John's University; M.S., Fordham University; Ed.D., Saint John's University

Johnson, Carolyn R. (1995), Associate Librarian; B.A., Montclair State College; M.S.L.S. University of Illinois; M.B.A., University of Minnesota

Jones, Robert W. (1994), Associate Professor of Collaborative Programs; Director, Center for Writing Across the Curriculum; B.S., M.A., Middle Tennessee State University; Ph.D., Miami University

K

Kammerlocher, Lisa (1988), Associate Librarian; B.S., M.L.S., University of Oklahoma

Katz, Charles (1997), Assistant Professor of Administration of Justice; B.S., Northeast Missouri State University; M.A., Ph.D., University of Nebraska, Omaha

Kelley, Douglas L. (1994), Assistant Professor of Communication Studies; B.A., Westmont College; M.C., Arizona State University; Ph.D., University of Arizona

Kelley, Michael F. (1990), Associate Professor of Early Childhood Education; B.S., M.S., Arizona State University; Ed.D., University of Georgia

Kirby, Andrew (1995), Professor of Social and Behavioral Sciences and Geography; Chair, Department of Social and Behavioral Sciences; B.A., Ph.D., University of Newcastle (United Kingdom)

Kline, Elliot (1993), Visiting Professor of Management; B.A., M.B.A., Ph.D., University of Colorado

Knopf, Richard C. (1986), Professor of Recreation and Tourism Management; B.S., M.S., Ph.D., University of Michigan

Koptiuch, Kristin (1992), Assistant Professor of Anthropology; B.A., State University of New York, Binghamton; M.A., Ph.D., University of Texas, Austin

Kostelnik, Joyce (1997), Assistant Professor of Reading; B.S., M.Ed., Ph.D., University of North Texas

Kupferberg, Natalie (1997), Associate Librarian; B.S.N., Columbia University; M.L.S., Pratt Institute; M.A., Brooklyn College

L

Lavitt, Melissa R. (1991), Assistant Professor of Social Work; B.A., University of Chicago; M.S.W., D.S.W., Tulane University

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ASU Vicinity Map

ASU Main Campus Map

ASU Main Campus Map

ASU Parking Map

Building Abbreviations

ADM A	Administration A-Wing	LAW	John S. Armstrong Hall
ADM B	Administration B-Wing	LAWLB	John J. Ross-William C. Blakley Law Library
AED	College of Architecture and Environmental Design/North	LIB	Charles T. Hayden Library
AG	Agriculture Building	LL (Wings A–C)	G. Homer Durham Language and Literature Building
AGB1–4	Agribusiness Quads 1–4 ¹	LS (Wings A–C)	Life Sciences Center
AGBFS	Agribusiness Food Service Lab ¹	LSE	Life Sciences E-Wing
ANTH (Wings A–C)	Anthropology Building	LYC	Lyceum Theatre
AQUAT (Wings A and B)	Mona Plummer Aquatics Center	MAIN	Old Main
ARCH	College of Architecture and Environmental Design/South	MCENT	A.J. Matthews Center
ARCV	University Archives	MCL	James H. McClintock Hall
ART	Art Building	MHALL	Carrie Matthews Hall
ARWH	Art Warehouse	MOEUR	B.B. Moeur Administration
ASUDC	Downtown Center	MTCHL	Mitchell School (Tempe)
BA	Business Administration Building	MU	Memorial Union
BAC	Business Administration C-Wing	MUR	John Murdock Lecture Hall
BKSTR	ASU Bookstore	MUSIC	Music Building
CERA (Wings A and B)	Ceramics Annex	NEEB	L.S. Neeb Hall
CFS	Center for Family Studies	NOBLE	Daniel E. Noble Science and Engineering Library
CHAPL	Danforth Chapel	NUR	Nursing Building
CLCC	Classroom Laboratory/Computer Building ²	PBS	Packard Baseball Stadium
CLRB	Classroom Building ¹	PEBE	Physical Education Building East
CMPIN	Campus Inn	PEBW	Physical Education Building West
CMSC	Community Services Center Building	PPS	Facilities Management
CNTR	Academic Center Building ¹	PRNT	Academic/Business Services Complex ¹
COWDN (Wings A and B)	Cowden Family Resources Building	PS (Wings A–H)	George M. Bateman Physical Sciences Center
CP	Central Plant	PSY	Psychology Building
CPCOM	Computing Commons Building	RITT (Wings A and B)	Ritter Building
CRI	Cancer Research Institute	SANDS	Sands Classroom Building ²
CRNX	Classroom Annex ²	SDF	Solar Demonstration Facility
CTRSV	Central Services Complex ²	SHS (Wings A and B)	Student Health Service
EC (Wings A–G)	Engineering Center	SIM	Flight Simulator Building ¹
ECANX	Engineering Center Annex	SRC	Student Recreation Complex
ED	Hiram B. Farmer Education Building	SS	Social Sciences Building
EDB	Ira D. Payne Education Hall	SSV	Student Services Building
EDC	G. D. McGrath Education Lecture Hall	STAD	Sun Devil Stadium
ELAB	Electronics Laboratory Building ¹	STAUF (Wings A and B)	Charles Stauffer Communication Arts Building
ENGRC	Engineering Research Center	TC	Technology Center
FAB	Faculty and Administration Building ²	TCB	Aeronautics Building
FAC	Nelson Fine Arts Center	TCC	Technology Center Annex
FIELD	University Field Lab	THWH	Theatre Warehouse
FLHLB	Fletcher Library ²	TOWER (Wings A and B)	University Tower Center
GGMA	Grady Gammage Memorial Auditorium	TRACK	Joe Sells Track
GHALL	Dixie Gammage Hall	UAC	University Activity Center
GWC	Barry M. Goldwater Center for Science and Engineering Research	UASB	Undergraduate Academic Services Building
IAPNX	Interdisciplinary Arts and Performance Annex ²	UCB	University Center Building ²
ICA	Intercollegiate Athletics	UCLUB	University Club
IRISH	Frederick M. Irish Hall	VISIT	ASU Visitor's Information Center
JWS (Wings A and B)	John W. Schwada Classroom Office Building	WH	Warehouse
		WHALL	West Hall
		WILSN	George W. Wilson Hall
		WTC	Whiteman Tennis Center

¹ Located at ASU East.

² Located at ASU West.

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