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Arizona State University

2002–2003 Graduate 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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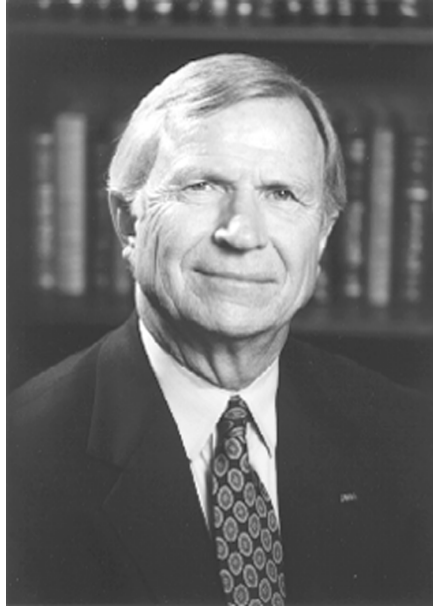
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President Lattie F. Coor

Tim Trumble photo

Dear ASU Students and Prospective Students:

I am pleased to welcome you to Arizona State University, a Research Extensive university in one of the nation's fastest-growing metropolitan areas.

I am proud of the fact that ASU continues to advance rapidly as a major national research university. This accomplishment is reflected by the talented and diverse students and faculty we have attracted, our ability to deliver quality education, achievements in research and creative activities, and the richness in our cultural diversity. We are committed to excellence in research, teaching, and professional and community service, which are all essential components of a great and engaging university.

Arizona State University is noted for its outstanding resources and environment and for faculty characterized by their creative and scholarly distinction and innovation. As well, we seek ways to create educational partnerships with the community to enrich its intellectual life and enhance the professional tenor of our programs.

We will continue to strive for excellence and to encourage creative individuals to be curious and to think critically and boldly. It is an honor to invite you to be a part of the vigorous academic community at ASU.

Sincerely,

A handwritten signature in black ink, appearing to read "Lattie F. Coor". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Lattie F. Coor
President



Bianca L. Bernstein
Tim Trumble photo

I extend a warm welcome to new and continuing graduate students at Arizona State University. Our advanced programs are a source of pride for our students, alumni, and faculty. We offer 48 doctoral programs, 91 master's degree programs, and 15 graduate certificates, supported by 1,600 faculty members whose innovative teaching and groundbreaking research are recognized nationally and internationally.

A leading center for research and technological development, ASU partners with the private sector to advance the economic competitiveness and quality of life in Arizona. Benefiting from the rich resources and intellectual capital existing in the Phoenix metropolitan area, ASU is a key contributor in developing the industries and services of the New Economy. As one of the major metropolitan research universities in America, we take pride in our success in matching university talents and expertise with the vision of community leaders to shape the future.

Our faculty are at the forefront of reforming doctoral education. ASU is one of 14 institutions in the U.S. participating in the Woodrow Wilson National Fellowship Foundation's Responsive Ph.D. program to improve doctoral education in the arts and sciences. We emphasize professional development through our Preparing Future Faculty program, one of the first in the nation, and our Preparing Future Professionals program for students headed toward nonacademic careers. A prominent feature of graduate education at ASU is the wide range of opportunities for students and faculty to work together on interdisciplinary, collaborative research projects.

We are proud of our commitment to graduate education: to prepare our students to become scholars and professional leaders in a new century marked by constant change, rapid technological advances, and rich traditions. Our partnership with ASU students provides a nurturing environment to enhance their intellectual and personal growth. Please call on us if we may be of assistance.

I wish you every success in the pursuit of your goals at Arizona State University.

Cordially,

Bianca L. Bernstein
Dean of the Graduate College

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AES Aerospace Studies ¹		COM Hugh Downs School of Human Communication ..	148
AET Aeronautical Engineering Technology.....	341	CON Construction.....	160
AFH African American Studies Humanities ¹		CPP College of Public Programs ¹	
AFR African American Studies ¹		CPY Counseling Psychology	163
AFS African American Studies Social Science ¹		CRJ Criminal Justice ²	
AGB Agribusiness.....	102	CSE Computer Science and Engineering	157
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AJS Administration of Justice ²		CSS Chicana and Chicano Studies Social Science ¹	
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IAP Interdisciplinary Arts and Performance ²		POR Portuguese ¹	
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ITA Italian ¹		RUS Russian.....	249
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JAC Joint Admission Continuous Enrollment ¹		SCA Scandinavian ¹	
JMC Journalism and Mass Communication.....	254	SCM Supply Chain Management.....	138
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¹ See the *General Catalog*.

² See the *ASU West Catalog*.

ASU Graduate Degrees

Graduate degrees, majors, and concentrations offered by ASU Main, ASU East, and ASU West and through ASU Extended Campus are shown in the “ASU Graduate Degrees” table below, organized by the name of the major. The table points to the primary page where more information can be found. The table includes only officially approved concentrations; other informal areas of study may be available.

Master of Accountancy and Information Systems (M.A.I.S.)
 Master of Architecture (M.Arch.)
 Master of Arts (M.A.)
 Master of Business Administration (M.B.A.)
 Master of Computer Science (M.C.S.)
 Master of Counseling (M.C.)
 Master of Education (M.Ed.)
 Master of Engineering (M.E.)
 Master of Environmental Planning (M.E.P.)
 Master of Fine Arts (M.F.A.)

Master of Health Services Administration (M.H.S.A.)
 Master of Mass Communication (M.M.C.)
 Master of Music (M.M.)
 Master of Natural Science (M.N.S.)
 Master of Physical Education (M.P.E.)
 Master of Public Administration (M.P.A.)
 Master of Public Health (M.P.H.)
 Master of Science (M.S.)
 Master of Science in Design (M.S.D.)
 Master of Science in Engineering (M.S.E.)
 Master of Science in Technology (M.S.Tech.)
 Master of Social Work (M.S.W.)
 Master of Taxation (M.Tax.)
 Master of Teaching English as a Second Language (M.TESL)
 Doctor of Education (Ed.D.)
 Doctor of Musical Arts (D.M.A.)
 Doctor of Philosophy (Ph.D.)
 Juris Doctor (J.D.)

ASU Graduate Degrees

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Aerospace Engineering	M.S., M.S.E., Ph.D.	—	Main	100
Agribusiness	M.S.	Agribusiness management and marketing, food quality assurance	East	101
Anthropology	M.A.	Archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, social-cultural anthropology	Main	104
	Ph.D.	Archaeology, physical anthropology, social-cultural anthropology	Main	105
Architecture	M.Arch.	—	Main	108
Art	M.A.	Art education, art history	Main	116
	M.F.A.	Ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	Main	117
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Main	245
Bioengineering	M.S., Ph.D.	—	Main	124
Biology ¹	M.S., Ph.D.	Ecology	Main	127

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, facilities development and management	Main	111
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	Ph.D.	Accountancy, computer information systems, finance, health services research, ² management, marketing, supply chain management	West Extended Main	445 457 132
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Main	139
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid-state chemistry	Main	142
Civil Engineering	M.S., M.S.E., Ph.D.	—	Main	144
Communication	M.A.	—	Main	147
	Ph.D.	Communicative development, intercultural communication, organizational communication	Main	150
Communication Disorders	M.S.	—	Main	152
Communication Studies	M.A.	—	West	445
Composition	M.M.	—	Main	274
Computational Biosciences	M.S.	—	Main	154
Computer Science	M.C.S., M.S., Ph.D.	—	Main	155
Construction	M.S.	Construction science, facilities, management	Main	159
Counseling	M.C.	—	Main	161
Counseling Psychology	Ph.D.	—	Main	162
Counselor Education	M.Ed.	—	Main	163
Creative Writing	M.F.A.	—	Main	164
Criminal Justice	M.A.	—	West	445
Curriculum and Instruction	M.A.	Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, social studies education	Main	165
		Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, social studies education	Main	165
	Secondary education	Extended	456	

¹ This major has formalized concentration(s); other areas of study are available.

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⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU GRADUATE DEGREES

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Curriculum and Instruction (continued)	Ed.D.	Bilingual education, curriculum studies, early childhood education, elementary education, ² English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, ² social studies education	Main	166
	Ph.D.	Art education, curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, special education	Main	171
Dance	M.F.A.	—	Main	174
Design	M.S.D.	Graphic design, industrial design, interior design	Main	176
Economics	M.S., Ph.D.	—	Main	179
Educational Administration and Supervision	M.Ed.	—	Main	183
	Ed.D.	—	West	445
			Main	183
Extended	458			
Educational Leadership and Policy Studies	Ph.D.	—	Main	185
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	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology	Main	187
Educational Technology	M.Ed., Ph.D.	—	Main	188
Electrical Engineering	M.S., Ph.D.	—	Main	190
			Main	190
	M.S.E.	—	Extended	457
Elementary Education	M.Ed.	Bilingual education, educational technology, ESL education, reading	West	445
Engineering ³	M.E.	—	Main	195
			Extended	457
Engineering Science	M.S., M.S.E., Ph.D.	—	Main	197
English	M.A.	Comparative literature, English linguistics, literature and language, rhetoric and composition	Main	198
	Ph.D.	Literature, rhetoric/composition and linguistics	Main	199
Environmental Design and Planning	Ph.D.	Design; history, theory, and criticism; planning	Main	203
Environmental Planning	M.E.P.	Landscape ecological planning, urban and regional development, urban design	Main	205
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, range ecology	East	209
Exercise and Wellness	M.S.	—	East	210
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Main	212

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Exercise Science/Physical Education	M.S.	—	Main	213
Family and Human Development	M.S.	Family studies	Main	215
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Geography	M.A., Ph.D.	—	Main	218
Geological Sciences	M.S., Ph.D.	—	Main	222
German	M.A.	Comparative literature, language and culture, literature	Main	225
Health Services Administration	M.H.S.A.	—	Main	226
Higher and Postsecondary Education	M.Ed., Ed.D.	Higher education	Main	229
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, U.S. Western history	Main	230
	Ph.D.	Asian history, British history, European history, Latin American history, U.S. history	Main	231
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Humanities	M.A.	—	Main	236
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	Ph.D.	Criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; women, law, and justice	Main	243
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Materials Engineering	M.S., M.S.E.	—	Main	256
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Mathematics	M.A., Ph.D.	—	Main	259
Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Main	264
Microbiology	M.S., Ph.D.	—	Main	269
Molecular and Cellular Biology	M.S., Ph.D.	—	Main	271
Music	M.A.	Ethnomusicology, music history and literature, music theory	Main	273
	D.M.A.	Conducting, music composition, music education, performance	Main	275
Music Education	M.M.	Choral music, general music, instrumental music, jazz studies	Main	274
Natural Science	M.N.S.	Biology, chemistry, geological sciences, mathematics, microbiology, physics, plant biology	Main	279

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU GRADUATE DEGREES

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Nursing	M.S.	Adult health nursing, community health nursing, community mental health/psychiatric nursing, family health nursing, parent-child nursing, women's health	Main	281
Nutrition	M.S.	—	East	285
Performance	M.M.	Music theatre/opera musical direction, music theatre/opera performance, performance, performance pedagogy, piano accompanying	Main	275
Philosophy	M.A., Ph.D.	—	Main	287
Physical Education	M.P.E.	—	Main	213
Physics	M.S., Ph.D.	—	Main	290
Plant Biology ¹	M.S., Ph.D.	Ecology, photosynthesis	Main	294
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, political theory	Main	297
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, environmental psychology, ² quantitative research methods, social psychology	Main	300
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban management and planning—	Main Extended	302 456
	Ph.D.	—	Main	305
Public Health ³	M.P.H.	Community health practice, health administration and policy	Main	306
Recreation	M.S.	—	Main	308
Religious Studies	M.A.	—	Main	309
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis, solid-state device materials design	Main	312
Secondary Education	M.Ed.	Educational technology	West	445
Social and Philosophical Foundations of Education	M.A.	—	Main	314
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	Main	315
		Advanced generalist practice	Extended	456
	Ph.D.	—	West Main	445 318
Sociology	M.A., Ph.D.	—	Main	321
Spanish	M.A.	Comparative literature, language and culture, linguistics, literature	Main	323
	Ph.D.	Cultural studies, literature	Main	323
Special Education	M.A.	—	Main	323
	M.Ed.	Gifted, mildly disabled, multicultural exceptional, severely/multiply disabled	Main	323
		Infants and young children	West	445
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Main	325
Statistics	M.S.	—	Main	327

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

ASU Graduate Degrees (continued)

Major	Degree	Concentration	Campus	Page
Taxation	M.Tax.	—	Main	328
Teaching English as a Second Language	M.TESL	—	Main	328
Technology	M.S.Tech.	Aeronautical engineering technology, aviation human factors, aviation management technology, computer systems engineering technology, electronic systems engineering technology, environmental technology management, fire service administration, global technology and development, information technology, instrumentation and measurement technology, management of technology, manufacturing engineering technology, mechanical engineering technology, microelectronics engineering technology, security engineering technology	East	329
Theatre	M.A.	—	Main	343
	M.F.A.	Performance, scenography, theatre for youth	Main	344
	Ph.D.	Theatre for youth	Main	344

¹ This major has formalized concentration(s); other areas of study are available.

² Applications are not being accepted at this time.

³ This collaborative program is offered by the three state universities.

⁴ This major is jointly offered with the University of Arizona.

⁵ Students apply to this degree program through the College of Law, not the Graduate College.

Dual Degrees

Dual Degrees	Administered By	Campus	Page(s)
J.D./M.H.S.A.	College of Law/School of Health Administration and Policy	Main	71 , 226
J.D./M.S. in Economics*	College of Law/Department of Economics	Main	71 , 179
J.D./Ph.D. in Justice Studies	College of Law/Committee on Law and Social Sciences	Main	71 , 245
M.A. in Anthropology/M.S. in Justice Studies	Department of Anthropology/School of Justice Studies	Main	242
M.A.I.S./M.B.A.	College of Business	Main	59 , 98
M.Arch./M.B.A.	School of Architecture/College of Business	Main	59 , 111
M.B.A./J.D.	College of Business/College of Law	Main	59 , 71
M.B.A./M.H.S.A.	College of Business	Main	59 , 226
M.B.A./M.S. in Economics	College of Business	Main	59 , 179
M.B.A./M.S. in Information Management	College of Business	Main	59 , 131
M.B.A./M.Tax.	College of Business	Main	59 , 328
M.B.A./Master of International Management	College of Business/American Graduate School of International Management (Thunderbird), Graduate School of Business Administration (Peru); Graduate School of Commerce (France); Monterrey Institute for Technical and Superior Studies, Mexico State Campus (Mexico); and Carlos III University of Madrid (Spain)	Main	59
M.S. in Nursing/M.P.H.	College of Nursing	Main	78
M.S.E. in Industrial Engineering/ Master of International Management of Technology	Department of Industrial and Management Systems Engineering/ American Graduate School of International Management (Thunderbird)	Main	238

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

ASU Certificates

Students may pursue some certificate programs along with a major and other certificate programs independently. Graduate certificates constitute graduate work; postbaccalaureate certificates are distinct from graduate certificates

and are an extension of the undergraduate curriculum. See the “[ASU Graduate Certificates](#)” table below. For information on undergraduate and postbaccalaureate certificates, see the *General Catalog* and *ASU West Catalog*.

ASU Graduate Certificates

Certificate	Administered By	Campus	Page
Atmospheric Sciences Certificate	College of Engineering and Applied Sciences and College of Liberal Arts and Sciences	Main	124
Geographic Information Science, Interdisciplinary Certificate in	Graduate College	Main	218
Gerontology, Certificate in	College of Human Services Graduate College	West Main Extended	445 225 458
Indian Law Certificate	College of Law	Main	72
Medieval Studies Certificate	Arizona Center for Medieval and Renaissance Studies (ACMRS)	Main	268
Museum Studies Certificate	Department of Anthropology	Main	105
Law, Science, and Technology, Certificate in	College of Law	Main	71
Nonprofit Leadership and Management Certificate	College of Public Programs	Main	280
Post-Bachelor’s Artist Diploma	School of Music	Main	276
Post-Master’s Nurse Practitioner Certificate	College of Nursing	Main	281
Renaissance Studies Certificate	ACMRS	Main	268
Scholarly Publishing Certificate	Department of History	Main	311
Statistics, Certificate in	Committee on Statistics and the Graduate College	Main	326
Translation Certificate	Department of Languages and Literatures	Main	246
Transportation Systems Certificate	Committee on Transportation Systems and the Graduate College	Main	348



An aerial view of Grady Gammage Memorial Auditorium

Jeff Havir photo

Graduate College Calendar

April 2002

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May 2002

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June 2002

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July 2002

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August 2002

S	M	T	W	T	F	S
			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September 2002

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

2002
 Check the 2002 *Summer Sessions Bulletin* for details and to confirm these dates.
 Mon., Feb. 4–
 Wed., May 29
 Mon., Feb. 4–
 Tues., July 2
 Tues., Apr. 30

Mon., May 27
 Tues., May 28
 Tues., June 4
 Tues., June 4
 Fri., June 14
 Fri., June 21
 Fri., June 28
 Mon., July 1
 Thurs., July 4
 Fri., July 5

Mon., July 8
 Fri., July 12
 Fri., July 12
 Fri., July 19
 Fri., July 19
 Fri., July 19
 Fri., July 26
 Fri., July 26
 Fri., July 26
 Tues., July 30

Fri., Aug. 2
 Fri., Aug. 2

2002
 Check the fall 2002 *Schedule of Classes* for details and to confirm these dates.
 Thurs., Mar. 28–
 Fri., Apr. 5

Summer Sessions

Registration and drop/add for first five-week session and eight-week session
 Registration and drop/add for second five-week session
 Final tuition payment deadline for all summer sessions (For students who register on or after the deadline, fees are due daily.)
 Memorial Day Holiday
 Instruction begins for first five-week session and eight-week session
 Unrestricted course and complete withdrawal deadline for first five-week session
 Unrestricted course and complete withdrawal deadline for eight-week session
 Restricted course withdrawal deadline for first five-week session and eight-week session
 Restricted complete withdrawal deadline for first five-week session
 First five-week session ends
 Instruction begins for second five-week session
 Classes are excused for Independence Day
 August graduation filing deadline (must be met to have name appear in commencement program)
 Unrestricted course and complete withdrawal deadline for second five-week session
 Restricted complete withdrawal deadline for eight-week session
 Deadline to submit thesis or dissertation for format review to Graduate College and schedule defense
 Eight-week session ends
 Restricted course withdrawal deadline for second five-week session
 Doctoral participation form due to reserve seat at commencement
 Restricted complete withdrawal deadline for second five-week session
 Last day to hold oral examination in defense of a thesis or dissertation
 Last day to obtain signature of the Graduate College dean for thesis or dissertation approval and to submit to ASU Bookstore for binding by 3 P.M.
 Second five-week session ends
 Commencement

Fall Semester

Preregistration

GRADUATE COLLEGE CALENDAR

September 2002

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October 2002

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November 2002

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December 2002

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

January 2003

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February 2003

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

Mon., Apr. 22–
Sun., Sept. 1
Wed., Apr. 24–
Sun., Sept. 1
Thurs., Aug. 1
Tues., Aug. 6

Mon., Aug. 12–
Sat., Aug. 17
Mon., Aug. 19

Tues., Aug. 20–
Thurs., Aug. 22
Wed., Aug. 21
Thurs., Aug. 22
Mon., Aug. 26
Mon., Sept. 2
Fri., Sept. 20
Tues., Oct. 1

Tues., Oct. 8

Mon., Oct. 14–
Fri., Oct. 18
Tues., Oct. 15

Fri., Nov. 1
Mon., Nov. 11
Wed., Nov. 27

Thurs., Nov. 28–
Fri., Nov. 29
Wed., Dec. 4
Fri., Dec. 6

Tues., Dec. 10
Wed., Dec. 11
Fri., Dec. 13

Tues., Dec. 17

Thurs., Dec. 12–
Sat., Dec. 14;
Mon., Dec. 16–
Wed., Dec. 18
Thurs., Dec. 19
Fri., Dec. 20
Sat., Dec. 21

Drop/add

Registration

Early Teaching Assistant Orientation (8:15 A.M.–12:30 P.M.)
Final tuition payment deadline for fall 2002
(For students who register on or after the deadline,
fees are due daily.)
International Student Orientation and activities

New Teaching Assistant Orientation and activities (8:15 A.M.–
12:30 P.M.)
Residence halls open (Check-in date varies by community/last
name. Refer to the Residential Life schedule.)
New graduate student orientation/reception (5–7 P.M.)
New Faculty and Academic Professional Orientation and Reception
Instruction begins
Classes are excused for Labor Day
Unrestricted withdrawal deadline
Winter Session (College of Extended Education [CEE]) registration
begins
Thesis/Dissertation Workshop, Memorial Union,
Ventana Room (3–5 P.M.)
Semester midpoint

December graduation filing deadline (must be met to have name
appear in commencement program)
Restricted course withdrawal deadline
Classes are excused for Veterans Day
Last day to submit materials for thesis or dissertation format review
and oral defense
Classes are excused for Thanksgiving recess

Restricted complete withdrawal deadline
Deadline for submission of Doctoral Participation Form to reserve
seat at commencement
Instruction ends
Reading day
Last day to hold oral examination in defense of a thesis or
dissertation
Last day to obtain signature of the Graduate College dean for thesis
or dissertation approval and to submit to ASU Bookstore for
binding by 3 P.M.
Final examinations

Commencement (4 P.M.)
Some residence halls close for semester break
Midyear recess begins

March 2003

S	M	T	W	T	F	S
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23	24	25	26	27	28	29
30	31					

April 2003

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			5	6	7	8
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

May 2003

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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June 2003

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1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July 2003

S	M	T	W	T	F	S
			1	2	3	4
			5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August 2003

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					1	2
					3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Mon., Dec. 30

2003

Check the spring 2003

Mon., Oct. 28–

Tues., Nov. 5, 2002

Mon., Nov. 18, 2002–

Sun., Jan. 26, 2003

Wed., Nov. 20, 2002–

Sun., Jan. 26, 2003

Tues., Dec. 17, 2002

Wed., Jan. 1, 2003

Mon., Jan. 6–

Sat., Jan. 11

Mon., Jan. 13

Wed., Jan. 15

Fri., Jan. 17

Mon., Jan. 20

Tues., Jan. 21

Fri., Feb. 21

Thurs., Feb. 27

Sun., Mar. 16–

Sun., Mar. 23

Mon., Mar. 31

Fri., Apr. 4

Tues., Apr. 8

Fri., Apr. 25

Wed., Apr. 30

Fri., May 2

Tues., May 6

Wed., May 7

Thurs., May 8–

Sat., May 10;

Mon., May 12–

Wed., May 14

Fri., May 9

Tues., May 13

Tues., May 13

Thurs., May 15

Fri., May 16

Winter Session (CEE) instruction begins

Spring Semester

Schedule of Classes for details and to confirm these dates.

Preregistration

Drop/add

Registration

Final tuition payment deadline for spring 2003
(For students who register on or after the deadline,
fees are due daily.)

Winter Session classes are excused for New Year's Day

International Student Orientation and activities

New Teaching Assistant Orientation (8:15 A.M.–12:30 P.M.)

Residence halls open

Winter Session (CEE) instruction ends

Classes are excused for Martin Luther King Jr. Day

Instruction begins

Unrestricted withdrawal deadline

Thesis/Dissertation Workshop, Memorial Union,
Ventana Room (3–5 P.M.)

Classes are excused for spring recess; semester midpoint

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

Restricted course withdrawal deadline

Graduate Forum and Information Fair

Last day to submit materials for thesis and dissertation format
review and oral defense

Restricted complete withdrawal deadline

Deadline for submission of Doctoral Participation Form to reserve
seat at commencement

Instruction ends

Reading day

Final examinations

Last day to hold oral examination in defense of a thesis or
dissertation

Last day to obtain signature of the Graduate College dean for thesis
and dissertation approval

Last day to submit to ASU Bookstore binding for thesis and
dissertation (due by 3 P.M.)

Commencement

Residence halls close

GRADUATE COLLEGE CALENDAR

April 2003

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May 2003

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				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June 2003

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July 2003

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August 2003

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

2003

Check the 2003 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 3–
Tues., June 3

Mon., Feb. 3–
Tues., July 8

Tues., Apr. 29

Mon., May 26

Mon., June 2

Mon., June 9

Fri., June 20

Fri., June 27

Tues., July 1

Thurs., July 3

Fri., July 4

Mon., July 7

Mon., July 14

Fri., July 18

Fri., July 18

Fri., July 25

Fri., July 25

Fri., July 25

Fri., Aug. 1

Fri., Aug. 1

Tues., Aug. 5

Tues., Aug. 5

Fri., Aug. 8

Fri., Aug. 8

Summer Sessions

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

Registration and drop/add for second five-week session

Final tuition payment deadline for all summer sessions (For students who register on or after the deadline, fees are due daily.)

Memorial Day Holiday

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

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

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

Restricted complete withdrawal deadline for first five-week session

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

First five-week session ends

Classes are excused for Independence Day

Instruction begins for second five-week session

Unrestricted course and complete withdrawal deadline for second five-week session

Restricted complete withdrawal deadline for eight-week session

Last day to submit materials for thesis and dissertation format review and oral defense

Deadline for submission of Doctoral Participation Form to reserve seat at commencement

Eight-week session ends

Restricted course withdrawal deadline for second five-week session

Last day to hold oral examination in defense of a thesis or dissertation

Restricted complete withdrawal deadline for second five-week session

Last day to obtain signature of the Graduate College dean for thesis and dissertation approval

Last day to obtain submit to ASU Bookstore binding for thesis and dissertation (due by 3 P.M.)

Second five-week session ends

Commencement

Frequently Asked Questions

Admission Information? Requests for applications should be directed to Graduate Admissions at 480/965-6113 or gradadmiss@asu.edu. For more information, visit www.asu.edu/graduate/admissions on the Web.

Advising? The Graduate College Advising/Referral Office is open to prospective and admitted graduate students. However, students admitted to a degree program should first seek advising within their programs.

Application Fee Waiver? ASU cannot waive, defer, or refund the fee. A decision cannot be made on your application until the \$45 application processing fee is paid.

Campus Map? See the “ASU Main Map,” on the inside back cover; “ASU East Map,” page [437](#); “[ASU West Map](#),” page [446](#); “ASU Downtown Center Map,” page [461](#); and “ASU Vicinity Map,” page [464](#). The Graduate College (Wilson Hall, center lobby) also distributes maps of the campus and parking facilities.

Corresponding with ASU? Address letters to: Department or Office Name, Arizona State University, Tempe, AZ 85287. For information regarding the progress of your file during the admission process, access the Graduate College Web site at www.asu.edu/graduate and click on Studies at ASU for department e-mail addresses and Web site links, or send inquiries to Graduate Admissions, and the staff will forward it to the proper office. New and continuing students may also access personal account information using ASU Interactive on the Web at www.asu.edu/interactive.

Degree Programs and Departments? For specific information about faculty, programs, application requirements, and deadlines, contact the academic unit directly, by mail or by phone.

Employment on Campus? The Student Employment Office, 480/965-5186, maintains and posts up-to-date employment information for jobs on campus.

Financial Assistance? Loans? Scholarships?

First. Your best source of information is the academic unit to which you are applying, where you can receive information, guidance, and application forms for scholarships, assistantships, and fellowships specific to that program. Most units set early deadlines and require special forms or procedures.

Second. Information about loans, scholarships, grants, work-study, and employment opportunities is available through the Graduate College Student Financial Assistance Office, Wilson Hall, 480/965-3521. For more information, access www.asu.edu/graduate/financial on the Web, or send e-mail to gradaid@asu.edu.

Third. At a college or public library, ask a librarian for publications to help you find scholarships and fellowships.

Fourth. If you now attend school, ask your advisor for guidance in finding information on financial assistance in your discipline.

Financial Guarantee? International applicants must provide explicit verification from their banks that funds equal to the amount specified on the Financial Guarantee Form are available to them. (A general assurance of good credit is not accepted.) For more information, access www.asu.edu/graduate/admissions on the Web.

Housing?

On Campus. Cholla Apartments house graduate students and should be specifically requested for campus housing on applications instead of other facilities; contact Residential Life, 480/965-3515 or reslife@asu.edu. University housing is available for married students or families only at ASU East campus. For more information, access www.asu.edu/reslife on the Web.

Off Campus. Information is available from the ASASU Tenants/Commuter Students Association, 480/965-6246. Local newspapers advertise many rentals.

I-20/IAP-66 Forms? ASU issues visa forms permitting attendance at ASU only. ASU issues the I-20 or IAP-66 only after receiving an acceptable Financial Guarantee Form and admitting the student to a graduate degree program.

Immunization? Students born after December 31, 1956, must receive a measles immunization or offer proof of measles immunity. Direct questions to Student Health and Wellness Center, 480/965-3346. For more information, access www.asu.edu/health on the Web.

International Student Association? Call the International Student Office, 480/965-7451, after arriving on campus. For more information, access www.asu.edu/vpsa/studentlife/iso on the Web.

Letters of Recommendation? Send these letters to the director of graduate study in the academic unit to which you are applying.

Phone Numbers? See the “[ASU Main Directory](#),” page [352](#), and other directories noted on that page. Call the campus operator Monday through Friday, 8 A.M. to 5 P.M., at 480/965-9011.

Release of Information to Friends? By law, staff members can give personal information only to the applicant. If you want us to release information to another person, you must authorize us to do so. Send a letter to Graduate Admissions naming the person who may represent you. Sign the letter with your name as it appears on your application form.

Teacher Certification? Students who select nondegree and degree graduate programs at ASU are eligible for Arizona teacher’s certification. Call the Office of Student Affairs, College of Education, at 480/965-5555.

TOEFL Scores? See “[TOEFL Requirement](#),” page [84](#).

Transcripts? See “[Transcripts](#),” page [40](#).

General Information

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 49,700 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 southeast 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.

Arizona State University's goal is to become a world-class university in a multicampus setting, one of the very best public universities in the nation. Its 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, ASU 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 named to Research Extensive (formerly Research I) 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 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 two students 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 provosts, vice presidents, deans, directors, department chairs, faculty, and other officers. See [“Administrative Personnel,” page 425](#).

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.

ACADEMIC ACCREDITATION AND AFFILIATION

See [“Accreditation and Affiliation,” page 465](#).

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, other eligible 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, other eligible 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, or 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 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.

INTERGROUP RELATIONS CENTER

The only center of its kind on a college campus, the Intergroup Relations Center (IRC) works with students, staff, and faculty to promote positive intergroup relations, to prepare students for living in a diverse democracy, to create greater understanding between the different groups that exist at ASU, and to provide faculty, staff, and students opportunities to explore the rich diversity that is part of the ASU campus community. Through structured interaction programs, including intergroup dialogues, story circles, retreats, and institutes and via educational and training workshops, the center promotes diversity as one of the university's greatest assets. The educational work of the center encompasses gender, race/ethnicity, sexual orientation, age, disability status, nationality, adult reentry, and other salient social identities found at ASU.

Some of the programs and initiatives offered by the center include Voices of Discovery, a six-week student intergroup dialogue program that brings together small groups of African Americans and white/EuroAmericans, males and females, American Indians and white/EuroAmericans, Latinos and white/EuroAmericans, gays, lesbians, bisexuals, heterosexuals, and other groups to interact with and learn about each other. Leadership 2000, an annual four-day, off-campus retreat brings together 80 students from many different backgrounds to explore their own and others' diversity. Allies in Action, a diverse group of students sponsored by the IRC, works together to improve intergroup relations on the campus. Intergroup Relations Theatre and Music programs use the arts to interactively involve, entertain, and educate participants about issues of diversity. The center also offers programs for faculty and staff addressing issues of diversity in the workplace and the classroom and custom-designed programs, consultation, and intergroup conflict mediation services for a wide range of campus offices, academic departments, and student groups.

For more information, visit the center in SSV 278, call 480/965-1574, or access the IRC Web site at www.asu.edu/provost/intergroup.

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 stu-

dents 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 arboretum.

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 for a three-year term. This was a time of uncertainty for educational institutions. Although enrollment increased due to the depression, many faculty were terminated and faculty salaries were cut. The North Central Association became the accrediting agency for Arizona State Teachers College.

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.

The Graduate Division was created in 1937, and the first master's program was established the same year.

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.

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ASU Research Park

Tim Trumble photo

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 percent 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 to fruition 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.

A transformation of ASU has taken place under the leadership of Dr. Lattie F. Coor, who became the university's 15th president on January 1, 1990. The university has grown to serve the Valley of the Sun through multiple campuses and the College of Extended Education, an architecture that positions ASU to meet future enrollment growth.

The quality of undergraduate students and programs has improved substantially during the past decade. In 2001, ASU had its best year in history in prestigious national scholarship competitions. Students brought home the Rhodes, Truman, Marshall, Goldwater, and Udall awards, making ASU one of only two public universities in the nation to be represented in all five top scholarship awards. Enrollment in the Barrett Honors College has more than tripled since 1988, from 800 to more than 2,600 students majoring in all disciplines throughout ASU.

Coor's strong commitment to increased diversity is reflected in the faculty and student body. During the last decade, the university's minority enrollment has more than doubled. This fall, minorities represent 30 percent of the university's freshman class and nearly 20 percent of the entire enrollment.

With regard to ASU faculty, the percentage of minorities has increased to 15.3 percent—up from 10.3 percent five years ago. ASU has the highest number and highest proportion of Hispanic faculty of any major U.S. research university.

ASU has become one of the leading research universities in America, developing nationally recognized programs in a number of fields, including accounting; astrobiology; design science; ecology and evolutionary biology; electron microscopy; engineering; exercise science; music; nanotechnology; psychology; and solid-state science. As part of Coor's vision for the economic vitality of Arizona, ASU is committing to a strategic focus on four critical research areas that are essential in the New Economy: materials; biomedicine and biotechnology; information science and technology; and manufacturing. These initiatives already have a significant impact on the Arizona economy, representing more than 207,000 jobs, 2,000 businesses, and \$1.5 billion in exports in the first quarter of 2000.

Part of Coor's legacy to the university—before retiring at the end of the 2002 academic year—is a successful fundraising campaign. Through private donations, primarily from the local community, \$500 million is being invested in targeted areas that most significantly impact the future of ASU. Among the campaign's achievements are the naming and endowing of the Barrett Honors College, the Katherine K. Herberger College of Fine Arts, and the Morrison School of Agribusiness and Resource Management at ASU East; the creation of many new endowed faculty positions; and hundreds of new scholarships and fellowships.

Research Extensive Status. ASU was named to Research Extensive (formerly Research I) status 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. In the 1940s, the college's teams became the Sun Devils.

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 against Ohio State.

In 2000, ASU finished ninth nationally in the Sears Directors' Cup, which recognizes the top athletic programs in the country. Six teams finished in the top 20 nationally with three teams posting top 10 finishes. Men's swimming and diving finished 10th, women's tennis finished in a tie for fifth, while men's indoor track and field also finished 10th.

Graduate College

Graduate education at ASU began with the creation of the Graduate Division in 1937 and the establishment of the first master's program the same year. For the first 20 years, graduate education focused exclusively on professional programs in education. During the 1950s as the campus grew and broadened its mission, a number of new degree programs appeared, significantly enhancing the role of graduate studies on the campus. By the early 1960s, graduate programs were established in many disciplines; humanities, social science, and science fields were well represented, as were professional programs in business, engineering, fine arts, and public administration. With this expansion of the mission of the campus came new facilities and the development of a wider range of research interests and activities.

Major changes in the nature and role of graduate education came in the early 1960s when the first Ph.D. programs were established in chemistry, education, engineering, English, physics, and psychology. The research focus of campus programs grew at a rapid pace. Master's programs matured as doctoral programs were added. From the late 1960s to the present, campus facilities for instruction, research, and advanced study significantly expanded to support university programs with the construction of new laboratories, classroom structures, and two large libraries—including a new main library and a separate science and engineering library.

UNIVERSITY CAMPUSES AND SITES

ASU Main. ASU Main is located near the heart of metropolitan Phoenix in the city of Tempe (population 158,625). 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. The campus is characterized by broad

pedestrian malls laid out in an easy-to-follow grid plan, spacious lawns, and subtropical landscaping.

ASU East. ASU East opened at the Williams Campus in the fall of 1996 and now serves approximately 2,400 students. ASU East offers many of the features of a small residential college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area.

The campus offers excellent educational facilities and residential opportunities, which include a choice of traditional residence halls or two- to five-bedroom homes. 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 [“ASU East,” page 434](#).

ASU West. A vital component of the ASU multicampus system, ASU West serves nearly 6,000 undergraduate and graduate students on its growing campus. ASU West provides a friendly, small-campus atmosphere along with the services, resources, and expertise of a nationally acclaimed, PAC-10 research university. Founded in 1984 with upper-division and master's programs, ASU West became a four-year university campus in 2001. The faculty and staff share a deep commitment to learner-centered education.

ASU West prides itself on serving the diverse needs of students who balance academics with the multiple demands of work and family through convenient scheduling of small classes. The campus mission balances teaching and research, faculty-student collaboration, interdisciplinary perspectives, and many thriving university-community partnerships. Courses at ASU West lead to 29 bachelor's degrees, nine master's degrees, and eight professional certificates.

The campus is located in northwest Phoenix between 43rd and 51st Avenues on West Thunderbird Road. The core campus was completed in 1991 and features a variety of state-of-the-art classroom and student service buildings, including Fletcher Library, the Sands Classroom Building, the Computer Laboratory/Classroom Building, Kiva Lecture Hall, the University Center Building, and the Faculty/Administration Building.

For more information, see [“ASU West,” page 444](#). For complete information and course listings, see the *ASU West Catalog*.

ASU Extended Campus. The ASU Extended Campus (www.asu.edu/xed) goes beyond the boundaries of the university's three physical campuses to provide access to quality academic credit and degree programs for working adults through flexible schedules; a vast network of off-campus sites; classes scheduled days, evenings, and weekends; and innovative delivery technologies, including television, the Internet, and Independent Learning. The ASU Extended Campus offers programs in partnership with the campuses and colleges of ASU, including a variety of professional continuing education programs. The ASU Downtown Center is the anchor location of the ASU Extended Campus. Lifelong learning opportunities are offered to students of all ages throughout Maricopa County and Arizona through the ASU Extended Campus.

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ASU Downtown Center. Located in downtown Phoenix, 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 scheduled at a variety of convenient times and offered through various modes of delivery. Professional continuing education, certificate programs, and lecture series are also available. Access to ASU library information and resources, ASU computing resources, and the Internet is available through the center's computer lab.

ASU Research Park. The mission of the ASU Research Park (researchpark.asu.edu) 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 new corporate and regional headquarters and research and development firms to Arizona—headquarters and firms that broaden the base for potential research, interact with graduate students, consult with university faculty, cosponsor seminars on research topics, and provide employment opportunities for ASU graduates.

The Research Park has numerous major tenants, including ASM Lithography, Avnet CMG, Bright Horizons Family Solutions, Iridium Satellite, Motorola Labs, Motorola University, National Association for Purchasing Management, Philips Electronics, and Walgreens Healthcare Plus. The Research Park contains over 1.5 million square feet of developed space on 320 acres.

Camp Tontozona. Located in the famed Mogollon Rim country near Kohl's Ranch, northeast of Payson, this continuing education facility 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 480/965-6851.

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 Hedgpeth Hills. For more information, call 623/582-8007.

The Arboretum. The Arboretum at Arizona State University is the entire 722-acre main campus. The Arboretum is home to a flourishing oasis of plants from around the world. This virtual outdoor classroom includes more than 300 species of trees and other woody ornamental and herbaceous plants from diverse geographic regions as well as the Sonoran Desert. The Arboretum contains one of the best collections of palms and conifers in the desert Southwest and a growing collection of native Southwestern plants. The Arboretum's date palm collection has received international recognition by the American Association of Botanical Gardens and Arboreta North American Plant Collection Consortium.

The Arboretum's collection began with Arthur J. Matthews. By the time Matthews' 30-year presidency was finished,

nearly 1,500 trees of 57 species and more than 5,700 feet of hedges were planted. One of his most enduring landscape projects was the planting of Mexican Fan Palms along Palm Walk in 1916, which extends from University Drive south to the Student Recreation Complex. Today the Arboretum has expanded its collection to include nearly 4,000 trees of 164 species/varieties.

The Arboretum is open to the public free of charge 365 days a year from dawn to dusk. Walking tours of the various collections and points of interest are designated by signage denoting those areas. Many of the plants in the collection throughout campus are marked with identification plaques.

UNIVERSITY LIBRARIES AND COLLECTIONS

The collections of the university's libraries comprise more than 3.6 million volumes, approximately 7 million microform units, and more than 33,500 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 "[Noble Science and Engineering Library](#)," page 358. For more information, access the Web site at www.asu.edu/lib.

Charles Trumbull Hayden Library. The Charles Trumbull Hayden Library, designed by Weaver and Drover in 1966, houses the largest multidisciplinary collection at ASU. In addition to the open stack areas, separate collections and service areas include Access for Disability Accommodations; Circulation; Current Periodicals and Microforms; Government Documents Services; Interlibrary Loan and Document Delivery Services; 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, the Benedict Visual Literacy Collection, and the Labriola National American Indian Data Center. Archives and Manuscripts holds the papers of several major Arizona political figures, including Senator Carl Hayden, with historic materials about Arizona, Chicano, and Indian affairs.

The Special Collections department includes the Child Drama Collection, collections of materials by and about William S. Burroughs, the Press of Thomas Bird Mosher, and the Patten Herbal Collection. For more information, access the Web site at www.asu.edu/lib/hayden.

Architecture and Environmental Design Library.

Located in the College of Architecture and Environmental Design/North building, this library has a general collection that focuses on architecture, design, graphic design, interior design, landscape architecture, and planning. The library's Special Collections and Archives, Architectural Drawings Collection, and Materials Resource Center provide additional opportunities for research. For more information, access the Web site at www.asu.edu/caed/AEDlibrary.

Arizona Historical Foundation. 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 audiovisual materials. Housed in the Charles Trumbull Hayden Library, the collection's focus is on the history of Arizona and the Southwest. For more information, access the Web site at www.users.qwest.net/~azhistoricalfdn.

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 more than 315,000 volumes, 5,000 serial subscriptions, and 1.4 million microforms selected to complement ASU West course offerings. For more information, access the Web site at www.west.asu.edu/library.

Law Library. The John J. Ross–William C. Blakley Law Library is located on McAllister Avenue. See “[Organization](#),” page 71, for more information.

Music Library. A large collection of music scores, recordings, books, music reference materials, and listening facilities for individuals and groups is located on the third floor of the Music Building, West Wing. For more information, access the Web site at www.asu.edu/lib/music.

Daniel E. Noble Science and Engineering Library. The Daniel E. Noble Science and Engineering Library houses books, journals, and microforms in the sciences, engineering, and nursing; the Map Collection; and the U.S. Patent and Trademark Depository. For more information, access the Web site at www.asu.edu/lib/noble.

University Archives. The University Archives collection is available for use at the Luhrs Reading Room in Hayden Library. The collection (1885–present) comprises university theses and dissertations; administrative records of the university; historical photographs and personal papers of faculty, staff, and alumni; and student, faculty, and official university publications. 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. For more information, access the Web site at www.asu.edu/lib/archives/archives.htm.

Video Resources. Located in ECA 100, Video Resources supports a variety of educational media services, including reserve videotapes of all ASU courses broadcast on cable television and ITFS, video viewing/study carrels, and a studio facility for students and faculty. In addition, Video Resources houses thousands of video titles in the ASU Media circulating collection that may be checked out for three days. Special Collections include the WorldFest Video Archive, Horizon, C-SPAN Booknotes, and C-SPAN I and II. Patrons with a current university ID may check out any available videotape for three days. Interlibrary loans and video booking may be scheduled by calling 480/965-7564. For more information, call 480/965-5046, or access the Web site at www.asu.edu/lib/video.

PERFORMING AND FINE ARTS FACILITIES

ASU Art Museum. The ASU Art Museum serves students and scholars within and beyond the university and as a cultural resource for the Phoenix Metropolitan area. Addition-

ally, the museum serves a public beyond the immediate area through traveling exhibitions and publications that not only document the exhibitions but also offer critical insight into the museum's areas of concentration.

Exhibitions, education programs, and publications are interdisciplinary and educational and are designed to engage viewers with art that is relevant to their lives. New technologies in the content of art and in the approaches to reaching new audiences are eagerly and openly adopted.

Collections and exhibitions focus on contemporary art, particularly new media and new methods of presentation; art by Latin American artists; art from the Southwest; prints, both historic and contemporary; and crafts, emphasizing American ceramics. The museum was founded by a gift of historic American paintings, which are on continuous display, including works by Gilbert Stuart, Albert Pinkham Ryder, Winslow Homer, Georgia O'Keeffe, and Romare Bearden. The contemporary art holdings include works by Nam June Paik, Lorna Simpson, Vernon Fisher, Sue Coe, and Enrique Chagoya. Exhibitions and collections are housed in galleries and study rooms within the international award-winning Nelson Fine Arts Center.

Educational programs include artist residencies and dialogs with classes, a student docent program, internships and research assistantships, lectures and symposia, in-gallery materials, special curricula-based school programs, and school and public tours. For information on upcoming exhibitions and programs, call 480/965-2787.

ASU Downtown Center Galleria. The Galleria, located on the second floor of the ASU Downtown Center, features work by ASU faculty, staff, students, and local artists. The Galleria is a member of Artlink First Friday's and the Phoenix Art Detour. Open Monday through Saturday, from 8 A.M. to 5 P.M., the Galleria features new and different works each month. For information on current or upcoming exhibitions, call 480/965-3046.

Computing Commons Gallery. One of the unique features of the Computing Commons building is the gallery located off the main lobby in the northwest corner of the building. This unique gallery is designed for showcasing technology-based artwork as well as more traditional two-dimensional graphic presentations. Now is an exciting time for the arts, as technology-based tools and techniques open new avenues for creativity. Such creativity is reflected in the Computing Commons Gallery's exhibits.

Dance Multimedia Learning Center. The Department of Dance Multimedia Learning Center is a facility designed to promote and encourage the use of media and computer technology in dance education and performance at ASU.

Dance Studio Theatre. The Dance Studio Theatre is a 300-seat performance space that is the mainstage performance site for the 12 formal and informal concerts produced annually by the Department of Dance. The theatre is one of the only dance spaces in the country that is designed with interactive and telematic capabilities. The facility uses video-based motion sensing and enables dancers to interact with sound, lighting, images, and video in performance. High-speed Internet connectivity enables this space to connect

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with other telematic spaces for dual, multisite, and Web performances.

Drama City. Housed in a 50-year-old former church, Drama City is the primary performance venue for the Institute for Studies in the Arts. The space is a black box, 60 by 30 feet with fixed lighting positions and flexible control stations. The area can seat up to 100 and is equipped for performance or installation pieces. The facility also houses a wide range of technology for performance and presentation, including video projection, automated luminaires, and a unique computerized control system for integrated media usage.

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 Nelson 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 ASU 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 Herberger College of Fine Arts.

The Intelligent Stage. The Intelligent Stage is a production and performance facility designed to explore the possibilities of interactive stage performance. The facility includes a sprung floor; 30 dimmers and a four channel sound system; a composer workstation; workstations for designing interactive MIDI performances; and a movement sensing, image-processing workstation. All are networked together for multimachine performance and production. Resident artists and technologists provide design and logistical support for projects in the facility.

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 venue for faculty productions and a laboratory for 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 operatic 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 140 persons.

Prism Theatre. The Prism Theatre is an alternative black box space devoted to student productions.

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, 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 an array of top entertainment from Las Vegas-style 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, access its Web site at www.kaet.asu.edu, or call 480/965-3506.

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 experimental 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 fundamental tools for learning, instruction, and research in every college and department at ASU. The Information Technology (IT) department provides a variety of computing equipment and services available for use by students, faculty, and staff. IT also provides programming, statistical, graphics, and other applications for micro-computers and mainframe computing systems. University-wide electronic mail and the library's online catalog are accessible through a high-speed campus network and from off campus via the Internet.

A wide range of university information is available online at www.asu.edu, the official ASU Web site. Prospective and current students can find details regarding undergraduate and graduate degree programs, financial assistance, housing, and student activities. The ASU Web site is also the gateway to many online services, including

1. finding and registering for classes;
2. viewing online grade reports;
3. checking e-mail and creating personal and course Web pages;
4. accessing courses online via myASU, the university's customizable portal;
5. viewing campus event calendars;
6. searching the student-faculty-staff directory;
7. browsing general and graduate catalogs; and
8. obtaining information about ASU athletics.

IT provides several service centers, described below, for the ASU academic community.

Computing Commons. The Computing Commons building (CPCOM) provides a "technology hub" that draws together students, faculty, and staff from all disciplines on campus in an environment conducive to maximum creative interaction. The building and its facilities have drawn national recognition and acclaim as a model for the support of instruction and research in a technology-based environment. The Computing Commons houses a 246-workstation computing site, seven electronic classrooms, a Research Support Lab, the Customer Assistance Center, a computer store, and a technology-based gallery (see "[Computing Commons Gallery](#)," page 27).

Computing Sites. In addition to the Computing Commons Atrium, there are three additional computing sites located on the ASU Main campus, available for ASU faculty, staff, and students with an ASURITE UserID. Site configurations and hours of operation vary; current information is available on the Web at www.asu.edu/it/fyi/sites.

ASU Downtown Center Computer Lab. The ASU Downtown Center offers an alternative to the computer labs at ASU Main. This facility features 20 Pentium III-800 Mhz computers—all loaded with Microsoft Windows 2000 and Office 2000, Internet Explorer, Netscape, and other software. A high-speed laser printer and a color flatbed scanner are available, and faculty may use the ceiling-mounted computer projection system. The ASU Downtown Center is located in downtown Phoenix. It is a unique educational,

applied-research, and community-service facility designed to address the multifaceted urban opportunities of the central Phoenix community. For more information, call 480/965-3046, or access the Web site at www.asu.edu/xed/dtccplab.

Computer Accounts. Computer Accounts, located in CPCOM 105, assists users with account access issues (including lost passwords), disk space quotas, accounts for non-ASURITE services (including mainframe computer access), and other account-related services. Most computing services are accessible through the standard ASURITE UserID and password, available from self-subscription workstations located in a variety of on-campus locations or online at www.asu.edu/asurite. More information about Computer Accounts is available on the Web at www.asu.edu/it/fyi/accounts.

Customer Assistance Center. The Customer Assistance Center, located in CPCOM 202, offers a library of reference manuals, computing periodicals, and other information concerning computing systems and software. Self-paced training is available for various software applications running under the Windows or Unix operating systems. The center also distributes communication, virus protection, and other site-licensed software, as well as site-specific documentation in a "print-on-demand" format. Print on demand is also available on the Web at www.asu.edu/quicklook. More information about the center is available from the Web site at www.asu.edu/cacenter.

Help Desk/Consulting. The IT Help Desk provides ASU students, faculty, and staff with centralized systems information and first-level assistance in resolving computing problems. Services are available by telephone at 480/965-6500, on the Web at www.asu.edu/helpdesk, and in person at the Customer Assistance Center, CPCOM 202. The IT Help Desk assists with data recovery and repair; AFS filespace and permissions for Web sites; communication, e-mail, and virus protection software; and computing and equipment problem referral.

Instruction Support (IT/IS). Instruction Support serves as a development center for the use of technology in the design and delivery of instruction. Staffed with students, faculty, and researchers skilled in the areas of system design, graphics, interactive software, networked delivery, and digital video, the innovation-driven group pushes the development of instruction to the limits of available technology. From this perspective, IT/IS fosters technological innovation by serving as a research and development unit, a production group, and a training facility.

IT/IS collaborates 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 support not otherwise available to a single academic unit or faculty member. Central to effective support services is the establishment of a partnership among the various support units within the university. IT/IS coordinates the efforts of these groups—which include the College of Extended Education,

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University Libraries, Disability Resources for Students, and the Office of Research and Creative Activities—to provide faculty with a wide array of instruction support services.

IT/IS offers consultation sessions tailored toward enhancing the instructional use of technology by the university teaching community. Sessions range from an introduction to technology in education through advanced and customized approaches for instructors in specific programs.

More information about IT/IS is available from the Web site at is.asu.edu.

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, both synchronous and asynchronous. Located in CPCOM 213, 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 (RS). Research Support provides assistance to faculty, staff, and student researchers engaged in scientific and creative endeavors. RS involves consulting in the use of software tools and program coding directly related to projects or specific research, including consulting for computation, statistics, visualization, and GIS platforms in conjunction with software package installation and use; media conversion; and product evaluation.

A variety of computation facilities are provided in support of research and creative endeavors within the ASU community, ranging from individual workstations to SMP/MPP servers and mainframes. Extended computer capabilities are available through access to national computing centers. More information is available at www.asu.edu/it/fyi/research.

Research Support (RS) Lab. The Research Support Lab seeks to establish partnerships with faculty, staff, and students to acquire, create, and enhance research and creative endeavors through the effective use of visualization and Geographic Information Systems (GIS) technologies.

The lab is located in CPCOM 235. Its staff assists researchers with hardware, software, and data 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 GIS classes, serving as a focal point for GIS users to meet and share information and technical expertise.

Additionally, Visualization Services provides faculty, staff, and graduate students with the hardware and application software resources and services needed for the high-level graphics and visualization used in research. Researchers receive assistance ranging from interactive viewing of scientific data to visualization in the liberal and the performing arts and other endeavors. Visualization Services pro-

vides a focal point for developing technologies in software, hardware, and communications.

Further information on GIS and Visualization Services is available on the Internet at www.asu.edu/gislab and www.asu.edu/visualization, respectively.

ALUMNI ASSOCIATION

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

With more than 240,000 alumni living in the United States and throughout the world, the association plays an important role as the university's primary support organization. Comprising more than 50 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 Board of Directors are elected each spring. See "[ASU Alumni Association Board of Directors](#)," page 431. For more information about the association or its board of directors, call 1-800-ALUMNUS or 480/965-ALUM.

LEARNING AND TEACHING EXCELLENCE

The Center for Learning and Teaching Excellence is dedicated to enhancing teaching and learning possibilities at ASU. To support this mission, the center provides a variety of training, support, and professional development programs for faculty, academic professionals, graduate students who have teaching responsibilities, and academic departments throughout the university. Our resources and services specifically focus on advancing improvements in student learning, especially the manner in which teachers promote and foster that learning.

Some of the center's goals are

1. assisting faculty, programs, and departments to assess and develop instructional approaches;
2. providing workshops designed to enhance specific instructional practices for all who teach;
3. serving as a clearinghouse of information about activities, events, resources, and projects that may enhance teaching and learning;
4. developing synergistic relationships with existing campus units;
5. providing instructional assistance to new faculty on campus;
6. encouraging reflective use of instructional technologies; and
7. collaborating with other campus units to secure grant moneys for new course development, exploration of innovative teaching methods, and/or research in effective instruction.

For more information, call 480/965-9401.

LEARNING AND TEACHING EXCELLENCE (LTE)

LTE 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Diversity in the Classroom: Prospects and Challenges. (1)
- Improving Teaching Through Assessment. (1)
- Strategies for Effective Lecturing. (1)
- Strategies for Promoting Active Learning. (1)
- Teaching with Technology. (1)
- Teaching with Writing. (1)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

RESEARCH CENTERS, INSTITUTES, AND LABORATORIES

These units serve the university’s mission in research. They are overseen by eight of the colleges, the vice provost for Research, and the ASU East provost.

Center for Research on Education in Science, Mathematics, Engineering, and Technology. The Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET), an alliance of the ASU Colleges of Education, Engineering and Applied Sciences, and Liberal Arts and Sciences, was initiated in 1999, growing out of what was previously the Center for Innovation in Engineering Education. The mission of the center is to bring together individuals, programs, and organizations interested in improving K–20 science, mathematics, engineering, and technology education to research, develop, and assess educational theories, curricula, courses, and administrative policies that impact science, mathematics, engineering, and technology education. The center also encourages and supports wide-scale sharing and implementation of effective approaches to producing a more scientifically and technologically literate populace and more capable science, mathematics, engineering, and technology majors.

Research. CRESMET pursues research and development that demonstrates coherent, consistent, and conceptually powerful mathematics, science, engineering, and technology education from kindergarten through college (K–20).

Partnering. CRESMET supports collaborations across the traditional boundaries of university, community, business, and local education agencies.

Sharing. CRESMET establishes communication avenues for intellectual and material products proven effective in supporting powerful learning in science, mathematics, engineering, and technology fields.

For more information, visit CRESMET in ECG 303, call 480/965-5350, or access the CRESMET Web site at www.eas.asu.edu/~cresmet.

College of Architecture and Environmental Design

Herberger Center for Design Excellence. The Herberger Center for Design Excellence is the research, outreach, and publication arm of the College of Architecture and Environmental Design. The center facilitates and promotes research, scholarship, and creative activity among the faculty and students of the college in the fields of architecture, interior design, industrial design, graphic design, landscape architecture and urban design, and environmental planning.

In keeping with its outreach mission, the Herberger Center also publishes reports, newsletters, and books that help to inform debate on key design and planning issues in the desert southwest. The center works closely with the faculty to publish books, working papers, and conference proceedings that promote scholarship in the planning and design disciplines.

The Joint Urban Design Program (JUDP), based in downtown Phoenix, is the center’s outreach arm. It facilitates interaction among college faculty, students, and the broader community, and offers design as a way to further dialogue and to address urban issues. The JUDP conducts intensive workshops, (community-based charrettes) that help neighborhoods, groups, and other city stakeholders focus on concerns and strategies to respond to critical needs. Student groups and faculty work with the JUDP to identify real world problems that they address in studio projects. For more information, call 480/727-5146, or access the JUDP Web site at www.asu.edu/caed.

College of Business

Arizona Real Estate Center. The Arizona Real Estate Center (AREC), 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, call 480/965-5440, access the AREC Web site at www.cob.asu.edu/seid/arec, or write

ARIZONA REAL ESTATE CENTER
PO BOX 874011
TEMPE AZ 85287-4011

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, call 480/965-5543, access the EOC Web site at www.cob.asu.edu/seid/eoc, or write

BANK ONE ECONOMIC OUTLOOK CENTER
PO BOX 874011
TEMPE AZ 85287-4011

Center for the Advancement of Small Business. The Center for the Advancement of Small Business (CASB) is a 21st-century leader in business education, practice, and research providing high-quality, relevant programs, and

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information services focused on small business since 1994. The center enables students and existing small and medium-size 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-size businesses, and aids small and medium-size 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, visit CASB in BAC 111, call 480/965-3962, access the CASB Web site at www.cob.asu.edu/seid/casb, or write

CENTER FOR THE ADVANCEMENT
OF SMALL BUSINESS
PO BOX 874406
TEMPE, AZ 85287-4406

CAPS Research. CAPS (Center for Advanced Purchasing Studies) Research was established in November 1986 by a national affiliation agreement between the ASU College of Business and the Institute for Supply Management. 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 ASU Main campus. CAPS Research 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 480/752-2277, access the Web site at www.capsresearch.org, or write

CAPS RESEARCH
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. CBR 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 Seidman Institute. The staff within the center is available to respond to inquiries and to provide available data.

For more information, call 480/965-3961, access the CBR Web site at www.cob.asu.edu/seid/cbr, or write

CENTER FOR BUSINESS RESEARCH
PO BOX 874011
TEMPE AZ 85287-4011

Center for Services Leadership. Since 1985 the Center for Services Leadership (CSL) has been a leading university-based hub devoted to the study of services marketing and management. The CSL addresses how any company can improve internal service processes and use service and customer satisfaction as a competitive advantage. The center encourages firms to share the best ideas and practices for adaptation across industries. Though grounded in marketing, the center's work is 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; customer satisfaction; services strategy; service culture; and service recovery. A leader in the business and academic communities, the Center for Services Leadership work advances the knowledge base in the field and provides applicable frameworks, concepts, and tools.

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

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

For more information, visit the CSL in BAC 440, call 480/965-6201, or write

CENTER FOR SERVICES LEADERSHIP
PO BOX 874106
TEMPE, AZ 85287-4106

L. William Seidman Research Institute. The mission of the L. William Seidman Research Institute is to encourage and support applied business research by serving as a public access point to the College of Business. Specific goals include transferring new knowledge to the public; supporting faculty and student research; encouraging the development of educational programs grounded in business research; and conducting high-quality, applied business research.

The institute encourages research activity by providing research support services to the faculty, staff, and students of the college. These services include facilitating grant preparation and assistance in grant administration. The institute's research centers act as the focal point for involving faculty and students in applied research on important issues identified by the business community.

The institute also serves an important role in the broader educational mission of the College of Business by disseminating the findings of research conducted by the faculty, students, and research center staff, as well as the results of business research from other sources around the world. This is accomplished through a variety of mechanisms: newsletters and research reports; seminars and conferences; Inter-

net Web pages; media interviews and press releases; and by responding to inquiries from businesses, public officials, and the community. For more information, call 480/965-5362, access the institute's Web site at www.cob.asu.edu/seid, or write

L. WILLIAM SEIDMAN RESEARCH INSTITUTE
PO BOX 874011
TEMPE AZ 85287-4011

Institute for Manufacturing Enterprise Systems. See "[Institute for Manufacturing Enterprise Systems](#)," page 34, for information on this joint venture of the College of Business and the College of Engineering and Applied Sciences.

College of Education

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, visit the center in ED 402, call 480/965-6292, or access the center's Web site at coe.asu.edu/cie.

CRESMET. See "[Center for Research on Education in Science, Mathematics, Engineering, and Technology](#)," page 31.

Education Policy Studies Laboratory. Located within the College of Education, the Education Policy Studies Laboratory (EPSL) conducts and coordinates original research in areas such as student performance standards, assessment, curriculum, and commercialism in schools. EPSL not only disseminates its analyses and reports to policy makers and educators, but concentrates on providing the public with readable accounts of research.

The EPSL houses two research units—the Commercialism in Education Research Unit (CERU), which is the only national academic research center dedicated to schoolhouse commercialism, and the Education Policy Research Unit (EPRU), which conducts original research and facilitates implementation of educational innovations.

For more information, contact Alex Molnar, director and professor of Educational Leadership and Policy Studies, EDB L1-01, 480/965-1886, or access the laboratory's Web site at www.asu.edu/educ/epsl.

Southwest Center for Education Equity and Language Diversity. The Southwest Center for Education Equity and Language Diversity conducts, supports, and promotes research, scholarship, and innovative practice in language education designed for minority students in public schools. The center gives priority to scholarship and field-based work relating to educational equity and the systematic usage of heritage languages and cultures. The aim is to integrate these resources into the educational experience of all children and youth.

The center's scope of work is driven by a need to merge several related topics into a single articulated conversation: biliteracy; promoting the role of public education to strengthen communities; and enabling binational collaboration among educators. The long-term vision is to help develop a new pedagogy tailored to the needs of the bicultural region the center serves. The integration of these themes shapes the scope of work for the center in the following areas:

1. Within the broad scope of educational policy research, the center focuses on scholarly inquiry that contributes to informed and enlightened discourse on language policy for schools and society, especially on the harmonious coexistence of English, the national language, and Spanish, the second most used language in our society.
2. Life in the American Southwest is bicultural and increasingly binational. In this Pan-American context, bilingualism will gain in importance. Equally important will be the collective ability of residents on both sides of the border to work harmoniously in pursuit of a common destiny that will be ever more intertwined. Schools must help children and youth develop skills and predispositions to face this challenge.
3. Mexico and the United States are becoming more interdependent. In this context, Mexican educators should have opportunities to contribute to improving education for Mexican immigrant children in U.S. schools. To enable this, schools must create pilot projects and an infrastructure for collaboration among institutions and individuals on both sides of the U.S.-Mexico border.

For more information, visit the Southwest Center for Education Equity and Language Diversity in ED 440, call 480/965-7134, or access the center's Web site at www.asu.edu/educ/sceed.

College of Engineering and Applied Sciences

Center for Low-Power Electronics. The Center for Low-Power Electronics (CLPE) is a collaborative effort of the University of Arizona and ASU to address fundamental, industry-relevant research problems in the design of ultra-low power microelectronic systems. The CLPE is formed under the State/Industry/University Cooperative Research initiative of the National Science Foundation (NSF). The NSF and the State of Arizona recognize that Arizona has the key ingredients to become a leader in this technology. It has

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the world's leading companies involved in the manufacture of portable computing and communication systems. The technical areas of focus of the Center for Low-Power Electronics 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, visit the center in ENGR 115, or call 480/965-8654.

Center for Solid State Electronics Research. The Center for Solid State Electronics Research (CSSER) focuses on research in the areas of epitaxial semiconductor crystal growth, device characterization and modeling, defect behavior in semiconductors material characterization, environmentally benign and other novel 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 and nano-structured devices. New thrust areas include molecular electronics and MEMS.

For more information, visit CSSER in ENGR 115, call 480/965-3708, or access [the CSSER Web site at ceaspub.eas.asu.edu/csser](http://ceaspub.eas.asu.edu/csser).

Center for System Science and Engineering Research. The Center for System Science and Engineering Research (SSERC) 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, visit the SSERC in GWC 606, call 480/965-8382, or access the SSERC Web site at www.eas.asu.edu/~sserc.

CRESMET. See "[Center for Research on Education in Science, Mathematics, Engineering, and Technology](#)," page 31.

Institute for Manufacturing Enterprise Systems. The Institute for Manufacturing Enterprise Systems (IMES) 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. IMES's mission is to establish ASU as an international leader in the creation and dissemination of new knowledge in the area of global manufacturing for the new economy. It particularly focuses on how manufacturing impacts Arizona. Research thrust areas include virtual manufacturing, enterprise systems, knowledge management, and software in the system solution.

For more information, visit the institute in GWC 402, or call 480/965-3709.

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

For more information, visit the center in GWC 411, call 480/965-5311, or access the center's Web site at trc.eas.asu.edu.

College of Law

Center for the Study of Law, Science, and Technology. Located in the College of Law, the Center for the Study of Law, Science, and Technology conducts research, edits *Jurimetrics: The 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, visit the center in LAW 201, or call 480/965-2124.

College of Liberal Arts and Sciences

Arizona Center for Medieval and Renaissance Studies (ACMRS). The Arizona Center for Medieval and Renaissance Studies 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 the 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 and Renaissance Texts and Studies (MRTS), a major series of editions, translations, and reference works. In collaboration with the University of Massachusetts at Dartmouth and the University of Kansas, 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, visit ACMRS in SS 224, call 480/965-5900, or access the ACMRS Web site at www.asu.edu/clas/acmrs.

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, visit the institute in CRI 209, or call 480/965-3351.

Center for Asian Studies. Through its East Asian and Southeast Asian studies programs, the Center for Asian Studies 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 works with the office of International Programs to administer student exchange programs with a number of universities in Asia. The center also sponsors an Asian film series each semester. 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, visit the center in WHALL 105, or call 480/965-7184.

Center for Meteorite Studies. The nation's largest university collection of extraterrestrial materials is available for research in the Center for Meteorite Studies. Teaching and research on meteorites, 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, visit the center in PS C151, or call 480/965-6511.

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 structure of condensed phases of matter at the interfaces between solid-state chemistry and physics, earth and planetary science, and materials science and engineering. It also supports interdisciplinary approaches to science and engineering educational outreach activities.

The center provides an administrative home for large, multidisciplinary, block-funded research projects. These include the NSF-supported Materials Research Science and Engineering Center (MRSEC) and the Interactive Nano-Visualization for Science and Engineering Education (IN-VSEE) project. To support these activities, members of the center operate modern and sophisticated research facilities and organize regular research colloquia and symposia.

Principal topical areas of research in the center include studies of structure and reactivity of surfaces and interfaces, electronic materials, advanced ceramics and glasses, synthesis of new materials, high-pressure research, development of techniques in high-resolution electron microscopy and micro-structural and chemical analysis, development of visualization techniques at different scales of magnification for science education and community outreach.

The research facilities of the center include the Center for High Resolution Electron Microscopy (CHREM) and the Goldwater Materials Science Laboratories (GMSL).

CHREM. The center operates several ultra high-resolution and ultra high-vacuum electron microscopes and supports microscopy methods and instrumentation development, including holography, position- and time-resolved nano-spectroscopy, and energy-filtered imaging and diffraction. The center provides high-resolution capability for a large external group from other universities and industry.

GMSL. These facilities include

1. the Materials Facility (MF), which provides a wide range of synthesis and processing capabilities for preparation of specimen materials. MF 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 micro-spectroscopy;
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

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used to determine crystal perfection and site occupancy;

4. 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;
5. the Scanning Probe Microscopy Laboratory (SPM), which provides facilities for nanoscale viewing of solid surfaces using scanning tunneling microscopy (STM), atomic force microscopy (AFM), and related techniques. The SPM laboratory serves as a focus for undergraduate research training programs and educational and outreach activities;
6. the Facility for High Pressure Research, which provides facilities for synthesis of new materials and for geochemistry/geophysics studies at up to 25 Gpa (250,000 atmospheres) and temperatures greater than 2000° C. These facilities are complemented by diamond anvil cells capable of in situ studies at up to one million atmospheres. This laboratory provides a focus for core research projects within the MRSEC;
7. the Goldwater Materials Visualization Facility (GMVF), which consists of a battery of linked workstations for remote operation of instruments and data collection, capture of images in real time, and advanced computing and simulation of materials. The GMVF is used in research and in undergraduate and graduate education, as well as in educational and community outreach; and
8. other specialized laboratories under development, which include high-resolution X-ray diffraction for thin film characterization, optical spectroscopy, and nuclear magnetic resonance spectroscopy for solid-state studies and research on materials under extreme conditions.

These facilities provide 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 also used extensively by students in disciplinary programs from affiliated departments.

For more information, visit the center in PS A213, call 480/965-4544, or access the Web site at www.asu.edu/clas/csss.

Center for the Study of Early Events in Photosynthesis. The ASU Center for the Study of Early Events in Photosynthesis was established in 1988 as part of a joint grant program of the Department of Energy, the National Science Foundation, and the Department of Agriculture. In 1990, it was designated a Regents Center of the University. Since September of 1995, it has been funded by the Office of the Vice Provost for Research and the College of Liberal Arts and Sciences. The center consists of about 90 students, postdoctoral associates, and research scientists led by 15 faculty members in the Department of Chemistry and Biochemistry and the Department of Plant Biology. These research groups

share a common goal: understanding the process of photosynthesis, which is responsible for producing all of our food and filling the vast majority of our energy and fiber needs. The impetus for development of the center was the premise that photosynthesis is a complex problem that will only yield to an investigation using a wide variety of approaches and techniques. Thus, the center serves as an infrastructure supporting individual ASU scientists and fostering 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 that 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, visit the center in PS D207, or call 480/965-1963.

CRESMET. See "[Center for Research on Education in Science, Mathematics, Engineering, and Technology](#)," page 31.

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. Faculty and graduate students within ESRI investigate a wide range of topics concerning physical activity, including different age cohorts, levels of health, levels of ability and fitness, levels and types of training, and physical and emotional stresses, nutrition, and genetic backgrounds. Where applicable, these aspects are studied using an interdisciplinary approach. ESRI is affiliated with a number of clinical and research institutions in the Phoenix area.

ESRI houses numerous specialized research laboratories. *Biomechanics* applies the laws of mechanics to the study of human movement. Current research examines kinematic and kinetic determinants of locomotion patterns in walking, running, cycling, and swimming; neuromusculoskeletal modeling and computer simulation of locomotion in clinical and sport applications; ergonomics; and mechanisms under-

lying upper extremity repetitive strain injuries. *Exercise physiology* is the study of physiologic systems (cardiovascular, respiratory, muscular, endocrine, metabolic) under conditions of stress, particularly exercise stress. Both acute exercise responses and chronic adaptations resulting from exercise training are considered in relation to health and performance and are investigated in several specialized labs. The *Exercise Biochemistry Lab* examines subcellular systems involved in the provision and regulation of energy transfer during exercise. The *Exercise Endocrinology Lab* studies interrelationships of exercise and training with stress, hormones, neurotransmitters, and the immune system. Research conducted in the *Applied Exercise Physiology Lab* is aimed at better understanding how physical activity and exercise influence the health, fitness, and athletic performance of able-bodied and physically-challenged individuals. Research in the *Motor Control Lab* investigates how movement is regulated and controlled via the nervous system in normal and pathological populations. Special emphases include motor deficits attributed to basal ganglia dysfunction and upper extremity coordination, particularly finger and hand posture, in reaching and prehensile movements. *Motor development* studies how human movement is generated and evolves throughout the lifespan. Current research focuses on learning and development of bimanual coordination. Timing and coordination of perceptual-motor skills are measured in normal developing children, persons with Down syndrome, and adults to investigate cerebral asymmetries and specificity of learning. The *Sport and Exercise Psychology Lab* examines the relationship between psychological constructs and physical activity and the influence of participation in physical activity on psychological phenomena. Current research is designed to examine the influence of physical activity, fitness, and particular sport practices on psychophysiological mechanisms and cognitive functioning; the effect of psychological skills for performance enhancement; motivational aspects of physical activity across the lifespan; and the effects of exercise on mental health.

For more information, visit ESRI in PEBE 159, or call 480/965-7906.

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 Community Art and Research Outreach (CARO), Chicano

and Chicano Space: Art Education Web site, Digital Divide Solutions Project, Project 1000, and the Western Alliance to Expand Student Opportunities.

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

For more information, visit the HRC in CFS 104, call 480/965-3990, or access the HRC Web site at www.asu.edu/clas/hrc.

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 IHO in SS 103, call 480/727-6580, or access the IHO Web site at www.asu.edu/clas/iho.

Joan and David Lincoln Center for Applied Ethics. The Joan and David Lincoln Center for Applied Ethics (LCAE) is a university-wide center for applied ethics that is administratively housed in the College of Liberal Arts and Sciences. Its mission is

1. to develop and coordinate a strong focus on theoretical and applied ethics across intellectual disciplines and professional programs within the university,
2. to support teaching and creative research in ethics, and
3. to foster collaboration between the university and its varied publics to address major ethical challenges facing contemporary society.

For more information, visit LCAE in AG 355, call 480/727-7691, or access the Web site at www.asu.edu/clas/lincolncenter.

Latin American Studies Center. Arizona maintains an ever-growing interest in Latin America that draws upon an extensive experience of historical and geographical ties. The Latin American Studies Center 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

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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. The center also has an exchange agreement with the Pontific Catholic University of Ecuador for faculty and students as well as summer programs in Quito, Ecuador, and Ensenada, Mexico.

The center is a member of the American Modern Language Association, Consortium of U.S. Research Programs for Mexico, 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 research conferences, but also through close coordination with the Latin American collection of Hayden Library and networking with Latin American universities.

For more information, visit the center in SS 213, or call 480/965-5127.

College of Public Programs

Center for Nonprofit Leadership and Management. The Center for Nonprofit Leadership and Management (CNLM) promotes the understanding and improved practice of nonprofit organizations. The center coordinates a nonprofit sector research program, facilitates educational offerings in nonprofit studies, serves as a convener on topical issues, and provides selected technical assistance and information services. The center facilitates relationships among students, faculty, and community organizations across a range of research and outreach activities. In addition, the center convenes leaders and managers from the nonprofit, business, and government sectors on topical issues pertinent to building nonprofit capacity in the region. The center supports the activities of three complementary nonprofit leadership and management education programs: the ASU American Humanics Program (undergraduate certificate), a postbaccalaureate program (graduate certificate), and a noncredit program (extended education certificate). For more information, call 480/965-0607, or access the Web site at www.asu.edu/copp/nonprofit.

Center for Urban Inquiry. The Center for Urban Inquiry focuses on civic involvement. The center's mission is to examine the unique features of the new urban West in the United States, particularly intersections of growth and development with citizen activism and community building. By harnessing the unique resources of the university, the center engages in partnerships with urban citizens, including youths, to increase awareness, promote inclusion, and address needs. Center programs include seed grants to students working in teams in pursuit of urban research and community service; service learning that involves students in community building; technical assistance to neighborhood organizations, schools, and hospitals; and the produc-

tion of works that appeal broadly to urban audiences, including performances, exhibits, and videos. For more information, call 480/965-9216, or access the center's Web site at www.asu.edu/copp/urban.

Morrison Institute for Public Policy. Established in 1981 by the Morrison family of Gilbert, Arizona, as a unit within the School of Public Affairs, 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 research, 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 480/965-4525, access the institute's 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

Herberger College of Fine Arts

Ceramics Research Center. The Ceramics Research Center was established in 2002 as part of the ASU Art Museum. For more information, call 480/965-2787, or access the museum's Web site at asuartmuseum.asu.edu.

Institute for Studies in the Arts. The Institute for Studies in the Arts (ISA) in the Herberger College of Fine Arts serves as a research laboratory for the 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 for research projects, performances, exhibitions, and symposia.

ISA facilities include an experimental media performance space with an adjacent technology prototyping and applications studio in Drama City; the "Intelligent Stage," an interactive and tele-performance studio with state-of-the-art digital audio and video production and post-production facilities in Matthews Center; a Technology Development Studio for the development of prototype technologies and their application to aesthetic research; and comprehensive archives that document the history of research initiatives supported by the ISA.

ISA is open to a wide range of proposals from faculty, graduate and undergraduate students, and visiting artists, provided such proposals address the ISA mission of experimentation and innovation in the arts. For more information, visit ISA in MCENT 224, call 480/965-9438, or access the ISA Web site at herbergercollege.asu.edu/isa.

Vice Provost for Research

Center for Environmental Studies. Established in 1974, the primary mission of the Center for Environmental Studies is to facilitate collaborations among faculty researchers and to aid decision making about environmental issues. Through its collaborations, both with ASU faculty and partners from government, business, and the educational community, the center advances the identification of key local and global environmental issues and collects reliable information to be used by scholars, policy makers, and the general public. For more information, access the CES Web site at www.asu.edu/ces.

The center is also home to the Central Arizona–Phoenix Long-Term Ecological Research (CAP LTER) project, one of only two urban sites in the NSF-funded LTER network. The CAP LTER project focuses on an arid-land ecosystem profoundly influenced, even defined, by the presence and activities of humans, and involves more than 50 associated faculty from biology, ecology, engineering, geography, geology, sociology, urban planning, and anthropology. For more information, access the CAP LTER Web site at caplter.asu.edu.

The center administers an NSF-funded Integrative Graduate Education and Research Training (IGERT) grant to develop a multidisciplinary program in urban ecology. The program's research component engages students in wide-ranging and multidisciplinary investigations into the

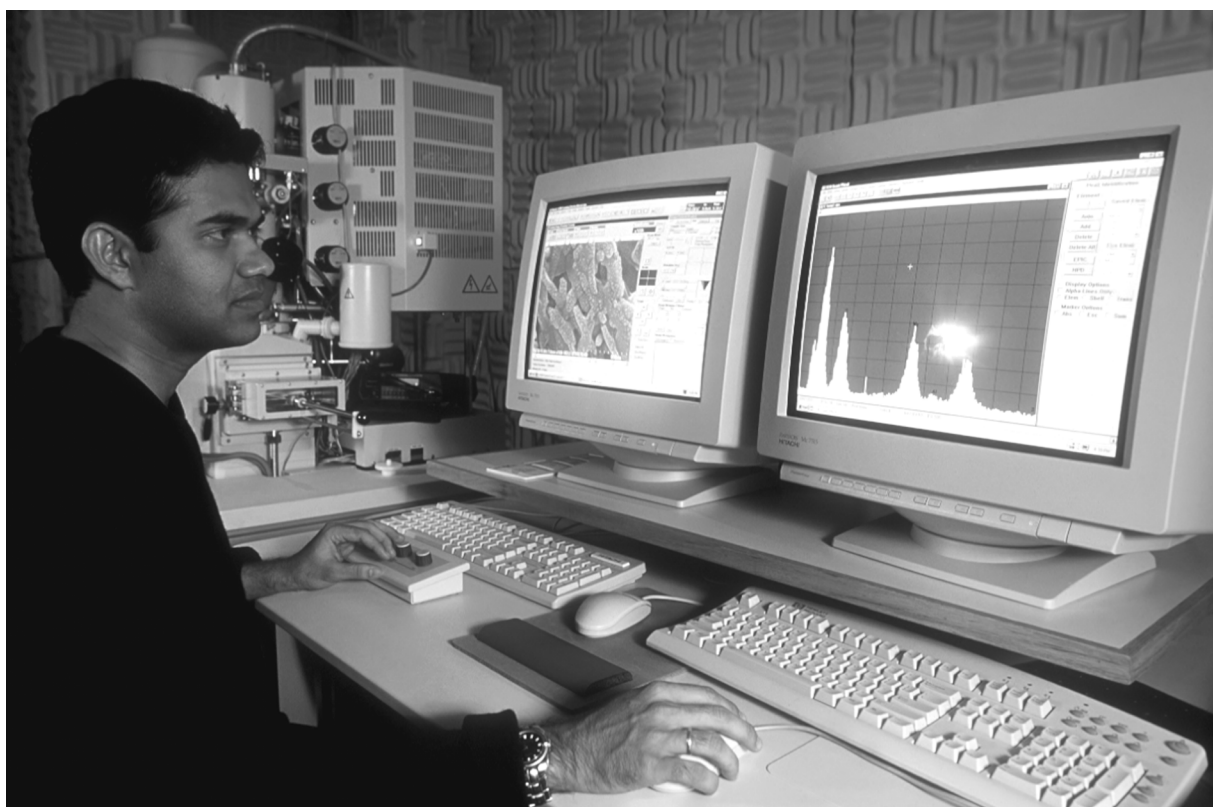
ecology of cities, with the CAP LTER project providing the research infrastructure. For more information, access the IGERT Web site at www.asu.edu/ces/igert.htm.

The center also facilitates applied environmental research projects undertaken by the Southwest Center for Environmental Research and Policy (SCERP), a consortium of five U.S. and four Mexican universities. SCERP develops a research agenda for the study of air and water quality, hazardous waste problems, environmental health issues, and growth management questions in the border region. For more information, access the Web site at www.scerp.org.

For more general information about the center, contact the director, Center for Environmental Studies, Tempe Center (located at the southeast corner of University and Mill), 480/965-2975, or access the center's Web site at www.asu.edu/ces.

ASU East

Sustainable Technologies, Agribusiness, and Resources Center. The focus of the Sustainable Technologies, Agribusiness, and Resources (STAR) Center is to bring together multidisciplinary researchers whose mission is to study sustainable processes and systems, whether natural or human designed, that will be efficient and less consumptive and will promote conservation of the earth. For more information, call 480/727-1240, or access the STAR Center Web site at www.east.asu.edu/research/star.



Prashant Majhi uses the Center for Solid State Electronics Research's high resolution scanning electron microscope for imaging work.

John Phillips photo

Fees, Deposits, and Other Charges

The Arizona Board of Regents reserves the right to change fees and charges without notice. The latest *Schedule of Classes* usually reflects up-to-date fee amounts. The following fees apply to both credit and noncredit (audit) registrations.

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 ["2002–2003 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 Policies and Procedures," page 43](#).

Students registered for seven or more hours are considered full-time for tuition payment purposes. See ["Enrollment Verification Guidelines," page 87](#).

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

Graduate College Differential Fees. Certain graduate programs assess an additional differential fee. These fees differ according to college and/or program. Contact the program advisor for details on these fees.

Summer Sessions Fees. The 2003 registration fee per semester hour is \$131, except for law students. The registration fee per semester hour for law students is \$270. For more information, see the *Summer Sessions Bulletin*.

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.

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 per semester. Part-time students pay \$12 per semester, and summer students pay \$12 per semester. See the latest *Schedule of Classes* for more information.

Financial Aid Trust Fee. All students must pay a financial aid trust fee. Full-time students (enrolled for seven or more hours) are charged no more than 1 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.

2002–2003 Resident and Nonresident Tuition

Hours	Resident*	Nonresident*
1	\$ 131.00	\$ 460.00
2	262.00	920.00
3	393.00	1,380.00
4	524.00	1,840.00
5	655.00	2,300.00
6	786.00	2,760.00
7	1,254.00	3,220.00
8	1,254.00	3,680.00
9	1,254.00	4,140.00
10	1,254.00	4,600.00
11	1,254.00	5,060.00
12 or more	1,254.00	5,514.00

* Tuition is subject to change. In addition to tuition, students are charged other fees (e.g., the Student Recreation Complex fee and financial aid trust fee).

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 used by the ASU Student Financial Assistance office.

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. In 1997, students at the state universities voted to change the mechanism for funding the ASA. A \$1 fee is charged to each student every semester. Any refunds for this fee are provided through the ASA Central Office.

Late Registration. The fee assessed for registrations on or after the first day of each session is \$35. A \$35 late fee is also assessed on registration payments received after the fee payment deadline but processed before the class enrollment purge.

Admission Application. The nonrefundable fee for graduate admission or readmission applications to a degree program is \$45. The nonrefundable fee for graduate admission applications to a degree program is \$45. The nonrefundable fee for graduate nondegree applications or applications for readmission to a degree program after a lapse in enrollment is \$15.

Transcripts. The Office of the Registrar releases official transcripts *only upon the written request of the student*. The request must include the following information about the student:

1. name and former name(s);

2. ID number;
3. date of birth;
4. dates of attendance;
5. return address;
6. specific address to mail transcript;
7. signature; and
8. appropriate fees (as described in the text that follows).

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 for the first copy. Additional copies ordered at the same time are \$1 each. The fee is \$1 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 (480/965-2295) if a signed release is enclosed. There is no charge for an unofficial transcript.

Copies of Education Records Other Than ASU Transcripts. For fewer than six pages, there is no charge. For six to 10 pages, the total charge is \$2. For 11 to 15 pages, the total charge is \$3. Copies of additional pages cost \$1 for every five pages copied.

Comprehensive Examination. This fee is paid by all students seeking to establish credit by examination and is \$50 per semester hour.

Private Music Instruction. The fee for one-half hour of instruction weekly is \$60. The fee for one hour of instruction weekly is \$100.

Musical Instrument Rental Charge. The charge for use of university-owned musical instruments is \$25 per semester. Consult the School of Music for specific information.

Binding and Microfilm Fees. The binding fee for a thesis or dissertation is \$17 per copy. This fee is subject to change. Additional charges may be required depending on the size and nature of the document. The dissertation microfilming fee is \$55 and is subject to change.

Sun Card/ID Card. The replacement fee is \$15.

Parking Decals. A parking decal must be purchased, in person or by using the Park Smart touch-tone telephone system, 480/921-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 for controlled access parking start at \$50. Decals are sold on a first-come, first-served basis. For more decal sales information, call 480/965-6124, or visit the Web site at www.asu.edu/dps/pts.

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 \$25 per vehicle.

Everyone is encouraged to support travel reduction measures by carpooling, bicycling, walking, using mass transit, or the university shuttle bus, whenever possible.

Parking Violations. Due to a high demand for parking, regulations are strictly enforced. Fines range from \$10 to \$100. 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 the provisions of the [“Delinquent Financial Obligations,” page 43](#). The vehicle of any person owing three or more unpaid parking citations or \$100 in unpaid parking citations is subject to impoundment. An \$85 minimum fee is assessed if impoundment is required. For more information, call 480/965-4527.

Returned Checks. Checks returned by a bank are assessed a \$15 service charge with repayment needed within five business days of notification. A second \$12 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 fees 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 according to the standard refund schedule as of the involuntary withdrawal date, as determined by the university.



Clock on west side of Memorial Union building

Tim Trumble photo

FEES, DEPOSITS, AND OTHER CHARGES

On-Campus Housing. The cost of ASU Main housing varies. In 2000–2001 the typical cost was \$3,100 per academic year. Meal plans are purchased separately.

TRANSPORTATION

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

Alternative transportation modes are used by thousands of ASU students. ASU is served by a regional transit 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 north-west 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. A free Neighborhood Flash also is available for the ASU community connecting the Escalante and University Heights neighborhoods with the Riverside/Sunset and Lindon Park neighborhoods through downtown Tempe and 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.

For more information on commute alternatives, call 480/965-1072.

PAYMENT METHODS AND DEADLINES

SunDial. The SunDial system, at 480/350-1500, allows students to register for classes, to drop and add classes, and to make fee payment from any touch-tone phone. Students paying fees with available financial aid, debit cards, Visa, MasterCard, or Discover must use the SunDial system. Refer to the *Schedule of Classes* for available dates and times and more information about the SunDial system.

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

Checks. 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, except Federal Work-Study, to pay university charges through the SunDial phone system (480/350-1500). If the balance owed exceeds the financial aid, it must be paid with a check or credit card by the fee payment deadline date.

Veterans Deferred Payment. The Veterans Readjustment Assistance Act allows veterans to apply for deferred pay-

ment of fees, books, materials, and supplies required for courses. To assist eligible students, a Veteran Promissory Note may be issued deferring payment during their first semester of benefits. Contact the Veterans Services Section at SSV 148, or call 480/965-7723 for information on meeting the necessary requirements. The university may deny this privilege if the student has had 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 Nonresident Tuition. Students withdrawing from school or individual classes receive a refund as described in the “Fall and Spring Withdrawal Refunds” table:

Fall and Spring Withdrawal Refunds

Withdrawal Date	Refund
Before first day of the semester	100%*
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

* A \$35 processing fee is subtracted per session.

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 SunDial. Students withdrawing for medical or other extenuating circumstances must contact their college 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 described in the “Summer Sessions Withdrawal Refunds” table. *Refunds are based on the session days and not the class meeting dates for any particular class.*

Summer Sessions Withdrawal Refunds

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 \$35 processing fee is subtracted per session.

Special Class Fees and Deposits. After the first week of classes, refunds, if any, are determined only by the department or school offering the course. Refund determination is

based on withdrawal date, type of activity, and costs already assessed by the department or school.

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 or less are refunded only by specific request.

Graduation Fee. Overpayments by mail of \$5 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 the Residential Life Schedule of Charges and Deadlines 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 payable only to the student for the net 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, payable to the student, and are mailed to the student's local address.

Parking Decal Refunds. 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 obtain 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 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 \$12 is assessed for any balances due the university not paid within 30 days of the initial due date, with a second \$12 late charge assessed if these amounts are not paid within 30 days of the first late charge, and a third \$12 late charge is assessed if these charges are not paid within 60 days of the first late charge. Procedures to be followed for disputed charges are available from the Accounts Receivable section of Student Business Services, located in ADM A109.

RESIDENCY CLASSIFICATION POLICIES AND PROCEDURES

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 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

FEES, DEPOSITS, AND OTHER CHARGES

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 146.

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.

A student who is a member of an Arizona National Guard or Arizona Reserve unit may be eligible for resident status for tuition purposes. A student may also be eligible if he or she has been honorably discharged from the armed forces of

the United States, has declared Arizona as his or her legal residence one year before discharge, and has taken the other appropriate actions, including filing an Arizona income tax return. A student who is the spouse or dependent of a member of the armed forces who has claimed Arizona as his or her legal residence and filed Arizona income tax for one year before enrollment may be eligible for resident status for tuition purposes.

Teachers and Classroom Aides. If a student is under contract to teach on a full-time basis or is employed as a full-time non-certified classroom aide at a school within a school district, the student is eligible to pay resident tuition only for courses necessary to complete the requirements for certification by the State Board of Education.

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 Resident 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 an Arizona residency information 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 residency 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. However, an appropriate refund is issued if resident status is later granted for that semester.

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

Failure to file a timely written petition for reclassification of resident 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*. Extensions to the deadlines are not permitted.

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 480/965-7712, or access the Web site at www.asu.edu/registrar/residency.

Financing Graduate Studies

Financial assistance for graduate study consists of scholarships, fellowships, assistantships, student loans, and work-study. Assistance can come from the university, private sources, and/or the federal government. The Graduate College Student Financial Assistance Office provides information and assistance to graduate and professional students. Students can also access the Web site for more information at www.asu.edu/graduate/financial or send e-mail to gradaid@asu.edu. For more information, see [“Assistantships and Associateships,” page 91](#).

UNIVERSITY SCHOLARSHIP AND FELLOWSHIP PROGRAMS

ASU offers several university-sponsored awards and scholarships for which both the Graduate College and the academic units conduct nominations and selections. To be considered for any of these award programs, students must apply directly to their academic department.

Regents Graduate Academic Scholarships. These scholarships are available on a competitive basis to graduate students with outstanding academic records. This scholarship covers the *resident tuition only (not nonresident tuition)* and is granted for the academic year or one semester only (not including summer sessions). Students must reapply to the academic unit every year.

Applicants must be regularly admitted to a graduate degree program; continuing students must also be in good standing (3.00 postbaccalaureate GPA at ASU). A graduate student may be nominated for this scholarship by the head of the student’s academic unit. Application forms and further information are available on the Web at www.asu.edu/graduate. Forms are also available from the Graduate College. Applications should be completed and returned to the academic unit. *The Graduate College does not accept direct applications. Applicants must meet deadlines established by the academic units and the Graduate College.*

Regents Graduate Tuition Scholarships. These scholarships are available on a competitive basis to nonresident graduate students with outstanding academic records. *This scholarship is granted for the academic year or one semester only (not including summer sessions).* Graduate students awarded this scholarship pay the resident tuition. Applicants must be regularly admitted to a graduate degree program; continuing students must also be in good standing (3.00 postbaccalaureate GPA at ASU). Application forms and further information are available on the Web at www.asu.edu/graduate. Forms are also available from the Graduate College. Applications should be completed and returned to the academic unit. *The Graduate College does not accept direct applications. Applicants must meet deadlines established by their academic unit and the Graduate College.*

University Graduate Scholars Program. This program offers competitive three-year merit packages that include scholarships ranging from \$1,000 to \$5,000, an annual stipend, plus waiver of resident and nonresident tuition. This fellowship program is for outstanding new graduate students with high credentials such as GRE scores, GPA, publications, and prestigious awards. Applicants should contact the academic unit for information.

Herman E. DeMund Memorial Scholarship. One \$2,000 scholarship is awarded annually to a deserving graduate student at ASU. Students who are regularly admitted to a graduate degree program are eligible to be nominated for this award. Nominations are made by the heads of the individual academic units to the Graduate College, and the recipient is chosen from these nominees. The selection for this award is made on the basis of scholastic ability.

ASU McNair Graduate Fellowship. ASU offers up to six annual McNair-specific graduate fellowships for incoming McNair scholars. In addition to an annual stipend, this fellowship includes a \$5,000 per year University Graduate Scholar Award for three years, a resident/nonresident tuition waiver for three years, and an additional \$5,000, which may be split over two summers. Application fees will be waived for all McNair Scholars applying for graduate study. Interested students should contact their program department for further information.

James J. Sweitzer Memorial Scholarship. This scholarship provides a stipend of \$2,000 to \$3,000 to a graduate student in Agribusiness. Regularly admitted graduate students planning a career in agribusiness are eligible to apply as first- or second-year students. The selection committee considers financial needs but gives preference to high scholarship and potential in the field.

Reiganji Graduate Scholarship Fund. This scholarship fund offers \$1,400 annual scholarships plus waiver of resident and nonresident tuition to students majoring in East Asian history and philosophy.

Travel and Research Grants. The Graduate College collaborates with the Graduate Student Research Office to fund small grants to support graduate student research. These grants usually are made to defray expenses incurred by students completing their theses or dissertations. The Graduate College funds travel grants for masters and doctoral students who wish to present their research results at regional and national conferences. Meeting scholars in their fields and participating with faculty in professional organizations presents opportunities for students to get involved in activities that will become central to their professional lives.

FINANCING GRADUATE STUDIES

PRIVATE FELLOWSHIPS AND AWARDS

ASU attracts a large number of graduate students who are honored with external sources of assistance such as national research fellowships and prestigious, private scholarships. In addition, the Graduate College assists in nominating graduate students for national competitions and provides support services to the recipients. These awards are targeted by academic discipline and/or student category.

Achievement Rewards for College Scientists (ARCS). Scholarships are given to gifted and needy scholars in the natural sciences, medicine, and engineering to complete their career preparation. The annual award is \$6,000 in addition to resident and nonresident tuition waivers. ARCS candidates must be nominated through their major department.

Philanthropic Educational Organization National Scholarship Award. This award is offered to outstanding women doctoral students. The successful applicant receives a cash stipend of \$7,000, matched by tuition remission. The award is renewable for a second year. Students must be nominated through their major department.

Ford Foundation Predoctoral Fellowship. This fellowship provides an annual stipend of \$15,500 for three years with tuition scholarships from ASU. The program supports fellows in research-based doctoral programs.

Jacob K. Javits Fellowship Program. This fellowship program offers an annual stipend of \$18,000 based on a fellow's need with tuition scholarships from ASU. This program is designed to assist students of superior ability to pursue studies leading to a doctoral or master's degree in fine arts.

National Science Foundation Graduate Fellowships and Minority Graduate Fellowships. These fellowships provide a stipend of \$16,000 for 12-month tenures. ASU provides additional tuition scholarships to fellows beginning their graduate study in science, mathematics, and engineering.

National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM). This fellowship program offers opportunities for underrepresented ethnic minority students to obtain master's degrees in engineering, through a program of paid summer internships and graduate financial assistance. Fellowships consist of a stipend of \$6,000 per academic year; when combined with the summer internship, the total value is between \$20,000 and \$40,000. ASU provides additional support to GEM fellows with tuition scholarships for both resident and nonresident tuition.



Jerry Richer (left) and ASU Geology Museum curator Brad Archer excavate woolly mammoth remains at a site in Arizona.

Tim Trumble photo

Other Forms of Scholarship Support. Students are encouraged to contact the academic unit in which they intend to study and the Graduate College Student Financial Assistance Office to determine if other sources of support are available.

Reference books on national and regional scholarships for which students may be eligible are on reserve at Hayden Library. Announcements are available for review in the center lobby, Wilson Hall, and on the Web at www.asu.edu/graduate.

NEED-BASED FINANCIAL AID

To be considered for need-based support, applicants must complete the Free Application for Federal Student Aid (FAFSA) or the Renewal FAFSA each year.

The FAFSA is available in two formats: (1) the paper FAFSA, which can be obtained at any U.S. college or university financial aid office and the ASU Graduate College Student Financial Assistance Office, and (2) the electronic FAFSA, which is available at www.fafsa.ed.gov.

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 percent interest rate. Like the subsidized Student Loan, no interest accrues on the Perkins Loan during the student's in-school status, grace, or other authorized periods of deferment. Maximum loan awards for 2001–2002 were \$3,000.

William D. Ford Direct Student Loans. 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. Repayment begins after the student graduates, leaves school, or drops below half-time enrollment. There are two loan types under this program: subsidized and unsubsidized. With a subsidized Direct Student Loan, the federal government pays the interest on the loan principal during the student's in-school status, grace, and other authorized periods of deferment.

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. As the student proceeds through school, interest will accrue and will be added once the student enters the repayment period. Otherwise, conditions and terms for the two programs are the same.

There is a variable interest rate, which cannot exceed 8.25 percent, that is adjusted every July 1. In addition, there is a 3 percent loan organization fee deducted from each disbursement. The federal government provides several options for repayment once the student has left school. The following total annual loan limits for subsidized and unsubsidized apply: \$8,500 for subsidized and \$10,000 for unsubsidized.

HIGHER EDUCATION TAX INCENTIVES

The Taxpayer Relief Act of 1997 provides assistance (Lifetime Learning Tax Credit) to graduate and professional students in meeting college expenses. For more information,

visit the U.S. Department of Education Web site at www.ed.gov.

TAXABILITY OF FINANCIAL AID PROGRAMS

Scholarships, grants, fellowships, and stipends are taxable income to the recipient, except for the portion of these funds used for tuition 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.gov.

FINANCIAL AID FOR INTERNATIONAL STUDENTS

Limited assistance is available to international students who hold an F1 (student visa) or J1 (student exchange visa). Limited assistance consists of private scholarships, alternative loans from banks, private lenders, on-campus hourly employment, and any assistance from the student's home country. Students should contact their academic department about Graduate Academic Scholarships and Graduate Tuition Scholarships. Each department or college has different deadline/eligibility requirements for these scholarships. Students may also contact their academic department about teaching or research assistantships. Academic departments provide the appropriate forms to apply for these positions.

CAMPUS SERVICES AND ONLINE SERVICES

Students can access personal information regarding financial aid by using FASTT Web at www.asu.edu/fa or the Sun-Dial phone system at 480/350-1500. Students can check on

1. documents still needed to complete the financial aid file;
2. award information; and
3. financial aid forms in versions that can be printed and mailed or completed and sent across the Web.

For more information about financial assistance, visit the Graduate College Student Financial Assistance Office, located in the center lobby, Wilson Hall, or phone 480/965-3521.

Classification of Courses

COURSE INFORMATION

Information about all lower- and upper-division courses offered at ASU Main and ASU East appears in the *General Catalog*, available on the Web at www.asu.edu/aad/catalogs. Course information at this Web site is more current than in the printed catalog.

ASU Main and ASU East graduate-level courses are described in the *Graduate Catalog*. ASU West courses are described in the *ASU West Catalog*.

Classes scheduled for the current or upcoming fall or spring semester are listed in the *Schedule of Classes*. Classes scheduled for the summer sessions are listed in the *Summer Sessions Bulletin*. Class schedules are available on the Web at www.asu.edu/registrar/schedule.

COURSE LISTINGS

See "[Course Prefix Index](#)," page 8, for the location of all ASU courses by prefix. See the "Key to Course Listings" diagram, page 49.

Campus Code. Campus codes are used in the *General Catalog* only for courses in prefixes used by both ASU East and ASU Main. Campus codes are used for all courses offered at ASU Main (M), ASU East (E), and ASU West (W) in the *Schedule of Classes* and the *Summer Sessions Bulletin*.

Semester Offered. In the *General Catalog* and *Graduate Catalog*, the semester offered shows when the academic unit plans to offer the course. Refer to the *Schedule of Classes* and the *Summer Sessions Bulletin* in print or on the Web for the actual course offerings.

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.

General Studies Code. The General Studies requirement does not apply to graduate students.

COURSE NUMBERING SYSTEM

Lower-Division Courses. Lower-division courses, numbered from 100 to 299, 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.

Upper-Division Courses. Upper-division courses, numbered from 300 to 499, are designed primarily for juniors and seniors. Prerequisites and other restrictions should be noted before registration. Courses at the 400 level apply to graduate degree requirements for some graduate programs when approved by the Graduate College. See "[Reserving of Course Credit by Undergraduates](#)," page 89.

Graduate-Level Courses. Graduate-level courses, numbered from 500 to 799, are designed primarily 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.

Omnibus Courses

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 prefixes with 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 omnibus courses.

Within the catalogs and *Schedules of Classes*, abbreviations are frequently used with a colon to introduce specific omnibus course topics (e.g., IBS 494 ST: Regional Business Environment of Southeast Asia). See the [“Omnibus Course Abbreviations” table below](#).

Omnibus Course Abbreviations

Abbreviation	Title	Number
AP	Applied Project	593, 693, 793
CW	Conference and Workshop	594
FW	Field Work	583, 683, 783
P	Practicum	580, 680, 780
PS	Pro-Seminar	498
R	Research	592, 692, 792
RC	Reading and Conference	590, 690, 790
RM	Research Methods	500, 600, 700
S	Seminar	591, 691, 791
ST	Special Topics	494, 598

OMNIBUS GRADUATE COURSES

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.

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 the 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.

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

SPECIALIZED PREFIXES

Elementary Education Program Courses. Some elementary education methodology courses use the prefix EDB for purposes of registration. These courses are reserved for students admitted to professional programs. EDB courses are converted to permanent ASU education courses (with other prefixes) following the drop-add period, as determined by the registrar’s calendar.

Graduate College Courses. Courses with the prefix GRD numbered 791 are reserved for doctoral students participating in the Preparing Future Faculty (PFF) program administered by the Graduate College. PFF students are required to take one semester hour for each of the semesters they are enrolled in the program. Students enroll for the first-year exploratory phase. Those accepted into the second-year participatory phase enroll for one semester hour each semester.

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 495 and 595 are converted to ASU credit for recording courses taken abroad.

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.

Colleges

Nine colleges at ASU Main and two colleges and one school at ASU East offer graduate degrees and certificates under the oversight of the Graduate College. ASU West graduate programs are offered separately.

For information about specific degree and certificate programs, see “[Graduate Programs and Courses](#),” page 98.

Graduate College

www.asu.edu/graduate

Bianca L. Bernstein, Ph.D., Dean

Through the faculty, Arizona State University’s Graduate College offers programs to meet the educational needs of those who already hold baccalaureate and master’s degrees. While many students prepare for careers in research, the professions, and the arts, others study for personal enrichment. Both part-time and full-time students are enrolled in 91 master’s and 48 doctoral majors encompassing hundreds of concentrations and specialties. Other students explore new areas of interest or prepare for career advancements apart from formal degree programs. The Graduate College partners with academic programs to assist in attracting and retaining talented graduate students with diverse career goals.

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 the social, cultural, and economic growth and development of Arizona and the Southwest.

One distinctive project that magnifies the Graduate College’s dedication to graduate students is the Preparing Future Faculty program, funded by the Pew Charitable Trusts and ASU. The program is designed to educate students about faculty roles and prepare doctoral students specifically for faculty positions in our nation’s colleges and universities.

This past year, about 2,000 ASU graduate students were awarded prestigious fellowships and scholarships, exceeding \$3.5 million. These awards were funded by the National Science Foundation, NASA, the Ford Foundation, Fulbright, and other public agencies and private foundations.

ASU assisted more than 2,800 outstanding graduate students through academic and tuition scholarship and other financial support programs—the total financial support

amounted to \$15.5 million, exemplifying the university’s commitment to enabling student success.

Funded programs, together with more than 30 research centers and institutes, provide assistantships and training for many graduate students; further, the centers coordinate conferences, colloquia, and special seminars to heighten the learning experience. The Office of the Vice Provost for Research provides seed money to enable ASU faculty and students to work at the frontiers of knowledge. Such activities continually encourage the creative embrace of change and experimentation.

ASU provides numerous choices in student life, for personal enrichment as well as cultural interaction. Many internationally known speakers present lectures here, bringing together faculty, graduate students, and the community to engage in stimulating dialogue.

Intellectual Environment. More than 10,000 students from all 50 states and more than 100 nations are enrolled in graduate study at the university. Such size and diversity contribute to a cosmopolitan setting that is ideal for intellectual discourse and stimulation. As a balance to this large grouping of students, individual graduate programs conduct small colloquia and seminars where students and faculty discuss their work in an intimate, intellectual environment supportive of student development. The result is a spirited, lively atmosphere in which students and faculty members get to know each other through collaborative research and intellectual exchange.

GRADUATE PROGRAMS

Degree Programs

Although graduate degree programs differ in many ways, they all share two important characteristics. First, in comparison to baccalaureate programs, they demand a deeper and broader understanding of a body of knowledge in a recognized discipline or profession. Second, in master’s and especially in doctoral programs, graduate students prepare to make original contributions to their fields through research and other creative activities of a high order. In contrast, then, to the broad-based baccalaureate degree, graduate degrees are specialized. ASU offers several types and levels of graduate degrees.

For admission information and procedures, access the Web site at www.asu.edu/graduate/admissions or refer to the *Application for Graduate Admission* booklet.

Master’s and Doctoral Work. Many students pursue a master’s degree to satisfy their own quest for learning. In some disciplines, such as dance or architecture, the master’s degree is normally the terminal or final degree. In other fields, students enter master’s programs as the first step toward more advanced work, such as doctoral studies, which prepare students for a lifetime of intellectual inquiry

Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College

Major	Degree	Concentration	Administered By
Creative Writing	M.F.A.	—	Creative Writing Committee
Curriculum and Instruction	Ph.D.	Art education, curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, special education	Interdisciplinary Committee on Curriculum and Instruction
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Committee on Exercise Science
Justice Studies	Ph.D.	Criminal and juvenile justice; dispute resolution; law, justice and minority populations; law, policy, and evaluation; women, law, and justice	Committee on Law and Social Sciences
Materials Science	M.S.	—	Committee on the Science and Engineering of Materials
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis, solid-state device materials design	Committee on the Science and Engineering of Materials
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Committee on Speech and Hearing Science
Statistics	M.S.	—	Committee on Statistics

and creativity or for the application of knowledge to professional practice.

Research Degrees. Students at ASU may pursue research-oriented or practice-oriented degrees. Research-oriented degree programs—the Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.)—prepare students for careers of research and scholarship in governmental, business, and industrial organizations, or in university or college teaching. Students in these programs develop abilities to evaluate existing knowledge critically and extend it into fresh areas of inquiry and scholarship.

Professional Degrees. The professional or practice-oriented degree programs have slightly different names and distinct academic missions. The names of the degrees are commonly tied to the academic unit offering the program, for example, Master of Business Administration (M.B.A.), Master of Music (M.M.), and Master of Social Work (M.S.W.). With the objective of preparing students for professional practice, such programs require rigorous preparation in the fundamental literature and scholarship of the field. Some degrees require demonstrated expertise through an internship, an exhibition (art), a performance (dance), or a recital (music). Examples of ASU fields in which academic units offer professional programs include architecture and design, business, education, engineering, health services administration, law, nursing, public administration, and social work.

Nondegree Graduate Study

Many serious students enter graduate studies not intending to obtain a new degree but rather to enhance personal knowledge. They may want to advance in their present

career, acquire the background to make a career change, or make up academic deficiencies before entering a degree program. All graduate students, degree or nondegree, enjoy the benefits of cultural and intellectual activities at the university, such as colloquia, seminars, and conferences focusing on the latest scholarship in the field. By consulting with appropriate academic units, students can learn which courses are suitable to their needs.

For admission information and procedures, access the Web site at www.asu.edu/graduate/admissions or refer to the *Application for Graduate Admission* booklet.

Student Services for Nondegree Students. The Graduate College maintains an advising office open year-round. See “[Graduate Student Support Services](#),” page 53, for more information.

Graduate Studies and University Environment

The Graduate College spans the university in supervising graduate studies and offering all postbaccalaureate degrees except the Juris Doctor, which is administered by the College of Law. Since more than 1,600 ASU faculty members teach graduate students in more than 115 instructional units, the Graduate College works closely with the other colleges and academic units. In most cases, graduate instruction is offered by units that also provide related undergraduate programs.

Interdisciplinary Study. Although most graduate programs are offered by academic units, diverse interdisciplinary programs cross academic disciplines and come under the supervision of the Graduate College. Many majors are in

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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 academic unit.

Currently, the Graduate College oversees ten interdisciplinary programs and has joint responsibility with the College of Education for another; several others are planned. Existing programs include the

1. Creative Writing (M.F.A.);
2. Curriculum and Instruction (Ph.D.), jointly administered with the College of Education;
3. Exercise Science (Ph.D.);
4. Geographic Information Science (Interdisciplinary Certificate);
5. Gerontology Program (Certificate in Gerontology jointly offered by ASU Main and ASU West);
6. Justice Studies (Ph.D.);
7. Materials Science (M.S.);
8. Science and Engineering of Materials (Ph.D.);
9. Speech and Hearing Science (Ph.D.);
10. Statistics (M.S.); and
11. Transportation Systems (Certificate in Transportation Systems).

Other interdisciplinary degree programs include

1. Communication (Ph.D.), administered by the College of Public Programs;
2. Environmental Design and Planning (Ph.D.), administered by the College of Architecture and Environmental Design;
3. History and Theory of Art (Ph.D.), jointly offered with the University of Arizona and administered by the School of Art;
4. Humanities (M.A.), administered by the College of Liberal Arts and Sciences; and
5. Molecular and Cellular Biology (M.S., Ph.D.), administered by the College of Liberal Arts and Sciences.

Each of these programs utilizes resources and faculty from several disciplines. They promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. They allow students to pursue degrees that are intellectually coherent but that bring together diverse strengths of the university. See the [“Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College” table, page 51](#).

Interdisciplinary Committee on Linguistics. Linguistics at ASU is interdisciplinary in nature. The linguistics faculty come from the Departments of Anthropology, Communication, Computer Science and Engineering, English, Languages and Literatures, Philosophy, Psychology, and Speech and Hearing Science and from the College of Education.

The Interdisciplinary Committee on Linguistics coordinates linguistics courses and programs, provides advising, and hosts conferences and lectures.

Faculty from three departments (Anthropology, English, Languages and Literatures) offer programs with concentrations in linguistics: the M.A. in Anthropology, M.A. in English, M.A. in Spanish, and Master of Teaching English as a Second Language.

Certificate Programs. A number of certificate programs are offered by various academic units or programs on campus (see [“ASU Graduate Degrees,” page 10](#)).

Research Programs. ASU continues to advance as a major research institution. The Office of the Vice Provost for Research provides leadership in obtaining external funding and in coordinating and administering sponsored projects. Many graduate students receive financial support and gain first-hand experience as they participate with faculty members in carrying out these research projects.

Much of this work is associated with campus research centers that help to develop proposals, coordinate activities, and bring together in colloquia and conferences students and faculty with common intellectual interests. Such centers include the Center for Solid State Science, the Institute for Manufacturing Enterprise Systems, the Institute of Human Origins, the Hispanic Research Center, the Joan and David Lincoln Center for Applied Ethics, and the Prevention Intervention Research Center. For more information, see [“Research Centers, Institutes, and Laboratories,” page 31](#).

Research Facilities. The university lends support to research in diverse ways, including extensive facilities for research and instructional programs. State-of-the-art facilities include an architecture building, a fine arts complex, the Goldwater Center for Science and Engineering, an addition to the Life Sciences Center, and the Computing Commons. The Engineering Research Center, built as part of the Engineering Excellence Program, houses advanced facilities such as the Molecular Beam Epitaxy laboratory and a clean room for microelectronic device fabrication. Among other facilities supporting research on campus are the Institute for Studies in the Arts, in the Herberger College of Fine Arts; the Facility for High Resolution Electron Microscopy, in the College of Liberal Arts and Sciences; and the Southwest Archaeological Collection, in the Department of Anthropology.

Library System. The ASU library system is a major research facility (see [“University Libraries and Collections,” page 26](#)). It contains more than 3 million volumes of books and approximately 6.6 million pieces of microforms and subscribes to more than 36,000 journals and serials. Among the nation’s research libraries, it is in the top quarter in annual volume acquisition. It is especially strong in amassing current monographs and serials to support graduate programs. Some of the most important research collections include manuscripts and rare photographs on Arizona and Southwest topics and an excellent collection of social science materials on Southwestern and border studies topics, including materials on northwestern Mexico. In the humanities, the main library has a fine collection of literary works

and literary criticism from small and major presses in American and English literature. The Child Drama Collection is also outstanding. A growing rare book and manuscript collection supports the research interests of academic units. The Arthur Young Tax Library emphasizes accounting and law. The Noble Science and Engineering Library is a designated U.S. Patent Depository and as such is one of fewer than 30 U.S. academic libraries to receive copies of all new patents. The entire collection of U.S. patents in microfilm is housed in the Noble Library.

The libraries contain extensive U.S. and Arizona government documents and selected international documents.

Branch libraries provide important specialized collections. The Music Library contains scores and sound recordings. The Architecture and Environmental Design Library houses a nationally recognized set of materials on solar energy and research collections on the work of Frank Lloyd Wright and Paolo Soleri as well as other Arizona architects.

The libraries offer excellent support to researchers interested in electronic information sources. The online library system incorporates the usual catalog to ASU library holdings as well as several other important electronic reference databases and gateways. Bibliographic information on the library holdings can be accessed from any location in the world via a modem-equipped microcomputer.

The library system belongs to the Center for Research Libraries, permitting access to the center's vast collections of materials for extended loan periods.

Graduate Student Support Services

Providing academic and professional development support to graduate students is an important part of the Graduate College mission. Services include advising, individual mentoring, financial support, orientation sessions, workshops, career seminars, and research conferences.

The Graduate College Student Programs/Services maintains a variety of programs specifically for graduate and nondegree students.

Graduate College Student Financial Assistance Office.

The Graduate College Student Financial Assistance Office meets the needs of graduate and professional students. Students may receive financial services at Wilson Hall, without having to visit other offices on campus. Students are offered general information about graduate financial assistance at ASU, may turn in documents, or receive status information on their student loans. Students can also apply for emergency short-term loans or pick up forms to report special circumstances. Staff members are available to help students with financial assistance concerns. Refer to "[Financing Graduate Studies](#)," page 45, for a full description of graduate financial support and services or visit the Web site at www.asu.edu/graduate/financial.

Advising and Career/Professional Development. Many graduate students have questions and concerns about which degree to pursue, how to combine their student roles with parenting, partnering and worker roles, and what to do with their degrees upon graduation. The Graduate College provides the following resources.

Advising. The Graduate College's Advising/Referral Office offers general information about policies, procedures, requirements, and support services. Students with regular admission status should contact their academic unit for degree program advising and program of study planning.

Career/Professional Development Seminars. The Graduate College, in conjunction with Counseling & Consultation, offers seminars to groups of graduate students interested in exploring career-related subject matters. Examples of seminar topics are dual career issues, the impact of values on career decision making, and transferable skills.

Career Planning Services for Graduate Students. In conjunction with Career Services and Counseling & Consultation, the Graduate College provides a brochure listing numerous career planning services for graduate student needs. This publication is also available at career.asu.edu.

Preparing Future Faculty (PFF). PFF is a national program designed to develop new approaches to preparing doctoral students who are seeking careers in the professoriate. A national initiative under the Council of Graduate Schools and the Association of American Colleges and Universities, PFF encourages fresh thinking and planning in faculty preparation, and identifies strategies to improve the quality of teaching and learning.

Preparing Future Professionals (PFP). The PFP program administered by the Graduate College, assists doctoral students interested in pursuing nonacademic professions. PFP parallels the well established and successful PFF program.

Through a series of activities, PFP familiarizes doctoral students with various nonacademic career tracks to help them develop skills to successfully pursue a wide range of career opportunities. For more information, contact the Graduate College at 480/965-3521.

Graduate College Support Program (GCSP). GCSP is designed to increase the number of graduate students from groups underrepresented in their chosen field of study. Students interested in these programs must first go to their respective departments for nomination.

The purpose of the program is to support research and creative activities related to a student's field of study. Nominations are made by departments, and recipients are supervised by a faculty member.

For students who demonstrate financial need through a FAFSA, the Graduate College offers financial assistance and peer mentoring. GCSP is available primarily to first-year students. However, departments are asked to provide a student's subsequent funding. The program is based on financial need and the nominations of students by departments. Financial support is provided in the form of a federal work-study to support field-related research that is supervised by a faculty member. For additional academic support, a student meets weekly with an assigned peer mentor who is two or more years advanced in the academic program.

The Social and Academic Mentor Program. The Graduate College Social and Academic Mentor (SAM) program is designed to recruit top graduate students from domestic, international, and underrepresented populations. Academic units submit applications to the Graduate College to nominate a first-year student (mentee) and peer mentor match. The mentor, two or more years advanced in the program,

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promotes the mentee's social and academic integration into graduate school using a structured format. The mentor meets weekly with the mentee and schedules regular monthly meetings with the faculty advisor to discuss the mentee's concerns, progress, accomplishments, or department-related matters.

Orientations. Before each fall semester, the Graduate College hosts an orientation/reception for new graduate students.

In addition to the orientation/reception, teaching assistants have the opportunity to enrich and enhance their teaching through seminars offered each semester. At least two seminars are mandatory for first-time TAs. Among other topics, TAs can attend sessions on teaching lab sciences, human diversity, critical thinking, classroom management, ethical issues, and multimedia applications in the classroom.

Workshops for Undergraduate Students Considering Graduate Education. The Graduate College holds workshops to address the issues that students contemplating graduate study should consider. The purpose of graduate study, the choices among research and professional degrees, the selection of schools to apply to, and the types and sources of financial support are among the topics discussed.

Student Organizations. The Graduate Student Council is part of the Associated Students of Arizona State University (ASASU), the student government for the university. The Graduate Research Support Office represents graduate student interests within ASASU and the Office of Student Life. It assists the Graduate College in planning orientations and other student-related activities and funds with the Graduate College small research grants to support graduate students' projects. In addition to the council, many other special interest organizations are open to graduate students.

Format Office. The thesis, dissertation, or equivalent is the culmination of an important stage of graduate studies. By researching and writing this final work, graduate students are able to show that they have acquired skills essential to a discipline. The Graduate College publishes a *Format Manual* as a guide in preparing the master's or doctoral document. The Format Manual, related formatting information and forms pertaining to procedures for completing all graduation requirements are available in the Graduate College lobby in Wilson Hall or on the Web at www.asu.edu/graduate/resources/student/formatinfo and www.asu.edu/graduate/forms, respectively.

Publications Program. The Graduate College publishes a number of brochures, fliers, and other items pertaining to academic program offerings, procedures, student financial assistance, and related topics and events in graduate education. For more information, call the Publications Unit at 480/965-3521.

ASU Graduate Council

The Graduate Council establishes general policies and standards for graduate programs and serves as an advisory board to the Graduate College dean. As part of its duties, the council reviews and makes recommendations regarding

graduate academic program proposals. Sixteen faculty members and one student serve on the council, representing a wide variety of degree programs at ASU Main and ASU East. An Academic Senate representative is also elected to serve. Council members are appointed by the president of the university. For a listing of Graduate Council members, access the Web site at www.asu.edu/graduate/gradcouncil.

Offices of the Graduate College

The general offices of the college, including those of the dean, admissions, advising, financial assistance, and graduate academic services and programs, are located on the first floor of Wilson Hall in the center of campus. College offices are open from 8 A.M. to 6 P.M. Monday through Thursday; 8 A.M. to 5 P.M. on Friday. The Graduate College may be called at 480/965-3521. The Web address is www.asu.edu/graduate.

Morrison School of Agribusiness and Resource Management

www.east.asu.edu/msabr

Raymond A. Marquardt, Ph.D., Dean

PURPOSE

The Morrison School of Agribusiness and Resource Management (MSABR) is committed to guiding students toward developing an integrated view of agribusiness, food systems, and environmental challenges that confront the world in the 21st century. Globalization, population growth, and new technologies require a sophisticated view toward the production, processing, storage, distribution, and marketing of food and fiber products. Prudent management of natural resources, to ensure that humanity's negative impact on the environment is mitigated, is becoming more and more important.

The Morrison School offers cutting edge programs enabling students to learn effective and responsible methods of agribusiness and environmental resource management. Strong relationships with industry and regulatory bodies afford students numerous opportunities to integrate theory and practice. This applied orientation traditionally makes MSABR students highly marketable upon graduation. MSABR programs are accessible to full- and part-time students, with many courses taught in both daytime and evenings. Some courses are taught in compressed formats and some online, thus helping students faced with growing time pressures. The faculty is committed to excellence in teaching, research and service, and strives to create a well-rounded experience for its students. The broad and diverse range of faculty research and teaching enables students to

Morrison School of Agribusiness and Resource Management Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Agribusiness	M.S.	Agribusiness management and marketing, food quality assurance	Morrison School of Agribusiness and Resource Management
Environmental Design and Planning*	Ph.D.	Design; history, theory, and criticism; planning	Committee on Environmental Design and Planning
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, range ecology	Morrison School of Agribusiness and Resource Management

* Courses for this interdisciplinary program administered by ASU Main are also offered at ASU East.

individualize their programs of study to fit their own particular career goals.

ORGANIZATION

The Morrison School offers Master of Science degree programs in Agribusiness and Environmental Resources. In addition, the Environmental Resources faculty participate in offering the Ph.D. in Environmental Design and Planning.

The M.S. in Agribusiness degree is supported by faculty with backgrounds in agricultural economics, applied business, food science, rural development, international trade, and a variety of experiences in industry and organizations. Many faculty work closely with agribusiness and business-related firms and in international projects, giving real world relevance to their research.

The M.S. in Environmental Resources degree is supported by faculty with backgrounds in ecology, forest and range management, botany, animal science, rangeland resources, and a wealth of field experiences. Research projects in wildlife inventory, habitat restoration, and GIS and remote sensing, among others, help support the applied nature of the program.

GRADUATE PROGRAMS

The M.S. in Agribusiness degree offers concentrations in agribusiness management and marketing, and food quality assurance. The degree is designed to prepare students from a variety of backgrounds with a set of critical and analytical business skills while recognizing the unique demands of the agribusiness sector. Graduates are well prepared for successful administrative or managerial careers with either government or private-sector organizations. Students are able to select either a research-oriented program, which leads to the completion of an organized thesis, or a program consisting of course work only (nonthesis option). All students can develop an area of specialization and apply their skills to a real world agribusiness problem through an integrative, capstone course experience. Both the thesis and nonthesis options require the completion of a common set of core courses. For more information regarding the M.S. in Agribusiness degree, access the Web site at www.east.asu.edu/msabr.

The M.S. in Environmental Resources degree is designed to train students who are scientifically competent, aware of the necessity of communicating the importance of sound ecosystem management, and able to work with numerous groups interested in natural resources. Students have the opportunity to study topics such as wildlife inventory and

habitat preference, habitat restoration, invasive plant species, Geographic Information Systems (GIS) and remote sensing applications to natural resource management, spatial modeling and the demand on natural resources, indicators of watershed condition, livestock riparian interactions, and influence of urbanization on soil carbon and nitrogen dynamics. All students are required to complete a core of graduate courses, conduct a research project under the direction of a faculty member, and prepare and defend a research thesis. For more information, access the Web site at cactus.east.asu.edu.

ADMISSION REQUIREMENTS

Admission requirements for the M.S. degrees in Agribusiness and Environmental Resources are based on those of the Graduate College. However, each requires further supporting materials pertaining solely to that degree; therefore, applicants are encouraged to refer to the sections of this catalog that correspond to each program.

SPECIAL PROGRAMS

Cooperative Degree Program. The Morrison School and the American Graduate School of International Management (Thunderbird) have a cooperative agreement for students interested in both agribusiness and international management. This agreement enables ASU students to take up to nine semester hours of course work at Thunderbird. To participate, an ASU student must be enrolled full-time and may only take three semester hours at Thunderbird in any semester. The goal of this agreement is to enhance the educational opportunities available to qualified students while making optimal use of the resources and facilities of both institutions.

Peace Corps Master’s International Program. The Morrison School has an agreement with the United States Peace Corps that makes combining graduate studies with Peace Corps service very appealing. Participants can receive up to six semester hours of credit for their independent field work while serving in the Peace Corps. Graduate course work precedes departure to foreign countries. Interested individuals must complete separate applications to ASU and the Peace Corps, and prepare plans of study with their faculty committees regarding studies in the field.

FACILITIES

In addition to the computing resources available to all students at ASU East, the Morrison School of Agribusiness

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and Resource Management has laboratories dedicated to food safety and science, soil and plant analysis, and GIS modeling. Laboratories are available to students for specific classes and related graduate thesis research.

ADVISING

Advising of graduate students is normally handled by graduate faculty committees. Once admitted, a student can request a temporary faculty advisor in a potential area of concentration in order to prepare a program of study. Students are encouraged to begin discussions with faculty members early in their studies so that course work and potential employment can be geared toward supporting their thesis research. All students, whether in a thesis or nonthesis option, must file a program of study and form a faculty advisory committee.

College of Architecture and Environmental Design

www.asu.edu/caed

PURPOSE

The college provides graduate education for professional, research, and academic careers in architecture, design, landscape architecture, and environmental and urban planning. Students in the master's programs benefit from small classes, seminars, and studios, from close, individual contact and faculty mentorship, and from an interdisciplinary curriculum. Students and faculty make full use of the Phoenix metropolitan area and the Sonoran region as research bases, and they also profit from strong interaction with the professional communities. The faculty have earned national reputations in energy-efficient design, computer-assisted design, corporate interior design, design for special populations, urban design, and environmental policy. Programs of study, including internship and trainee opportunities, give graduates the best possible start on academic, research, and professional careers.

ORGANIZATION

The college has three academic units: the School of Architecture, the School of Design, and the School of Planning and Landscape Architecture. The units and their faculty have strong ties with programs and faculty in business, computer science, construction, engineering, fine arts, geography, biological sciences, environmental resources, and public affairs.

GRADUATE PROGRAMS

The Ph.D. degree program in Environmental Design and Planning is a collegewide interdisciplinary degree offered by faculty representing the different disciplines comprising the Schools of Architecture, Design, and Planning and

Landscape Architecture. Environmental Resource faculty from the Morrison School of Agribusiness and Resource Management at ASU East also participate in offering this degree. Three areas of concentration are available: design; planning; and history, theory and criticism.

Faculty in the College of Architecture and Environmental Design offer four master's degree programs through the Graduate College: a professional program leading to the National Architectural Accrediting Board (NAAB)-accredited Master of Architecture degree (the two-year as well as three-plus-year programs); a research and applications M.S. degree in Building Design; the Master of Science in Design degree with concentrations in graphic design, industrial design, and interior design; and a professional graduate program leading to the PAB-accredited Master of Environmental Planning degree. Faculty in the School of Design offer the professional Master of Science in Design degree with concentrations in graphic design, industrial design, and interior design. Faculty in the School of Architecture offer the Master of Architecture and the M.S. degree in Building Design. Faculty in the School of Planning and Landscape Architecture offer the Master of Environmental Planning.

ADMISSION REQUIREMENTS

Applicants to each of the five graduate degree programs must meet Graduate College admission requirements, in addition to requirements of the academic unit offering the program. For application requirements and deadlines of the Graduate College, see "[Admission to the Graduate College.](#)" [on this page.](#) For application requirements and deadlines of each program, refer to the specific program section within "[Graduate Programs and Courses.](#)" [page 98.](#)

Doctor of Philosophy Degree in Environmental Design and Planning. Applicants to the Ph.D. program must have completed a master's degree in architecture, environmental resources, graphic design, industrial design, interior design, landscape architecture, or planning, or must be able to demonstrate equivalent standing. The degree is structured as a 54 semester-hour postmaster's program, and not as an 84-hour postbaccalaureate program. The following test scores are required: Graduate Record Examination scores and Test of English as a Foreign Language (TOEFL) score of at least 600 from applicants whose native language is not English.

Master of Architecture. Admission as a graduate student to the Master of Architecture program is a two-part process and is granted only with the approval of both the Graduate College and the School of Architecture.

Regular admission to the Master of Architecture program is open to applicants who have completed a four-year Bachelor of Science degree with a major in Architectural Studies or similar preprofessional degree in Architecture. The degree must be granted by an institution with an NAAB-accredited degree program in Architecture.

Admission to the three-plus-year Master of Architecture program has similar two-part application procedures. This is an NAAB-accredited program designed for applications with a bachelor's degree in fields unrelated to architecture. The program begins with a 10-week summer program followed by three academic years.

Master of Science in Building Design. Admission as a graduate student to the Master of Science degree in Building Design program is a two-part process and is granted only with the approval of both the ASU Graduate College and the School of Architecture.

Students with a previous NAAB-accredited professional degree in Architecture who wish to pursue advanced study and research should apply to the Master of Science degree in Building Design program.

Master of Environmental Planning. Applicants must hold a baccalaureate degree. International applicants whose native language is not English must achieve a TOEFL score of 550 or above.

Master of Science in Design Degree. Applicants must hold a baccalaureate degree in graphic design, industrial design, interior design, or a related design discipline as determined by the School of Design Graduate Program Committee. International applicants whose native language is not English must achieve a TOEFL score of 550 or above on the paper-based test and 213 or above on the computer-based test.

SPECIAL PROGRAMS

A concurrent Master of Architecture/Master of Business Administration degree program is available. The School of Architecture offers a foreign study abroad program. Also, a selective summer internship program places highly qualified students in nationally known American firms.

The Master of Environmental Planning program has special ties with the professional planning community and offers students considerable interaction with practitioners in the field, as well as experience in local planning offices and agencies.

The School of Design offers a Distance Learning M.S.D. in Industrial Design. Design analysis combines traditional Industrial Design education with components of the digital age. Most courses are delivered in a distance-learning format, but students attend intensive workshops on campus once a year.

All of the master's programs are interdisciplinary in focus and require or strongly recommend course work in other programs, departments, and colleges. Each program works with affiliated and associated faculty from other units within the college. Also, faculty from such areas as geography, engineering, public affairs, business, transportation, environmental studies, and fine arts collaborate with the faculty and graduate students of the college.

COLLEGE FACILITIES

With the opening of the award-winning expansion to the Architecture building in spring of 1989, the college consolidated its facilities into a single complex and more than doubled the space available for instruction, research, and service activities. Expanded facilities include the library, the shop, studios, faculty and administrative offices, and research facilities. Research and special project rooms include a high-bay research laboratory, a lighting laboratory, community outreach and design excellence studios, a materials resource center, as well as a solar instrumentation labo-

ratory and a rooftop outdoor solar and day lighting testing area. The college is especially proud of its computer facilities and the faculty-graduate student computer research laboratory. There is a local area network that ties together faculty, studio, and library resources. Emphasis is on mini- and microcomputer modeling, simulation, and design applications (see "[Computing Facilities and Services](#)," page 29). Teaching and research activities are also supported by a media center with photography and video services and a slide and media library. Individual studio work space is available to graduate students and the expansion features extensive jury, review, and display space.

The Gallery of Design is one of eight university galleries and museums. It provides premium space for traveling exhibitions and exhibitions of student and faculty work.

Housed in the College of Architecture and Environmental Design/North building, the college's Design Library has a spacious and welcoming interior, with cherry wood furnishings. A branch of the University Libraries, the Architecture and Environmental Design (AED) Library provides access to books, periodicals, reference materials, and product catalogs. The collection includes approximately 35,000 volumes. There are also 150 current periodical subscriptions available. ASU Libraries provide access to numerous online databases, including the *Avery Index to Architectural Periodicals*.

Rare and unusual materials related to architecture and environmental design reside in the Special Collections area. Notable among these are the extensive collections of books and ephemera on Paolo Soleri and Frank Lloyd Wright.

The rapidly growing Archival Drawings Collection is also part of the AED Library's Special Collections area. Included are the archival drawings and papers of several noteworthy architects including: Alfred N. Beadle, William P. Bruder, Blaine Drake, Albert Chase McArthur, Victor Olgay, Paul Schweikher, Calvin Straub, Marcus Whiffen, and Martin Ray Young, Jr. The Archival Drawings Collection also contains documentation of the company town of Litchfield Park, the Rio Salado Project, the Phoenix Civic Plaza design competition, and the Metropolitan Canal Alliance.

ADVISING

Architecture. Students should consult the school's Web site at www.asu.edu/caed/architecture for general information about the programs and procedures. In addition, a graduate coordinator is available for professional advising. For more information, call 480/965-3536, or send e-mail to arch_grad@asu.edu.

Design. Preadmission information, advising, and continued support are provided by the director of the school and the graduate program coordinator. Call 480/965-4135 for more information.

Planning. The school's academic advisor provides preadmission information, general program information and procedures, and general advising. The school's director and M.E.P. program coordinator provides program information, professional advising, and continued support. For more information, call 480/965-7167, or access the school's Web site at www.asu.edu/caed.

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College of Architecture and Environmental Design Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Architecture	M.Arch.	—	School of Architecture
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, facilities development and management	School of Architecture
Design	M.S.D.	Graphic design, industrial design, interior design	School of Design
Environmental Design and Planning*	Ph.D.	Design; history, theory, and criticism; planning	College of Architecture and Environmental Design
Environmental Planning	M.E.P.	Landscape ecological planning, urban and regional development, urban design	School of Planning and Landscape Architecture

* Doctoral courses for these interdisciplinary programs administered by ASU Main are also offered at ASU East.

ACCREDITATION

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The NAAB (www.naab.org), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. (A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.)

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, compose an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

The Master of Architecture program at ASU is fully accredited by the NAAB. The Master of Architecture requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. This professional degree is structured to educate those who aspire to registration/licensure as architects.

The School of Architecture is a full member of the Association of Collegiate Schools of Architecture and the Architectural Research Centers Consortium.

The programs in the School of Planning and Landscape Architecture are affiliated with the Association of Collegiate Schools of Planning and the Council of Educators in Landscape Architecture.

The Master of Environmental Planning program is accredited by the Planning Accreditation Board while the Bachelor of Science in Landscape Architecture program is accredited by the Landscape Architecture Accreditation Board.

College of Business

www.cob.asu.edu

Larry E. Penley, Ph.D., Dean

PURPOSE

The College of Business is a professional school that pursues excellence in instruction and research. The pursuit of excellence in programs of instruction implies that the college admits only students who are especially well qualified for the study of business and who will, upon graduation, compete successfully for highly desirable positions, both nationally and internationally.

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 that address issues of importance to future managers in a world characterized by racial, cultural, and gender diversity in the work force; demands for continuous improvements in quality; growing technological sophistication; and globalized markets.

The College of Business is a comprehensive research school of business that selects and retains faculty based on their ability to use their teaching and research skills to fulfill its mission.

The College of Business—through its research support, its Seidman Institute programs and centers, and its doctoral programs—develops knowledge that is important to managers and the management of organizations. It endorses joint research projects that are not only supported by business but include managers as partners in the research objectives, processes, and outcomes.

The College of Business anticipates that its mission will lead to research and professional degree programs that will result in its being recognized among the top schools of business in the U.S. Strategies to achieve its mission include an emphasis on the M.B.A. degree: increasing its quality such that it is competitive with the best 25 programs found at

College of Business Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Accountancy and Information Systems	M.A.I.S.	—	School of Accountancy and Information Management
Business Administration	M.B.A.	—	College of Business
	Ph.D.	Accountancy, computer information systems, finance, health services research, ¹ management, marketing, supply chain management	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
Public Health ²	M.P.H.	Health administration and policy	School of Health Administration and Policy
Statistics ³	M.S.	—	Committee on Statistics
Taxation	M.Tax.	—	School of Accountancy and Information Management

¹ Applications are not being accepted at this time.

² This collaborative program is offered by the three state universities. Another concentration is offered by the College of Nursing.

³ This program is administered by the Graduate College.

other large public schools of business, and developing a curriculum that incorporates the knowledge, skills, and abilities identified in the mission of the college.

Strategies relative to the doctoral program also include raising admission standards, increasing stipends, and assuring that students possess the teaching and research skills necessary for placement at peer schools of business. Consistent with the mission, an additional strategy is to improve the retention and graduation rates of minority students through programs at the M.B.A. and doctoral levels.

Finally, the college will, through its Seidman Institute, increase the level of funded research by adding support services to facilitate grant preparation and by clarifying the mission of research centers as liaisons between faculty and businesses.

ORGANIZATION

The college's seven academic units and several centers serve more than 1,400 graduate students enrolled in eight graduate degree programs. Academic units contributing to graduate offerings include the School of Accountancy and Information Management, the School of Health Administration and Policy, and the Departments of Economics, Finance, Management, Marketing, and Supply Chain Management. The Seidman Institute serves as the college's focal point for applied research, and several centers are organized in conjunction with the Seidman Institute: the Arizona Real Estate Center, the Bank One Economic Outlook Center, CAPS Research, the Center for Business Research, and the Center for Services Leadership.

GRADUATE PROGRAMS

The M.B.A. program is the premier professional degree in the College of Business. The college offers the traditional full-time program, an Executive M.B.A. program, an eve-

ning program for working managers, and a program for high technology professionals. The faculty also offer the Ph.D. degree in Economics and in Business Administration, with concentrations in accountancy, computer information systems, finance, health services research, management, marketing, and supply chain management. Other master's offerings include the Master of Accountancy and Information Systems, Master of Health Services Administration, and M.S. degrees in Economics and in Information Management, an interdisciplinary program leading to an M.S. degree in Statistics, and the Master of Taxation.

ADMISSION REQUIREMENTS

Applicants to all degree programs must meet the minimum Graduate College academic requirements. Admission is highly competitive and selective. Acceptance is based on the applicant's previous college record, all relevant data provided with the application, and scores from the Graduate Management Admission Test or the Graduate Record Examination (GRE). (GRE scores are required for the Economics programs only.) Certain degree programs require applicants to submit a statement of purpose and letters of recommendation. In addition, the Test of English as a Foreign Language is required of international applicants whose native language is not English.

SPECIAL PROGRAMS

Dual Degree Programs. The College of Business and the American Graduate School of International Management (Thunderbird) have developed a dual degree for students interested in both business administration and international management. Thunderbird is an internationally recognized private graduate school, located in the Phoenix metropolitan area, offering course work in international studies, modern

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languages and world business. The dual degree program is designed to allow a limited number of qualified graduate students to pursue an M.B.A. degree at ASU and a Master of International Management (M.I.M.) degree at Thunderbird, concurrently allowing students to earn two degrees in less time than if done separately. Applicants must be regularly admitted to both programs and may begin at either location.

The College of Business also offers dual degree programs with Groupe Ecole Supérieure de Commerce Toulouse in Toulouse, France; Universidad Carlos III de Madrid in Spain; Instituto Tecnológico y de Estudios Superiores de Monterrey in Mexico City, Mexico; and ESAN Business School in Latin America. Call 480/965-3332 for more information.

The college also offers the following dual degrees:

1. Master of Science (M.S.) in Economics/Juris Doctor (J.D.);
2. M.B.A./J.D.;
3. M.B.A./Master of Accountancy and Information Systems;
4. M.B.A./Master of Architecture;
5. M.B.A./M.S. in Information Management;
6. M.B.A./Master of Health Services Administration (M.H.S.A.);
7. M.B.A./M.S. in Economics; and
8. M.B.A./M.Tax.



U.S. News and World Report recently ranked the ASU M.B.A. program 12th in the nation among 352 public universities and colleges.

Tim Trumble photo

Separate applications are required for each degree and each application is reviewed independently. It is recommended that the student apply simultaneously to both of the dual degree programs. The M.B.A./J.D. is best completed by attending one year in the law school, then attending the M.B.A. program after the first or second year, and finally returning to the law school to complete the third year. Students are not admitted from the law school after the third year.

INSTITUTES/RESEARCH CENTERS

L. William Seidman Research Institute. The L. William Seidman Research Institute encourages, promotes, and supports multidisciplinary, cross-disciplinary, and applied research on a wide range of business topics. The institute serves as the “port-of-entry” for applied business research in the College of Business as well as an incubator to transfer knowledge to the business community. The institute also acts as a facilitator for postdoctoral, continuing, and executive business education that is taught by ASU faculty. In addition, the institute contributes funding for operations.

Arizona Real Estate Center. The Arizona Real Estate Center collects and analyzes data concerning the multifaceted real estate market to provide insight into solutions for problems confronting the real estate industry.

Bank One Economic Outlook Center. The Bank One Economic Outlook Center serves as the economic forecasting unit of the college and is responsible for the publication of the Arizona Blue Chip, Western Blue Chip, Mexico Blue Chip, Greater Phoenix Blue Chip, and Blue Chip Job Growth Update.

CAPS Research. CAPS Research is a national affiliation agreement between the College of Business at ASU and the Institute for Supply Management. The center conducts in-depth research into the problems facing the purchasing profession today and the requirements of the future.

Center for the Advancement of Small Business.

Endowed with private funding, the center’s mission is to enhance the formation and management of small- and medium-size companies to enable them to compete in the global economy of the 21st century. The primary goal is to ensure that ASU students from all disciplines are provided with programs that prepare them for positions of leadership in small- and medium-size businesses.

Center for Business Research. The Center for Business Research collects, analyzes, and disseminates information on the economy and business climate of Arizona. Analyses of Gross State Product, prices, income, employment, and demographic data for Arizona are made available to business and the general public. The center coordinates interdisciplinary sponsored-research efforts to provide useful information to business and a learning experience for students and faculty researchers.

Center for Services Leadership. The Center for Services Leadership is North America’s leading university-based center for the study of services marketing and management. The center conducts extensive research in the field; offers

specialized education and training to services executives; and provides the latest services information to organizations engaged in banking, insurance, health care, tourism, transportation, and other service industries. Its charter members include some of America's foremost services firms and non-services firms.

Institute for Manufacturing Enterprise Systems. The Institute for Manufacturing Enterprise Systems is a joint venture of the College of Business and the College of Engineering and Applied Sciences. The institute was established to enhance manufacturing research and industrial collaboration between the two colleges. The mission of the institute involves integrating aspects of manufacturing in both the business and engineering areas, helping to fulfill ASU's goal of becoming one of the leading educational and research institutions in both manufacturing enterprise and manufacturing process technology issues.

M.B.A. Council. The M.B.A. Council plays an active role in linking students with alumni to enhance the M.B.A. student experience. The M.B.A. Council also assists to unite alumni and promote the national reputation of the M.B.A. program.

Washington Campus. Founded in 1978 by William Seidman and other leaders in business, government, and higher education, the Washington Campus is a nonpartisan, not-for-profit organization committed to educating business executives on the public policy process. The campus is a consortium of the business schools of 17 U.S. universities. Located in Washington, D.C., it draws upon the unique resources of the nation's capital to provide business-oriented education on the institutions and decision-making processes of government. Participants earn graduate credit, observe the intricacies of national politics, and enjoy the excitement of the nation's capital.

COLLEGE FACILITIES

The College of Business offers one of the most modern and sophisticated environments available for professional graduate study. The college facilities provide attractive and comfortable classrooms, computer systems, study areas, a television studio, modern auditoriums, and a graduate student reading room and lounge. Both mainframe interactive and networked microcomputer facilities, in addition to wireless capabilities, are available to graduate students throughout the two business buildings. Refer to "[Computing Facilities and Services](#)," page 29.

ADVISING

Information sessions are held daily (Monday, Wednesday, and Friday at 10 A.M., Tuesday at 5:30 P.M. and Thursday at 2 P.M.) in the M.B.A. Program Office, BA 160. For more information about information sessions, send e-mail to mba.infosession@asu.edu. Summer hours may vary. M.B.A. brochures may be obtained at the office; call 480/965-3332, or send e-mail to asu.mba@asu.edu.

ACCREDITATION

The College of Business and its School of Accountancy and Information Management are accredited by AACSB International—The Association to Advance Collegiate Schools of Business. AACSB International is the recognized accrediting agency in the field of business education. The School of Health Administration and Policy is accredited by the Accrediting Commission on Education for Health Services Administration.

East College

www.east.asu.edu/ecollege

David E. Schwalm, Ph.D., Dean

PURPOSE

East College was established as the initial administrative home for all new ASU East undergraduate and graduate programs outside of agribusiness and technology. The college also provides general studies and other supporting course work for all students enrolled at ASU East. East College offers seven undergraduate and two graduate degrees.

ORGANIZATION

East College is organized into six faculties or departments:

- Applied Psychology, Faculty of
- Business Administration, Faculty of
- Elementary Education, Faculty of
- Exercise and Wellness, Department of
- Multimedia Writing and Technical Communication, Faculty of
- Nutrition, Department of

GRADUATE PROGRAMS

Graduate degree programs as shown in the "[East College Graduate Degrees and Majors](#)" table, page 62, are offered by the faculty within the college.

ADMISSION REQUIREMENTS

Applicants to East College graduate degree programs must meet the minimum Graduate College academic requirements. Individual programs may require additional supporting materials. Applicants should refer to requirements specified by each East College graduate degree program.

COLLEGE FACILITIES

East College is located at ASU East, the newest of the ASU campuses. The easily accessible campus offers students modern mediated classrooms, state-of-the-art computer facilities, electronic access to library resources, and a range of on-campus housing options. ASU East students

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East College Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Curriculum and Instruction*	Ph.D.	Exercise and wellness education	Interdisciplinary Committee on Curriculum and Instruction
Exercise and Wellness	M.S.	—	Department of Exercise and Wellness
Nutrition	M.S.	—	Department of Nutrition

* Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

also have access to ASU Main resources and research facilities. A shuttle runs regularly between the two campuses.

ADVISING

Career advising is available on campus and through Career Services at ASU Main. Academic advising is provided by the department offering the degree program.

College of Education

coe.asu.edu/coe

Eugene E. Garcia, Ph.D., Dean

PURPOSE

The College of Education is committed to the development of innovative programs that prepare graduate students for leadership roles in solving educational problems. The college provides a stimulating, challenging forum in which research and practice are viewed as essential and complementary. Faculty members are dedicated to producing quality scholarship and research that lead to excellence in teaching, professional practice, and administration of educational institutions.

ORGANIZATION

The College of Education is organized into three divisions.

Division of Curriculum and Instruction

Carlos Julio Ovando, Associate Dean
(ED 426) 480/965-1644

www.ed.asu.edu/coe/candi

Research Clusters. Research clusters have been established for existing concentration areas to promote and develop support of academic scholarly interests. Cluster areas include: curriculum studies, early childhood, equity and diversity and citizenship, gender, language and literacy, mathematics, middle level interest, science education, special education, and teacher education.

Graduate programs offered by faculty of the Division of Curriculum and Instruction, through the Graduate College, prepare students for positions in schools, colleges, universi-

ties, government agencies, and public or private organizations. Graduates work as educational leaders, researchers, media and computer specialists, and librarians. This division offers programs that prepare students for Arizona State teacher certification in the following areas: special, elementary, or secondary education. It is designed for students who have graduated from accredited colleges or universities with majors other than education. If desired, a master's degree may be pursued concurrently with teacher certification.

The M.A. and M.Ed. degrees in Curriculum and Instruction offer areas of concentration in bilingual education, early childhood education, elementary education, English as a second language, Indian education, mathematics education, language and literacy, science education, secondary education, and social studies education. The M.Ed. offers a concentration in professional studies.

The Ed.D. degree in Curriculum and Instruction offers areas of concentration in bilingual education, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, and social studies education.

The division is committed to research. Members of the faculty edit several national, scholarly journals; publish and present research papers; and direct funded research. Faculty members encourage and assist graduate students in conducting research, writing for publication, and making presentations at professional conferences. Particular research interests of the faculty are noted under each degree major.

Division of Educational Leadership and Policy Studies

Terrence Wiley, Director
(ED 120) 480/965-6357
coe.asu.edu/elps

Program Areas

Education Policy Studies
Educational Administration and Supervision
Higher and Postsecondary Education
Social and Philosophical Foundations of Education

Degrees:

M.A., M.Ed., Ed.D., Ph.D.

Graduate programs in this division are designed to develop leaders, researchers, and policy analysts for careers in schools, colleges, and private and government agencies. Graduates will be able to examine educational institutions, theories, and practices within broad economic, historic,

College of Education Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
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
Curriculum and Instruction	M.A.	Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, social studies education	Division of Curriculum and Instruction
	M.Ed.	Bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, social studies education	Division of Curriculum and Instruction
	Ed.D.	Bilingual education, curriculum studies, early childhood education, elementary education, ¹ English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, ¹ social studies education	Division of Curriculum and Instruction
	Ph.D. ²	Art education, ³ curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, ⁴ language and literacy, mathematics education, music education, physical education, science education, special education	Interdisciplinary Committee on Curriculum and Instruction
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 Psychology	M.A., M.Ed.	—	Division of Psychology in Education
	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology	Division of Psychology in Education
Educational Technology	M.Ed., Ph.D.	—	Division of Psychology in Education
Higher and Postsecondary Education	M.Ed., Ed.D.	Higher education	Division of Educational Leadership and Policy Studies
Social and Philosophical Foundations of Education	M.A.	—	Division of Educational Leadership and Policy Studies
Special Education	M.A.	—	Division of Curriculum and Instruction
	M.Ed.	Gifted, mildly disabled, multicultural exceptional, severely/multiply disabled	Division of Curriculum and Instruction

¹ Applications are not being accepted at this time.

² Program is administered in collaboration with the Graduate College.

³ This concentration is administered in collaboration with the Herberger College of Fine Arts.

⁴ Doctoral courses for this interdisciplinary program administered by ASU Main are offered by ASU East.

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political, social, and intellectual contexts in this country and abroad.

Two basic emphases exist within the division's programs. One strand focuses on the administration and policies of educational practices from preschool through secondary education. The other strand focuses on the administration and policies of postsecondary education. Specific details of these strands are given under the headings of the degree offerings in Educational Administration and Supervision, Educational Leadership and Policy Studies, Higher and Postsecondary Education, and Social and Philosophical Foundations.

Faculty within the division are involved in both data-based and theoretical research. Qualitative and quantitative paradigms are employed. Students have the opportunity to work on research projects in the College of Education and in school districts and educational agencies throughout the country.

Division of Psychology in Education

Elsie Moore, Director
(EDB 302) 480/965-3384
coe.asu.edu/psyched

Program Areas

Counseling Psychology
Counselor Education
Educational Psychology
 Learning
 Lifespan Developmental Psychology
 Measurement, Statistics, and Methodological Studies
 School Psychology
Educational Technology

Degrees:

M.A., M.Ed., M.C., Ph.D.

All program areas within this division strongly emphasize research activities. Areas of concentration within the Ph.D. in Educational Psychology include learning; lifespan developmental psychology; measurement, statistics, and methodological studies; and school psychology. The Ph.D. program in Counseling Psychology and Educational Psychology concentration in school psychology are accredited by the American Psychological Association and are based upon the scientist-practitioner model. The Master of Counseling program in community counseling is accredited by the Council for the Accreditation of Counseling and Related Educational Programs (CACREP).

Members of the faculty are actively involved in a variety of research and other scholarly activities, including basic and applied educational research, editing and reviewing for a number of refereed journals, publishing and presenting research papers, and seeking external funding for research projects. The faculty encourage and assist graduate students' research, publications, and presentations at professional conferences. Particular research interests of the faculty are noted under each degree major.

GRADUATE PROGRAMS

The College of Education offers degrees for the practitioner and for the academic researcher. The Master of Education and the Doctor of Education are designed for

teachers and other practitioners working directly with students and schools. The Master of Counseling is designed to prepare helping professionals for work in a variety of counseling settings. The M.A. and Ph.D. degrees are designed for persons interested in careers in universities and other research settings. The M.A. and Ph.D. programs emphasize theory development, research methods, and acquisition of a broad base of knowledge about education, as well as in-depth knowledge of a chosen field of specialization.

The Interdisciplinary Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. Areas of concentration are as follows: art education, curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, language and literacy, mathematics education, music education, physical education, science education, and special education. The interdisciplinary committee sets guidelines and supervises programs of study, while an executive committee, appointed by the dean of the College of Education and the dean of the Graduate College, has primary responsibility for the operation of the program. It is composed of faculty representing the various concentrations.

Most graduate programs of the College of Education include a core of courses designed to give students an understanding of the context of American education and of the methods of scholarship by which the understanding of the educational system is deepened.

Core course requirements along with specific requirements for the various types of degrees are given under the appropriate majors. The table presents a summary of those degrees authorized by the Arizona Board of Regents. Contact the division offices for further information about degrees offered through each faculty group. Several of the degrees have various concentrations.

ADMISSION REQUIREMENTS

Applicants must meet the general admission requirements established by the Graduate College. For the M.Ed. and M.C. degrees, test scores from the Miller Analogies Test or the Graduate Record Examination are required.

Individual divisions or programs may have admission standards higher than these minimums. Also, some units are limited by the number of faculty members or resources they have, and in keeping with the college's goals of providing a high quality education for all enrolled students, only a small proportion of the qualified students who apply are admitted. Students should consult the division director or program coordinator for specific admission requirements.

SPECIAL PROGRAMS

Research and services to students and the community are provided through two centers authorized by the Arizona Board of Regents: the Southwest Center for Education Equity and Language Diversity and the Center for Indian Education. The College of Education offers graduate course work pertaining to the development and education of children and youth from diverse cultural, linguistic, and racial/ethnic populations. Faculty affiliated with multicultural education are actively involved in research related to effective

schooling for children of Hispanic American and American Indian heritage, parents as partners in education, bilingual education, and English as a second language.

For more information regarding the Southwest Center for Education Equity and Language Diversity, call 480/965-7134. Additional information about the Center for Indian Education is available by calling 480/965-6292.

The college's Technology Based Learning and Research Facility conducts research activity related to software evaluation and the use of microcomputers in schools. For more information, call 480/965-3322.

CERTIFICATION AND ENDORSEMENT

Postbaccalaureate programs that lead to Initial Teacher Certification (ITC) are designed for people who hold bachelor's degrees in areas other than education. ITC programs are available in one of the following areas: early childhood education, elementary education, principalship, secondary education, special education, superintendent, and supervisor. Programs to earn endorsements, which are added to teaching certificates, include educating the gifted, library science, middle school education, multilingual/multicultural, and reading. Programs that prepare students for certification by the State as a school counselor are offered by the Counselor Education Program.

COLLEGE FACILITIES

In addition to the special programs mentioned earlier, other administrative units and centers provide services to students and the community. These include the College of Education Preschool, which provides young children a variety of learning experiences designed to encourage the development of thinking skills, intellectual curiosity, creative expression, and the foundation upon which academic skills will later be built. The preschool provides on-site observation opportunities for students preparing to become early childhood teachers. For more information, call 480/965-2510.

The Counselor Training Center provides counseling for ASU students, faculty, staff, and the community at large, regarding personal relationships, and career development issues. Counseling is conducted by graduate students in counseling and counseling psychology under the supervision of licensed psychologists. For more information regarding the Counselor Training Center, call 480/965-5067.

Education Policy Studies Laboratory. Located within the College of Education, the Education Policy Studies Laboratory (EPSL) conducts and coordinates original research in areas such as student performance standards, assessment, curriculum, and commercialism in schools. EPSL disseminates its analyses and reports to policy makers and educators and also concentrates on providing the public with readable accounts of research.

EPSL houses two research units—the Commercialism in Education Research Unit (CERU), which is the only national academic research center dedicated to schoolhouse commercialism; and the Education Policy Research Unit (EPRU), which conducts original research and facilitates implementation of educational innovations.

For more information, contact the director of Educational Leadership and Policy Studies, EDB L1-01, call 480/965-1886, or access the laboratory's Web site at www.asu.edu/educ/epsl.

ADVISING

General career advising in a program can be obtained by contacting the director of the division or the coordinator of the program in which a degree is offered. After admission to a degree program, specific advice related to degree activities is provided by supervisory committees.

ACCREDITATION AND AFFILIATION

The Ph.D. programs in Counseling Psychology and the Educational Psychology concentration in school psychology are accredited by the American Psychological Association. The school psychology program is also approved by the National Association of School Psychologists. The Master of Counseling is accredited by the Council for Accreditation of Counseling and Related Educational Programs. The College of Education is approved by the State Board of Education (Arizona). The college is affiliated and has membership with the American Association of Colleges for Teacher Education, the American Educational Research Association, and the University Council for Educational Administration.

College of Engineering and Applied Sciences

www.eas.asu.edu

Peter E. Crouch, Ph.D., Dean

PURPOSE

Faculty in the College of Engineering and Applied Sciences offer opportunities for graduate study through the Del E. Webb School of Construction and the School of Engineering. Degrees offered include the Master of Engineering (a tri-university degree program); the Master of Science in Engineering; the M.S. in the fields of computer science, construction, and engineering; the Master of Computer Science; and the Ph.D. in the fields of engineering and computer science.

The primary purpose of a graduate education is to provide the student with advanced training for a professional, teaching, or research career. The graduate program in the School of Engineering is designed to bridge the gap between knowledge of engineering sciences and creative engineering practice, while at the same time increasing the student's depth and breadth of knowledge in an area of emphasis. The performance of scholarly research and the acceptance of professional responsibility for the

COLLEGES

documented results are considered essential requirements for graduate degrees and entrance into professional careers.

Information about the College of Engineering and Applied Sciences can be accessed via the World Wide Web at www.eas.asu.edu. The individual department and research program Web pages may also be accessed through this main address.

ORGANIZATION

The College of Engineering and Applied Sciences is organized as follows:

Del E. Webb School of Construction

School of Engineering

Department of Bioengineering

Department of Chemical and Materials Engineering

Department of Civil and Environmental Engineering

Department of Computer Science and Engineering

Department of Electrical Engineering

Department of Industrial Engineering

Department of Mechanical and Aerospace
Engineering

Each academic unit, headed by a chair or director, offers various undergraduate and graduate degree programs. Faculty from these academic units participate in the research programs offered through the college research centers as well as individual laboratories and facilities. Drawing on the interests, strengths, and resources of academic units in the College of Engineering and Applied Sciences and other schools and colleges within the university, interdisciplinary research centers coordinate research, sponsor conferences and continuing education courses, and serve as liaison between the academic and industrial or technical communities.

ADMISSION REQUIREMENTS

Applicants must meet the general admission requirements established by the Graduate College. Additional supporting materials may be required by individual academic units. These materials may include test scores from the Graduate Record Examination, letters of recommendation, and statements of educational and professional goals. International applicants whose native language is not English must also submit Test of English as a Foreign Language (TOEFL) scores. See the requirements listed under each major in this catalog for specific TOEFL information.

General information on admission, expenses, and other such topics may be obtained from the Office of the Associate Dean for Academic Affairs via the college's Web site at www.eas.asu.edu. Specific questions on a program should be addressed to the academic unit.

GRADUATE PROGRAMS

Through the Graduate College, faculty in the College of Engineering and Applied Sciences offer various graduate programs leading to the M.S., Master of Science in Engineering, Master of Engineering, Master of Computer Science, and Ph.D.

The college is committed to becoming a nationally prominent center for graduate research. Faculty members con-

duct research on government or industry-sponsored programs in such areas as aerodynamics, biomedical engineering, biotechnology, computer design, computer-integrated manufacturing, construction management, 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 infrastructure. The research activities of the academic units within the college are complemented and supported by the work of centers for research and development.

Research in the Center for Low Power Electronics focuses on the following technical areas:

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 multichip VLSI systems.

Faculty and graduate students in the college participate in programs of the Center for Solid State Electronics Research, coordinating the work of researchers from various units. The center emphasizes the development of solid-state electronics research and teaching and facilitates interaction with the electronics industry. The center operates modern, sophisticated research facilities, organizes colloquia and symposia, collaborates with external researchers, and sponsors visiting professorships.

The college's Telecommunications Research Center focuses, plans, and promotes the research activities of the faculty with interests in antennas, propagation, and scattering; microwave circuits, devices, and measurements; optical communications; signal processing; and switching and data communications. The center conducts research, develops technologies, and provides educational programs. Industrial and multidisciplinary programs are encouraged. The center operates modern research laboratories, including an excellent, spacious electromagnetic anechoic chamber.

The Institute for Manufacturing Enterprise Systems was established to broaden the scope of manufacturing research in the university to include research at the interface between the College of Business and the College of Engineering and Applied Sciences as well as research in manufacturing processes. The institute has codirectors from both colleges and also enjoys active industry involvement.

The Center for Systems Science and Engineering 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. The center's focal areas include nonlinear and adaptive systems, large scale systems, and scientific computing and simulation.

The Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET) is a col-

College of Engineering and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Del E. Webb School of Construction			
Construction	M.S.	Construction science, facilities, management	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 Bioengineering
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Department of Chemical and Materials Engineering
Civil Engineering	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	M.E. ¹	—	School of 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 Engineering
Materials Engineering	M.S., M.S.E.	—	Department of Chemical and Materials Engineering
Materials Science	M.S. ²	—	Committee on the Science and Engineering of Materials
Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Department of Mechanical and Aerospace Engineering
Science and Engineering of Materials	Ph.D. ²	High-resolution nanostructure analysis, solid-state device materials design	Committee on the Science and Engineering of Materials

¹ This collaborative program is offered by the three state universities.

² This program is administered by the Graduate College.

laborative effort between CEAS, the College of Liberal Arts and Sciences, and the College of Education. The mission of this center is to research, develop, and assess educational theories, curricula, and administrative policies that impact science, mathematics, engineering, and technology education, and to encourage and support wide-scale sharing and implementation of effective approaches to producing a more scientifically and technologically literate populace, and more capable science, math, engineering, and technology graduates. Partnership-building with individuals, programs, and organizations throughout the K-12 education system is an important role for this center, which is ideally positioned to exploit the synergism that can result from linking all educational levels in these disciplines together to foster improvements.

The Center for Professional Development coordinates continuing education services for the local, national, and international technical community, sponsoring conferences, seminars, institutes, and short courses for professionals in the rapidly changing fields of science and technology. The center also coordinates distance-learning and media-delivered programs via television, satellite, and Web connections.

The College of Engineering and Applied Sciences serves the high technology community through the Interactive Instructional Television Program. The system allows

employees of participating companies to attend graduate-level courses, special interest seminars, and video teleconferences without leaving their place of employment. In cooperation with the National Technological University, the college also provides instruction via satellite.

The College of Engineering and Applied Sciences and the industrial and business communities of Arizona interact regularly through the Dean's Advisory Council. The council's primary purpose is to assist the college in its threefold mission:

1. to provide undergraduate and graduate students with a variety of high-quality educational opportunities that will serve their professional interests into the 21st century,
2. to enhance the economic well-being of Arizona and the nation, and
3. to meet the rapidly expanding need for research and educational support of the high-technology industry of Arizona.

The Engineering Excellence 2000 program sponsored by the college and the Arizona industrial and business communities has been instrumental in dramatically increasing state, federal, and private funding of undergraduate and graduate instruction and the college's research programs. Currently, the School of Engineering, which houses the college's seven

engineering departments, is emphasizing research in the areas of electronics/materials, manufacturing, communications and information systems, environmental engineering, biotechnology, and software engineering. The college's Del E. Webb School of Construction enjoys great community support for its active graduate program in construction sciences and facilities management.

Arizona's three state universities—Arizona State University, Northern Arizona University, and the University of Arizona—are cooperating in the offering of a new tri-university degree program: the Master of Engineering. The Master of Engineering is a graduate degree program that is intended to meet the educational needs of Arizona's practicing engineers. With input from industry professionals, the three universities expect to develop courses that address the enhancement and development of skills, knowledge, and understanding that are critical to today's practicing engineer. These courses will be offered through a variety of distance-delivery methods and in flexible formats. Students enrolled in the program will be able to take advantage of course offerings at any of the three universities. These offerings reflect the diversity of strengths across the state. The Master of Engineering offers the practicing engineer the opportunity to design, in conjunction with an advisory committee, a program of study that can reflect the increasingly interdisciplinary nature of engineering practice.

For more information on this degree program, see "[Master of Engineering—M.E.](#)" page 195, visit the program's Web site at triuniv.engr.arizona.edu, contact the College of Engineering and Applied Sciences at 480/965-1726, or send e-mail to m.eng@asu.edu.

COLLEGE FACILITIES

Numerous well-equipped laboratories, extensive library holdings, and widely available computer services encourage the best in research and graduate training. Laboratories include facilities for environmental fluid dynamics, interactive nonvisualization via scanning probe microscopy, materials and surface characterization, mechanical testing, molecular beam epitaxy, neuromechanical control, rapid manufacturing processes, transmission microscopy, and surface research, to name only a few of the diverse capabilities of the college's physical resources. Supporting the work of researchers, a well-equipped and well-staffed machine and structures fabrication shop makes special-purpose equipment for student and faculty projects. For more information about laboratories, consult the descriptions of individual programs and centers for research in this catalog.

The College of Engineering and Applied Sciences offers extensive computing facilities to its faculty and graduate students. The college centrally maintains computing resources for general engineering use, including a large Sun SPARCcenter 2000 superserver, Hewlett Packard 9000

superserver, and an IBM Netfinity Quad M7000 NT Server. Also available are specialty computers for World Wide Web services, electronic mail, Internet collaboration, and special applications. Distributed throughout the college are several thousands of networked UNIX workstations and PCs accessing UNIX or NT servers available for research and instruction. UNIX workstations are provided by manufacturers such as Sun Microsystems, Hewlett Packard, Silicon Graphics, and Digital Equipment Corporation. All college computing resources are interconnected via the Internet standard TCP/IP on 10Mb or 100Mb dedicated ethernet.

ACADEMIC STANDARDS

Retention. A student who has been admitted to a graduate program of study in the College of Engineering and Applied Sciences, on either a regular or provisional basis, must maintain a 3.00 or higher GPA in all work taken for graduate credit as well as an overall 3.00 GPA in all studies at ASU.

A student is placed on academic probation if

1. the student's GPA falls below 3.00 in the approved program of study;
2. the student's overall GPA for all postbaccalaureate courses taken at ASU falls below 3.00;
3. the student receives a "D" or "E" in a required deficiency or in a course at the 400 level or above; or
4. for reasons other than above, the student fails to make satisfactory progress toward a degree.

A student is recommended for withdrawal from a graduate program if

1. the student is on academic probation because his or her GPA has fallen below 3.00 in the approved program of study or for all postbaccalaureate courses taken at ASU and fails to bring the GPA to 3.00 or above by the time the next nine semester hours are completed;
2. the student receives a "D" or lower grade while on academic probation for any reason;
3. the student fails to obtain at least a 3.00 GPA in all courses cited as deficiencies upon admission to a graduate program;
4. the student fails to meet any other conditions imposed as part of the probation; or
5. for reasons other than above, the student fails to make satisfactory progress toward a degree.

A student may appeal any action concerning academic probation and withdrawal by petitioning the graduate affairs committee within the student's academic unit.

The Katherine K. Herberger College of Fine Arts

herbergercollege.asu.edu

J. Robert Wills, Ph.D., Dean

PURPOSE

The Katherine K. Herberger College of Fine Arts at ASU offers preprofessional and professional education in the arts disciplines and opportunities for nonmajors to become culturally literate through participation and involvement in the creative and performing arts.

At the graduate level, the college provides students the opportunity to participate with faculty mentors in research, performance and performance practices, and other creative activities.

As the largest and most diverse fine arts academic unit in the Southwest, and one of the largest in North America, the college has an implicit responsibility to maintain quality and leadership in all aspects of its activities. Through its programs in art, dance, music, and theatre, the college reflects a wide range of challenges facing the artist and scholar into the 21st century.

ORGANIZATION

The college houses the School of Art, the Department of Dance, the School of Music, the Department of Theatre, the University Art Museum, and the Institute for Studies in the Arts. An average of 2,000 students per semester enroll as majors in various degree programs offered through these units. Approximately one third of these are graduate students.

GRADUATE PROGRAMS

Faculty in the School of Art, Department of Dance, School of Music, and Department of Theatre offer both research and professional degrees through the Graduate College: the M.A., Master of Fine Arts, Master of Music, Doctor of Musical Arts, and Ph.D. degrees. A full range of majors and concentrations is available.

ADMISSION REQUIREMENTS

Admission requirements vary according to degree programs. However, applicants must first meet all admission requirements of the Graduate College. Most programs require a bachelor's degree with a major in the selected area; many of them also require an audition. See the specific degree program for pertinent admission requirements.

SPECIAL PROGRAMS

Together with faculty, visiting scholars, and artists-in-residence, graduate students in all fields of the college participate in dynamic, innovative programs. The creative energy

that infuses the visual and performing arts finds expression in research and study.

The School of Art offers scholarly programs in the history, theory, and teaching of art, and highly respected studio programs in ceramics, drawing/painting, fibers, intermedia, metals, photography, printmaking, sculpture, and wood. The accomplished faculty and visiting artists/scholars create an excellent learning environment for innovation and collaboration. Harry Wood and Northlight galleries, studios and workshops, and three computer and/or video labs support this outstanding program.

In addition, the School of Art has three traveling research fellowships that allow students to study or conduct research abroad. The Nathan Cummings Travel Fellowship is for M.F.A. students and the Anthony Gully Travel Fellowship and the Rabiner Memorial Fellowship are for graduate History and Theory of Art students.

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 to the public several concerts each year with additional works created and performed by graduate and undergraduate students. Students work closely with major artists and companies who visit campus annually, and with researchers in the areas of dance science, dance in relation to technology, dance music composition, labanotation, and 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.

As the research center for the college, the Institute for Studies in the Arts serves as a laboratory for the development and funding of creative ideas and for the exploration of new tools and 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. Through technical and monetary support, the institute sponsors a wide variety of projects that address its mission of experimentation and innovation.

Faculty in the School of Music include a wide range of performers, teachers, conductors, composers, and scholars, whose knowledge and guidance support the training of students in the Doctor of Musical Arts and master's degree programs. Individuals who hold graduate degrees from ASU's School of Music hold prestigious performing and university teaching positions throughout the nation. The graduate programs are indeed comprehensive and provide for wide and diverse opportunities in performance, course work, and research.

Three concentrations are available in the M.F.A. in Theatre program: performance, scenography, and theatre for youth. The concentration in performance challenges performing artists to reinvigorate the classics, develop new works, explore new theatrical forms, and discover changing relationships between art and technology.

Students in the scenography program are actively involved in all aspects of design and technology for

COLLEGES

Herberger College of Fine Arts Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Art	M.A.	Art education, art history	School of Art
	M.F.A.	Ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	School of Art
Composition	M.M.	—	School of Music
Creative Writing	M.F.A. ¹	—	Creative Writing Committee
Curriculum and Instruction	Ph.D. ²	Art education	School of Art
Dance	M.F.A.	—	Department of Dance
History and Theory of Art ³	Ph.D.	—	School of Art
Music	M.A.	Ethnomusicology, music history and literature, music theory	School of Music
	D.M.A.	Conducting, music composition, music education, performance	School of Music
Music Education	M.M.	Choral music, general music, instrumental music, jazz studies	School of Music
Performance	M.M.	Music theatre/opera musical direction, music theatre/opera performance, performance, performance pedagogy, piano accompanying	School of Music
Theatre	M.A.	—	Department of Theatre
	M.F.A.	Performance, scenography, theatre for youth	Department of Theatre
	Ph.D.	Theatre for youth	Department of Theatre

¹ This program is administered by the Graduate College.

² This program is administered in collaboration with the College of Education and the Graduate College.

³ This major is jointly offered with the University of Arizona.

mainstage and studio productions and receive regional and national awards on a regular basis for their work.

The Ph.D. in Theatre program also offers a concentration in theatre for youth.

The Department of Theatre takes special pride in its nationally and internationally acclaimed theatre for youth program, which provides comprehensive graduate training and attracts students, scholars, and artists from around the world. Graduate students are challenged to excel in every aspect of theatrical training. They are offered acting, directing, and other production opportunities for mainstage, studio, and touring shows, as well as research and teaching opportunities on and off campus. The program has developed Hayden Library's Child Drama Collection, which includes rare books, plays, memorabilia and personal and national association archives. It is the most complete and comprehensive child drama collection in the English-speaking world.

The M.F.A. 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. This interdisciplinary program, involving the artistic, research, and teaching interests of faculty in these departments, offers students a unique opportunity to tailor a course of study to fit individual needs, talents, and goals.

The Department of Theatre has a special interest in new scripts that bring a wealth of professional productions and workshops to campus for the benefit of all students.

COLLEGE FACILITIES

The arts programs are housed in the following buildings: Art Building; Dixie Gammage Hall; Physical Education Building East; Gammage Center for the Performing Arts; Matthews Center; Matthews Hall; the J. Russell and Bonita Nelson Fine Arts Center, which includes the University Art Museum; the 496-seat Paul V. Galvin Playhouse; six theatre studios; a 7,000-square-foot Experimental Dance Lab; a dance studio theatre; and a video lab. The Music Building and expansion wing house four performance halls ranging in size from the 125-seat Recital Hall to the 500-seat Music Theatre and the 350-seat Katzin Concert Hall, which is used primarily for solo and chamber music recitals. The Katzin Concert Hall contains a nine-foot Hamburg Concert Steinway piano. The new 175-seat Organ Hall was designed to house the Paul Fritts Tracker Organ, an instrument reflecting the aesthetics and style of North German organ building in the 17th century. The Theatre Department also stages productions in the renovated Lyceum Theatre and Prism Theatre. Many of these facilities are equipped with studios and laboratories, where needed.

The University Art Museum's 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 print-makers 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 20th-century artists Rivera, Siquerios, 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 contemporary art and new media, crafts, and Mexican art.

All units have developed computer facilities for graduate student training. Also refer to "[Computing Facilities and Services,](#)" page 29.

ADVISING

Advising is handled as a decentralized activity within the college. To offer personalized attention, each academic unit establishes its own graduate advising procedures. Students are encouraged to make appointments through the central office of their major discipline.

ACCREDITATION

While all of the arts programs in the college meet or exceed standards established by various arts accrediting agencies, the School of Music and the Department of Theatre hold formal memberships; the School of Music by the National Association of Schools of Music, and the Department of Theatre by the National Association of Schools of Theatre.

College of Law

www.law.asu.edu

Patricia D. White, J.D., 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 society.

ORGANIZATION

Law Building and Law Library

The John S. Armstrong Law Building is located near other colleges on the university's main campus. The Law Building provides every modern facility for legal education and has been described by experts involved in the planning of 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.

The library houses 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 also includes a growing selection of special materials dealing with international law, Indian law, Mexican law, and law and technology.

The library, housed in a dramatic and functional building that opened in August 1993, is also a selective U.S. government depository. The building provides accessible shelving for the expanding collections and comfortable study space at carrels, tables, and lounge seating located throughout the library. Additionally, the law library has a 30-station computer lab as well as LEXIS and WESTLAW rooms that 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 maintained in all university libraries comprise more than 3 million volumes.

GRADUATE PROGRAMS

Juris Doctor Degree

The College of Law offers a three-year program of professional study at the graduate level leading to the degree of Juris Doctor (J.D.).

Dual Degree Programs

Law students wishing to pursue a joint degree program at ASU must have a joint degree application and program of study approved by the associate dean of the College of Law before pursuing the joint degree.

Certificate Programs

See "[Indian Legal Program,](#)" page 72, for information about the Certificate in Indian Law. For information about the Certificate in Law, Science, and Technology, contact the college.

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 (1) the formulation and improvement of law and public policy affecting science and technology; and (2) 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 *Jurimetrics: The Journal of Law, Science and Technology*. Student editors both edit submitted works and write original articles for publication in the journal.

Clinical Program

The College of Law's Clinical Program is a rigorous in-house program that provides third-year students, under the close supervision of an ASU faculty member, the opportunity to represent clients in court. Four live-client clinics, the Civil Practice Clinic, the Criminal Practice Clinic, the Public Defender Clinic, and the Mediation Clinic provide students with an opportunity to choose from civil or criminal representation or to serve as mediators in disputes that are resolved outside the court system.

The Civil Practice Clinic operates as a functioning law firm within the college, while Criminal Practice and Public Defender Clinic students work in offices located within agencies or courthouses. Second-year students are offered "simulation-based" courses in Lawyering Theory and Practice in preparation for enrollment in a live-client clinic. Other simulation courses include Trial Advocacy, Pre-Trial Practice, and Negotiations.

Indian Legal Program

The College of Law offers an Indian Legal Program intended to serve tribal courts and governments by providing information on legal issues. The program also provides education and general scholarship on Indian law. Through a Certificate in Indian Law, the college provides its students with a quality legal education and an opportunity to gain specific 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 an in-depth understanding of the legal issues affecting Indian tribes and peoples. Courses on Federal Indian law and seminars on advanced Indian law topics such as American Indian cultural resources protection, tribal law, economic development, and tribal environmental law are part of the curriculum. Students also have the opportunity to participate in internships with local tribal courts, the Native American Rights Fund, the U.S. Department of the Interior, or the Senate Committee on Indian Affairs in Washington, D.C. This variety of academic and work experience provides the students with an outstanding legal education and 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 by submitting written work in a writing competition. Participation on law review is hard but rewarding work. For those eligible, the review provides one of the finest avenues for legal education thus far developed. Its work contributes to the student's intellectual advancement, to the development of law and the legal profession, and to the stature of the law school.

ADMISSION REQUIREMENTS

First-year students are admitted for only 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.

Each applicant for admission to the Juris Doctor (J.D.) program must have earned an undergraduate degree from an accredited four-year college or university (B.A., B.S., or other equivalent). The College of Law Admissions Office considers an applicant's file complete only if it includes each of the following:

1. a completed Application for Admission form;
2. a completed Arizona residency information form if claiming Arizona residency;
3. a \$45 application fee;
4. a personal statement that does not exceed three double-spaced typed pages; and
5. a Law School Data Assembly Service (LSDAS) report, which must be from the current application year, with all transcripts, two letters of recommendation, and the Law School Admissions Test (LSAT) score(s) from Law Services.

To be assured consideration, all application materials must be complete by March 1.

Further detailed information concerning the course of study, admission practices, expenses, and financial assistance can be found in the *Bulletin of the College of Law*. To request the bulletin or application forms, call 480/965-7207 or write

ADMISSIONS OFFICE
COLLEGE OF LAW
ARIZONA STATE UNIVERSITY
P.O. BOX 877906
TEMPE, AZ 85287-7906

For general information about the College of Law, call 480/965-1474 or access the college's Web site at www.law.asu.edu.

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. Through case

methods, problem methods, moot court experience, and other techniques, the first year gives students an intensive exposure to basic legal processes.

As 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 sharply contrasts with 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.

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 based 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. In cases 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 a substantial prospect for future 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*.

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 college's Student Services Office.

ADVISING

Preadmission information, advising, and continued support for the J.D. is provided by the College of Law Admissions Office, 480/965-1474.

ACCREDITATION

The college is fully accredited by the American Bar Association and is a member of the Association of American Law Schools.

College of Liberal Arts and Sciences

www.asu.edu/clas

David A. Young, Ph.D., Dean

PURPOSE

The graduate programs in the College of Liberal Arts and Sciences are characterized by both a diversity of disciplines and a commonality of purpose. The disciplinary diversity of the college is broad by intent, embracing those branches of learning most central to the foundations of society in the humanities and the sciences. Unity of purpose is achieved through a common commitment to intellectual integrity, to research, and to the preservation of freedom of academic inquiry, as well as through informal exchanges and cross-disciplinary centers.

The College of Liberal Arts and Sciences has active research programs in all units offering advanced degrees. In recent years, the rapid addition of excellent faculty has enhanced the cadre of senior scholars and scientists with whom graduate students work.

ORGANIZATION

The College of Liberal Arts and Sciences, which offers graduate study in the humanities, the mathematical and the natural sciences, and the social sciences, brings together highly qualified faculty and advanced students to share learning and discovery in 20 academic units and in a number of interdisciplinary centers. In lectures and seminars, in laboratories and libraries, in creative endeavors, field experiences, and research projects, faculty and students cooperate in preserving, evaluating, and expanding knowledge.

GRADUATE PROGRAMS

In cooperation with the Graduate College, faculty affiliated with various departments and units within the College of Liberal Arts and Sciences offer three research-oriented degrees: the M.A., the M.S., and the Ph.D. In addition, four professional degrees are offered: the Master of Natural Science, the Master of Teaching English as a Second Language, the Master of Physical Education, and the Master of Fine Arts, an interdisciplinary creative writing program offered in cooperation with the Herberger College of Fine Arts. The interdisciplinary master's program in Humanities draws faculty expertise from the Departments of Anthropology, Dance, English, History, Languages and Literatures, Philosophy, Religious Studies, and the School of Art.

COLLEGES

Interdisciplinary programs leading to the Ph.D. degree are offered in Exercise Science, Molecular and Cellular Biology, Science and Engineering of Materials, and Speech and Hearing Science. Many departments within the college participate in the Master of Education, Doctor of Education, and Doctor of Philosophy degrees offered and administered through the College of Education. Members of the Department of Mathematics and Statistics faculty participate in the interdisciplinary M.S. degree in Statistics (with College of Business faculty); members of the Departments of Biology, Chemistry and Biochemistry, Microbiology, and Plant Biology participate in the interdisciplinary M.S. and Ph.D. in Molecular and Cellular Biology; members of the faculty in the Departments of Anthropology, History, Languages and Literatures, Philosophy, Political Science, Psychology, Religious Studies, and Sociology participate in the interdisciplinary Ph.D. in Justice Studies program; members of the Departments of Geography, Political Science, and Sociology faculty contribute to the interdisciplinary Doctor of Public Administration program; and members of the Departments of English, Family and Human Development, Sociology, and Speech and Hearing Science faculty participate in the interdisciplinary Ph.D. degree in Communication.

One of the unique features of an interdisciplinary program is that it draws upon faculty research and teaching interests from a number of academic units; thus a student may tailor a course of study to fit individual needs and goals.

ADMISSION REQUIREMENTS

Applicants to graduate programs within the College of Liberal Arts and Sciences must meet general requirements for admission established by the Graduate College (see [“Admission to the Graduate College,” page 84](#)). In addition, academic units usually require test scores from the Graduate Record Examination and Miller Analogies Test, letters of recommendation, and a statement of purpose. Consult the individual degree programs for particular requirements. International applicants must also submit Test of English as a Foreign Language (TOEFL) scores and are advised to submit application materials well in advance of deadlines.

SPECIAL PROGRAMS

The college continually strives to provide students with new program areas, many of which are interdisciplinary in content. There is a special strength, for example, in planetary geology, as well as in more traditional geological sub-disciplines; in geochemistry, as well as in biochemistry and solid-state and materials science; and in magnetic properties of materials, as well as nuclear physics and surface physics. In psychology, traditional social, developmental and clinical research is augmented by a new interest in preventive mental health. Flexibility and forward-looking program development pervade all college programs. The interdisciplinary degree in Exercise Science is internationally recognized. The graduate Creative Writing program brings talented students together with distinguished poets, playwrights, and novelists. The Teaching English as a Second language program attracts students from all over the world. The Southwest environment has favorably affected program develop-

ment in several ways, ranging from research activities in water resources, archaeology, and fluvial geomorphology to distinguished programs in Hispanic language, literature, culture, and history.

In addition to traditional and innovative programs within departments, there are multidisciplinary research centers within the college, bringing together faculty from various departments. These include the Centers for Asian Studies, Exercise and Sport Research, Hispanic Research, Latin American Studies, Medieval and Renaissance Studies, Meteorite Studies, and Solid-State Science. Centers sponsor colloquia, workshops, conferences, and visiting scholars. They administer international exchange programs, enhance library holdings and other collections, publish papers and monographs, maintain archives, and employ graduate research assistants.

COLLEGE FACILITIES

Strong and nationally funded research facilities, like the Facility for High Resolution Electron Microscopy and the Planetary Geology Laboratory have attained national and international prominence. Important research collections include one of the largest meteorite collections in the world, the holdings of the anthropology archives and museum, the space photography collection, the Herbarium, and extensive library holdings, including important manuscript collections in late 19th-century British literature and historical documents of the Southwest.

Graduate students in all disciplines have access to outstanding computer facilities. Mainframe computing for research is provided free of charge. There are substantial microcomputer facilities within individual academic units as well as clusters serving the humanities and social sciences. Minicomputer capabilities are found in various academic units. Also refer to [“Computing Facilities and Services,” page 29](#).

FINANCIAL ASSISTANCE AND SUPPORT

In addition to the usual support for graduate students in the form of stipends and teaching and research assistantships, there is a vigorous funding program to support graduate student research. Not only do graduate students obtain grants from external sources to support their research projects, they also receive support from the college and university to present papers at professional meetings.

ADVISING

Faculty advisors in each academic unit provide guidance to graduate students from admission through completion of the program. Consult the director of graduate studies in the appropriate academic unit. Graduate students must follow an approved program of study filed with the Graduate College. The calendar for enrollment activities is published in the schedule of classes for each semester. Teaching and research assistants, who are required to be enrolled in at least six hours, as well as those enrolled for individual project, thesis and dissertation credit, are subject to the same calendar deadlines as students enrolled in regularly scheduled classes.

College of Liberal Arts and Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Anthropology	M.A. ¹	Archaeology, bioarchaeology, linguistics, medical anthropology, museum studies, physical anthropology, social-cultural anthropology	Department of Anthropology
	Ph.D.	Archaeology, physical anthropology, social-cultural anthropology	Department of Anthropology
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Department of Languages and Literatures
Biology ²	M.S., Ph.D.	Ecology	Department of Biology
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid-state chemistry	Department of Chemistry and Biochemistry
Communication Disorders	M.S.	—	Department of Speech and Hearing Science
Computational Biosciences	M.S.	—	College of Liberal Arts and Sciences
Creative Writing ³	M.F.A.	—	Creative Writing Committee
English	M.A.	Comparative literature, English linguistics, literature and language, rhetoric and composition	Department of English
	Ph.D.	Literature, rhetoric/composition and linguistics	Department of English
Exercise Science ³	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Committee on Exercise Science
Exercise Science/Physical Education	M.S.	—	Department of Exercise Science and Physical Education
Family and Human Development	M.S.	Family studies	Department of Family and Human Development
Family Science ²	Ph.D.	Marriage and family therapy	Department of Family and Human Development
French	M.A.	Comparative literature, linguistics, literature	Department of Languages and Literatures
Geography	M.A., Ph.D.	—	Department of Geography
Geological Sciences	M.S., Ph.D.	—	Department of Geological Sciences
German	M.A.	Comparative literature, language and culture, literature	Department of Languages and Literatures
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, U.S. Western history	Department of History
	Ph.D.	Asian history, British history, European history, Latin American history, U.S. history	Department of History
Humanities	M.A.	—	Graduate Committee on Humanities
Materials Science ³	M.S.	—	Committee on the Science and Engineering of Materials
Mathematics	M.A., Ph.D.	—	Department of Mathematics and Statistics
Microbiology	M.S., Ph.D.	—	Department of Microbiology

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 major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

⁴ Applications are not being accepted at this time.

COLLEGES

College of Liberal Arts and Sciences Graduate Degrees and Majors (continued)

Major	Degree	Concentration	Administered By
Molecular and Cellular Biology	M.S., Ph.D.	—	Interdisciplinary Committee on Molecular and Cellular Biology
Natural Science	M.N.S.	Biology Chemistry Geological sciences Mathematics Microbiology Physics Plant biology	Department of Biology Department of Chemistry and Biochemistry Department of Geological Sciences Department of Mathematics and Statistics Department of Microbiology Department of Physics and Astronomy Department of Plant Biology
Philosophy	M.A., Ph.D.	—	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 ²	M.S., Ph.D.	Ecology, photosynthesis	Department of Plant Biology
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, political theory	Department of Political Science
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, environmental psychology, ⁴ quantitative research methods, social psychology	Department of Psychology
Religious Studies	M.A.	—	Department of Religious Studies
Science and Engineering of Materials	Ph.D. ³	High-resolution nanostructure analysis, solid-state device materials design	Committee on the Science and Engineering of Materials
Sociology	M.A., Ph.D.	—	Department of Sociology
Spanish	M.A. Ph.D.	Comparative literature, language and culture, linguistics, literature Cultural studies, literature	Department of Languages and Literatures Department of Languages and Literatures
Speech and Hearing ³ Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Committee on Speech and Hearing Science
Statistics ³	M.S.	—	Committee on Statistics
Teaching English as a Second Language	M.TESL	—	Department of English

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 major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

⁴ Applications are not being accepted at this time.

College of Nursing

nursing.asu.edu

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 practices, 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. provide the highest-quality health care to individuals, groups, and communities and who critically examine and effectively respond to the changing health care needs of society;
2. conduct research and creative activity that strengthens the knowledge base of the discipline, improve theory-based nursing practice, and benefit the health of individuals, groups, and communities; and
3. provide service to the community through a range of nursing activities with diverse populations in a variety of settings.

The continuing and extended education program facilitates lifelong learning by providing opportunities for registered nurses (RNs) to enhance 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 recognizes the three major missions of the university, i.e., teaching, research, and service. The responsibility of the associate dean for graduate programs and research is twofold: to oversee the master's program, including the progression of students through the program; and to work with faculty and students to facilitate research activities, such as research development. The associate dean for undergraduate programs and extended education is responsible for undergraduate degree programs, progression of students through the program, and extended and continuing education.

The faculty are grouped under two major clinical divisions within nursing: adult health/parent-child nursing and community health/psychosocial nursing systems. Each division has a chair, and each faculty member belongs to a division.

NURSING—M.S.

The graduate curriculum leads to the Master of Science degree in Nursing. The graduate program provides an academic environment that fosters scholarship, critical thinking, and creativity, while preparing nurses for leadership as nurse specialists. The program offers advanced-level courses that can be used as a base for doctoral study and for functional role development in teaching.

Students may select one area of concentration as shown in the [“College of Nursing Graduate Degrees and Majors” table, page 78](#). Within most concentrations, the student may select a Nurse Practitioner or Clinical Specialist role preparation.

Options within the adult health nursing concentration include primary care of chronically ill adults or acute care.

Options within the parent-child nursing concentration include childbearing family, nursing of children, and neonatal nursing.

Students may further select a primary or acute focus in parent-child nursing.

The curriculum also provides clinical nurse practitioner roles, including adult, pediatrics, women's health, psychiatric, and family as well as clinical nurse specialist in parent-child, adult, community, and community/mental health for preparation for teaching nursing.

R.N.-B.S.N.-M.S. PROGRAM

The College of Nursing offers a flexible program leading to a Master of Science degree with a major in Nursing. The program features individually designed plans of study for nurses seeking to become advanced practice nurses as nurse practitioners, clinical nurse specialists, and nurse educators.

Students receive a Bachelor of Science in Nursing (B.S.N.) degree after completing the undergraduate program requirements. Students choose a graduate clinical specialty area from one of the following: adult health nursing, community health nursing, community mental health/psychiatric nursing, family health, nursing of children, and women's health.

PUBLIC HEALTH—M.P.H.

The School of Health Administration and Policy and the College of Nursing, at ASU, in conjunction with the University of Arizona and Northern Arizona University, offer courses leading to the Master of Public Health degree. Two concentrations are offered at ASU: (1) Community health practice is coordinated by the College of Nursing, and (2) health administration and policy is coordinated by the School of Health Administration and Policy. For more information, see [“Public Health,” page 306](#).

Beginning fall 2002, students can enroll in a two-year dual degree program, earning both the M.S. and the M.P.H.

POST-MASTER'S CERTIFICATE

A post-master's Nurse Practitioner Certificate is available. The certificate program is offered periodically based on community need and college resources.

COLLEGES

College of Nursing Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Nursing	M.S. ¹	Adult health nursing, community health nursing, community mental health/psychiatric nursing, family health nursing, parent-child nursing, women's health	College of Nursing
Public Health ^{1, 2}	M.P.H.	Community health practice	School of Health Administration and Policy and the College of Nursing

¹ A two-year M.S./M.P.H. dual degree program is also available.

² This collaborative program is offered by the three state universities.

SPECIAL PROGRAMS AND SERVICES

Continuing Education Programs. This program presents a variety of noncredit offerings on the ASU Main campus, ASU West campus, and off-campus locations. These offerings are designed to assist practicing professional nurses in maintaining and enhancing their competencies, broadening their scientific knowledge base, and further developing their skills in the changing health care environment. Workshops, conferences, institutes, short evening courses, and special programs are offered at times convenient to the working professional. Some offerings are multidisciplinary and are also open to individuals in professions outside of nursing.

Student Services. The Student Services Office in the College of Nursing provides academic advising, general advising, and referral to university resources. Prospective students with academic questions relating to the College of Nursing should contact the College of Nursing Student Services Office at 480/965-2987.

Scholarships and Financial Assistance. Information about scholarships and loan funds for nursing students may be obtained from the Student Financial Assistance Office, College of Nursing Office of Student Services (call 480/965-2487) or the associate dean for graduate programs and research (call 480/965-3948).

College Council of Nursing Students. The council is a member of ASASU (Associated Students of Arizona State University) and serves as the governing body of all student activities in the college. The College Council of Nursing Students 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. The 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.

Sigma Theta Tau International. Beta Upsilon Chapter of Sigma Theta Tau was chartered at the ASU College of Nurs-

ing in 1976. Membership in Sigma Theta Tau is an honor conferred on students in baccalaureate and graduate programs who have demonstrated outstanding academic and professional achievement.

COLLEGE FACILITIES

Learning experiences with patients and their families are provided under the supervision of qualified faculty with the cooperation of a variety of federal, state, county, and private health agencies. The College of Nursing has contracts with more than 300 agencies in the Phoenix metropolitan area. The college also operates a unique nurse-managed clinic in a community setting, as well as three other community or school-based outreach programs.

Computer Facilities. Computers are available for student use in the Learning Resource Center of the college. Also refer to [“Computing Facilities and Services,” page 29.](#)

ADVISING

Students are advised by the Student Services Office before admission to the graduate program. Upon admission, each student is assigned a faculty advisor within the area of concentration. Questions may also be directed to the associate dean for graduate programs and research. For more information, call 480/965-3948.

ACCREDITATION

The baccalaureate and master's programs of the College of Nursing are accredited by the Arizona State Board of Nursing and the National League for Nursing. Preliminary approval of the baccalaureate and master's nursing education programs has been granted by the Commission on Collegiate Nursing Education. The continuing education program is accredited by the Western Regional Accrediting Committee of the American Nurses' Association as a provider of Continuing Education for Nursing. The college is a member of the Council of Member Agencies for the Baccalaureate and Higher Degree Programs of the National League for Nursing, the Western Institute of Nursing, and the American Association of Colleges of Nurses.

College of Public Programs

www.asu.edu/copp

Anne L. Schneider, Ph.D., Dean

PURPOSE

The College of Public Programs offers a wide range of course work, in both on-campus and off-campus settings, to full-time and part-time students. Through the Graduate College, faculty offer various programs leading to graduate degrees. Each academic unit of the College of Public Programs not only assumes responsibility in preparing its own majors, but also provides a variety of service courses for the rest of the university. The college is committed to excellence in teaching, research, and public service. College units work closely with numerous public and private agencies at the national, state, and local levels.

ORGANIZATION

The College of Public Programs consists of American Indian Studies, Asian Pacific American Studies, the Department of Recreation Management and Tourism, the Hugh Downs School of Human Communication, the School of Justice Studies, the School of Public Affairs, the School of Social Work, and the Walter Cronkite School of Journalism and Mass Communication. Each academic unit is administered by a chair or director.

Hugh Downs School of Human Communication. The faculty in the Hugh Downs School of Human Communication advance the understanding of message-related human behavior in part through the M.A. degree in Communication. The focus of the M.A. degree program is research in one of five areas: intercultural communication, interpersonal communication, organizational communication, performance studies, and rhetoric/public address.

Faculty in the Hugh Downs School of Human Communication participate in offering the interdisciplinary Ph.D. degree in Communication. The program is designed to prepare scholars for research-oriented careers in universities and in the public and private sectors and offers areas of study in critical/cultural studies, information technology, intercultural communication, interpersonal communication, organizational communication, performance studies, relational communication, and rhetoric.

Walter Cronkite School of Journalism and Mass Communication. The faculty in the Walter Cronkite School of Journalism and Mass Communication offer the Master of Mass Communication degree (M.M.C.). The M.M.C. is designed to accommodate students who wish to study in the fields of journalism, broadcasting, or public relations. The program provides broader training for professionals employed in the media and for those who wish to enter media fields.

Department of Recreation Management and Tourism.

The faculty in the Department of Recreation Management and Tourism offer a graduate program leading to the M.S. degree in Recreation. The program focuses both on building professional knowledge and developing the ability to analyze topics and issues related to the recreation and tourism fields critically. Students choose between pursuing a more academic, focused thesis option or the more professionally applied nonthesis option. Each student takes graduate core courses in the department and then can pursue individual interests with related course work and a research project.

School of Public Affairs. The faculty in the School of Public Affairs offer a professional graduate program leading to the Master of Public Administration degree. Courses are offered in the evenings to fit the scheduling needs of working students. The diversity of the school's program offerings accommodates both preservice students and midcareer public administrators. State and local government internships are available to those with no previous public sector experience. Students work with faculty on the school's active research and publications program, including public policy reports and other community service projects for state and local governments in Arizona.

The school also administers the interdisciplinary Ph.D. in Public Administration program. Faculty of the School of Public Affairs participate in offering this degree program.

School of Justice Studies. The School of Justice Studies provides an interdisciplinary social science perspective for studying law and justice, crime and delinquency, dispute resolution, gender justice, racial and ethnic minorities and the law, and social and economic justice. Its faculty have academic backgrounds in anthropology, criminology, history, law, philosophy, political science, psychology, and sociology.

Faculty in the School of Justice Studies also participate in offering the Ph.D. degree in Public Administration. The school administers the interdisciplinary Ph.D. program in Justice Studies under the auspices of the Graduate College.

School of Social Work. The School of Social Work offers the full complement of social work academic programs: Bachelor of Social Work, Master of Social Work, and Ph.D. The mission and the goals of the school are consistent with the university's mission and overall objectives, as can be seen in the school's focus on excellence in professional instruction; the advancement of social work research; the understanding of social issues; and public/community service. Central to the mission of the school is the emphasis on the understanding of and respect for the unique cultural diversity of the Southwest and the promotion of social and economic justice.

GRADUATE PROGRAMS

Graduate degree programs as shown in the "[College of Public Programs Graduate Degrees and Majors](#)" table, page 80, are offered by the faculty within the college.

One of the unique features of an interdisciplinary program is that it uses faculty research and teaching interests from a large number of academic units. Students may tailor a course of study to fit individual needs and goals.

COLLEGES

College of Public Programs Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Communication	M.A.	—	Hugh Downs School of Human Communication
	Ph.D.	Communicative development, intercultural communication, organizational communication	Hugh Downs School of Human Communication
Justice Studies	M.S.	—	School of Justice Studies
	Ph.D.*	Criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; women, law, and justice	Committee on Law and Social Sciences
Mass Communication	M.M.C.	—	Walter Cronkite School of Journalism and Mass Communication
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban management and planning	School of Public Affairs
	Ph.D.	—	School of Public Affairs
Recreation	M.S.	—	Department of Recreation Management and Tourism
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	School of Social Work
	Ph.D.	—	School of Social Work

* This program is administered by the Graduate College.

ADMISSION REQUIREMENTS

Admission requirements of all advanced degree programs within the college are connected with those required by the Graduate College. In addition, individual units may require further supporting materials such as letters of recommendation, scores on the Graduate Record Examination, statements of educational and career goals, and writing samples. Applicants should refer to requirements specified by the academic unit under each degree program in this catalog.

SPECIAL PROGRAMS

Concurrent M.A. in Anthropology and M.S. in Justice Studies. Graduate students in the School of Justice Studies and the Department of Anthropology may pursue a concurrent M.S. degree in Justice Studies and M.A. degree in Anthropology with a concentration in social-cultural anthropology. The purpose of the program is to provide individuals with combined, complementary knowledge and skills for basic and applied research; as well as administrative and educational activities related to both disciplines. Students must be admitted separately to each program, following the guidelines established by the Graduate College, Department of Anthropology, and School of Justice Studies. Additional information on concurrent degrees may be obtained from the respective academic units.

Concurrent Ph.D. in Justice Studies/J.D. The purpose of the Ph.D. in Justice Studies/J.D. is to provide a rigorous educational program for highly qualified students interested in pursuing academic careers in law, law and the social sciences, or law and philosophy.

COLLEGE FACILITIES

Microcomputer training and remote site terminal access are available to students in all programs within the College of Public Programs. Academic units provide facilities, equipment, and support for student research, including laboratory space, computer terminals connected to the mainframe computer, and personal computers for individual student use. See [“Computing Facilities and Services,” page 29.](#)

Broadcast laboratories within the School of Journalism and Mass Communication have the latest in-studio and ENG-EFP equipment, and provide facilities for performance, writing, and the other necessary broadcasting skills.

ADVISING

Advising of graduate students is usually handled by graduate faculty or a committee. Once admitted, students are typically assigned a temporary faculty advisor in the potential areas of specialization who will assist in planning a course of study. For those degree programs requiring the completion of a thesis, a chair and thesis supervisory committee are selected by the director of graduate studies, in consultation with the student, and appointed by the dean of the Graduate College.

ACCREDITATION

The Walter Cronkite School of Journalism and Mass Communication is accredited by the Accrediting Council on Education in Journalism and Mass Communication (ACEJMC). The Master of Public Administration program is accredited by the National Association of Schools of Public Affairs and Administration. The School of Social Work is fully accredited by the council on Social Work Education.

College of Technology and Applied Sciences

www.east.asu.edu/ctas

Albert L. McHenry, Ph.D., Dean

PURPOSE

The College of Technology and Applied Sciences (CTAS) offers professional degree programs leading to the Master of Science in Technology (M.S.Tech.) degree. These degree programs are intended as preparation for a career in a selected branch of technology or as the foundation for further study. Graduates of these programs are provided with technical and professional skills for use in leadership positions in industry and education.

ORGANIZATION

The M.S.Tech. degree is offered through the Graduate College by the faculty in the College of Technology and Applied Sciences and its four departments: The Departments of Aeronautical Management Technology, Electronics and Computer Engineering Technology, Information and Management Technology, and Manufacturing and Aeronautical Engineering Technology. Faculty members administering the programs have been selected because of their relevant backgrounds in industry and business along with their academic training and teaching experience.

GRADUATE PROGRAMS

Graduate programs as shown in the [“College of Technology and Applied Sciences Graduate Degrees and Majors” table, page 82](#), are offered by the faculty within the college.

ADMISSION REQUIREMENTS

Admission to the degree program requires the completion of all general admission requirements and procedures set forth by the Graduate College. CTAS also requires an appropriate baccalaureate degree from an accredited college or university, with a minimum of 30 semester hours in technology or its equivalent and 16 semester hours of physical science and mathematics appropriate to the program pursued. The specific requirements vary within each department.

Graduate work presupposes an adequate technical preparation in a selected technology at the undergraduate level. Deficiencies for admission to the graduate program, if any, are specified at the time of admission. The applicant’s past work and professional experience are also evaluated and taken into consideration when determining admission classification. To be considered for regular admission, a 3.00 GPA is required.

ADVISING AND PROGRAM OF STUDY

The program of study is planned in consultation with an appointed supervisory committee. It is designed for flexibility, permitting the student to select a combination of courses in a technological area and a supporting area to meet individual career goals.

A minimum of 33 semester hours is required for the degree program. Of these, a minimum of 15 semester hours must be 500-level courses and part of the approved program. A maximum of 12 hours of course work may be taken from offerings outside CTAS with approval of the appropriate academic program or department. Programs of study for the M.S.Tech., with an interdisciplinary area of concentration, may have up to but not more than 15 hours of course work drawn from areas outside CTAS at the discretion of the program or department in which the concentration is administered. A maximum of nine semester hours of appropriate course work completed before admission may be included in the program of study. Specific credit requirements are as follows:

Thesis Option

Technical area of emphasis	15–18
Supporting area	6–9
Research course	3
Research	6
Minimum total	33

Applied Project Option

Technical area of emphasis	15–18
Supporting area	9–12
Research course	3
Research	6
Minimum total	33

A master’s degree candidate forms a supervisory committee, the chair of which is from one of four CTAS departments. The chair and the committee members assist the student in selecting and approving appropriate courses to meet the degree requirements and student’s goals.

The Department of Aeronautical Management Technology offers concentrations in aeronautical management technology and aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, and microelectronics engineering technology.

The Department of Information and Management Technology provides students the opportunity to study environmental technology management, fire service administration, information technology, and management of technology.

The Department of Manufacturing and Aeronautical Engineering Technology offers concentrations in aeronautical engineering technology, manufacturing engineering technology, and mechanical engineering technology.

College of Technology and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Technology	M.S.Tech.	Global technology and development, security engineering technology Aviation human factors, aviation management technology Computer systems engineering technology, electronic systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology Environmental technology management, fire service administration, information technology, management of technology Aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology	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 Technology



The vertical diffusion furnace was the first piece of equipment to be delivered and installed in the Teaching Factory, located in the Technology Center at ASU East.

Tim Trumble photo

SPECIAL PROGRAMS

Concentration in Global Technology and Development (GTD)

The global technology and development (GTD) concentration is an interdisciplinary program offered by the CTAS faculty. This concentration gives students a comprehensive understanding of systems of technology, how they interface, and their role in global economic, political, and social development and change. The GTD concentration integrates the study of economic, social, and political development with technology course work to explore issues critical to 21st-century globalization and the role and impact of technological innovations on societies around the world. Students completing the GTD concentration gain the knowledge and skills to become “technology interpreters” for careers in technology-related public policy, government service, international development, and international management.

The GTD concentration consists of two seminars in global technology and development, and technology and the international political system, and one core course (chosen from several that are offered) in each of the four GTD technology content areas: telecommunications, transportation, commerce, and sustainable development. Students are able to select elective courses from a wide range of topics in social science and/or technology to create their own individualized specialization. An emphasis is placed on the acquisition of solid research skills with a required sequence in applied research methodologies and tools. A minimum of 33 semester hours is required (24 of which must be at the 500 level or above), including an applied project or thesis. The exact program of study—including elective courses leading to an area of specialization, and the final project or thesis—is planned in consultation with a faculty advisor from the GTD faculty committee.

Graduate Studies at ASU Main and ASU East

GRADUATE DEGREES AND MAJORS

The Graduate College at ASU provides students with opportunities to study beyond the bachelor's degree. The college enrolls students in programs leading to both professional and research-oriented advanced degrees. The M.A., M.S., and Ph.D. degrees are awarded to students completing programs that culminate in research and creative endeavors. The Ph.D. degree is the highest university award, conferred on candidates who have proven 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 Master of Arts and Master of Science degree programs have professional tracks. The professional doctoral degree is the highest university award to candidates completing academic preparation for professional practice. The following professional degrees are offered through the Graduate College:

- Master of Accountancy and Information Systems (M.A.I.S.)
- Master of Architecture (M.Arch.)
- Master of Arts (M.A.)
- Master of Business Administration (M.B.A.)
- Master of Computer Science (M.C.S.)
- Master of Counseling (M.C.)
- Master of Education (M.Ed.)
- Master of Engineering (M.E.)
- Master of Environmental Planning (M.E.P.)
- Master of Fine Arts (M.F.A.)
- Master of Health Services Administration (M.H.S.A.)
- Master of Mass Communication (M.M.C.)
- Master of Music (M.M.)
- Master of Natural Science (M.N.S.)
- Master of Physical Education (M.P.E.)
- Master of Public Administration (M.P.A.)
- Master of Public Health (M.P.H.)
- Master of Science (M.S.)
- Master of Science in Design (M.S.D.)
- Master of Science in Engineering (M.S.E.)
- Master of Science in Technology (M.S.Tech.)
- Master of Social Work (M.S.W.)
- Master of Taxation (M.Tax.)
- Master of Teaching English as a Second Language (M.TESL)
- Doctor of Education (Ed.D.)
- Doctor of Musical Arts (D.M.A.)
- Doctor of Philosophy (Ph.D.)

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.

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 programs and has joint responsibility with the College of Education for another; several others are planned. Existing interdisciplinary programs are as follows:

- Creative Writing (M.F.A.)
- Curriculum and Instruction (Ph.D.) (jointly administered with the College of Education)
- Exercise Science (Ph.D.)
- Gerontology Program (Certificate in Gerontology)
- Justice Studies (Ph.D.)
- Science and Engineering of Materials (Ph.D.)
- Speech and Hearing Science (Ph.D.)
- Statistics (M.S.)
- Transportation Systems (Certificate in Transportation Systems)

Other interdisciplinary programs include Communication (Ph.D.), administered by the College of Public Programs; History and Theory of Art (Ph.D.), jointly offered with the University of Arizona, administered by the School of Art; Humanities (M.A.), administered by the College of Liberal Arts and Sciences; and Molecular and Cellular Biology (M.S., Ph.D.), administered by the College of Liberal Arts and Sciences.

Each of these programs uses resources and faculty from several disciplines. The programs promote cooperative research and instruction among faculty who share common interests but are housed in different academic units. Interdisciplinary programs allow students to pursue degrees that are intellectually coherent while bringing together diverse strengths of the university.

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

Certificate Programs

A number of certificate programs are offered by various academic units or programs on campus. For more information, see “[ASU Graduate Certificates](#)” table, page 16.

ADMISSION TO THE GRADUATE COLLEGE

Eligibility

To apply for admission, an applicant must hold a U.S. bachelor’s degree (or the equivalent) from a regionally accredited institution. A bachelor’s degree in the United States is a four-year degree that follows 12 years of primary and secondary school work.

Anyone who holds a bachelor’s (or the 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 (scale is 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, 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, Graduate Management Admission Test, or the Miller Analogies Test. Some programs require a portfolio, letters of recommendation, or a statement of goals. Applicants should contact the academic unit regarding specific requirements.

Submission of an Application

For admission information and procedures, access the Web site at www.asu.edu/graduate/admissions, or refer to the *Application for Graduate Admission* booklet. Students may apply via the Web, by mail, or by fax.

Application Fee

Each application for entry to ASU graduate programs must be accompanied by a nonrefundable application processing fee. The fee is \$45 to apply for admission to a degree program and \$15 to apply for nondegree studies. For admission information and procedures, access the Web site at www.asu.edu/graduate/admissions, or refer to the *Application for Graduate Admission* booklet.

Note: Applications are not processed until the fee is received.

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 Service in addition to the require-

ments of the Graduate College and the academic units to which they apply.

International applicants must meet the requirements of the Graduate College as well as those of the degree programs to which they apply. Applicants from outside the United States are also required to submit additional materials and should follow the procedures described in the *Application for Graduate Admission* booklet or on the Web at www.asu.edu/graduate/admissions. International applicants should read this information carefully to become familiar with all requirements, consulting it often for instructions regarding materials. The *Graduate Catalog* provides essential information about ASU and its graduate programs, but 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).

TOEFL Requirement. 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). The TOEFL can be waived for students who have graduated from a college or university in a country whose native language is English, or for a student who has had immigrant status (permanent residency) in the United States for at least 18 months. For a complete list of TOEFL requirements, see page 7 of the *Graduate Admissions* booklet, or refer to the Web site at www.asu.edu/graduate/admissions/international.html.

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 Speaking Proficiency English Assessment Kit (SPEAK) test, which is administered at ASU. Some degree programs also require TSE or SPEAK scores of 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 Financial Guarantee form is available in the *Application for Graduate Admission* booklet. It can also be accessed through the Graduate College Web site at www.asu.edu/graduate/admissions. The I-20 or the IAP66 (documents needed to obtain a student visa) are issued only after the completed, properly verified Financial Guarantee form and support document have arrived. International students may enroll at ASU only if they have been admitted to a degree program, a certificate program, or the postbaccalaureate teacher education program. They must meet all appropriate immigration standards and requirements.

Applications are processed when they are received. However, international applicants should submit all materials in December or January in order to begin study the following fall semester and in August or September in order to begin study the following spring semester. An application fee of

\$45 (in U.S. funds) must accompany each formal degree program application.

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 an advisor in the International Student Office.

Additional Information

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.

Academic units, which must indicate their willingness to admit applicants, frequently set higher standards than those established by the Graduate College. Many qualified applicants are denied because of limits on the number of students admitted each year.

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 academic credentials and supporting materials 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 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 considered nondegree hours.

Admission Classifications

Regular Admission. Applicants who fulfill all requirements for admission and are academically 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. In such cases, 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 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 academic 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 ready to apply to a particular degree program may enroll as a nondegree student. The application process is streamlined and does not require submission of transcripts or test scores. For nondegree admission information and procedures, access the Web site at www.asu.edu/graduate/admissions or refer to the *Application for Graduate Admission* booklet. Students may apply electronically. A maximum of nine hours taken at ASU while in this category 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 at ASU is expected to have undergraduate educational experiences, including general education studies, that are appropriate for the program.

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 is the equivalent 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 of 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.

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 "[Admission Application.](#)" page 40.

Readmission to the Graduate College

Any graduate student who has not been in attendance at the university for one or more semesters must submit an application for readmission 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 reenter. For details on readmission and other matters relating to the application fee, access the Web site at www.asu.edu/graduate/admissions, or refer to the *Application for Graduate Admission* booklet.

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.

A student graduates under the curriculum, course requirements, and regulations for graduation in effect at the time of admission to a graduate degree program at ASU. A student may also choose to graduate under any subsequent catalog issued. *In determining graduation requirements, a student may use only one catalog.*

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

Graduate students, like all university students, register during the intervals indicated in the *Schedule of Classes* issued by the Office of the Registrar. Details regarding registration and course drop-add procedures are also provided in the *Schedule of Classes*. Day and evening graduate classes, offered on or off campus, during the two regular semesters and the summer sessions, are considered part of the regular program.

SunDial, the ASU touch-tone telephone system for registration and fee payment, and the online registration system, accessed at any registrar site, ease the enrollment process.

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., graduate 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.

Withdrawal Policies and Procedures

Students who find it necessary to withdraw from the university should obtain and complete an official withdrawal form from any registrar site. Until officially withdrawn, the student is registered in all courses and, at the end of the semester, receives grades appropriate for the performance in each course. A student who officially withdraws from the university during the first four weeks of a semester receives the mark of "W" in all courses registered. A student who officially withdraws from the university later than the fourth week receives a mark of "W" or "E," depending upon the quality of work at the time of official withdrawal. No student is permitted to withdraw during or after the last two weeks of the semester (the last week of classes and final examination week).

Failure to withdraw officially from a course results in a grade of "E," which is used in the computation of the GPA. The *Schedule of Classes* lists the procedures for withdrawal.

An instructor may withdraw a student from a class with a mark of "W" or a grade of "E" only if the student's continued presence in the course is disruptive to the instructor's ability to teach the course. A student may appeal an instructor-initiated withdrawal within 10 days of being withdrawn to the standards committee of the college in which the course is offered. The decision of the committee is final.

A graduate student who does not enroll for three calendar years is considered withdrawn and must submit a new application for admission to a degree program.

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 the *Schedule of Classes* or the *Summer Sessions Bulletin* for the dates of the unrestricted withdrawal period.



The ASU School of Music has an outstanding reputation in graduate programming.

Tim Trumble photo

Enrollment Verification Guidelines for Graduate Students

	Full Time	Half Time	Less Than Half Time
Regular semester			
Graduate	9 or more hours	5–8 hours	4 or fewer hours
Graduate assistant*	6 or more hours	—	—
Five-week summer session			
Graduate	3 or more hours	2 hours	1 hour
Graduate assistant*	2 or more hours	1 hour	—
Eight-week summer session			
Graduate	5 or more hours	3–4 hours	2 or fewer hours

* For enrollment verification purposes, “graduate assistant” is a generic term that includes teaching assistants, research assistants, teaching associates, and research associates.

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 courses only 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.

Medical Withdrawal. Normally, a medical withdrawal request is made in cases where serious illness or injury prevents a student from completing course work or finishing incompletes or when other arrangements with the instructor are not possible. Consideration is usually given for complete withdrawal. An application for less than a complete withdrawal must be well documented to justify the selective nature of the medical withdrawal request. This policy applies both to cases involving physical health problems and those involving mental or emotional difficulties.

To receive permission for a medical withdrawal from courses, a student must present a Request for Documented Medical Withdrawal form and proper documentation (usually a letter from a physician) of the medical condition to the medical withdrawal designee of the college of the student’s major. For complete procedural information, contact the appropriate medical withdrawal designee.

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. Refer to the latest *Summer Sessions Bulletin* for course load limits for five-week and eight-week sessions. An audited course is counted in the student’s maximum load.

All teaching and research assistants and associates must enroll for a minimum of six semester hours during each semester (fall and spring) 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 percent) teaching and research 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 percent) assistant or associate for more than 13 hours; and a quarter-time (25 percent) assistant or associate for more than 15 hours.

All graduate students doing research, working on theses or dissertations, taking comprehensive or final examina-

tions, or using university facilities or faculty time must be registered for a minimum of one semester hour of credit, not audit, that appears on the program of study or is an appropriate graduate-level course, such as 595, 695, or 795 Continuing Registration.

Doctoral students fulfilling residence requirements for the Doctor of Philosophy and Doctor of Musical Arts degrees must be enrolled full time (nine semester hours minimum or six semester hours for research assistants or teaching assistants) during the specified period. See [“Residency,” page 97](#), for details on this policy, and specific degree requirements for fulfilling residence requirements for other doctoral degree programs.

Summer Course Loads. Refer to the latest Summer Sessions Bulletin for course load limits for five-week and eight-week sessions.

Enrollment Verification Guidelines. The registrar is responsible for verifying enrollment according to the general guidelines in the [“Enrollment Verification Guidelines for Graduate Students” table, on this page](#).

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.

Grading

The [“Grades” table, page 88](#), 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.

There are two graduate GPA calculations, the cumulative GPA of graduate-level (i.e., 500-level and above) course work on the transcript, and the GPA calculation on the program of study. A student receiving a grade of “D” or “E” must repeat the course in a regularly scheduled (not an individualized instruction) class, and obtain a grade of “C” or higher, *if the student chooses to include it on the program of study*. When a course is repeated and the new grade is listed

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

on the program of study, both the new grade and the initial “D” or “E” are averaged in computing the cumulative GPA of graduate-level course work on the transcript. If a student chooses not to repeat the course after receiving a “D” or “E,” the “D” or “E” is still reflected in the cumulative GPA calculation of graduate-level course work on the transcript. To graduate, all graduate students must have a minimum 3.0 GPA calculation both on the program of study, and in the cumulative GPA of graduate-level course work listed on the transcript.

Grades

Grade	Definition	Value
A	Excellent	4.00
B	Good	3.00
C	Passing	2.00
D	No graduate credit	1.00
E	Failure	0.00
I	Incomplete	—
W	Withdrawal ¹	—
X	Audit	—
Y	Satisfactory	—
Z	Course in progress ²	—

¹ This grade is given whenever a student officially withdraws.

² This grade is usually given pending completion of courses.

Graduate course work (500-, 600-, and 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 a “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 (500-, 600-, and 700-level courses) 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.”

Repeating ASU Courses. Graduate students (degree or nondegree) may retake any courses at any level at ASU, but all grades remain on the student transcript and within the cumulative GPA calculation of the transcript.

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 will be protected from retaliation. Before begin-

ning an appeal, students should speak to the appropriate, designated administrator in the academic dean’s office 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 utilized, 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 is 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.

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.

Graduate students (degree or nondegree) may retake any courses at any level at ASU, but all grades remain on the

student transcript as well as on the cumulative GPA calculation of the transcript.

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.

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.

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. 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 class, 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 hours of credit 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.

Transfer Credit. Transfer of credit is the acceptance of credit from another institution 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 percent 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 Main or East is nondegree credit. Nondegree credit taken at ASU Main or East combined with nondegree credit taken at another institution may not exceed nine hours on the master's program of study. The nine-hour limit does not apply to doctoral programs.

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. Courses taken at ASU West are considered transferred credit.

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.

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 faculty 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, 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 on master's and doctoral committees at ASU Main. ASU West tenured (or tenure-track) faculty may serve as cochairs 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. Cochairs 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 cochairs (unless they have affiliated faculty status). With the approval of the academic unit and

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

the dean of the Graduate College, former ASU faculty with students completing their degrees may continue to serve as cochairs. At least 50 percent of the committee must be faculty from ASU Main.

Once a student has an approved program of study on file and the committee is in place, it is the student's responsibility to file a Graduate Supervisory Committee Appointment form in the event of a committee change. The Graduate Supervisory Committee Appointment form for committee changes is accessible from the Graduate College in Wilson Hall or the Web site at www.asu.edu/graduate/forms.

Foreign Language Requirements

A graduate degree program may require proficiency in a foreign language. If a foreign language 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 program. 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 with the Department of Languages and Literatures at least one month in advance of the examination date. 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 then prepared. The chair should submit or recommend relevant books or journals of approximately 200 pages in length in the desired foreign language.

A student may petition the Graduate College for a reexamination 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 degree in Music (concentrations in choral conducting and solo performance), which requires three recitals and a research paper. The Ph.D. dissertation should be a valuable educational experience that demonstrates the candidate's mastery of research methods, theory, and tools of the discipline. It should demonstrate the candidate's ability to address a major intellectual problem and to propose meaningful questions and hypotheses. The dissertation 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 on the Web at www.asu.edu/graduate/resources/student/formatinfo and in the Graduate College. The student is required to submit appropriate signed forms and a complete copy of the thesis or dissertation for format review at least 10 working days

(two weeks if there are no holidays during the time period) before the oral defense. Doctoral students must also 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 certain 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. The student is responsible for the binding fees. Bound copies are placed in the Hayden Library and Archives. Doctoral students must submit one copy of the title page, approval page, and abstract (which must not exceed 350 words); the original signature of the doctoral student must appear on the University Microfilms International (UMI) Dissertation Agreement Form. The student is responsible for the UMI microfilming fee, which covers the expense of having the document sent to UMI, where it is microfilmed and catalogued. Information on the dissertation will appear in *Dissertation Abstracts International*.

Application for Graduation

Students should apply for graduation no later than the date specified in the "[Graduate College Calendar](#)," page 17. All fees are payable at that time. Students applying for graduation after the deadline listed in the "Graduate College 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 requirements for their degree that they have not yet completed.

Students are requested to complete a questionnaire that serves as a graduate student exit survey.

Students who do not complete all degree requirements by their anticipated graduation date are required to pay a re-filing fee.

Summer Sessions

Work taken during the summer sessions carries the same scholastic recognition as that taken during the regular semester. A complete schedule of offerings is available in the *Summer Sessions Bulletin*, which may be obtained from the Office of Summer Sessions.

Dates and Deadlines

The "[Graduate College Calendar](#)," page 17, 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*. Each student should also be informed about the requirements concerning the student's degree program and any special requirements within the academic unit.

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 and/or other sanctions as specified in the academic integrity policies of the individual colleges.

Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities.

The university academic integrity policy is available at the Office of the Senior Vice President and Provost and in the *Student Affairs Policies and Procedures Manual* STA 104-01, on the Web at www.asu.edu/aad/manuals/sta104-01.html.

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 other sanctions as specified by the individual colleges. Policies on misconduct are available in the Office of the Vice Provost for Research and on the Web at www.asu.edu/aad/manuals/rsp/rsp111.html.

ASSISTANTSHIPS AND ASSOCIATESHIPS

Application Procedure. Since it is necessary for all applicants to be admitted to degree programs before awards are made, students should apply for admission through the Graduate Admissions Office at the same time they apply for financial assistance.

Teaching and Research Assistantships and Associateships. Appointments as teaching or research assistants and associates are available in most academic units offering graduate work to students admitted with regular status. Students who have completed a master's degree or the equivalent may be considered for graduate associateships when available.

Note: All teaching and research assistants and associates must enroll for a minimum of six semester hours during each semester of their appointment. The six hours cannot include audit enrollment. A half-time (50 percent) teaching and research 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 percent) assistant or associate for more than 13 hours; and a quarter-time (25 percent) assistant or associate for more than 15 hours.

During the summer sessions, teaching or research assistants and associates employed 25 percent time may enroll for a maximum of six semester hours during a five-week session or nine hours during the eight-week session; those employed 50 percent time may enroll for a maximum of five hours during a five-week session or seven hours during the eight-week session; and those employed 100 percent time may enroll for a maximum of three hours during a five-week session or four hours during the eight-week session.

Teaching and research assistantships and associateships allow nonresident graduate students to pay tuition at the resident tuition rate. Eligibility applies to teaching and research assistants and associates working 25 percent or more time if their first working day occurs before the end of the first five days of instruction during the semester in question. Only under exceptional circumstances are exceptions granted by the Dean's Office.

A number of academic units administer assistantships and associateships under research programs sponsored and supported by government, industry, and foundations. Inquiries concerning requirements and deadlines as well as applications should be sent to the head of the appropriate academic unit.

Assistantships, Associateships, 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 and research 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 and paid review sessions) that might be associated with a course for which the assistant or associate has assigned responsibilities.

STUDENT RECORDS

Family Educational Rights and Privacy Act of 1974

This act, 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. 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 educational record refers to those records that are directly related to a student and are 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. *Directory information* includes the following student information: name, local and permanent address, 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

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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. *Personally identifiable information* includes the name of a student, the 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

Eligible students, or parents of a dependent eligible student, may inspect and review their 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 indicates otherwise. Students may request that this information not be released by completing a form in the Office of the Registrar. Request to withhold this information will exclude the student from being listed in the annual *Directory*.

All other educational records that contain *personally identifiable information* may not be released without the written consent of the student. Parents 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 parents will be required to sign an affidavit that affirms that the student is their dependent. The affidavit will be retained by the Office of the Registrar. Upon receipt of the affidavit, the university will make student records available to parents for the rest of that calendar year as specified under the Privacy Act.

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: the Reserve Section of Hayden Library and the Noble Science and Engineering Library, the Office of the Registrar, the Offices of Undergraduate and Graduate Admissions, and the Student Life Office. The Office of the Registrar also maintains a directory that lists all education records maintained on students by ASU.

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.

GCAB. The purpose of the board is to review written appeals of graduate students. (On occasion a faculty member may be appealing the decision about a graduate student made by a program, an academic unit, the Graduate College, or another college.) Such appeals concern

1. retention in graduate programs;
2. other academic issues (except grade appeals, which are handled in academic colleges); and
3. procedural matters in graduate student programs (e.g., programs of study, thesis/dissertation, exams).

The GCAB consists of three or more members of the Graduate Council appointed by the dean of the Graduate College at the beginning of each academic year. In specific cases the GCAB may ask for additional members from the faculty or one or more graduate students to be appointed by the dean of the Graduate College. The GCAB is chaired by one of the members as designated by the dean or associate dean. The GCAB is assisted by the assistant dean, who oversees the hearing but does not serve as a member of the GCAB. Membership is on an annual basis, but members of the Graduate Council may serve for a maximum of three consecutive years. To the extent possible, GCAB membership does not change during a student appeal. A member continues to serve on the GCAB into the next academic year if an appeal is continued during that time.

Meetings. The board meets when notified by the assistant dean that an appeal is pending. The GCAB requires two-thirds of the committee present for a quorum. A GCAB member must disqualify herself or himself if a case involves a student in her or his academic unit or the member has some direct tie to the student who is appealing. The dean of the Graduate College replaces the individual with a current or past Graduate Council member. A recording secretary is selected before each appeal. This person keeps notes of the hearing. Secretarial support for typing notes is provided by the assistant dean. A tape is made of the hearing.

Jurisdiction. The GCAB has the authority to receive written appeals from graduate students on the review of any action or decision by any university faculty member, staff member, or administrator. However, any appeal must first be reviewed at the level of the academic unit from which the graduate student is making an appeal.

The GCAB has the right to decide not to hear an appeal. In this case, the decision of the academic unit is final. The GCAB may hear appeals on program dismissal, other academic issues, or procedural issues. In addition, the GCAB hears any appeal referred to it by the dean of the Graduate College.

The GCAB does not review

1. appeals of course grades, including omnibus courses such as independent research, thesis, or dissertation, which are handled through the academic colleges;
2. appeals concerning academic dishonesty, which are handled by the academic unit with appeals to the University Hearing Board;
3. appeals concerning scientific misconduct, which are handled by the academic unit with appeals to the Council of Research and Creative Activity through the Office of the Vice Provost for Research;
4. appeals for which the graduate student has not fully used all other appeal and review processes (e.g., the academic unit);

5. appeals filed more than 30 calendar days after receiving notification of the action taken at an appeal by the academic unit (or, if appropriate, another university committee);
6. allegations of discrimination; and
7. other appeals or grievances under the jurisdiction of other university boards and committees.

Appeals are not heard during the summer. The calendar stops on the last day of exams for the spring semester and begins on the first day of classes for the fall semester.

Mediation. Mediation between the graduate student and any university official is always a preferred option to a hearing. If mediation appears beneficial when the initial appeal is filed with the GCAB, the GCAB may recommend that mediation occur and select a mediator. If mediation is successful and both parties agree to the decision, a written record of the outcome is filed by the mediator with the GCAB, all parties involved, and the dean of the Graduate College. If mediation is not successful, the graduate student has 30 days from the end of the mediation process to request in writing a formal appeal hearing.

Authority. The GCAB may affirm or reverse the original decision being appealed and make such recommendations for further actions as appropriate. In the course of any hearing, the GCAB is authorized to request additional evidence or testimony by any student, faculty or staff member, administrator, other university employee, or other individual as a witness. The GCAB has final authority in procedural matters. The decision of the GCAB is final. The chair of the GCAB notifies all parties of the decision.

Filing an Appeal. Before an appeal comes to the GCAB, the normal channels for resolving disputes must have been consulted. The appellant should consult with the major professor to resolve the issue at that level. If the issue cannot be resolved with the major professor, the appellant should seek out the department chair or designated individual for resolution. In some cases, if the major professor and department chair have not been able to resolve the issue or the outcome still needs to be pursued, it may be appropriate to pursue the issue with the academic college dean. If the issue has not been resolved at one of these levels, an appeal to the GCAB may be pursued.

Before initiating an appeal, the graduate student should speak to the associate dean of the Graduate College to see if the issue can be resolved informally. Should negotiation, through the associate dean of the Graduate College, not succeed, the graduate student may submit a written appeal.

All appeals must be submitted in writing to the associate or assistant dean of the Graduate College. Witnesses and any other pertinent evidence must be listed in the appeal. The written appeal must specify the grounds for the appeal as listed in the document "Guidelines for Appeals," available in the Graduate College. Only documents that follow the guidelines are considered, although university regulations pertinent to the case may be used as supporting grounds. It is incumbent upon the student to demonstrate to the GCAB that grounds for the appeal exist. The written appeal may not exceed 10 pages.

The associate or assistant dean notifies the appellee and requests, in writing, information from the appellee related to the case. The initial written response by the appellee is submitted within 15 days of receiving notice of the appeal.

Master's Degrees

Faculty at ASU offer programs leading to the Master of Arts (M.A.) degree, the Master of Science (M.S.) degree, and various professional master's degrees. The M.A. and M.S. programs serve primarily as an introduction to research; the professional master's programs are intended primarily as a preparation for a career in professional practice.

For more information, refer to the appropriate section within "[Graduate Programs and Courses](#)," page 98.

Admission to all Master's Degree Programs. Students wishing to enroll in a master's program at ASU are admitted according to the procedure described under "[Admission to the Graduate College](#)," page 84. Since graduate work presupposes adequate preparation in a selected field at the undergraduate level, deficiencies are specified at the time of admission by the academic unit involved.

Credit Requirements. A minimum of 30 semester hours of graduate work approved by a student's supervisory committee and the Graduate College is required. More than 30 semester hours are required in certain programs.

Supervisory Committee. The supervisory committee is responsible for the guidance and direction of the student's graduate program. The committee is composed of a minimum of three members, including a chair, for students writing a thesis or equivalent.

Program of Study. After regular status has been granted, it is in the student's best interest to have an official program of study filed with the Graduate College at the earliest possible date. When the program of study is filed, a supervisory committee is appointed by the dean of the Graduate College upon the recommendation of the head of the academic unit (verified by the signature on the program of study). Changes in the planned program may be made by the student's supervisory committee, with the approval of the head of the academic unit and the dean of the Graduate College. Forms for the submission of the program of study are available in the Graduate College, in the Graduation section of the Office of the Registrar (located in the Student Services Building), or on the Web at www.asu.edu/registrar/forms/pos.html. A student is not eligible to apply for the comprehensive or final examination until a program of study has been approved and any foreign language requirement completed.

Credit Completed Before Admission. With the approval of the student's supervisory committee, the head of the academic unit, and the dean of the Graduate College, a maximum of nine semester hours of ASU (Main and East) graduate course work completed before admission to a graduate degree program may be included in the program of study for a master's degree. 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

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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. Individual academic units may have a policy of accepting fewer than nine semester hours attained before admission. For details, refer to the specific degree program.

Graduate credit earned at another institution before admission to a graduate degree program at ASU is nondegree credit. Nondegree credit earned at ASU Main and East combined with nondegree credit earned at another institution may not exceed nine semester hours in the program of study. For example, if six semester hours earned before admission to ASU are transferred from another institution, only three nondegree semester hours may be from ASU Main or East for a master's degree program. (See "[Transfer Credit](#)," page 89.)

The six-year maximum time limit applies to nondegree/transferred semester hours appearing on a program of study. (See "[Maximum Time Limit](#)," page 95.) Certain degree programs may have different maximum time limits. The student should refer to the specific degree program.

College of Law Credit. The Graduate College accepts a numerical grade of 70 or above for courses taken in the College of Law at ASU as part of an approved program of study for a master's degree program. These grades are not used in the two GPAs calculated for graduation: the courses on the program of study and all courses numbered 500 and above.

A maximum of six semester hours taken in the College of Law may be included in a 30-hour program of study for a master's degree. For a 36- to 45-hour program, the number of hours is limited to a maximum of nine semester hours of course work in the College of Law.

Foreign Language Requirements. A graduate degree program may have a foreign language requirement. This requirement must be fulfilled before the student is eligible to apply for the final written comprehensive examination or the defense of the thesis or equivalent. For certification of proficiency, see "[Foreign Language Requirements](#)," page 90.

Comprehensive Examinations. A comprehensive examination, written, oral, or both, administered by the academic unit, is required in all professional master's programs that do not have a thesis or equivalent requirement. A comprehensive examination is optional in other programs. Students are not eligible to apply for the comprehensives or for the oral defense of the thesis or equivalent until they have been regularly admitted, have filed an approved program of study, removed any deficiencies, and fulfilled any foreign language requirements. Students are required to register for at least one semester hour of credit that appears on the program of study or one hour of appropriate graduate-level credit (such as 595, 695, and 795 Continuing Registration) during the semester or summer session in which they take their comprehensive examinations. Failure in the comprehensive examination is considered final unless the supervisory committee and the head of the academic unit recommend, and the dean of the Graduate College approves, a reexamination. Only one reexamination is permitted. A reexamination may

be administered no sooner than three months and no later than one year from the date of the original examination.

Thesis or Equivalent Requirements. To satisfy the research requirement for most M.A. or M.S. degrees, a student is expected to present a thesis or equivalent, which is defended in an oral examination. Some professional master's programs may also require a thesis, research project, performance, or exhibition. The requirement varies with each major. Each student writing a thesis or equivalent must register for a minimum of six semester hours of thesis or for a combination of research and thesis totaling six hours, which are directed toward a common research problem.

Credit taken to fulfill the thesis or equivalent enrollment requirement must appear on the program of study.

A student writing a thesis must include on the program of study six hours of 592 Research and 599 Thesis, at least three of which must be 599 Thesis. Although additional 592 Research hours may be included on a program of study, a maximum of six hours of 599 Thesis may be used.

A thesis or equivalent should be of high quality, giving evidence that the program provided an introduction to research. Format evaluation of the thesis or equivalent, described under "[Theses and Dissertations](#)," page 90, must be obtained before its submission to the Graduate College for the oral defense. The final approved copy is bound and placed in Hayden Library. Copies of the *Format Manual* are available in the Graduate College or on the Web site at www.asu.edu/graduate/formatmanual.

The final copy of the thesis or equivalent must be reviewed by the student's supervisory committee and submitted to the Graduate College for format evaluation at least 10 working days before the defense date. The final oral examination in defense of the thesis or equivalent must be conducted at least one week before the degree conferral date. The examination is conducted by the supervisory committee. Applications for the examination are available at the Graduate College or on the Web at www.asu.edu/graduate/forms.

Each student must be enrolled for at least one semester hour of credit that appears on the program of study or one hour of appropriate graduate-level credit (such as 595, 695, or 795 Continuing Registration) during the semester or summer session in which the student defends the thesis or equivalent.

Open Thesis Defenses. Master's thesis defenses are open to all members of the university community. The oral defense engages the supervisory committee and the candidate in a critical, analytical discussion of the research and findings of the study as well as a review of the relation of the thesis to the major field. The presentation of a thesis defense in an open forum fosters a broader awareness of the state of graduate research at the university, promotes a wider scholarly dialogue among disciplines, and recognizes publicly the scholarly contributions of thesis candidates. Announcements are posted in prominent places in the student's department. Members of the university community are invited to thesis defenses through announcements published in *ASU Insight*, the university's weekly news bulletin. The supervisory committee may conduct the final part of its

questioning in closed session. Committee deliberations and final vote are conducted in closed session.

Graduation. The student is eligible for graduation when all course work is successfully completed, the Graduate College scholarship requirements have been met, any required comprehensive examinations have been passed, and the thesis or equivalent, if applicable, has been approved by the supervisory committee and accepted by the head of the academic unit and the dean of the Graduate College. See [“Application for Graduation,” page 90.](#)

Maximum Time Limit. Unless stated otherwise for a specific degree program, all work offered toward a master’s degree must be completed within six consecutive years. The six years begin with the first course included on a student’s approved program of study. For example, if the first course listed was taken fall semester 1999, the student must complete all requirements by August 2005. The six-year maximum time limit applies to nondegree transferred semester hours appearing on a program of study. (See [“Credit Completed Before Admission,” page 93.](#))

Withdrawal Policy. See [“Withdrawal Policies and Procedures,” page 86.](#)

Programs Leading to Two Master’s Degrees. A student may pursue concurrent master’s degrees provided that a maximum of one-sixth of the minimum total semester hours required for the completion of both degrees is common to the two programs of study. The total number of hours common to both degree programs may vary from this maximum value only when the Graduate Council has formally approved coordinated degree programs.

In all cases, these guidelines must be followed:

1. course work common to both programs must constitute a well-planned and meaningful part of each of the programs;
2. the course work common to both programs may not include 599 Thesis or 592 Research credits leading to the thesis or equivalent in either degree;
3. graduate credit transferred from another institution may be applied toward only one degree program;
4. when the two degree programs are pursued at the same time, they must have the approval of the heads of both academic units involved; and
5. concurrent enrollment in a doctoral and master’s degree may not have common hours appear on both programs of study.

Doctoral Degrees

Faculty at ASU offer programs leading to the Doctor of Philosophy (Ph.D.) degree and various professional doctoral degrees. For more information, refer to the appropriate section within [“Graduate Programs and Courses,” page 98.](#)

DOCTORAL DISSERTATIONS

The doctoral dissertation is based on a substantial and sustained research project and constitutes a significant contribution to knowledge in the student’s discipline. Accord-

ingly, it is presumed that the results should be published in scholarly journals, books, or other appropriate forms, either before or following completion of the doctoral degree. The research on which the dissertation is based should have been conducted during the time of the student’s doctoral studies at ASU, under guidance of ASU faculty, and in accord with Graduate College policies and procedures.

The pedagogical function of the dissertation is twofold. On the one hand, students learn to conduct a major, independent research project and to present the results, all under the guidance of an experienced doctoral mentor. On the other hand, the dissertation is a demonstration of the student’s ability to conduct a major research project at the highest level of professional competence. The research experience culminates in a final oral exam, commonly known as the “dissertation defense.” At ASU, defenses are public; students and faculty from the candidate’s unit especially are encouraged to attend. In the successful dissertation defense, doctoral study culminates in a public affirmation of the student’s scholarly competence and of his or her new status in the community of scholars.

The doctoral student must submit two final copies of the dissertation or research paper (research papers are for certain D.M.A. concentrations only) to the ASU Bookstore for binding. The student is responsible for the binding fees. Bound copies are placed in Hayden Library and Archives. See [“Theses and Dissertations,” page 90,](#) for more information.

Open Dissertation Defenses

Doctoral dissertation defenses are open to all members of the university community. The oral defense engages the supervisory committee and the candidate in a critical, analytical discussion of the research and findings of the study as well as a review of the relation of the dissertation to the specialized field in which it lies. The presentation of dissertation defenses in an open forum fosters a broader awareness of the state of graduate research at the university, promotes a wider scholarly dialogue among disciplines, and recognizes publicly the scholarly contributions of doctoral candidates. Announcements are posted in prominent places in the student’s department. Members of the university community are invited to dissertation defenses through announcements published in *ASU Insight*, the university’s weekly news bulletin. If circumstances warrant, the supervisory committee may conduct the final part of its questioning in closed session. Committee deliberations and the final vote are conducted in closed session.

Coauthored Work in Doctoral Dissertations

The Graduate Council recognizes the necessity of collaborative research by graduate students with their mentors and with other graduate students. These efforts often result in coauthored works such as journal articles and presentations at meetings. When data or information contained in coauthored works or the actual coauthored works themselves appear in a doctoral dissertation, the graduate author should obtain necessary permission from involved parties (such as written consent from coauthors and the journal that holds the copyright), credit the sources and inspiration of the research, and properly acknowledge the coauthors. For more information, see the *Research and Sponsored Projects*

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Policies and Procedures Manual—RSP 106 at www.asu.edu/aad/manuals/rsp/rsp106.html.

Course Work After Admission to Doctoral Program

A student with an appropriate master's degree must complete at ASU a minimum of 54 to 60 semester hours of approved graduate work, including 24 hours of dissertation and research (or recital for Music majors), after admission to the doctoral degree program. A student without an appropriate master's degree usually must complete 84 to 90 semester hours of work at ASU.

Research and Dissertation Credits on Programs of Study

The doctoral program of study generally consists of appropriate graduate course work and 24 hours of 792 Research and 799 Dissertation. No more than 24 hours of 799 Dissertation may be included on the doctoral program of study.

Thesis Credit on Doctoral Programs of Study

A maximum of six hours of thesis credit may be included in a doctoral program of study. The thesis credit must be recorded, the thesis successfully defended, and the degree conferred.

College of Law Credit

The Graduate College accepts a numerical grade of 70 or above for courses taken in the College of Law at ASU as part of an approved program of study for a doctoral degree program, if the ASU law courses are deemed appropriate. These grades are not used in the two GPAs calculated for graduation, i.e., the courses on the program of study and all courses numbered 500 and above.

Withdrawal Policy

See "[Withdrawal Policies and Procedures](#)," page 86.

DOCTOR OF PHILOSOPHY

The Doctor of Philosophy degree is granted upon evidence of excellence in research and the demonstration of independent, creative scholarship culminating in a dissertation.

Admission. See "[Admission to the Graduate College](#)," page 84, for general requirements. Graduate students may apply for admission to the Ph.D. program by filing a written application with the Graduate Admissions Office.

Program Committee. Upon the recommendation of the head of the academic unit, the dean of the Graduate College appoints the program committee, consisting of a chair and at least two other members. The program committee advises the student in planning the program of study. The recommendation for the program committee is reviewed simultaneously with the program of study.

Comprehensive Examination Committee. Ph.D. comprehensive examinations are administered by a committee consisting of three to five members, depending on the requirements of the academic unit.

Dissertation Committee. Upon the recommendation of the head of the academic unit, the dean of the Graduate College

appoints the student's dissertation committee, consisting of a chair and at least two other members. This committee must approve the subject and title of the dissertation. The members of the dissertation committee have the necessary knowledge and skills to advise the student during the formulation of the research topic and during the completion of the research and the dissertation. The chair of the program committee may serve as the chair of the dissertation committee. In some cases, the same members serve on both committees. However, the two different committees may have memberships with overlapping functions.

If the head of the academic unit recommends changes in membership for either committee after the committee has been appointed, the student must submit a change of committee form to the Graduate College and receive the approval of the dean of the Graduate College.

Program of Study. The program of study should be submitted as early as possible and must have the approval of the student's supervisory committee, head of the academic unit, and the dean of the Graduate College. The program of study is reviewed simultaneously with the recommendation for the program committee. In general, Ph.D. degree students should expect to devote to the program of study the equivalent of at least three academic years (84 semester hours) beyond the bachelor's degree. A minimum of 84 semester hours is required; 24 of these hours must be a combination of 792 Research and 799 Dissertation. Of the 84 semester hours, at least 30 hours (which may include research credit) of the approved Ph.D. program and 24 research and dissertation hours must be completed *after admission* to a Ph.D. program at ASU. A maximum of 24 dissertation hours is permitted on the program of study. In addition, on the Ph.D. program of study, a student may use up to six hours (maximum) of thesis credit from the completed master's degree. The master's thesis must have been defended and the hours must have been used as part of a completed master's program.

Continuous Enrollment. Once admitted to a Ph.D. degree program, the student is expected to be enrolled continuously, excluding summer sessions, until all requirements for the degree have been fulfilled. Continuous enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If additional credit is not required toward the Ph.D. degree, the student may enroll for 595, 695, or 795 Continuing Registration. Continuing Registration does not carry credit; no grade is given. If a program of study must be interrupted for one or more semesters, the student may apply for leave status, not to exceed one calendar year. A student on leave is not required to pay fees, but is not permitted to place any demands on university faculty or use any university facilities. A student who interrupts a program without obtaining leave status may be removed automatically by the Graduate College, under the assumption that the student has decided to discontinue the program. A student removed by the Graduate College for this reason may reapply for admission; the application is considered along with all other new applications to the degree program.

An application for leave status, endorsed by the members of the student's supervisory committee and the head of the academic unit, must be approved by the dean of the Graduate College. This request must be filed and approved no later than the last day of registration in the semester of anticipated absence.

Residency. In general, Ph.D. degree students should expect to devote to their program of study the equivalent of at least three academic years (84 semester hours) beyond the bachelor's degree. At least two consecutive semesters subsequent to admission to the Ph.D. program must be spent in full-time residence at ASU. At least 30 hours of the approved Ph.D. program in which they are enrolled, in addition to the 24 semester hours of research and dissertation credit, must be completed after admission to the Ph.D. program at ASU. These courses must appear on an approved program of study.

It is expected that, during the period spent in residence, full time (nine semester hours minimum or six semester hours for research assistants or teaching assistants) is devoted to graduate studies. This period is designed to provide an opportunity for students to avail themselves of university resources and to interact fully with faculty and fellow graduate students. This time represents total involvement in the academic major of the program in which they are enrolled.

Foreign Language Requirements. Language requirements are determined by the academic unit concerned. For information concerning certification of proficiency, see "[Foreign Language Requirements](#)," page 90.

Comprehensive Examinations. When students have essentially completed the course work in an approved program of study, they should request permission to take the comprehensive examinations. Some academic units may require that the foreign language requirements be fulfilled before taking the comprehensive examinations. These written and oral examinations are designed to test the student's mastery of the field of specialization. Ph.D. comprehensive examinations are administered by a committee consisting of three to five members, depending on the requirements of the academic unit. Failure in the comprehensive examinations is considered final unless the supervisory committee and the head of the academic unit recommend, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Ph.D. students will achieve candidacy status in a letter from the Graduate College dean upon:

1. passing the foreign language examination, if applicable;
2. passing the comprehensive examinations; and
3. successfully defending the dissertation prospectus.

Students must enroll for a minimum of 12 semester hours of 792 Research and 799 Dissertation credit (combined) in subsequent semesters, following the semester in which they are advanced to candidacy.

Note: The 12 semester hours come *after* advancing to candidacy.

Research and Dissertation Requirements. Each candidate must register for a combined total of 24 semester hours of credit for 792 Research and 799 Dissertation. No more than 24 hours of 799 Dissertation may be included on the 84-hour program of study. Courses or semester hours taken beyond the listed requirements should not be included on the program of study. The final copy of the dissertation must be reviewed by the supervisory committee and the Graduate College at least three weeks before the degree conferral date. Copies of the *Format Manual* are available in the Graduate College and on the Web at www.asu.edu/graduate/formatmanual.

Final Examinations. The final oral examination in defense of the dissertation is mandatory and must be held on the main campus. The oral defense is scheduled by the supervisory committee with the approval of the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the head of the academic unit and the dean of the Graduate College.

Maximum Time Limit. The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.



Graduate College Office Assistant Debby Parker (right) hands out materials to students attending the Thesis/Dissertation Workshop at the Memorial Union.

Dennis Durband photo

Graduate Programs and Courses

All graduate degree programs and certificate programs are organized alphabetically by the name of the major or certificate with only a few exceptions. For example, French, German, and Spanish are found under [“Languages and Literatures,”](#) page 245.

Accountancy

Certificate Program

ASU West offers a postbaccalaureate certificate in Accountancy. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Accountancy and Information Systems

Master’s Program

www.cob.asu.edu/acct

480/965-3631

BA 223

Philip M.J. Reckers, Director

Professors: J.R. Boatsman, Boyd, Christian, Goul, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: Bhattacharya, David, Golen, Gupta, Hwang, Iyer, Keim, Kulkarni, Moeckel, O’Dell, O’Leary, Regier, Whitecotton, Yen

Assistant Professors: Chen, Chenoweth, Comprix, Dowling, Lee, O’Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

Senior Lecturers: Goldman, Maccracken, Shrednick

Lecturers: J.L. Boatsman, Geiger, Hayes

The faculty in the School of Accountancy and Information Management, College of Business, offer specialized professional programs leading to the Master of Accountancy and Information Systems (M.A.I.S.), Master of Science in Information Management (see [“Information Management,”](#)

page 240), and Master of Taxation (see “Taxation,” page 328) degrees.

The faculty participate in offering the program leading to the Master of Business Administration (see [“Master of Business Administration,”](#) page 131) and Ph.D. in Business Administration (see [“Doctor of Philosophy,”](#) page 133).

MASTER OF ACCOUNTANCY AND INFORMATION SYSTEMS

The M.A.I.S. degree provides specialized preparation for careers in professional accounting and computer information systems/management, corporate accounting/finance, and management consulting.

Admission. Applicants must submit scores from the Graduate Management Admissions Test (GMAT) exam. All applicants are also required to submit the supplemental application materials required from the school. International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) and Test of Spoken English (TSE) exams. Preference in admission is given to those with degrees in accounting and business, although other exceptional candidates are considered. Complete application instructions may be obtained from the school’s Web site.

Prerequisites. Applicants must complete the program prerequisites. Refer to the School of Accountancy and Information Management Web site for a current listing of required course prerequisites for the program.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. A representative program might include the following courses:

ACC 511	Taxes and Business Strategy	3
ACC 533	Application Solutions in the Connected Economy	3
ACC 541	Strategic Innovations in Information and Cost Management.....	3
ACC 585	Performance Measurement of Emerging Business Models.....	3
ACC 586	Shareholder Value Creation and Financial Statement Analysis	3
ACC 587	Business Process Integrity Controls.....	3
ACC 591	Seminar: Electronic Commerce	3
CIS 505	Object-Oriented Modeling and Programming	3
CIS 506	Business Database Systems	3
CIS 512	Intelligent Decision Systems and Knowledge Management	3

Visit the school’s Web site for a current program of study.

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. A final comprehensive, written examination is required of all candidates.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Systems Web site at www.cob.asu.edu/acct.

ACCOUNTANCY (ACC)

ACC 502 Financial Accounting. (3)

once a year

Financial accounting concepts and procedures for external reporting. Prerequisite: M.B.A. degree program student.

ACC 503 Managerial Accounting. (3)

once a year

Managerial accounting concepts and procedures for internal reporting. Prerequisite: M.B.A. degree program student.

ACC 511 Taxes and Business Strategy. (3)

once a year

Economic implications of selected management decisions involving application of federal income tax laws. Recognition of tax hazards and tax savings. Prerequisite: ACC 502 (or its equivalent).

ACC 515 Professional Practice Seminar. (3)

selected semesters

History, structure, environment, regulation, and emerging issues of the accounting profession.

ACC 521 Tax Research. (3)

once a year

Tax research source materials and techniques. Application to business and investment decisions. Prerequisite: ACC 430.

ACC 533 Application Solutions in the Connected Economy. (3)

once a year

Analyzes software solutions and evaluation methods. Emphasizes current topics such as enterprise modeling, ERP software, and inter-organizational solutions. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 541 Strategic Innovations in Information and Cost Management. (3)

once a year

Strategic cost management emphasizing contemporary topics, including activity-based costing and strategic uses of information technology systems. Cooperative learning, lecture. Prerequisite: ACC 503 or M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 567 Financial Models in Accounting Systems. (3)

selected semesters

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)

once a year

Tax aspects of the formation, operation, reorganization, and liquidation of corporations and the impact on shareholders. Pre- or corequisite: ACC 521.

ACC 573 Taxation of Pass-Through Entities. (3)

once a year

Tax aspects of the definition, formation, operation, liquidation, and termination of a partnership. Emphasizes tax planning. Pre- or corequisite: ACC 521.

ACC 575 Family Tax Planning and Wealth Transfer Taxation. (3)

once a year

Tax treatment of wealth transfers at death and during lifetime, with emphasis on tax planning. Pre- or corequisite: ACC 521.

ACC 577 Taxation of Real Estate Transactions. (3)

selected semesters

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 Information Security of Interorganizational Systems. (3)
selected semesters

Function and responsibility of the information security officer.

Advanced topics in security methods and technology. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 585 Performance Measurement of Emerging Business Models. (3)

once a year

Applies quantitative techniques to accounting problems. Prerequisite: ACC 503 or M.S. in Information Management degree program student or M.A.I.S. degree program student.

ACC 586 Shareholder Value Creation and Financial Statement Analysis. (3)

once a year

Develops skills necessary to exploit financial reporting information in a business environment and appreciation of reporting issues faced by management.

ACC 587 Business Process Integrity Controls. (3)

once a year

Design and evaluation of computer-based accounting information system. Development of computer-based business models for planning and control. Prerequisite: M.A.I.S. degree program student.

ACC 591 Seminar on Selected ACC Topics. (1–12)

once a year

Topics may include the following:

- Computer Security. (3)
- Data Warehouse and Data Mining. (3)
- Electronic Commerce. (3)
- Enterprise Modeling. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48](#).

COMPUTER INFORMATION SYSTEMS (CIS)

CIS 502 Management Information and Decision Support Systems. (3)

once a year

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)

once a year

Object-oriented modeling of business information systems, abstract data types and object-oriented programming using a visual language. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 506 Business Database Systems. (3)

once a year

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 degree program student or M.A.I.S. degree program student.

CIS 512 Intelligent Decision Systems and Knowledge Management. (3)

once a year

Definition, description, construction, and evaluation of computer-based decision systems. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 515 Management Information Systems. (3)

selected semesters

Systems theory concepts applied to the collection, retention, and dissemination of information for management decision making. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 520 Systems Design and Evaluation. (3)

selected semesters

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 degree program student or M.A.I.S. degree program student.

GRADUATE PROGRAMS AND COURSES

CIS 530 Information Systems Development. (3)

once a year

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 degree program student or M.A.I.S. degree program student.

CIS 535 Distributed Information Systems. (3)

once a year

Distributed systems and their impact on information systems in business. Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 591 Seminar on Selected CIS Topics. (1–12)

once a year

Topics may include the following:

- Computer Security
- Computing Architectures
- Data Warehouse and Data Mining
- Electronic Commerce
- Enterprise Modeling

Prerequisite: M.S. in Information Management degree program student or M.A.I.S. degree program student.

CIS 593 Applied Project. (1–12)

once a year

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Aerospace Engineering

Master’s and Doctoral Programs

www.eas.asu.edu/~mae

480/965-3291

ECG 346

Robert E. Peck, Chair

Professors: Chattopadhyay, Laananen, Liu, Mignolet, Peck, Reed, Saric, Wie

Associate Professors: Lee, Rankin, Wells

Assistant Professor: Mikellides

The faculty in the Department of Mechanical and Aerospace Engineering offer graduate programs leading to the M.S., Master of Science in Engineering, and Ph.D. degrees in Aerospace Engineering. A number of areas of study may be pursued, including aerodynamics, design, dynamics and control, propulsion, and structures. The faculty also offer graduate degree programs in Mechanical Engineering. All of the department’s graduate programs stress a sound foundation leading to a specialized area of study.

The application deadline for admission in the fall semester is April 15. Applications received after that date and

before November 15 are considered for admission in the spring semester.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination; the subject test in Engineering is highly recommended but not required.

MASTER OF SCIENCE

See [“Master’s Degrees,” page 93,](#) for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See [“Master of Science in Engineering,” page 196,](#) for information on the Master of Science in Engineering degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon evidence of excellence in research leading to a scholarly dissertation that is an original contribution to knowledge in the field of aerospace engineering. See [“Doctor of Philosophy,” page 96,](#) for general requirements.

Program of Study. The program of study must be established no later than the first semester after successfully completing the qualifying examination.

Qualifying Examinations. The purposes of the qualifying criteria are to assess if the student is prepared to continue in the doctoral program and to detect deficiencies in the student’s background that can be corrected by appropriate course work and individual study. Within the first year of graduate studies at ASU, a graduate student pursuing a Ph.D. program of study in Aerospace Engineering must complete three 500-level core courses, preferably in the major area of interest, and one 500-level mathematics course, both with an average GPA of 3.25 or higher.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the program committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

Computer Resources and Facilities

See [“Computer Resources and Facilities,” page 265.](#)

COURSES

For courses, see *“Mechanical and Aerospace Engineering (MAE),” page 265.*

Agribusiness

Master's Program

www.east.asu.edu/msabr

480/727-1585

CNTR 20

Raymond A. Marquardt, Dean

Professors: Daneke, Edwards, Kagan, Marquardt, Seperich, Shultz, Thor

Associate Professors: Patterson, Raccach, Richards

Assistant Professors: Manfredo, Schmitz, Stanton

MASTER OF SCIENCE

The Morrison School of Agribusiness and Resource Management (MSABR), at ASU East, offers the M.S. degree in Agribusiness with a choice of two concentrations: (1) agribusiness management and marketing and (2) food quality assurance. In general, this degree is designed to prepare students from a variety of backgrounds with a set of critical and analytical business skills while recognizing the unique demands of the agribusiness and resource management sectors. Graduates are well prepared for successful administrative or managerial careers with either government or private-sector organizations in either field. Students are able to select either a research-oriented program, which leads to the completion of a supervised thesis, or a program consisting of course work only (nonthesis option). The nonthesis option allows students to develop an area of specialization and apply these skills to a real-world agribusiness problem through an integrative, capstone course experience. Both the thesis and nonthesis options require the completion of a common set of core courses and successful completion of an MSABR standard comprehensive exam following the first year of course work.

Admission. Applicants to the program are expected to meet the minimum requirements for admission to the Graduate College. In addition, scores from the Graduate Record Examination, Miller Analogies Test, or Graduate Management Admission Test are required. Applications must include a vita and statement of purpose; letters of recommendation are suggested. The statement of purpose must offer evidence of the applicant's basic skills in economics, accounting, statistics, and computer use, as well as some experience or knowledge in an area related to agribusiness. Applicants not meeting this last requirement may be considered for admission with deficiencies. The application deadline for admission in the fall semester is April 15. Applications received after that date and before November 15 are considered for admission in the spring semester.

Applicants are strongly encouraged to apply by mid-February to increase their chances for official university funding.

Thesis Option. Students interested in pursuing a research-related career, or an in-depth study of a particular agribusiness issue to improve employment prospects, may choose the thesis option. These students are advised to begin discussions with faculty members early in their studies so that course work and potential employment can be geared toward supporting thesis research. Six of the 36 semester hours in the program are dedicated to the research time required to complete a thesis.

Nonthesis Option. The nonthesis M.S. degree in Agribusiness option provides an opportunity for students who wish to pursue a professional career that is not specifically research-oriented to obtain a rigorous and comprehensive graduate degree. The nonthesis option allows for the selection of six semester hours of electives to be taken in a specific area of emphasis. In lieu of a thesis, a nonthesis option student completes a case-oriented capstone course, which allows the student an opportunity to pursue a course-based project that integrates all of the core business skills acquired during the course work sequence.

Program of Study. All M.S. candidates must complete a minimum of 36 hours of approved graduate-level course work, excluding courses taken to address deficiencies. Of these 36 hours, 21 must be taken to satisfy core requirements in basic business, statistics, and computer proficiency. For students selecting the nonthesis option, fulfilling the requirements for an area of emphasis consists of the successful completion of six hours of elective courses from within that area chosen from graduate agribusiness courses. The specific courses are determined by the student and his or her academic advisor. Thesis students are required to complete three semester hours of research and three hours of writing in addition to six hours of general 500-level agribusiness electives.

It is suggested that students take a coherent sequence of courses such as those indicated below, but considerable flexibility is possible based on individual backgrounds and interests.

Thesis and Nonthesis M.S. in Agribusiness

Semester I

AGB 560 Advanced Agribusiness Management Systems.....	3
AGB 570 Managerial Economics for Agribusiness	3
Total	6

Semester II

AGB 528 Advanced Agribusiness Marketing	3
AGB 532 Advanced Agribusiness Finance	3
AGB 561 Agribusiness Research Methods	3
Total	9

Semester III

Nonthesis Option	
500-level AGB emphasis electives.....	9
Total	9

Thesis Option	
AGB 511 Advanced Agribusiness Management.....	3

GRADUATE PROGRAMS AND COURSES

500-level AGB electives.....	6
Total	9
Semester IV	
Nonthesis Option	
AGB 511 Advanced Agribusiness Management	3
500-level AGB emphasis or other electives	6
Total	9
Thesis Option	
AGB 592 Research	6
AGB 599 Thesis	3
Total	9
Total hours in program.....	36

Cooperative Degree Program. The Morrison School of Agribusiness and Resource Management and the American Graduate School of International Management (Thunderbird) have a cooperative agreement for students interested in both agribusiness and international management. Thunderbird is an internationally recognized private graduate school, located in the Phoenix metropolitan area, offering course work in international studies, modern languages, and world business. This agreement enables students of ASU to take up to nine semester hours of course work at Thunderbird. To participate, the ASU student must be enrolled full-time (nine semester hours) and may only take three semester hours per semester at Thunderbird. The goal of this agreement is to enhance the educational opportunities available to qualified students of both institutions while making optimal use of the resources and facilities of both institutions.

Foreign Language Requirements. None.

Peace Corps' Master's International Program. MSABR has an agreement with the United States Peace Corps that makes combining graduate studies with Peace Corps service even more appealing. Participants can receive up to six hours of credit for their independent field work while in Peace Corps service. Graduate course work precedes departure to foreign countries. Interested individuals make separate application to ASU and the Peace Corps, and prepare plans of study with their faculty committees regarding studies in the field.

RESEARCH ACTIVITY

The faculty of agribusiness are engaged in a number of research projects of global, national, regional, or state importance. Scholarship in service to community is the hallmark of a state-supported university and is evident in the Morrison School of Agribusiness and Resource Management.

A few examples of this scholarship are "The National Food and Agriculture Policy Project;" a project involved with "Retail Contracting and Growers' Prices in Fresh Fruit;" investigations in "Emerging Markets of the Balkans and Black Sea Region;" as well as "Curriculum for a Bachelor of Science Degree in Food Management."

AGRIBUSINESS (AGB)

AGB 410 Agribusiness Management II. (3)

spring

Principles of human resource management in agribusiness firms. Prerequisite: AGB 310.

AGB 411 Agricultural Cooperatives. (3)

spring

Organization, operation, and management of agricultural cooperatives.

AGB 414 Agribusiness Analysis. (3)

fall and spring

Analysis of agribusiness firm decisions in the ecological, economic, social, and political environments. Special emphasis on ethical issues surrounding food production and consumption.

AGB 420 Food Marketing. (3)

spring

Food processing, packaging, distribution, market research, new food research and development, and social implications. Prerequisite: AGB 320.

AGB 422 Consumer Behavior. (3)

fall

Applies behavioral concepts in analyzing consumer food purchases and their implications for marketing strategies. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 424 Sales and Merchandising in Agribusiness. (3)

summer

Principles and techniques of selling and merchandising in the agricultural and food industries.

AGB 425 Agricultural Marketing Channels. (3)

fall

Operational stages of agricultural commodities in normal distribution systems and implementation of marketing strategies. Prerequisite: AGB 320.

AGB 429 Marketing Research. (3)

fall

Examines the marketing research process and its role in facilitating agribusiness decisions. Emphasizes problem identification, survey design, and data analysis. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 431 Intermediate Agribusiness Financial Management. (3)

spring

Comprehensive treatment of topics in financial management of agribusiness: capital structure, dividend policy, asset valuation, mergers and acquisitions, risk management. Prerequisites: AGB 332, 333.

AGB 433 Intermediate Agribusiness Financial Markets. (3)

spring

Role and function of agribusiness in U.S. financial system. Topics include rural banking, farm credit system, monetary policy, and federal reserve. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 434 Agricultural Risk Management and Insurance. (3)

fall

Strategies to manage agricultural price and business risk: derivatives, insurance, self-insurance, and public policy. Prerequisite: completion of Agribusiness core (or its equivalent).

AGB 436 Entrepreneurship and Financial Management of E-commerce. (3)

fall

Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

AGB 440 Food Safety. (3)

spring

Control, prevention, and prediction of microbial and chemical food-borne diseases. Prerequisite: AGB 442 or instructor approval.

AGB 441 Food Chemistry. (3)

spring

Biochemical and chemical interactions that occur in raw and processed foods. Prerequisites: CHM 115, 231.

AGB 442 Food and Industrial Microbiology. (4)

selected semesters

Food- and industrial-related microorganisms; deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: a course in microbiology with lecture and lab.

AGB 443 Food and Industrial Fermentations. (3)

spring

Management, manipulation, and metabolic activities of industrial microbial cultures and their processes. Prerequisite: AGB 442 or instructor approval.

AGB 445 Food Retailing. (3)

fall

Food retail management. Discusses trends, problems, and functions of food retail managers within various retail institutions. Lecture, case studies.

AGB 450 International Agricultural Development. (3)

fall

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

AGB 452 International Agricultural Policy. (3)

fall

Use of international trade theory to analyze the effects of government policies, trade agreements, and exchange rates on agribusiness. Prerequisite: ECN 112.

AGB 454 International Trade. (3)

spring

International practices in trading of agribusiness, technology, and resource products and services.

AGB 455 Resource Management. (3)

spring

Explores differences between societal and individual valuations of natural resources and considers public policy versus market-based solutions to environmental concerns. Prerequisite: ECN 112.

AGB 457 Resource Policy and Sustainability. (3)

fall

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies. Prerequisite: ECN 112.

AGB 460 Agribusiness Management Systems. (4)

spring

Development and use of decision support systems for agribusiness management and marketing. Lecture, lab.

AGB 463 Electronic Commerce Applications. (3)

fall

Overview of electronic commerce technology with introduction to basics of design, control, operation, organization, and emerging issues. Pre- or corequisite: AGB 460 (or its equivalent).

AGB 466 Integrated Pest Control. (2)

fall and spring

Management of pests affecting golf turf and landscape plants. Structural Pest Control Board sprayer certification preparation offered during the semester. Lecture, lab.

AGB 470 Comparative Nutrition. (3)

selected semesters

Effects of nutrition on animal systems and metabolic functions. Prerequisite: CHM 231.

AGB 471 Diseases of Domestic Animals. (3)

spring

Discusses animal welfare, mechanisms of disease development, causes and classification of diseases, disease resistance, and common zoonoses. Prerequisite: BIO 188.

AGB 473 Animal Physiology I. (3)

selected semesters

Control and function of the nervous, muscular, cardiovascular, respiratory, and renal systems of domestic animals. Prerequisites: BIO 188; CHM 113.

AGB 479 Veterinary Practices. (3)

fall and spring

Observation of and participation in veterinary medicine and surgery supervised by local veterinarians. Prerequisite: advanced preveterinary student.

AGB 480 Agribusiness Policy and Government Regulations. (3)

spring

Development and implementation of government food, drug, pesticide, and farm policies and regulations that affect the management of agribusiness.

AGB 484 Internship. (1–12)

fall and spring

AGB 500 Research Methods. (1–12)

selected semesters

AGB 501 Master's Thesis Preparation. (1)

fall and spring

Step-by-step guidelines to major elements of a master's thesis along with practical guidelines for conducting research.

AGB 511 Advanced Agribusiness Management. (3)

spring

Analyzes organization behavior, change, and resource requirements within agribusiness systems.

AGB 512 Food Industry Management. (3)

spring

Operations and management of food-processing factories, food distribution centers, and retail food-handling firms.

AGB 513 Advanced Cooperatives. (3)

fall

Advanced study of cooperatives and other nongovernmental organizations (NGO) focusing on management and proposal preparation for international agencies.

AGB 514 Advanced Agribusiness Analysis I. (3)

spring

Vertical integration and differentiation in food and agricultural industries. Prerequisite: AGB 528.

AGB 515 Agribusiness Coordination. (3)

spring

Organizational alternatives for agribusiness with emphasis on cooperatives and trading companies. Prerequisite: AGB 528.

AGB 528 Advanced Agribusiness Marketing. (3)

fall

Theory and analysis of marketing farm commodities, risks, and the effect of future trading on cash prices.

AGB 529 Advanced Agribusiness Marketing Channels. (3)

spring

Analyzes agribusiness market channel systems. Formulation of marketing strategies.

AGB 532 Advanced Agribusiness Finance. (3)

fall

Financial management of agribusiness firms; agribusiness financial analysis, investment analysis, agricultural risk management, and introduction to agricultural financial intermediaries. Prerequisites: both computer literacy and a course in finance or only instructor approval.

AGB 535 Commodity Analysis. (3)

fall

Analysis of commodity markets.

AGB 536 Small Business Finance, Entrepreneurship, and E-commerce. (3)

fall

Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

AGB 540 Advanced Food Science. (3)

selected semesters

Chemical and physical nature of processed foods. Emphasizes food product development.

AGB 550 International Agricultural Development. (3)

fall

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

AGB 551 Agribusiness in Developing Countries. (3)

spring

Factors influencing successful development of agribusiness enterprises in developing countries, including poverty, access to capital and technology, and trade opportunities.

GRADUATE PROGRAMS AND COURSES

AGB 552 International Agricultural Policy. (3)

fall

Uses international trade theory to analyze the effects of government policies, trade agreements, and exchange rates on agribusiness.

AGB 554 Advanced International Trade. (3)

fall

Advanced international practices in trading of agribusiness, technology, and resource products and services.

AGB 557 Resource Policy and Sustainability. (3)

fall

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies.

AGB 558 Advanced Bioremediation. (3)

spring

Management and policy issues related to bioremediation of mineral tailing and animal waste and replacement of chemical control with biological methods. Lecture, case studies.

AGB 560 Advanced Agribusiness Management Systems. (3)

selected semesters

Development and use of decision support systems for agribusiness management decision making.

AGB 561 Agribusiness Research Methods. (3)

fall

Uses model building, hypothesis testing, and empirical analysis in solving agribusiness problems.

AGB 570 Managerial Economics for Agribusiness. (3)

fall

Concepts in micro- and macroeconomics applied to agribusiness management environments: price formation, market structure, information economics, fiscal and monetary policy. Prerequisites: introductory micro- and macroeconomics.

AGB 580 Practicum. (1–12)

selected semesters

AGB 581 Advanced Agribusiness Policy. (3)

fall

Policy-making history, structure, and process.

AGB 583 Field Work. (1–12)

selected semesters

AGB 584 Internship. (1–12)

selected semesters

AGB 587 Resource Policy and Sustainability. (3)

fall

Considers the evolution of policy design, focusing on how resource and environmental concerns have affected agricultural development and trade policies.

AGB 589 Agribusiness Capstone. (3)

fall and spring

Strategic management of organizations focusing on developing value-creating strategies in dynamic environments. Pre- or corequisites: AGB 511, 528, 532, 560, 561, 570.

AGB 590 Reading and Conference. (1–12)

selected semesters

AGB 591 Seminar. (1–12)

selected semesters

AGB 592 Research. (1–12)

selected semesters

AGB 593 Applied Project. (1–12)

selected semesters

AGB 594 Conference and Workshop. (1–12)

selected semesters

AGB 595 Continuing Registration. (1)

selected semesters

AGB 598 Special Topics. (1–4)

selected semesters

AGB 599 Thesis. (1–12)

selected semesters

AGB 600 Research Methods. (1–12)

selected semesters

AGB 690 Reading and Conference. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Anthropology

Master's and Doctoral Programs

www.asu.edu/clas/anthropology

480/965-6213

ANTH 233

John K. Chance, Chair

Regents' Professors: Clark, Turner

Professors: Bahr, Barton, Brandt, Carr, Chance, Cowgill, Eder, Hudak, Johanson, Kintigh, Koss-Chioino, Marean, Martin, Marzke, Merbs, Nash, B. Nelson, M. Nelson, Redman, Spielmann, Stark, Williams

Associate Professors: Falconer, Hegmon, Kimbel, Rice, Welsh

Assistant Professors: Baker, Haenn, Jonsson, Reed, Steadman

Senior Lecturer: Winkelman

Associate Research Professors: Simon, Sugiyama

The faculty in the Department of Anthropology offer graduate programs leading to the M.A. and Ph.D. degrees in Anthropology.

Admission. In addition to the general requirements for admission to the Graduate College, the Department of Anthropology requires applicants to provide a statement of their interests and professional goals and three letters of recommendation. Applicants who received their B.A. during the past ten years must also submit scores on the Graduate Record Examination. Undergraduate course work in anthropology is not a prerequisite for admission to the M.A. program. Admission to the Ph.D. program normally presumes an M.A. in Anthropology; students may be admitted without such a background on the condition that they acquire a knowledge of general anthropology in a manner to be specified at the time of admission.

Program of Study. Special training programs designed to terminate with a master's degree are possible at the discretion of the student and faculty advisors. For example, the concentrations in linguistics, museum studies, medical anthropology, and bioarchaeology are at the master's level. The primary purpose and scope of the graduate program in anthropology, however, is intended to lead to the Ph.D. degree.

The doctoral program is divided into three phases. The first consists of 24 semester hours of course work and read-

ings, usually within a subdiscipline and closely allied areas, followed by six semester hours for the M.A. thesis (or publishable paper). The faculty may require additional hours of course work or other preparation for entering students who are unfamiliar with the concepts of general anthropology at a level equivalent to that of the ASU undergraduate anthropology core. Mastery of the phase I course material is demonstrated by successful completion of a sequence of core courses.

Admission to phase II of the doctoral program is granted to students on the basis of performance in phase I, the quality of M.A. research, prior course work, faculty recommendations, and other relevant information. The second phase consists of 30 semester hours of course work, readings in anthropology and related fields, and directed research designed to prepare the student for the dissertation project. Proficiency in one foreign language or quantitative methods may be required by the supervisory committee. The second phase is completed when the following have been met: (1) passing a written comprehensive examination, and (2) passing the oral defense of the dissertation proposal. The successful student is then advanced to candidacy.

The final phase consists of 24 semester hours of research and dissertation.

Certificate in Museum Studies. The certificate is awarded to nondegree or graduate students who are accepted into the certificate program and who complete 12 hours of required course work and a six-semester hour internship at an approved museum. The certificate may be taken independently or in conjunction with the M.A. degree in Anthropology with a concentration in museum studies.

MASTER OF ARTS

Concentrations are available at the master's level in archaeology, bioarchaeology, linguistics, museum studies, physical anthropology, and social-cultural anthropology.

See [“Master's Degrees,” page 93](#), for general requirements. A concurrent M.A. degree in Anthropology and M.S. degree in Justice Studies is also available. See [“Concurrent M.A. Anthropology/M.S. Justice Studies,” page 242](#).

DOCTOR OF PHILOSOPHY

Concentrations are available at the doctoral level in archaeology, physical anthropology, bioarchaeology, and social-cultural anthropology.

For more information on the Ph.D. degree, see [“Doctor of Philosophy,” page 96](#).

Concentrations

Anthropology faculty and the department's curriculum are organized into five areas of concentration.

Archaeology. Graduate studies in archaeology provide training leading to M.A. and Ph.D. degrees; these emphasize a solid methodological and theoretical foundation coupled with a practical approach to field and laboratory applications. Major theoretical course offerings are concerned with the archaeology of complex societies, hunter-gatherer adaptations, settlement patterns and locational analysis, intrasite spatial analysis, cultural ecology, economic archaeology, ideation, and style. Analytical topics are covered in

courses dealing with quantitative and formal methods, simulation, geoarchaeology, field methods and the analysis of ceramics, lithics, fauna, and pollen. The university's location in an archaeologically rich area has resulted in an especially strong emphasis on U.S. Southwest research. Other geographic emphases are on Mesoamerica, the circum-Mediterranean Old World, sub-Saharan Africa, and other parts of North America.

Bioarchaeology. Bioarchaeology, a theoretical and applied interface of archaeology and physical anthropology, is concerned with reconstructing the cultural, biological, and environmental conditions of past human lifeways and their roles in human adaptation. ASU's program leads to either an M.A. or Ph.D. degree and emphasizes a dual theoretical and methodological foundation in the relevant aspects of archaeology and in skeletal biology and dental anthropology. Course offerings include archaeological method and theory, comparative anatomy, death and dying in cross-cultural perspective, demography, dental anthropology, disease and human evolution, economic archaeology, faunal analysis, fossil hominids, human origins, human osteology, mortuary analysis, prehistoric diet, quantitative analysis, and a variety of topical and areal courses in archaeology and physical anthropology.

Museum Studies. Museum studies encompasses theoretically oriented analyses of museums as cultural institutions (including the activities of staff members, visitors, represented peoples, and all implicated others) as well as applied aspects of working in museums and related agencies. Drawing on all subdisciplines of anthropology, special emphasis is placed on connecting material culture and ideation in a variety of institutional and field settings. Museum studies students apply museum philosophy, principles, practices, and current critiques to explore the many dimensions of curatorship, including research, collections management, exhibition work, educational programming, and administration. The department offers an M.A. degree in Anthropology with a concentration in museum studies and a non-degree certificate in museum studies at the graduate (postbaccalaureate) level.

Physical Anthropology. The graduate program in physical anthropology provides training leading to the M.A. and Ph.D. degrees. M.A. students are introduced to current data, methods, and theories in six core areas of physical anthropology: anthropological genetics, dental anthropology, fossil hominids, health and disease, osteology, and primatology. The Ph.D. program focuses on the student's area of interest, which may fall within one of seven areas of concentration in which faculty are actively involved and collaborating, or may bridge and extend these areas. Areas of concentration for which special course lists and groups of faculty have been organized include anthropological genetics, dental anthropology, health and disease, peopling of the Pacific basin and adjoining areas, primate ecology and social behavior, primate functional morphology, paleoanthropology, and skeletal biology.

Social-Cultural Anthropology. The sociocultural program provides education leading to the M.A. and Ph.D. degrees in

GRADUATE PROGRAMS AND COURSES

most topics of sociocultural anthropology. Strong resources for studies in ecology, demography, religion, social organization, and political economy are available. An emphasis in method and theory crosscuts all of these topics. Special areas of strength include the U.S. Southwest, Mesoamerica, and Southeast Asia. Sociocultural faculty also share interests with faculty in physical anthropology and archaeology, especially in the study of disease, sociobiology, and native societies of the New World. M.A. and Ph.D. concentrations in anthropological linguistics are also available.

RESEARCH ACTIVITY

For current information about research activity, access the Department of Anthropology Web site at www.asu.edu/clas/anthropology.

ANTHROPOLOGY (SOCIAL AND BEHAVIORAL) (ASB)

ASB 400 Cultural Factors in International Business. (3)

spring

Anthropological perspectives on international business relations; applied principles of cross-cultural communication and management; regional approaches to culture and business.

ASB 411 Kinship and Social Organization. (3)

selected semesters

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 in anthropology or instructor approval.

ASB 412 History of Anthropology. (3)

fall

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.

ASB 416 Economic Anthropology. (3)

fall

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.

ASB 417 Political Anthropology. (3)

selected semesters

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)

fall

Role of culture in health, illness, and curing; health status, provider relations, and indigenous healing practices in United States ethnic groups. Lecture, discussion.

ASB 466 Peoples and Cultures of Africa. (3)

fall and spring

Survey of African peoples and their cultures, external contact, and changes. Meets non-Western requirement. Lecture, discussion. Cross-listed as AFS 466. Credit is allowed for only AFS 466 or ASB 466.

ASB 471 Introduction to Museums. (3)

fall

History, philosophy, and current status of museums. Explores collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: both ASB 102 and ASM 104 or only instructor approval.

ASB 480 Introduction to Linguistics. (3)

fall

Descriptive and historical linguistics. Survey of theories of human language, emphasizing synchronic linguistics.

ASB 481 Language and Culture. (3)

spring

Applies linguistic theories and findings to nonlinguistic aspects of culture; language change; psycholinguistics. Prerequisite: ASB 102 or instructor approval.

ASB 483 Sociolinguistics and the Ethnography of Communication. (3)

selected semesters

Relationships between linguistic and social categories; functional analysis of language use, maintenance, and diversity; interaction between verbal and nonverbal communication. Prerequisites: both ASB 480 and ENG 213 (or FLA 400) or only instructor approval.

ASB 485 U.S.-Mexico Border in Comparative Perspective. (3)

spring in odd years

Explores the multicultural and social dimensions of communities along the U.S.-Mexico border, emphasizing social organization, migration, culture, and frontier ideology. Prerequisite: 6 hours in anthropology or instructor approval.

ASB 501 Applied Medical Anthropology. (3)

fall

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)

spring

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)

fall

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)

fall

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 506 Gender, Emotions, and Culture. (3)

spring

Relationships among gender and emotion across cultures. Lecture, seminar. Prerequisite: graduate standing or instructor approval.

ASB 529 Culture and Political Economy. (3)

selected semesters

Origin and spread of Western capitalism and its impact on non-Western societies. Utilizes ethnographic and historical case studies. Prerequisite: graduate standing.

ASB 530 Ecological Anthropology. (3)

once a year

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)

spring

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 its equivalent); instructor approval.

ASB 536 Ethnohistory of Mesoamerica. (3)

selected semesters

Indigenous societies of southern Mexico and Guatemala at Spanish contact and their postconquest transformation. Emphasizes the Aztec Empire. Prerequisite: graduate standing.

ASB 537 Topics in Mesoamerican Archaeology. (3)

selected semesters

Explores changing organization of pre-Columbian civilizations in Mesoamerica through interpretive issues, such as regional analysis, chiefdoms, urbanism, and exchange. Prerequisite: instructor approval.

ASB 540 Method and Theory of Sociocultural Anthropology and Archaeology. (3)

fall

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)

spring

Continuation of ASB 540. Prerequisite: ASB 540 or instructor approval.

ASB 542 Method and Theory of Archaeology I. (3)

spring

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 II. (3)

fall

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)

selected semesters

Spatial arrangement of residences, activity sites, and communities over landscape. Emphasizes natural and cultural factors influencing settlement patterns. Prerequisite: instructor approval.

ASB 546 Pleistocene Prehistory. (3)

fall

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 its equivalent).

ASB 547 Issues in Old World Domestication Economies. (3)

spring

Archaeological evidence for transitions in Old World subsistence economies from hunting and gathering to dependence on domesticated plants and animals. Prerequisite: ASB 362 (or its equivalent).

ASB 550 Economic Archaeology. (3)

selected semesters

Prehistoric economies in hunter-gatherer, tribal, and complex societies. Covers subsistence strategies, craft production and specialization, and exchange. Prerequisite: instructor approval.

ASB 551 Prehistoric Diet. (3)

selected semesters

Critical review of techniques for recovering dietary information and theoretical models concerned with explaining diet and nutrition. Prerequisite: instructor approval.

ASB 555 Complex Societies. (3)

spring

Examines structural variations in hierarchically organized societies, along with origins, dynamics, and collapse. Seminar.

ASB 559 Archaeology and the Ideational Realm. (3)

selected semesters

"Postprocessual" and other views concerning relevance of mental phenomena for understanding sociocultural change. Various approaches to inferring prehistoric meanings.

ASB 563 Hunter-Gatherer Adaptations. (3)

selected semesters

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)

spring

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)

fall

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)

fall

History, philosophy, and current status of museums. Explores collecting, preservation, exhibition, education, and research activities in different types of museums. Prerequisites: both ASB 102 and ASM 104 or only instructor approval.

ASB 572 Museum Collection Management. (3)

spring

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)

spring

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)

spring

Exhibition philosophies and development; processes of planning, designing, staging, installing, evaluating, and disassembling temporary and long-term exhibits. Prerequisites: both ASB 571 and 572 or only instructor approval.

ASB 575 Computers and Museums. (3)

fall

Basics of museum computer application; hardware and software; fundamentals of database management; issues of research, collections management, and administration.

ASB 576 Museum Interpretation. (3)

fall

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)

spring

Preservation of museum objects: nature of materials, environmental controls, and causes of degradation; recognizing problems, damage, and solutions; proper care of objects. Prerequisites: both ASB 571 and 572 or only instructor approval.

ASB 579 Critical Issues in Museum Studies. (3)

fall

Current debates of museum practice from an anthropological perspective. Addresses issues of collection, presentation, authenticity, and authority. Seminar. Prerequisite: ASB 571 or instructor approval.

ASB 591 Seminar. (1–12)

selected semesters

Selected topics in archaeology, linguistics, and social-cultural anthropology. Topics may include the following:

- Archaeological Ceramics. (3)
- Archaeology of North America. (3)
- Cultural Anthropology. (3)
- Culture and Personality. (3)
- Evolution and Culture. (3)
- Historical Archaeology. (3)
- Interdepartmental Seminar. (3)
- Language and Culture. (3)
- Linguistics. (3)
- Museum Studies. (3)
- Problems in Southwestern Archaeology. (3)
- Problems in Southwestern Ethnology. (3)
- Social Anthropology. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

**ANTHROPOLOGY (SCIENCE AND MATHEMATICS)
(ASM)**

ASM 435 Archaeological Pollen Analysis. (3)

selected semesters

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.

GRADUATE PROGRAMS AND COURSES

ASM 448 Geoarchaeology. (3)

fall and spring

Geologic context relevant to archaeological research. Topics include sediments, deposition environments, soils, anthropogenic and biogenic deposits, and quaternary chronology. Lecture, discussion, field experiences. Prerequisites: ASB 222 (or 223) or GLG 101 (or 103) or GPH 111; instructor approval.

ASM 450 Bioarchaeology. (3)

spring

Surveys archaeological and physical anthropological methods and theories for evaluating skeletal and burial remains to reconstruct bio-cultural adaptation and lifeways. Prerequisite: ASM 104 or instructor approval.

ASM 452 Dental Anthropology. (4)

fall

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.

ASM 454 Comparative Primate Anatomy. (4)

spring

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)

selected semesters

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.

ASM 456 Infectious Disease and Human Evolution. (3)

once a year

Study of infectious disease and humanity, using evidence from anthropology, history, medicine, and ancient skeletons. Prerequisite: ASM 345.

ASM 465 Quantification and Analysis for Anthropologists. (3)

spring

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)

selected semesters

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 548 Geoarchaeology. (3)

fall

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)

selected semesters

Laboratory and field techniques in dealing with the human skeleton. Emphasizes 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)

spring

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)

fall

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)

selected semesters

Analysis and interpretation of chipped stone artifacts. Focuses on both techniques and underlying concepts and their application to real collections. Prerequisite: instructor approval.

ASM 591 Seminar. (1–12)

selected semesters

Selected topics in archaeology and physical anthropology. Topics may include the following:

- Bioarchaeology. (3)
- Evolution and Culture. (3)
- Interdepartmental Seminar. (3)
- Physical Anthropology. (3)
- Primates and Behavior. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Architecture

Master's Program

www.asu.edu/caed/architecture

480/965-3536

AED 162

Ron McCoy, Director

Regents' Professor: Cook

Professors: Hoffman, McCoy, Meunier, Ozel, Rotondi, Underhill, Underwood

Associate Professors: Bryan, Ellin, Hartman, Krolloff, Kupper, Loope, Spellman, Van Duzer, Zygas

Assistant Professors: Caicco, Hejduk, Innes, Kobayashi, Lerum, Murff, Petrucci

The faculty in the School of Architecture offer a professional program leading to the Master of Architecture degree and a research-based postprofessional graduate program leading to the M.S. degree in Building Design. See "[Master of Science in Building Design](#)," page 111, for information on this degree program.

The faculty in the school also participate in offering a Ph.D. in Environmental Design and Planning. See "[Environmental Design and Planning](#)," page 202, for information on this degree program.

MASTER OF ARCHITECTURE

The Master of Architecture is the accredited professional degree program at ASU. There are two typical programs of study available: (1) a two-year program for applicants who have completed the four-year Bachelor of Science in Design (with a major in Architectural Studies) at ASU or an equivalent degree from another school that offers an accredited professional degree in architecture, and (2) a three-plus-year program for applicants with an undergraduate degree in a discipline or field other than architecture. Both programs

promote broad areas of knowledge, professional skill, and a social awareness that the architect must command if architecture is to enhance contemporary life and remain an enduring and valid expression of society.

The program represents an attempt to develop the knowledge and skills necessary for graduates to achieve future leadership roles in the professional practice of architecture and related environmental design fields.

It is the intention of the faculty that the programs also

1. ensure a basic level of educational experience sufficient to enter the practice of architecture after successfully completing state licensing requirements and examination,
2. encourage the student to develop proficiencies in specific areas compatible with individual interests and university instructional capabilities,
3. provide a breadth of understanding that will encourage and motivate the student to continue learning throughout a professional career, and
4. develop opportunities that combine instruction and research directed toward adding value to the built environment.

Elective foci currently offered in the program include energy-conscious design, computer applications, urban design, architectural history and theory, and architectural administration and management.

In the first year of the two-year program, graduate design studio projects focus on advanced comprehensive problems that require integration of the full range of knowledge and skills from students' undergraduate education. In the second year, students select design studios and undertake final design projects that complement their areas of interest. Courses in technology, history and theory, and architectural management are structured alongside the studio sequence.

The three-plus-year program begins with an intensive 10-week summer session introducing architecture and design fundamentals and continues with a preparatory year of architectural history, technology, and design. The final two years are similar to the two-year program described above. Students without work experience in architecture must also complete a summer internship between the first and second years.

Application Requirements. An applicant to the M.Arch. program must hold a baccalaureate or graduate degree from a college or university recognized by ASU and must meet the minimum GPA requirements as established by the Graduate College.

In addition, all applicants are required to submit for review a design portfolio, GRE scores, a statement of intent, and letters of reference. Applicants are accepted on a space-available basis only. Students may be admitted to the two-year program *with deficiencies* if their previous course work is not equivalent to the ASU undergraduate requirements and standards.

Students intending to apply for admission to the professional program in architecture at the *graduate level* should apply to the program well in advance of the application deadline.

International applicants whose native language is not English must submit the official GRE scores as well as the TOEFL (with a minimum score of 610, or 253 for the computer-based exam). International students should apply to the program at least one year before the date they plan to begin study.

Application Procedures. Applicants must submit separate application materials to the Graduate College and the School of Architecture.

School of Architecture. In addition to the Graduate College admission requirements, applicants must file all of the following admission materials with

MASTER OF ARCHITECTURE ADMISSIONS
COMMITTEE
SCHOOL OF ARCHITECTURE
ARIZONA STATE UNIVERSITY
PO BOX 871605
TEMPE AZ 85287-1605

1. *Statement of Intent.* A personal narrative (maximum 600 words or two pages typed) indicating the applicant's interest, previous academic and practical background, and personal and professional educational objectives must be submitted.
2. *Letters of Recommendation.* A minimum of three letters of recommendation in support of the applicant must be mailed directly to the Graduate Admissions Committee, School of Architecture. The references should be from professionals or educators familiar with the applicant's experience and capability for graduate work.
3. *Portfolio.* Candidates applying for the two-year Master of Architecture program are required to submit a portfolio. The portfolio must be no larger than 8.5" x 11" (image size). The admissions committee is interested in the quality of work submitted in the portfolio, and applicants are advised not to lavish expense on special or unusual packaging. Slides, original drawings, and loose (unbound) materials should not be submitted. The portfolio should include at least five projects with a range of complexity and with concise, explanatory statements for each project. Include the dates of execution; course, professor, or firm; objective or program summary; and most importantly, a brief self-analysis of the results. When any work is not completely original, the relevant sources must be given. When work is of a team nature, the applicant's role and contribution to the project should be clearly indicated. Applicants who have professional experience and wish to submit examples of professional work may do so. Of particular interest are projects in which the applicant has played a principal role in design. The portfolio is returned after final admission procedures, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage or if the applicant appears in person to claim the materials within one year of submission. Unclaimed portfolios are retained for one year only. The School of

GRADUATE PROGRAMS AND COURSES

Architecture assumes no liability for materials lost or damaged during shipment or handling.

4. *Creative Work.* Candidates applying for the three-plus-year Master of Architecture program must also provide a portfolio of work as described in paragraph three above. It is recognized that candidates to this program may not have work related to architecture. Therefore, the portfolio should include other forms of creative work such as drawings, designs, paintings, photography, writing, craft, and construction. The work presented may be from vocational, avocational, or academic sources.

Because of space limitations, not all qualified applicants can be accommodated and the admission process is necessarily selective.

Students should indicate for which program of study they are applying. Those with a four-year degree equivalent to the B.S.D. in Architectural Studies should apply for the two-year program. Those with an undergraduate degree that is not part of an accredited program in architecture should apply for the three-plus-year program. Students who are uncertain about which program suits them should contact the senior academic advisor for determination of appropriate application. Applicants are required to write their names in a clear and consistent manner on all materials submitted, preferably in the “family name, first name” format (e.g. Smith, John).

Students with a previous professional degree in architecture (five or six years) who wish to pursue advanced study in climate responsive architecture, building energy performance, computer-aided design, energy simulation and analysis, and facilities development and management should apply to the Master of Science in Building Design program. See [“Master of Science in Building Design,” page 111](#).

Application Deadline. Priority consideration is given to completed applications received on or before January 15. Students are not admitted to the two-year Master of Architecture program at any time other than the beginning of the fall semester. Students are not admitted to the three-plus-year Master of Architecture program at any time other than the beginning of the first summer session.

Personal Interview. A personal interview is not required. However, a candidate wishing to visit the school is welcome and should make arrangements by contacting the graduate coordinator in the School of Architecture.

Requirements for the Two-Year Program. The two-year graduate program requires a minimum of 56 semester hours of approved courses and electives and a comprehensive examination. For most students, this program involves an average of 14 semester hours per semester. An internship may be offered as an elective to be taken in the summer before the final year of study. The internship is an honors program individually arranged and approved by the Master of Architecture Committee.

Students who can adequately demonstrate competence through experience or previous academic course work for any of the specific requirements outlined below are encour-

aged to petition the graduate coordinator for a course substitution.

Typical Program of Study

First Year

Fall	
ADE 521	Advanced Architectural Studio I.....5
APH 505	Foundation Theory Seminar.....3
ATE 553	Building Systems III.....3
ATE 563	Building Structures III.....3
Total14

Spring

ADE 522	Advanced Architectural Studio II.....5
APH 515	Current Issues and Topics.....3
ATE 556	Building Development.....3
Professional elective*3
Total14

Second Year

Fall

AAD 551	Architectural Management I.....3
ADE 621	Advanced Architectural Studio III.....5
ANP 681	Project Development.....3
Professional elective*3
Total14

Spring

AAD 552	Architectural Management II.....3
ADE 622	Advanced Architectural Studio IV.....5
Approved elective3
Professional elective*3
Total14

Master of Architecture total56

* At least one professional elective must be a CAD course or be taken in the area of computers, if the student can demonstrate CAD skills.

Requirements for the Three-Plus-Year Program. The three-plus-year graduate program requires a minimum of 99 semester hours of approved courses and electives and a comprehensive examination. For most students, this program involves 12 semester hours in the first summer and 14–15 semester hours in each of the subsequent six semesters. A summer internship is required after the first full year of study. A second internship may be offered as an elective to be taken in the summer before the final year of study. The second internship is an honors program individually arranged and approved by the Master of Architecture Committee.

Students who can adequately demonstrate competence through experience or previous academic course work for any of the specific requirements outlined below are encouraged to petition the graduate coordinator for a course substitution.

Typical Program of Study

First Year

Summer	
ADE 510	Foundation Architectural Studio.....6
APH 200	Introduction to Architecture.....3

APH 509 Foundation Seminar	3
Total	12
Fall	
ADE 511 Core Architectural Studio I	6
APH 313 History of Architecture I	3
ATE 353 Architectural Construction	3
ATE 451 Building Systems I	3
Total	15
Spring	
ADE 512 Core Architectural Studio II	6
APH 314 History of Western Architecture II	3
ATE 361 Building Structures I	3
ATE 452 Building Systems II	3
Total	15
Summer	
ARP 584 Clinical Internship	1
Total	1
Second Year	
Fall	
ADE 521 Advanced Architectural Studio I	5
APH 505 Foundation Theory Seminar	3
ATE 462 Building Structures II	3
ATE 553 Building Systems III	3
Total	14
Spring	
ADE 522 Advanced Architectural Studio II	5
APH 515 Current Issues and Topics	3
ATE 556 Building Development	3
Professional elective*	3
Total	14
Third Year	
Fall	
AAD 551 Architectural Management I	3
ADE 621 Advanced Architectural Studio III	5
ANP 681 Project Development	3
ATE 563 Building Structures III	3
Total	14
Spring	
AAD 552 Architectural Management II	3
ADE 622 Advanced Architectural Studio IV	5
Approved elective	3
Professional elective*	3
Total	14
Total hours in program	99

* At least one professional elective must be a CAD course or be taken in the area of computers, if the student can demonstrate CAD skills.

Comprehensive Examinations. The faculty require that all students pass an oral comprehensive examination based, in part, on a defense of their final design project in ADE 622. Each student is required to undertake an independent design project in ADE 622, based on an approved proposal completed the previous semester in ANP 681. Examiners typically include members of the Architecture faculty and may include distinguished practitioners not on the faculty.

M.Arch./M.B.A. Concurrent Degree Program. A Master of Architecture/Master of Business Administration concurrent degree program is offered through cooperative arrangement between the faculty of the College of Business and the College of Architecture and Environmental Design. Students may obtain both degrees in approximately three years of study by concurrently meeting the requirements for each degree program. Separate applications are required by the respective units.

This program requires a minimum of 88 semester hours for those in the two-year M.Arch. program. Once admitted, in consultation with their respective advisors, students develop programs of study that meet degree requirements of both programs and their particular interests. Students interested in this offering should request further information from the School of Architecture graduate advisor.

MASTER OF SCIENCE IN BUILDING DESIGN

The faculty in the School of Architecture offer a graduate program leading to the M.S. degree in Building Design. Concentrations are available in design knowledge and computing, energy performance and climate-responsive architecture, and facilities development and management. The program provides advanced study at the postprofessional level for architects, and at the specialist level for nonarchitects who have a degree in a related area such as engineering, business, computer science, and the physical and environmental sciences. The purpose of the program is the development of knowledge useful to the arts and sciences of building design and the integration of that knowledge in the design process. Within this context, the program emphasizes (1) the ecological importance of energy-conscious design and construction, as well as the high social value placed on buildings in which natural forces and systems are utilized rather than suppressed, and (2) the development of research, information systems, and management processes suited to the planning and design of complex buildings in urban settings.

It is preferred that applicants have at least one year of professional employment or comparable field/research experience in building design in addition to their academic experiences. Applicants are accepted on a space-availability basis, and must specify an area of research concentration upon application. International applicants whose native language is not English must submit the official GRE scores as well as the TOEFL (with a minimum score of 610 or above, or 253 for the computer-based exam). International students should apply to the program at least one year prior to the date they plan to begin study.

The faculty in the school also participate in offering the Ph.D. in Environmental Design and Planning. See "[Environmental Design and Planning](#)," page 202, for information on the Ph.D. degree program.

Application Procedures. Applicants must submit separate application materials to the Graduate College and the School of Architecture.

Application Deadline. Priority consideration is given to completed applications received on or before February 15. Applications for admission received after February 15 are

GRADUATE PROGRAMS AND COURSES

considered only for remaining vacancies and “alternate” placement.

School of Architecture. In addition to the Graduate College admission requirements, applicants must file all of the following admission materials with

MASTER OF SCIENCE IN BUILDING DESIGN
ADMISSIONS COMMITTEE
SCHOOL OF ARCHITECTURE
ARIZONA STATE UNIVERSITY
PO BOX 871605
TEMPE AZ 85287-1605

Statement of Intent. A personal narrative (maximum 600 words or two pages typed) indicating the applicant’s interest, previous academic and practical background, and personal and professional educational objectives must be submitted.

Letters of Recommendation. A minimum of three letters of recommendation in support of the applicant must be mailed directly to the Master of Science in Building Design Graduate Admissions Committee, School of Architecture. The references should be from professionals or educators familiar with the applicant’s experience and capability for graduate work.

Portfolio. Applicants must submit a portfolio documenting projects, papers, creative endeavors, and, if appropriate, work experience (maximum size 9" x 12").

The portfolio is returned after final admission procedures, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage, or if the applicant appears in person to claim the materials within one year of submission. Unclaimed portfolios are retained for only one year. The School of Architecture assumes no liability for lost or damaged materials. Applicants are required to write their names in a clear and consistent manner on all materials submitted, preferably in the “family name, first name” format (e.g., Smith, John).

Research/Teaching Statement. Students wishing to be considered for teaching or research assistantships must submit the *application for graduate assistant* form with their application materials. International students who wish to be considered for a teaching assistantship and whose native language is not English are required to pass the Test of Spoken English administered by the American English and Culture Program at ASU.

Program of Study. The program requires a minimum of 30 semester hours of approved course work at the advanced level, including six hours of thesis credit.

The M.S. degree in Building Design is based on concepts of research and decision making emphasized by the College of Architecture and Environmental Design.

Students admitted to the program are required to take a research methods core, certain courses in their area of concentration, additional elective course work as approved and directed by the supervisory committee, and write and defend a thesis. While the minimum requirement is 30 semester hours, most students require at least four semesters of course work and work on their thesis to successfully complete this degree program.

The concentrations include the following: design knowledge and computing, energy performance and climate-responsive architecture, and facilities development and management.

The *design knowledge and computing* concentration addresses computer-aided design methods and techniques and their application to problem-solving issues in the built environment. The goal of the program is to provide a fundamental understanding of computational issues and methods in architectural design and to explore critically the application and potential of these techniques in practice. Topics studied include computer graphics and geometric modeling, simulation and analysis, Web development and programming, knowledge-based and object-oriented systems, databases, and comprehensive computer-aided design and information management systems.

Design Knowledge and Computing Concentration

Research/thesis.....	12
Area of concentration requirements.....	12
Approved electives.....	6
Minimum total	30

In climate-responsive architecture, a student applies the principles of “bioclimatic” building design in a studio setting to maximize the use of renewable energy resources in particular locations and building programs. In analysis of building energy performance, a student applies physical and economic analysis, computer simulation, and/or measurement as tools in determining component or whole-building performance relative to energy, climate, and cost-efficiency.

The energy and climate concentration educates students to become experts in energy-efficient design and technology. The program is concerned with the relationships between climate and site, thermal and visual comfort, and energy demand and consumption.

Energy Performance and Climate-Responsive Architecture Concentration

Research/thesis.....	6
Area of concentration requirements.....	24
Minimum total	30

The facilities development and management concentration is concerned with decision-making processes in building (real estate) development and firm management. The goal of the program is the advancement of knowledge in managerial theory, knowledge structures, risk/benefit analysis, marketplace dynamics, and their relationship to building development, and firm management. This concentration addresses the following topics: spatial decision models, building development models and processes, financing and the economic return of facilities, market structure, market strategy, pricing, costs, design automation, group decision making, team building, architectural programming, post-occupancy evaluation, value-based design, and financial management models. The program benefits from ties to various professional groups concerned with real estate development and facilities management, as well as interdisciplinary ties to the School of Business and the Del E. Webb School of Construction.

The facilities development and management core course requirements (six semester hours) consist of courses taken in the architectural administration and management sequence of the program with the AAD prefix.

Facilities Development and Management Concentration

Research/thesis.....	12
Area of concentration requirements.....	6
Approved electives.....	12
Minimum total	30

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required. Each candidate devotes research effort of six semester hours of thesis/ research credit in preparation of a thesis. The thesis must conform to school policies and meet Graduate College format requirements.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

Renata Hejduk is an architectural historian/theorist who works on the Continental and American post-World War II avant-garde in architecture and urbanism. Her focus is on the 1960s and 70s. Her upcoming book is coedited with Jim Williamson and is entitled *The Structure of Faith: The Continuity of Religious Imagination in Modern and Contemporary Architecture*.

Professor Dan Hoffman’s research takes the form of design projects focusing on the tectonic implications of sustainable building strategies. Current projects include the development of a housing prototype for the Navajo using small diameter logs and a camp for children and adults of special needs in the Arizona forests.

David Scheatzle’s recent research activity includes a demonstration of residential comfort control using radiant cool ceiling panels. His research paper was published in the transactions of the American Society of Heating, Refrigerating and Air Conditioning Engineers, February, 2000: “Monitoring and evaluating a year round radiant/convective system.”

Leslie Van Duzer (in collaboration with Kent Kleinman) is completing a building monograph entitled “Notes on Almost Nothing: Mies van der Rohe’s Haus Lange and Haus Esters.”

Paul Zygas’ current research interest is focused on the Baroque architecture in the Grand Duchy of Lithuania from 1600 to 1750.

ARCHITECTURE COURSES

Courses offered by the faculty of the School of Architecture are categorized in the instructional areas described below.

Architectural Administration and Management (AAD). AAD courses investigate the organization and managerial aspects of contemporary architectural practice. These studies examine the overall processes relative to management coordination, administration procedures, ethics, legal con-

straints, and the financial controls and measures of contemporary architectural practice.

Architectural Design and Technology Studios (ADE). ADE encourages synthesis of the knowledge and understanding the student has gained from previous and parallel course work, and from other sources, toward the comprehensive design of architectural projects. The laboratories integrate the needs, limitations, and determinants of design problems while applying analytical methods and technical skills in seeking and comparing alternative solutions for assigned problems.

Environmental Analysis and Programming (ANP). ANP develops capabilities to analyze and program environmental and human factors as preconditions for architectural design. These studies are concerned with the existing and emerging methods used by the profession to evaluate and analyze. A variety of courses on computer utilization is included in this area.

Architectural Philosophy and History (APH). APH develops an understanding of architecture as both a determinant and a consequence of humankind’s culture, technology, needs, and behavior in the past and present. These studies are concerned with the rationale for the methods and results of design and construction.

Architecture Professional Studies (ARP). ARP provides students with residency and off-campus opportunities and educational experience in group and individual studies relative to specific student interests and faculty expertise.

The program also offers several opportunities to study abroad. In addition, various required and optional field trips are undertaken in course work. (Supplemental fees are assessed for these offerings.)

Architectural Technology (ATE). ATE develops knowledge of the technical determinants, resources, and processes of architecture. These studies are concerned primarily with the science and technology of design and construction, including materials, structural systems, construction systems, environmental control systems, active and passive solar systems, and acoustics and lighting.

ARCHITECTURAL ADMINISTRATION AND MANAGEMENT (AAD)

AAD 494 Special Topics. (1–4)
selected semesters

AAD 551 Architectural Management I. (3)
fall

Design delivery, coordination of construction documents, cost estimating, bidding and negotiations, construction observation, and post construction services. Lecture, discussion, case studies. Prerequisite: graduate-level standing. Corequisites: ADE 621; ANP 681.

AAD 552 Architectural Management II. (3)
spring

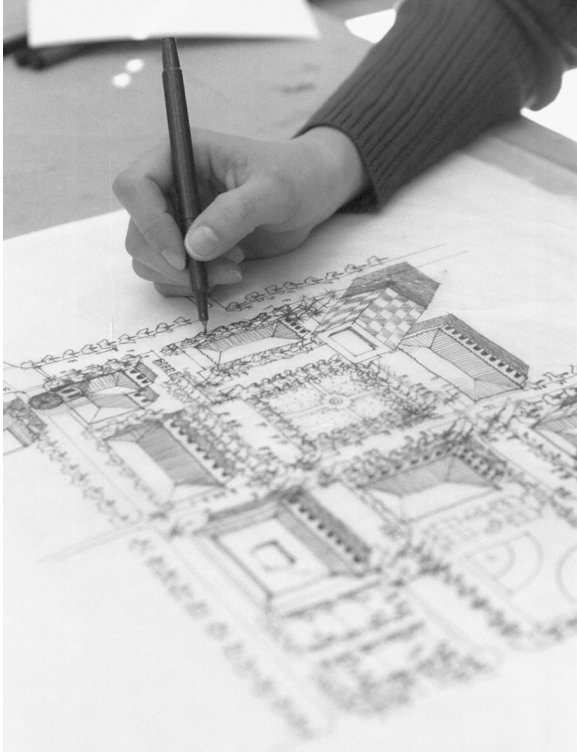
Organizational, human performance, and market influences on architecture firms and projects. Readings, case studies, and analysis of managerial problems and solutions. Lecture, discussion. Prerequisite with a grade of “C” or higher: AAD 551. Corequisite: ADE 622.

AAD 555 Architect as Developer. (3)
once a year

Development building, real estate, construction funding, land acquisition, and the sources for capital. Prerequisite: instructor approval.

AAD 598 Special Topics. (1–4)
selected semesters

GRADUATE PROGRAMS AND COURSES



Student creates an architectural drawing of a landscape.

Tim Trumble photo

AAD 599 Thesis. (1–12)

fall or spring

Fee.

AAD 681 Professional Seminar: Capstone. (3)

selected semesters

Examines ethical, political, social, economic, ecological, and cultural issues confronting the practice of architecture. Seminar, readings, case studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

ARCHITECTURAL DESIGN AND TECHNOLOGY STUDIOS (ADE)

ADE 510 Foundation Architectural Studio. (6)

summer

Fundamentals of architectural design, methodology, visualization, and representation. Lecture, studio, field trips. Fee. Prerequisite: admission to Master of Architecture degree program. Corequisite: APH 509.

ADE 511 Core Architectural Studio I. (6)

fall

Applies design fundamentals in architectural problems, including construction, technology, programmatic and environmental determinants. Lecture, studio, field trips. Fee. Prerequisite with a grade of “C” or higher: ADE 510. Corequisite: ATE 353.

ADE 512 Core Architectural Studio II. (6)

spring

Applies architectural design fundamentals to increasingly complex problems, including specific sites and activities. Lecture, studio, field trips. Fee. Prerequisite with a grade of “C” or higher: ADE 511.

ADE 521 Advanced Architectural Studio I. (5)

fall

Design problems emphasizing theory, aesthetics, and tectonics as influences on architectural form. Lecture, studio, field trips. Fee. Pre-

requisite: admission to Master of Architecture degree program. Corequisite: APH 505.

ADE 522 Advanced Architectural Studio II. (5)

spring

Design problems emphasizing the comprehensive integration of building systems and technologies as influences on architectural form. Lecture, studio, field trips. Fee. Prerequisite with a grade of “C” or higher: ADE 521. Corequisites: APH 515; ATE 556.

ADE 621 Advanced Architectural Studio III. (5)

fall

Design problems emphasizing the urban context, planning issues, and urban design theory as influences on architectural form. Lecture, studio, field trips. Fee. Prerequisite with a grade of “C” or higher: ADE 522. Corequisites: AAD 551; ANP 681.

ADE 622 Advanced Architectural Studio IV. (5)

spring

Individual, student-initiated project reflecting a culminating synthesis of architectural ideas. Studio. Fee. Prerequisites with a grade of “C” or higher: ADE 621; ANP 681. Corequisite: AAD 552.

ADE 631 Building Systems Simulation Studio. (5)

fall

Design of energy-efficient medium and large commercial complexes; synthesis to optimize performance using new and advanced algorithms. Lecture, lab, studio. Prerequisite: admission to graduate program.

ADE 661 Bioclimatic Design Studio. (6)

once a year

Sustainable architectural and site synthesis at a variety of scales emphasizing bioclimatic criteria and the use of passive and low-energy systems. Prerequisite: admission to graduate program.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

ENVIRONMENTAL ANALYSIS AND PROGRAMMING (ANP)

ANP 494 Special Topics. (1–4)

fall, spring, summer

ANP 500 Research Methods. (1–12)

fall

Fee. Prerequisite: admission to graduate program. Corequisite: ANP 561.

ANP 530 Computer Graphics in Architecture. (3)

spring

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: instructor approval. Corequisite: ANP 563.

ANP 561 Architectural Information Processing Systems. (3)

fall

Applies information processing systems to architectural problems. Analyzes computing tools with respect to assumptions and theories. Lecture, lab. Prerequisite: admission to graduate program. Corequisite: ANP 500.

ANP 563 Methods in Architectural Design Computation. (3)

spring

Concepts and models for research in computer-aided architectural design with an emphasis on computational methods and a system framework. Discussion, lab. Prerequisite: ANP 500 or instructor approval. Corequisite: ANP 530.

ANP 590 RC: Computer Programming and Architecture. (1–12)

fall

ANP 598 Special Topics. (1–4)

fall or spring

ANP 599 Thesis. (1–12)

fall or spring

Fee.

ANP 681 Project Development. (3)

fall

Defines and elaborates on major ideas for implementation in ADE 622 in relation to contemporary theory and practice. Seminar. Prerequisite

with a grade of "C" or higher: ADE 522. Corequisites: AAD 551; ADE 621.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ARCHITECTURAL PHILOSOPHY AND HISTORY (APH)

APH 494 Special Topics. (1–4)

once a year

APH 505 Foundation Theory Seminar. (3)

fall

Foundation of conceptual architectural inquiry, stressing the reciprocal and interdependent relationship between design and theory. Lecture, seminar. Corequisite: ADE 521.

APH 509 Foundation Seminar. (3)

summer

Historical, technical, theoretical, environmental, and professional issues in architecture. Lecture, seminar, field trips. Corequisite: ADE 510.

APH 511 Energy Environment Theory. (3)

fall

Solar and other energy sources in designed and natural environments; architectural, urban, and regional implications of strategies using other renewable resources.

APH 515 Current Issues and Topics. (3)

spring

Critical examination of current architectural issues, topics, and discourse. Prerequisite with a grade of "C" or higher: APH 505. Corequisites: ADE 522; ATE 556.

APH 581 Contemporary Urban Design. (3)

spring

Explores contemporary city and urban design issues related to contemporary cities. Seminar, lecture, discussion.

APH 598 Special Topics. (1–4)

fall or spring

APH 681 Architectural Theory. (3)

selected semesters

Examines architectural theory. Emphasizes application of theory to practice. Seminar. Prerequisite: instructor approval.

APH 683 Critical Regionalism. (3)

spring

Critical inquiry in cultural grounding; the definition of place in architectural theory and practice. Lecture, field studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ARCHITECTURE PROFESSIONAL STUDIES (ARP)

ARP 584 Clinical Internship. (1)

fall

Structured practical experience following a contract or plan, supervised by faculty and practitioners. Prerequisite: admission to graduate program.

ARP 684 Professional Internship. (2–6)

fall

Field experience in an architectural firm specializing in an area directly related to the student's advanced study. Integrates theory and state-of-the-art practices. Credit/no credit. Prerequisite: admission to graduate program.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ARCHITECTURAL TECHNOLOGY (ATE)

ATE 494 Special Topics. (1–4)

selected semesters

ATE 521 Building Environmental Science. (3)

fall

Scientific principles relating to comfort and environmental control. Heat and moisture transfer. Solar/natural energies for heating, cooling, and lighting. Lecture, lab. Prerequisite: admission to graduate program. Corequisite: ATE 562.

ATE 530 Daylighting Design. (3)

selected semesters

Daylight analysis, availability, design sky measurements, modeling and simulation. Integration with passive heating, cooling, building design, and energy considerations. Lecture, lab.

ATE 550 Passive Cooling and Heating. (3)

fall

Theory, analysis, and application of passive and low-energy systems in order to maximize comfort and minimize energy consumption in buildings. Lecture, lab. Prerequisite: instructor approval.

ATE 553 Building Systems III. (3)

fall

Design and integration of building systems, including mechanical, electrical, plumbing, security, communications, fire protection, and transportation. Prerequisite: admission to Master of Architecture program.

ATE 554 Building Energy Efficiency. (3)

selected semesters

Impact of building design on energy performance. Climate responsiveness, operations dynamics, and subsystems integration in thermal comfort and efficiency. Prerequisite: instructor approval.

ATE 556 Building Development. (3)

spring

Comprehensive design development through the understanding and integration of building materials and systems. Lecture, seminar. Prerequisite: admission to graduate program. Corequisites: ADE 522; APH 515.

ATE 557 Construction Documents. (3)

selected semesters

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 or graduate program.

ATE 560 Building Energy Analysis. (3)

spring

Computer simulation of building thermal behavior. Software review. Detailed study of selected simulation models using case study projects. Lab. Prerequisite: ANP 475. Corequisite: ATE 582.

ATE 562 Experimental Evaluation. (3)

selected semesters

Instrumentation, measurement and computational techniques for analysis of building components, and assessment of thermal and luminous performance. Fee. Corequisite: ATE 521.

ATE 563 Building Structures III. (3)

fall

Analysis, design, and detailing of steel buildings and frames. Lateral analysis of small rigid and braced frame systems. Lecture, lab. Prerequisites: ATE 462 (or its equivalent); admission to graduate program.

ATE 564 Advanced Structures: Concrete. (3)

selected semesters

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)

selected semesters

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)

spring

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.

ATE 599 Thesis. (1–12)

fall or spring

Fee.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

GRADUATE PROGRAMS AND COURSES

ARCHITECTURAL COMMUNICATION (AVC)

AVC 494 Special Topics. (1–4)
once a year

AVC 598 Special Topics. (1–4)
fall or spring

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 48.

Art

Master’s and Doctoral Programs

herbergercollege.asu.edu/art

480/965-3468

ART 102

Jon Sharer, Interim Director

Regents’ Professors: Klett, Weiser

Professors: Alquist, Bates, Britton, Cocke, Codell, Eckert, Erickson, Fahlman, Gasowski, Gillingwater, Hajicek, Kaida, Magenta, Marc, Maxwell, Meissingner, Otis, Pile, Pimentel, Risseeuw, Schmidt, Sharer, Stokrocki, Sweeney, Verstegen, White, Young

Associate Professors: Collins, Duncan, Gully, Jenkins, Pessler, Pittsley, Schleif, Schoebel, Schutte, Segura, Serwint, Umberger, Wolftahl

Assistant Professors: Brown, McIver, Mesch, Newport

The faculty in the School of Art offer a program with a major in Art leading to the M.A. degree with concentrations in art education and art history.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect art as the subject matter field.

The Ph.D. degree in Curriculum and Instruction is offered with a concentration in art education through the College of Education. The Ph.D. degree in History and Theory of Art is offered in collaboration with the University of Arizona.

MASTER OF ARTS

Art Education

Admission. An applicant must have a bachelor’s degree from an accredited college or university with a major of not less than 45 semester hours of art, including 12 hours of art history and six hours of art education. Additional hours may be required by the school.

An applicant must have a GPA of at least 3.00 in undergraduate course work during the junior and senior years. Applicants who do not meet these requirements must submit scores from the Miller Analogies Test or the Graduate Record Examination. Applicants should submit a formal art education research paper for review.

Program of Study. The degree program requires a minimum of 30 semester hours of credit in art education, including 18 hours of core courses, six hours of special topics on research related to integrating the teaching of studio art, art history, and criticism or aesthetics, and six hours of research and thesis.

To meet the core requirements, students must take the following core courses:

ARE 510 Art Education Colloquium.....	3
ARE 520 Issues in Teaching Inquiry in Art.....	3
ARE 525 Research on Teaching Art History	3
ARE 530 Issues in Teaching Studio Art.....	3
ARE 535 Research on Teaching Studio Art.....	3
ARE 540 Teaching Art in Cultural Contexts	3

Before the end of the first semester of course work (six or more semester hours), a program of study must be submitted to the Graduate College. Additional program requirements are indicated in the *M.A. in Art Education Guidelines*.

Qualifying Research Paper. A qualifying research paper must be submitted at the end of the semester in which the student completes the first 15 hours of course work. This paper must be judged satisfactory by the art education faculty before the start of the following semester, or the student is put on probation. During the semester following the qualifying research paper review, the student on probation may not enroll in more than nine semester hours of course work (these may not be thesis hours). To continue in the program, the student must submit a satisfactory research paper before the end of that semester.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

Art History

Admission. An applicant must have a bachelor’s degree with an undergraduate major or minor in art history, or at least four upper-division art history courses, in which an average GPA of 3.00 was maintained. Graduate Record Examination (aptitude test) scores must be submitted in support of the application, along with three letters of recommendation. Applicants should submit one formal research paper for review and a one-page statement of intent indicating their objectives for graduate study. The application deadline is January 15.

Program of Study. The degree program requires 33 semester hours of credit including a minimum of 21 hours in art history, with at least 12 of these earned in 500-level seminars. At least one course must be taken in each of the four core areas: non-Western, ancient/medieval, renaissance/baroque, and modern. Satisfactory completion of ARS 501 Methodologies and Art History is required during the first semester of residence. The remaining hours include ARS 599 Thesis, approved electives, and other courses specified by the faculty.

For more information, a student should request a copy of the *M.A. in Art History Guidelines* from the School of Art.

Foreign Language Requirements. Demonstration of a reading knowledge of one foreign language (French, German, or with faculty approval, another language appropriate to the field of study) is required. Depending upon the student's chosen area of study, reading knowledge of an additional language may be required.

Qualifying Research Paper. In order for the student to continue graduate study, a qualifying research paper, submitted in the semester in which 15 hours will be completed, must be judged satisfactory by the faculty.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF FINE ARTS

Art

The Master of Fine Arts degree in Art requires a minimum of 60 semester hours of graduate work beyond the bachelor's degree. The objective of this degree is to provide advanced study in one or more of the following concentrations: ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, or wood.

Admission. A bachelor's degree from a college or university recognized by ASU is required. All students applying for the M.F.A. degree must submit to the chair of the Graduate Studio Committee a portfolio of 20 slides of their work with a return envelope and postage. Three letters of recommendation and a statement of intent pertaining to the student's educational objectives are also required. Because each area of specialization may have unique requirements, students are advised to contact the School of Art for additional information.

Selection Procedures. Faculty review committees appointed by the Graduate Studio Committee make the recommendations for admission. All aspects of the application are evaluated with the purpose of selecting for the available openings those students who have the most reasonable prospect for success in the proposed programs of study. The application deadline is January 15 for the following fall semester. Each student whose application is complete by the deadline date should be advised of admission status within six weeks of the deadline.

Review Sequence

All students are reviewed after completing 15 semester hours of graduate studio work. A progress review may be called at any time during the course of the graduate program. Following the review (after 15 semester hours), the student must form a supervisory committee to direct the program through the completion of the M.F.A. exhibition and final oral examination. For more information, a student should request a copy of the *M.F.A. Guidelines* from the School of Art.

Program of Study. A total of 60 semester hours of graduate credit subject to committee approval is required, including

1. 27–32 graduate studio hours in the major area(s) of concentration;
2. nine hours of graduate-level art history;
3. nine hours of graduate work outside the area of concentration. These hours may be taken in art auxiliary, art education, art history, or outside the school or college. At least three hours are recommended in a studio discipline; and
4. 10–15 hours of ART 680 Practicum, resulting in an M.F.A. Exhibition.

Credit Before Admission. Subject to the recommendation of the review committee, students with a completed M.A. degree in Studio Art may have up to 24 hours (exclusive of thesis or project) applied to the M.F.A. program. In other cases, a maximum of 12 semester hours of transfer credit may be applied to the degree program. However, only nine hours of nondegree graduate credit taken before admission at ASU or another institution may be used to fill degree requirements (see [“Credit Completed Before Admission,” page 93](#)).

Foreign Language Requirements. None.

Final Examination. An oral defense of the M.F.A. exhibition (ART 680) is required.

Time Limit. The total program and all requirements for the degree, including transferred course work, must be completed within seven calendar years.

DOCTOR OF PHILOSOPHY—PH.D.

Faculty in the School of Art offer programs leading to doctoral degrees in art education and art history. Additional information about graduate programs and forms for graduate study are available online at www.asu.edu/graduate or from graduate admissions.

ART EDUCATION

Ph.D. in Curriculum and Instruction

A Ph.D. degree in Curriculum and Instruction with a concentration in art education is available through the College of Education. For more information, see [“Curriculum and Instruction,” page 171](#).

Admissions. In addition to meeting the Graduate College admission requirements, each applicant must provide the following: a letter of intent including career goals and reasons for seeking the interdisciplinary Ph.D. in Curriculum and Instruction; GRE scores; a sample of scholarly written work; and three letters of recommendation. One year of full-time K–12 teaching experience is strongly recommended.

Program of Study. The degree requires 90 to 93 semester hours beyond the bachelor's degree. Course work is divided into four core areas: core requirements, professional focus, cognate study, and dissertation/individual research. A foreign language is not required.

Program Committee. A chair and at least two other members oversee early advising and the preparation of the initial program of study. A five-member committee is required for

GRADUATE PROGRAMS AND COURSES

the administration and evaluation of the comprehensive examination. Three of these members must be from the interdisciplinary committee, two of whom must have expertise in the student's area of concentration.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed with the approval of the dean of the Graduate College. Members of the program committee may continue to serve as members of the dissertation committee or the members of the committee may change. The dissertation committee chair must be a faculty member designated eligible to serve in this capacity by the interdisciplinary committee and the dean of the Graduate College.

HISTORY AND THEORY OF ART

Ph.D. in History and Theory of Art

The Arizona Ph.D. in the History and Theory of Art is a collaborative program between Arizona State University and the University of Arizona, directed by a Ph.D. steering and academic committee with members from both universities. The emphasis is on interdisciplinary methodologies and electronic technologies to prepare students for museum and teaching careers. See "[Doctor of Philosophy](#)," page 96, for general requirements.

Admissions. Applicants must submit an application form, fee, GRE scores, official transcripts, and other materials to the Graduate College Admissions Office. The following materials must be sent to the graduate advisor, art history: a statement of intent regarding graduate study, a scholarly research paper, requests for assistantships and tuition waivers, and three academic letters of recommendation (to be sent directly by referees). The postmark deadline is January 15 for complete admission applications for enrollment in the following fall semester.

Students with a B.A. fulfilling the requirements for acceptance into the M.A. program may seek admission directly into the Ph.D. program. Other applicants may hold an M.A. in Art History or another discipline approved by the Ph.D. steering committee. Students lacking in sufficient background in art history are required to make up these credits before courses may be counted toward the Ph.D.

Program of Study. The Ph.D. requires 54 semester hours beyond the M.A., including six semester hours of Ph.D. core classes, 12 semester hours in the major area of emphasis, six semester hours in the minor area, six semester hours in interdisciplinary courses outside of art history, and a written dissertation (24 semester hours). Students need to complete the requirements for the M.A. in Art with a concentration in art history before advancing to the Ph.D. program.

Foreign Language. A reading knowledge of at least two foreign languages is required. A third language may be necessary, depending on the field of study.

Ph.D. Committee. A three- to five-member comprehensive examination and dissertation committee directs the student's subsequent work. The committee consists of two art history faculty members in the student's major area and one in the

minor area or related discipline. One member must be from the University of Arizona.

Comprehensive Examinations. A written examination is required upon completion of course work. The subsequent oral examination, within six months of passing the written examination, addresses the dissertation proposal.

Admission to Candidacy. A student advances to candidacy upon completion of the written and oral examinations.

ART AUXILIARY (ARA)

ARA 460 Gallery Exhibitions. (3)

fall and spring

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)

fall and spring

Understanding art as an emergent cultural phenomenon with an emphasis on a critical examination of conceptual issues in art. Requires writing. Prerequisites: both ARS 101 and 102 or only instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

ART EDUCATION (ARE)

ARE 440 Disciplines of Art Education. (3)

once a year

Explorations in art education's disciplines, history, and people's art-making development at diverse age levels and abilities. Lecture, discussion. Prerequisites: a combination of ARS 101 and 102 and ART 113 and 115 or only instructor approval.

ARE 450 Teaching Inquiry in Art. (3)

fall and spring

Designing inquiry-based curriculum units built on developmental levels of art making and art understanding. Lecture, discussion. Prerequisites: ARS 101, 102.

ARE 470 Art Criticism: Aesthetics. (3)

fall

Traditions of aesthetics and art criticism; conceptual issues in contemporary art; education in the visual arts. Prerequisite: ARE 440 or instructor approval.

ARE 482 Teaching Art Processes. (3)

spring

Art traditions of the 20th century as a basis for studio and art history instruction. Meets art postbaccalaureate certification requirement. 2 hours lecture, 2 hours studio. Prerequisite: ARE 450.

ARE 486 Art Education: Strategies and Applications. (3)

fall

Implementation and evaluation of art instruction for K–12 population. Includes teaching of Saturday classes in the Children's Art Workshop. Meets art postbaccalaureate certification requirement. Prerequisite: ARE 482.

ARE 496 Methods and Assessment of Learning in Art. (3)

once a year

Individual or group research on the assessment of art learning incorporating theory and practice. Meets art postbaccalaureate certification requirement. Prerequisites: both ARE 470 and 486 or only instructor approval.

ARE 510 Art Education Colloquium. (3)

selected semesters

Historical foundations of art education and faculty presentations regarding teaching and research related to the visual arts.

ARE 520 Issues in Teaching Inquiry in Art. (3)

once a year

Issues in teaching and learning through inquiry about artworks using print and electronic reproductions and information. Recommended to be taken before ARE 525.

ARE 525 Research on Teaching Art History. (3)*once a year*

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)*once a year*

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)*once a year*

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)*once a year*

Relationship of multicultural perspectives to teaching/learning art criticism, aesthetics, studio art, and art history.

ARE 610 Issues and Trends in Art Education. (3)*selected semesters*

Doctoral-level investigation of historical and contemporary issues related to teaching and research in art education.

ARE 611 Curriculum Development in Art Education. (3)*selected semesters*

Doctoral-level inquiry into the philosophical, psychological, and sociological foundations of curriculum development.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

ART HISTORY (ARS)**ARS 400 History of Printmaking. (3)***once a year*

History of the print as an art form and its relation to other modes and forms of artistic expression. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 410 Early Christian and Byzantine Art. (3)*once a year*

Art and architecture of the early church and the Byzantine Empire from the 4th to the 15th century. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 458 Critical Theories in the Visual Arts. (3)*selected semesters*

Examines current critical theories through their application to all visual arts. May include new historicism, Marxism, deconstruction, post-structuralism, semiotics, Lacanian psychoanalysis, feminism, post-modernism. Lecture, discussion, student presentations. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 469 Mexican Art. (3)*once a year*

Art of Mexico and related Central American cultures from the prehistoric to the contemporary schools. Meets non-Western art history requirement. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 473 Art of Japan. (3)*once a year*

Japanese art from the Jomon period to the present. Meets non-Western art history requirement. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 485 Women in the Visual Arts. (3)*spring*

Historical study of art by women in various media; related social, political, educational issues; representation of women in art. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 501 Methodologies and Art History. (3)*fall*

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)*selected semesters*

Egyptian art from pre-Dynastic to New Kingdom periods. Focus on aesthetic, philosophical, and cultural contexts. Requires research paper and readings.

ARS 504 Critical Approaches to Greek Art. (3)*once a year*

Art and architecture of Aegean civilizations (Cycladic, Minoan, Mycenaean) and of Greece to end of Hellenistic period. Requires research paper and readings.

ARS 506 Critical Studies in Roman Art. (3)*once a year*

Art and architecture of Etruria, the Roman Republic, and the Roman Empire. Requires research paper and/or supplemental readings.

ARS 514 Critical Approaches to Romanesque Art. (3)*selected semesters*

Sculpture, painting, architecture, and the minor arts in western Europe, ca. 1030–1200, considered within religious, economic, and social contexts. Requires research paper.

ARS 516 Critical Approaches to Gothic Art. (3)*selected semesters*

Architecture, sculpture, painting, and the minor arts in western Europe, ca. 1150–1350, considered within religious, social, and economic contexts. Requires research paper.

ARS 517 Critical Approaches to Late Gothic Art. (3)*selected semesters*

Art of the late-Gothic style, ca. 1350–1525, considered within religious, social, economic, and political contexts. Requires research or reading project.

ARS 522 16th-Century Italian Art. (3)*once a year*

Critical study of painting, sculpture, and architecture in 16th-century Italy in its religious and historical context.

ARS 528 18th-Century Art in Europe. (3)*once a year*

Critical study of European art from the late Baroque to the early years of Neoclassicism.

ARS 530 Art of Spain and New Spain. (3)*once a year*

Critical study of architecture, painting, and sculpture from 1500 to 1800. Lecture, conference.

ARS 532 Art, Politics, and Patronage, 1770–1850. (3)*fall*

Critical analyses of political events in Europe. Examines issues of patronage, art as propaganda. Impact of war and revolution on visual arts.

ARS 534 Studies in Modern European Art, 1850–1914. (3)*once a year*

Critical study of visual arts using primary source material from mid-19th century to WWI within philosophical, socioeconomic, and economic contexts. Lecture, tutorial. Prerequisite: instructor approval.

ARS 542 Critical Issues in American Painting I. (3)*once a year*

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)*once a year*

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)*once a year*

Critical study of the social, political, and artistic changes in American art during the first half of the 20th century. Prerequisites: both ARS 101 and 102 or only ARS 340.

ARS 562 Art of Ancient Mesoamerica. (3)*fall*

Critical study of art and architecture of Mexico and Maya areas before Spanish contact. Lecture, conference.

GRADUATE PROGRAMS AND COURSES

ARS 565 Native Art of North America. (3)

once a year

Critical examination of Native American art within culture, prehistory to the present. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 574 Studies in Japanese Art. (3)

once a year

Critical examination of the nature and history of Japanese art, its rich heritage and its indebtedness to foreign sources. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 575 Approaches to Chinese Painting. (3)

fall

Critical history of Chinese painting from Eastern Chou to 1911. Emphasis on masters, regional developments, and conceptual underpinnings. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 591 Seminar. (1–12)

once a year

Graduate seminar. Problems or criticism in topics that may include the following:

- American Art. (3–6)
- American Indian Art. (3–6)
- Ancient Art. (3–6)
- Baroque Art. (3–6)
- British Empire (3–6)
- Chinese Art. (3–6)
- Critical Theories in the Visual Arts. (3–6)
- Medieval Art. (3–6)
- Modern Art. (3–6)
- Native American Art. (3–6)
- Photographic History. (3–6)
- Pre-Columbian Art. (3–6)
- Renaissance Art. (3–6)

Prerequisite: instructor approval.

ARS 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ART (ART)

Ceramics

ART 460 Ceramic Clay. (3)

spring

Research into various clay body formulations, local natural materials, slip glazes, and engobes. Lecture, lab, studio. Fee. Prerequisites: both ART 360 and 364 or only instructor approval.

ART 463 Ceramic Glaze. (3)

fall

Glaze calculation and formulation using various glaze colors and surfaces. Lecture, lab, studio. Fee. Prerequisite: ART 460 or instructor approval.

ART 466 Special Problems in Ceramics. (3)

fall, spring, summer

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. Fee. Prerequisite: ART 364 or instructor approval.

ART 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Ceramics Printmaking
Fee.
- Enameling
Fee.
- Turning
Fee.

- Vapor Glazes
Fee.

ART 594 Conference and Workshop. (1–12)

selected semesters

Topics may include the following:

- Turning
Fee.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Ceramic Clay
Fee.
- Ceramic Glaze
Fee.
- Ceramics Printmaking
Fee.
- Enameling
Fee.
- Experimental Printmaking
Fee.
- Special Problems in Ceramics
Fee.

Drawing

ART 411 Advanced Drawing. (3)

fall and spring

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)

fall and spring

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. Fee. Prerequisite: ART 315 or instructor approval.

ART 415 Art Anatomy. (4)

selected semesters

Study of human anatomical structures as applied to the practice of figure-oriented art. 3 hours lecture, 5 hours studio a week. Fee. Prerequisite: ART 214.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Art Anatomy
Fee.
- Life Drawing
Fee.

Fibers

ART 476 Fibers: Multiple Harness Weaving. (3)

fall and spring

Advanced loom techniques and computer pattern design. Emphasis on individual design and loom application. Fee. Prerequisite: ART 113 or 115 or 376 or instructor approval.

ART 477 Printed Textiles. (3)

once a year

Techniques for screen printing on fabric exploring pattern as a compositional element. Various stencil methods including photographic processes. May be repeated for credit. Studio. Fee. Prerequisite: ART 377 or instructor approval.

ART 478 Advanced Surface Design. (3)

spring in odd years

Emphasis on personal expression with advanced problems in stitch resist, arashi shibori, transfers, indigo, vat and disperse dyes, and pigments. Studio. Prerequisites: both ART 377 and 477 or only instructor approval.

ART 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- 3-Dimensional Fiber
Fee.

- Fibers and Surface
Fee.
- Print Textiles
Fee.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- 3-Dimensional Fiber
Fee.
- Fibers and Surface
Fee.
- Print Textiles
Fee.
- Printed Textiles
Fee.

Intermedia

ART 439 Mixed Media. (3)

fall and spring

Exploring visual effects by combining traditional and nontraditional methods, techniques, and concepts. 6 hours a week. May be repeated for credit. Studio. Prerequisites: a combination of ART 113 and 115 and 6 hours additional studio requirements or only instructor approval.

ART 440 New Media Concepts. (3)

fall and spring

Continued experiments with new media and interdisciplinary concerns in art. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 443. Corequisite: ART 441.

ART 441 Video Art. (1)

fall and spring

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)

fall

Explores ideas, attitudes, and art of contemporary “self-taught,” “visionary,” and “outsider” artists. Research and studio practice. Lecture, studio. Prerequisites: both ART 113 and 115 or only instructor approval.

ART 443 Intermedia. (3)

fall and spring

Experimental, conceptual, and interdisciplinary studio art with emphasis on new media and technologies. 6 hours a week. May be repeated once for credit. Prerequisites: both ART 113 and 115 or only instructor approval.

ART 449 Computer Animation and Video. (3)

fall and spring

Integrates 3D fine arts animation with video and compositing. May be repeated for credit. Studio. Fee. Prerequisite: ART 348 or instructor approval.

ART 450 Computer Animation and Audio. (3)

fall and spring

Integrates audio with 3D animation for fine arts applications. Includes compositing and effects. May be repeated for credit. Studio. Fee. Prerequisites: ART 449; instructor approval.

ART 530 Two-Dimensional and Three-Dimensional Computer Art. (3)

once a year

Integrates 2D and 3D computer imaging for art. Emphasizes new directions for computer imaging that accounts for media characteristics. Studio. Fee.

ART 540 Advanced Computer Art. (3)

once a year

Study of motion for 3D models, light sources, and surface effects. Assumes a comprehension of complex modeling, mapping, and lighting. Studio. Fee. Prerequisite: ART 346 or instructor approval.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Dimensional Animation
Fee.

- New Media Concepts
Fee.
- Video Art

Metals

ART 472 Advanced Jewelry. (3)

fall and spring

Jewelry making with emphasis on developing personal statements and craftsmanship. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 372; instructor approval.

ART 473 Advanced Metalworking. (3)

once a year

Forging and forming techniques in individualized directions. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 373; instructor approval.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Jewelry Metalworking
Fee.

Painting

ART 423 Advanced Painting. (3)

fall and spring

Continuation of ART 324. 6 hours a week. May be repeated for credit. Prerequisite: ART 324.

ART 425 Advanced Figure Painting. (3)

fall and spring

Continuation of ART 325. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 315, 324, 325.

ART 427 Advanced Watermedia. (3)

fall and spring

Continuation of ART 327. Advanced techniques, concepts, and methods with watercolor and other water-based media on paper. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 327 or instructor approval.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Figure Painting
Fee.
- Watercolor
Fee.

Photography

ART 401 Nonsilver Photography. (3)

fall and spring

Recognition of the inherent characteristics of nonsilver processes and their use in communicating ideas. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 403 Senior Photographic Projects. (3)

fall and spring

Technical and philosophical refinement of personal aesthetic with various photographic media. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 404 Portraiture Photography. (3)

fall and spring

Photographing people. Critical discussions and slide lectures on issues in portraiture. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 304 or instructor approval.

ART 405 Advanced Color Photography. (3)

fall and spring

Intensive use of subtractive color process in photographic printing. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 305 or instructor approval.

ART 406 Photo Techniques. (3)

fall and spring

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.

GRADUATE PROGRAMS AND COURSES

ART 407 View Camera. (3)

fall and spring

View camera and darkroom techniques. Studio, lab. Fee. Prerequisite: ART 301 or instructor approval.

ART 409 Photographic Exhibition. (3)

once a year

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.

ART 498 Pro-Seminar. (1–7)

selected semesters

Topics may include the following:

- Landscape Photography: Theory
Fee.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Color Photography
Fee.
- Collotype
Fee.
- Digital Photographic Images
Fee.
- Digital Printing
Fee.
- Documentary Photography
Fee.
- Issues in Digital Photography
Fee.
- Landscape Photography
Fee.
- Nonsilver Photography
Fee.
- Photographic Fabrications
Fee.
- Photogravure
Fee.
- Portraiture Photography
Fee.
- View Camera
Fee.

Printmaking

ART 452 Advanced Lithography. (3)

fall and spring

Continuation of ART 352. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 352 or instructor approval.

ART 454 Advanced Screen Printing. (3)

once a year

Continuation of ART 354. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 354 or instructor approval.

ART 455 Advanced Photo Processes for Printmaking. (3)

once a year

Continued study of photomechanical techniques and applications to printmaking or photographic processes. Fee. Prerequisite: ART 355 or instructor approval.

ART 456 Fine Printing and Bookmaking I. (3)

once a year

Letterpress printing and typography as fine art. Study of history, alphabets, mechanics of hand typesetting, presswork, and various forms of printed matter. Fee. Prerequisite: instructor approval.

ART 457 Fine Printing and Bookmaking II. (3)

once a year

Continuation of ART 456. Bookbinding, book design and printing, advanced typography, theory, and presswork. May be repeated for credit. Fee. Prerequisites: ART 456; instructor approval.

ART 458 Papermaking. (3)

fall and spring

History, theory, demonstrations, sheet forming, collage treatments, and 3-dimensional approaches. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 459 Monoprinting. (3)

fall and spring

Nonmultiple printed image using a variety of technical approaches. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 311, 323 (or any 300-level printmaking class); instructor approval.

ART 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Artists' Books
Fee.
- Experimental Paper
Fee.
- Experimental Printmaking
Fee.
- Relief Printmaking
Fee.

ART 551 Intaglio Projects. (3)

fall and spring

Materials and methods of intaglio as a matrix for exploring various contemporary issues. Specifically structured to accommodate the graduate-level drawing student with no printmaking background. Studio. Fee.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Photo Process for Printmaking
Fee.
- Advanced Screenprinting
- Artists' Books
Fee.
- Experimental Paper
Fee.
- Fine Printing and Bookmaking I
Fee.
- Fine Printing and Bookmaking II
Fee.
- Lithography
Fee.
- Monoprinting
Fee.
- Papermaking
Fee.
- Photo Processes for Printmaking
Fee.
- Relief Printmaking
Fee.
- Screen Printing

Sculpture

ART 431 Special Problems in Sculpture. (3)

fall and spring

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. Fee. Prerequisites: ART 332; instructor approval.

ART 432 Neon Sculpture. (3)

fall

Techniques for creating neon in an art context. Glass tube bending and fabrication. Construction of artworks utilizing light-generating gases. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 433 Foundry Research Methods. (3)

fall and spring

Research in foundry techniques. Studio. Pre- or corequisite: ART 333 or instructor approval.

ART 436 Architectural Sculpture. (3)

selected semesters

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. Fee. Prerequisite: ART 332 or instructor approval.

ART 437 Film Animation. (3)

fall

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. Fee. Prerequisite: instructor approval.

ART 438 Experimental Systems in Sculpture. (3)

spring

Simple electrical and mechanical systems that can be utilized in the context of studio art and installations. Requires active production of studio artworks. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

ART 474 Advanced Wood. (3)

fall and spring

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. Fee. Prerequisites: ART 374; instructor approval.

ART 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Sculpture
- Carving
Fee.
- Film: Post-Production
Fee.
- Foundry Casting Methods
Fee.
- Foundry Research Methods
Fee.
- Live Action Filmmaking
Fee.

ART 594 Conference and Workshop. (1–12)

selected semesters

Topics may include the following:

- Carving
Fee.

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Sculpture
- Architectural Sculpture
Fee.
- Experimental Systems in Sculpture
Fee.
- Film Animation
Fee.
- Film: Post-Production
Fee.
- Foundry Casting Methods
Fee.
- Foundry Research Methods
Fee.
- Live Action Filmmaking
Fee.
- Neon Sculpture
Fee.
- Special Problems in Sculpture
Fee.
- Wood
Fee.

Special Studio Art

ART 582 Art Research. (1–12)

fall, spring, summer

Independent study research using classroom facilities and supplies. Studio.

ART 621 Studio Problems. (3)

fall, spring, summer

Advanced study. 6 hours a week each section. May be repeated for credit. Topics may include the following:

- Ceramics
Fee.
- Drawing
- Fiber Art

- Intermedia
- Jewelry Metalworking
- Metals
- Painting
- Photography
- Printmaking
Fee.
- Sculpture
- Studio Art
- Wood

Prerequisite: instructor approval.

ART 680 Practicum: M.F.A. Exhibition. (1–15)

fall, spring, summer

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.

ART 682 M.F.A. Exhibition Research. (1–12)

fall, spring, summer

M.F.A. exhibition practicum using classroom facilities and supplies. Can be used in place of ART 680. Prerequisite: approval of the student's supervisory committee.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses.](#)" [page 48.](#)

Artist Diploma, Post-Bachelor's

See "[Post-Bachelor's Artist Diploma.](#)" [page 276.](#)

Asian Languages and Civilizations— Chinese/Japanese

See "[Languages and Literatures.](#)" [page 245.](#)



Students from all over the United States and Puerto Rico attending the 2002 Minority Graduate Education and Mountain States Alliance Graduate Fair and Student Research Conference took a tour of a laboratory in the Goldwater Center for Engineering Research at ASU.

Dennis Durband photo

Atmospheric Science

Interdisciplinary Certificate Program

www.asu.edu/clas/atmocert

480/965-6366 or -6436

SCOB 145

Joseph A. Zehnder, Codirector, Executive Committee

Anthony Brazel, Codirector, Executive Committee

Chemical and Materials Engineering

Assistant Professors: Allen, Dillner

Civil and Environmental Engineering

Assistant Professors: Allen, Dillner, Peccia

Geography

Professors: Balling, Brazel, Cervený, Zehnder

Assistant Professor: Ellis

Geological Sciences

Professors: Christansen, Greely

Mathematics and Statistics

Professor: Nicolaenko

Associate Professors: Gelb, Lopez, Mahalov, Ringhofer

Mechanical and Aerospace Engineering

Professors: Anderson, Boyer, Fernando

Assistant Professor: Calhoun

Plant Biology

Professors: Day, Klopatek

The interdisciplinary certificate program in Atmospheric Science is administered by an Executive Committee composed of faculty from the College of Engineering and Applied Sciences and the College of Liberal Arts and Sciences. The objective of this program is to recognize ASU graduate students who specialize in a thesis or dissertation topic related to the atmospheric or oceanic sciences.

A minimum of 16 semester hours consisting of three core courses and two electives, plus a capstone seminar (one semester hour), are required to complete the certificate. Students must also complete a dissertation on a topic related to the atmospheric or oceanic sciences under the supervision of a faculty member from one of the cooperating departments. A full description of the program is available on the Web at www.asu.edu/clas/atmocert.

Students qualify for admission to the certificate program by maintaining good standing in a cooperating department and completing an application specific to the Atmospheric Science Certificate. Admission is subject to approval of the Executive Committee.

For more information, access the program Web site, or call 480/965-6366 or -6436.

Bioengineering

Master's and Doctoral Programs

www.eas.asu.edu/~bme

480/965-3028

ECG 334

Eric J. Guilbeau, Chair

Professors: Guilbeau, Towe

Associate Professors: Garcia, He, Iasemidis, Massia, Pizziconi, Sweeney, Yamaguchi

Assistant Professors: Muthuswamy, Panitch, Vernon

The Bioengineering faculty within the Department of Bioengineering offer graduate programs leading to the M.S. and Ph.D. degrees in Bioengineering. Areas of study include biochemical engineering, bioelectrical engineering, biomechanical engineering, biosystems/biotransport engineering, bioinstrumentation, biomaterial engineering, and biocontrol engineering. Research topics include artificial organs, biocontrol systems, biomechanics, bioinstrumentation, biomaterials, biosystems engineering, biotechnology, cardiovascular engineering, cellular and tissue bioengineering, neural bioengineering, noninvasive imaging, and rehabilitation engineering.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See "[Master of Engineering](#)," page 190, for program description.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

Transition Program. Students applying to the Bioengineering M.S. or Ph.D. degree programs may have an undergraduate B.S. degree in a major field other than Bioengineering. The qualifications of transition students are reviewed by the department graduate committee, and a special program of transition course work is designed for successful applicants. In general, transition students should have had, or be prepared to take, calculus through ordinary differential equations, inorganic chemistry, physics, and a number of undergraduate engineering courses in order to be prepared for graduate bioengineering courses. Other course work from the undergraduate program may be required depending upon the research topic selected by the student. Transition students should contact the associate chair to evaluate the undergraduate transcript.

MASTER OF SCIENCE

See "[Master's Degrees](#)," page 93, for general requirements.

Program of Study. All candidates pursuing an M.S. degree in Bioengineering are required to complete an approved

program of study consisting of the minimum required semester hours, including research and thesis. Special course requirements for the different areas of study are established by the faculty and are available from the Department of Bioengineering. Part-time students must successfully complete a research seminar course for at least three semesters during the course of study. Candidates whose undergraduate degree was in a field other than bioengineering may be required to complete more than 30 semester hours of credit on the program of study.

Research Seminar Requirements. In addition to the course work and thesis requirements, all full-time master's degree students must successfully complete a research seminar course during each semester of attendance.

Thesis Requirements. A written thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

Nonthesis Option

The nonthesis option within the M.S. degree program in Bioengineering is reserved for students who have full-time employment in industry and who intend to enroll in the M.S. degree program on a part-time basis, or for students who wish to continue their study of bioengineering past the baccalaureate level before seeking admission to a medical school.

Admission Requirements. Students seeking admission to the nonthesis option must request this option when applying for admission to the M.S. degree program. Students who are admitted to the thesis option are not allowed to subsequently transfer into the nonthesis option. Students admitted to the nonthesis option, however, may subsequently request approval to transfer into the thesis option. Additionally, the student must meet the following criteria to qualify for the nonthesis option: (1) be a full-time employee of a local industry and indicate at the time of application that he or she intends to pursue the M.S. degree on a part-time basis or (2) declare at the time of application that his or her career goal is to seek admission to a medical school.

Course Requirements. A total of 33 semester hours, including a bioengineering seminar and project, is required for graduation in the nonthesis option. The program of study for the nonthesis option requires the same set of core courses and seminar in bioengineering that is required of students in the thesis option. Instead of research and thesis hours, the student must complete six additional credits of course work selected from the catalog list of BME courses (the total course work requirement, including seminar, is 33 semester hours).

Project. Students admitted to the nonthesis option must also register for three semester hours of BME 593 Applied Project. Students are required to complete an in-depth literature survey and/or research design in some aspect of bioengineering, resulting in a written report.

Defense of the Applied Project. The student is required to successfully defend the Applied Project in bioengineering before his or her graduate supervisory committee.

Financial Aid. Students admitted to the nonthesis option within the bioengineering master's degree program do not qualify for graduate research or teaching assistantships or other financial assistance available to thesis option master's degree students.

Admission to the Ph.D. Program. If the student wishes to subsequently enter the Ph.D. program after completing the requirements for the nonthesis option, the application procedure is the same as if the student was applying with a thesis-track M.S. degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Bioengineering is conferred upon evidence of excellence in research resulting in a scholarly dissertation that is a contribution to knowledge. See "[Doctor of Philosophy](#)," page 96, for general requirements.

Program of Study. Upon admission of the applicant with regular or provisional status, a supervisory committee (program committee) is appointed. This committee is responsible for the guidance and direction of the student's graduate program of study. The program committee is composed of a minimum of three faculty members, including a chair. Generally, the student's graduate advisor serves as chair of the program committee. The program committee advises the student in developing a program of study and assumes primary responsibility in assessing the student's progress in the program.

Research Seminar Requirements. In addition to the course work and dissertation requirements, all full-time doctoral students must successfully complete a research seminar course during each semester of attendance.

Foreign Language Requirements. None.

Comprehensive Examinations. When the Ph.D. student has essentially completed the course work in the approved program of study, the student is given a comprehensive examination covering the field of study.

Admission to Candidacy and Appointment of Dissertation Committee. After the student passes the comprehensive examinations, a dissertation committee composed of at least five faculty members is appointed. The dissertation committee meets to approve the student's dissertation prospectus. Generally, the prospectus should include a pertinent review of the literature, a statement of the proposed study, the hypothesis to be tested, a description of the research design, a discussion of the specific data to be collected, and a description of the means by which the data is to be analyzed. After the dissertation committee has approved the prospectus, the student applies to the Graduate College for admission to candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required. The dissertation is expected to reflect and contribute significantly to knowledge. It must clearly indicate mastery of research methods.

Final Examinations. A final oral examination in defense of the dissertation is required.

GRADUATE PROGRAMS AND COURSES

RESEARCH ACTIVITY

For current information about research activity, access the Department of Bioengineering Web site at www.eas.asu.edu/~bme.

BIOENGINEERING (BME)

BME 411 Biomedical Engineering I. (3)

once a year

Reviews diagnostic and prosthetic methods using engineering methodology. Introduces 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)

once a year

Reviews electrophysiology and nerve pacing applications. Introduces biomechanics and joint/limb replacement technology, cardiovascular and pulmonary fluid mechanics, and the application of mathematical modeling. Prerequisite: instructor approval.

BME 415 Biomedical Transport Processes. (3)

once a year

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)

fall

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)

fall

Technical, regulatory, economic, legal, social, and ethical aspects of medical device systems engineering design. Lecture, field trips. Prerequisite: ECE 300. Prerequisites with a grade of "C" or higher: BME 318, 334.

BME 419 Biocontrol Systems. (3)

fall

Applies linear and nonlinear control systems techniques to analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body. Prerequisites: ECE 201; MAT 274.

BME 435 Physiology for Engineers. (4)

fall

Physiology of the nervous, muscular, cardiovascular, endocrine, renal, and respiratory systems. Emphasizes use of quantitative methods in understanding physiological systems. Lecture, lab. Prerequisites: a combination of BIO 188 and CHM 116 and PHY 131 or only instructor approval.

BME 470 Microcomputer Applications in Bioengineering. (4)

spring

Uses 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 511 Biomedical Engineering I. (3)

once a year

Diagnostic and prosthetic methods using engineering methodology. Transport, metabolic, and autoregulatory processes in the body.

BME 512 Biomedical Engineering II. (3)

once a year

Electrophysiology and nerve pacing applications. Introduces biomechanics and joint/limb replacement, technology, cardiovascular and pulmonary fluid mechanics, and mathematical modeling.

BME 513 Biomedical Instrumentation. (3)

fall

Principles of medical instrumentation. Studies of medical diagnostic instruments and techniques for the measurement of physiological variables in living systems.

BME 514 Advanced Biomedical Instrumentation. (3)

selected semesters

Principles of applied biophysical measurements using bioelectric and radiological approach. Prerequisites: ECE 334; MAT 274 (or its equivalent).

BME 515 Biomedical Transport Processes. (3)

selected semesters

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)

fall

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)

spring

Topics include structure property relationships for synthetic and natural biomaterials, biocompatibility, and uses of materials to replace body parts. Prerequisite: ECE 350 (or its equivalent) or instructor approval.

BME 519 Topics in Biocontrol Systems. (3)

fall

Linear and nonlinear control systems analysis of neuromusculoskeletal, cardiovascular, thermal, and mass transfer systems of the body, including in-depth project. Prerequisites: both ECE 201 and MAT 274 or only instructor approval.

BME 520 Bioelectric Phenomena. (3)

selected semesters

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)

spring

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)

once a year

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)

fall

Laboratory experience with problems, concepts, and techniques of biomedical instrumentation in static and dynamic environments. Lab. Prerequisites: BME 435; ECE 334. Pre- or corequisite: BME 513.

BME 524 Fundamentals of Applied Neural Control. (3)

once a year

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)

spring

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)

once a year

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)

fall

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. Credit is allowed for only BME 533 or CHE 533.

BME 534 Transport Processes II. (3)

spring

Continuation of BME 533 or CHE 533, emphasizing mass transfer. Cross-listed as CHE 534. Credit is allowed for only BME 534 or CHE 534. Prerequisite: BME 533 or CHE 533.

BME 543 Thermodynamics of Chemical Systems. (3)

fall

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions.

Cross-listed as CHE 543. Credit is allowed for only BME 543 or CHE 543.

BME 544 Chemical Reactor Engineering. (3)

spring

Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as CHE 544. Credit is allowed for only BME 544 or CHE 544. Prerequisite: BME 543 or CHE 543.

BME 551 Movement Biomechanics. (3)

spring

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)

selected semesters

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 568 Medical Imaging. (3)

selected semesters

CT, SPECT, PET, and MRI. 3-dimensional *in vivo* measurements. Instrument design, physiological modeling, clinical protocols, reconstruction algorithms, and quantitation issues. Prerequisite: instructor approval.

BME 593 Applied Project. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48](#).

Biology

Master's and Doctoral Programs

ls.la.asu.edu/biology

480/965-3571

LSC 226

James P. Collins, Chair

Regents' Professors: Alcock, Maienschein

Professors: Capco, Chandler, Church, Collins, Dowling, Elser, Faeth, Fisher, Grimm, Hazel, Hedrick, Lawson, McGaughey, Moore, Ohmart, Pyne, Rutowski, Satterlie, Smith, Walsberg

Associate Professors: Deviche, Fewell, Fouquette, Goldstein, Harrison, Orchinik

Assistant Professors: DeNardo, Gerber, Hofmann, Kinzig, Kumar, Laubichler, Lorson, Newfeld, Sabo, Wilson-Rawls

Research Professors: Davidson, Pearson

The faculty in the Department of Biology offer programs leading to the M.S. and Ph.D. degrees in Biology. A concentration in ecology is available, among other areas of study.

The faculty collaborate with the Departments of Microbiology and Plant Biology in offering the program leading to the Master of Natural Science degree when one of the concentrations is biology (see ["Natural Science," page 279](#)).

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect biology as the subject matter field.

These programs are designed to prepare students for careers in teaching and research in educational, medical, industrial, and governmental institutions.

Graduate Record Examination. Submission of scores on the verbal, quantitative, analytical, and advanced sections of the Graduate Record Examination is required for admission to the M.S. and Ph.D. degree programs.

Application Deadline. Completed college and departmental application materials should be received by December 15 for admission in the fall semester.

MASTER OF SCIENCE

The program of each student is prepared in consultation with the supervisory committee, consisting of a major professor and two additional faculty members. A minimum of 30 semester hours is required. The program must include six hours of thesis and one hour of seminar. The remainder of the program of study usually consists of (1) a mixture of course work, readings and conference, and seminars in the student's primary field and related fields and (2) research credits. Courses and research credits can be distributed in any combination appropriate to the student's individual educational goals. A typical program of study consists of six semester hours of thesis, one semester hour of seminar, nine to 15 hours of course work and additional seminars, and eight to 14 semester hours of research credit. A final oral examination covering the thesis and related subject matter is administered by the supervisory committee.

DOCTOR OF PHILOSOPHY

The Ph.D. program in the Department of Biology allows the student to acquire high research competency in one or more specialized areas while receiving a broad, solid grounding in biological sciences.

See ["Doctor of Philosophy," page 96](#), for general requirements.

Program of Study. The program of study is planned by the student and the supervisory committee, consisting of a major professor and four additional faculty members. The program is tailored to the needs of the individual student.

Foreign Language Requirements. None are required by the department. However, each student's supervisory committee may specify a reading proficiency in one or more foreign languages if appropriate to the student's educational objectives.

Comprehensive Examinations. The comprehensive examination consists of a written and oral component. To advance to candidacy for the Ph.D., the student must successfully complete three graduate seminars in areas different from the major area of emphasis; one of these must be a two-semester-hour writing seminar completed by the end of the third semester (see topics outlines under "Research Activity"). The seminars include evaluation of synthetic writing skills. A synthetic, detailed research proposal must

GRADUATE PROGRAMS AND COURSES

be completed by the fourth semester. The student must defend the proposal orally to the supervisory committee within three weeks after successful completion of the written research proposal.

Dissertation Requirements. A dissertation based on original research is required. (See [“Doctoral Dissertations,” page 95.](#))

Final Examinations. A final defense of the dissertation is required. (See [“Open Dissertation Defenses,” page 95.](#))

FACILITIES

The modern Life Sciences center houses well-equipped research laboratories and teaching facilities. The W. M. Keck Bioimaging Laboratory includes a laser-equipped scanning confocal microscope and an LFO high resolution scanning electronic microscope. The Life Sciences Electron Microscopy Laboratory includes both scanning and transmission electron microscopes as well as a freeze-fracture unit. Housing of laboratory animals and maintenance of breeding colonies are provided by the Animal Research Center. Arizona fauna is well represented in departmental collections. Desert, montane, riparian, and lacustrine habitats are within driving distance; species diversity is high.

RESEARCH ACTIVITY

Research of faculty and graduate students includes a wide range of biological topics. Current research interests within the department include these topics.

Behavior. Reproductive behavior; sexual selection; communication; neural and hormonal mechanisms of behavior; behavioral ecology; behavioral genetics.

Biology Education. Student reasoning patterns and alternative conceptual frameworks; the nature of scientific reasoning; learning styles, instructional techniques, and issues in curriculum development.

Cell and Molecular Biology. Cytoskeleton assembly; localization of RNA in oocytes and embryos; regulation of exocytosis and endocytosis; cell-division; cell-cell interaction; recombinant DNA; gene mapping; regulation of gene expression in eukaryotes; mechanisms of interferon action; signal transduction; confocal and electron microscopy; cellular bases of vertebrate photoperiodic responses.

Computational, Statistical, and Mathematical Biology. Functional genomics; population and statistical genetics; genome computing; computational molecular evolution; population and community ecology, including extinction risk, spatial dynamics, and the evolution and assembly of communities; spatial modeling of species richness; environmental monitoring and assessment; environmental statistics.

Conservation Biology. Conservation genetics; fragmentation effects; extinction dynamics; patterns and consequences of rarity; design and operation of reserves; urban ecology; conserving desert fishes and aquatic habitats; desert to rain-forest biodiversity; international dimensions; sustainable development.

Developmental Biology. Cell and organ differentiation; regulation; development of synapses; developmental genetics; control of oogenesis; in vitro fertilization; regulation of pat-

tern formation; myogenesis; morphogens; intercellular signaling pathways.

Ecology. Life histories, dispersal, and foraging; plant-animal interactions; community structure; biogeography; physiological ecology; ecosystems structure and functioning; wildlife fisheries management; research in terrestrial and aquatic desert habitats reflecting the unique location of ASU; metapopulation dynamics.

Evolution. Population genetics, molecular evolution, systematics, speciation, evolution of behavior, morphological diversification.

Genetics. Molecular and developmental genetics; genetic regulatory mechanisms of cellular differentiation; behavioral genetics; variation in natural populations; molecular evolutionary genetics; functional genomics.

History and Philosophy of Biology. The nature of biological science and the way science changes over time; who does biology and why; what assumptions and contextual factors (like funding and ethical considerations) shape biology; issues of environmental history, theoretical biology, and development and genetics in society.

Neuroscience. Behavioral neuroendocrinology; invertebrate and vertebrate neurobiology; control of locomotion; actions of stress on the brain; mechanisms of hormone action in the brain; action of neuropeptides, neural basis of behavior; neuroanatomical correlates of behavior; hormonal control of neural plasticity.

Physiology. Membrane metabolism and function, thermal adaptation, regulation, and ion transport; tissue, epithelial, and cuticular function; comparative and reproductive endocrinology; neurophysiology; environmental physiology especially related to desert adaptations; parasites and reproduction; comparative biochemistry; the physiology of temperature; environmental regulation of gene expression; renal and respiratory physiology; energetics and physiology of flight.

BIOLOGY (BIO)

BIO 406 Computer Applications in Biology. (3)

fall

Computer analysis techniques in biology emphasizing data entry, management and analysis, and graphic portrayal. Employs mainframe and microcomputers. 2 hours lecture, 3 hours lab. Cross-listed as PLB 432. Credit is allowed for only BIO 406 or PLB 432. Prerequisites: both BIO 187 and MAT 117 (or 210) or only instructor approval.

BIO 410 Techniques in Wildlife Conservation Biology. (3)

fall

Field and analytical techniques used in evaluating population structure, viability and environmental impacts. Lecture, lab. Fee. Prerequisites: both BIO 317 and 320 or only instructor approval.

BIO 411 Advanced Conservation Biology I. (3)

fall

Principles of conservation science, biology of threatened species, management principles that meet conservation goals, emphasizing North American ecosystems. Prerequisites: BIO 317, 320.

BIO 412 Advanced Conservation Biology II. (3)

spring

Global biodiversity patterns, processes, and conservation; global environmental change; sustainable use of natural resources; emphasizing international approaches to conservation biology. Prerequisites: BIO 317, 320.

BIO 415 Biometry. (4)*fall*

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 College of Liberal Arts and Sciences' General Studies program. 3 hours lecture, 3 hours lab. Prerequisite: MAT 210 (or its equivalent).

BIO 416 Professional Values in Science. (3)*once a year*

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. Credit is allowed for only BIO 416 or HPS 410.

BIO 417 Experimental Design. (3)*spring*

Fixed, random, mixed models; crossed and nested factorial designs; balanced and unbalanced data; completely randomized, blocked, repeated measure designs; ANCOVA. Prerequisite: BIO 415 (or its equivalent).

BIO 423 Population and Community Ecology. (3)*selected semesters*

Organization and dynamics of population and communities, emphasizing animals. Theoretical and empirical approaches. Prerequisite: BIO 320 or instructor approval.

BIO 424 Mathematical Models in Ecology. (4)*selected semesters*

Mathematical modeling of populations, communities, and ecosystems, including case studies and student-designed projects. 3 hours lecture, 3 hours lab. Prerequisites: BIO 320; a course in calculus.

BIO 425 Animal Ecology. (3)*selected semesters*

Physiological and behavioral adaptations of individual animals to both abiotic and biotic environments. Prerequisite: BIO 320.

BIO 426 Limnology. (4)*selected semesters*

Structure and function of aquatic ecosystems, with emphasis on freshwater lakes and streams. 3 hours lecture, 3 hours lab or field trip. Fee. Prerequisite: BIO 320 or instructor approval.

BIO 428 Biogeography. (3)*fall*

Environmental and historical processes determining distributional patterns of animals and plants, emphasizing terrestrial life. Prerequisites: BIO 187 (or its equivalent); junior standing.

BIO 435 Research Techniques in Animal Behavior. (3)*selected semesters*

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 331.

BIO 441 Cytogenetics. (3)*selected semesters*

Chromosomal basis of inheritance. Cross-listed as PLB 412. Credit is allowed for only BIO 441 or PLB 412. Prerequisite: BIO 340.

BIO 442 Cytogenetics Laboratory. (2)*selected semesters*

Microscopic analysis of meiosis, mitosis, and aberrant cell division. 6 hours lab. Cross-listed as PLB 413. Credit is allowed for only BIO 442 or PLB 413. Pre- or corequisite: BIO 441 or PLB 412.

BIO 446 Principles of Human Genetics. (3)*once a year*

Molecular and cellular analysis of the human genome. Prerequisite: BIO 340.

BIO 450 Advanced Developmental Biology. (3)*spring*

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)*spring*

Microscopic study of animal tissues. 3 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 187 or instructor approval.

BIO 454 Aquatic Insects. (3)*selected semesters*

Systematics and ecology of aquatic insects. Prerequisite: BIO 386.

BIO 464 Photobiology. (3)*selected semesters*

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Cross-listed as PLB 440. Credit is allowed for only BIO 464 or PLB 440. Prerequisites: CHM 231 (or 331); 12 hours in life sciences.

BIO 465 Neurophysiology. (3)*spring in even years*

Detailed treatment of cellular and organismal neurophysiology and nervous system function. Prerequisite: BIO 360.

BIO 466 Neurophysiology Laboratory. (2)*selected semesters*

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)*spring in odd years*

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.

BIO 471 Ornithology. (3)*spring in odd years*

Biology of birds. 2 hours lecture, 3 hours lab, weekend field trips. Fee. Prerequisite: BIO 370 or instructor approval.

BIO 472 Mammalogy. (4)*fall in odd years*

Classification, structure, habits, ecology, and distribution of mammals, emphasizing North American forms. 3 hours lecture, 3 hours lab or field trip, weekend field trips. Fee. Prerequisite: BIO 370 or instructor approval.

BIO 473 Ichthyology. (3)*spring in odd years*

Systematics and biology of recent and extinct fishes. 2 hours lecture, 3 hours lab or field trip, weekend field trips. Fee. Prerequisites: both BIO 370 and 425 or only instructor approval.

BIO 474 Herpetology. (3)*spring in even years*

Systematics and biology of recent and extinct reptiles and amphibians. 2 hours lecture, 3 hours lab or field trip. Fee. Prerequisite: BIO 370.

BIO 480 Methods of Teaching Biology. (3)*spring*

Methods of instruction, experimentation, organization, and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences.

BIO 495 Undergraduate Thesis. (3)*fall, spring, summer*

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)*selected semesters*

Theory, use, and methods of preparing biological materials for transmission electron microscopy. Lecture, lab. Materials fee. Prerequisite: instructor approval.

BIO 505 Scanning Electron Microscopy. (3)*selected semesters*

Theory, use, and methods of preparing biological materials for scanning electron microscopy. 2 hours lecture, 3 hours lab. Materials fee. Prerequisite: instructor approval.

BIO 508 Scientific Data Presentation. (2)*spring*

Techniques necessary for presentation of scientific data used in journal publications, grant proposals, and visual presentations. Lecture, lab. Prerequisite: instructor approval.

GRADUATE PROGRAMS AND COURSES

BIO 520 Biology of the Desert. (2)

selected semesters

Factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Prerequisite: 10 hours in biological sciences or instructor approval.

BIO 522 Populations: Evolutionary Ecology. (3)

selected semesters

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)

selected semesters

Structure and function of terrestrial and aquatic ecosystems, with emphasis on productivity, energetics, biogeochemical cycling, and systems integration. Prerequisite: BIO 320 (or its equivalent).

BIO 526 Quantitative Ecology. (3)

selected semesters

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 its equivalent); a course in ecology.

BIO 529 Advanced Limnology. (3)

selected semesters

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)

fall

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)

selected semesters

Mathematical models in the description and analysis of the genetics of populations. Prerequisites: a combination of BIO 320 and 345 and 415 or only instructor approval.

BIO 547 Techniques in Evolutionary Genetics. (4)

selected semesters

Practical experience in modern techniques for the study of evolution. Lecture, lab. Prerequisites: BIO 340, 345; instructor approval.

BIO 550 Advanced Cell Biology. (3)

spring

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 its equivalent or PLB 360); CHM 231 (or 331 or its equivalent).

BIO 551 Biomembranes. (3)

selected semesters

Structure and function of biological membranes, emphasizing synthesis, fluidity, exocytosis, endocytosis, and cell responses to hormones and neurotransmitters. Prerequisites: BIO 353 and CHM 231 (or 331) (or their equivalents).

BIO 552 Developmental Genetics. (3)

spring

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)

selected semesters

Analyzes function in invertebrates and vertebrates, emphasizing evolutionary trends in physiological systems. Prerequisite: BIO 360 (or its equivalent).

BIO 566 Environmental Physiology. (3)

selected semesters

Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: BIO 320, 360.

BIO 568 Mammalian Physiology. (3)

selected semesters

Detailed treatment of mammalian organ system functions emphasizing integrative mechanisms. Prerequisite: BIO 360 (or its equivalent).

BIO 569 Cellular Physiology. (3)

selected semesters

Emphasizes the molecular basis for cell structure and function. Prerequisites: BIO 360; a course in organic chemistry.

BIO 583 OTS: Fieldwork in Tropical Biology. (6–8)

spring and summer

Intensive field-orientated classes with Organization for Tropical Studies (OTS) in Costa Rica with emphasis on research in ecology and systematics. Lecture, lab, fieldwork. Cross-listed as PLB 583. Credit is allowed for only BIO 583 or PLB 583. Prerequisites: graduate standing; a course in basic ecology.

BIO 584 Internship. (1–12)

fall and spring

BIO 591 Seminar. (1–12)

fall and spring

May be repeated for credit. Topics may include the following:

- Adaptations. (1–3)
- Behavior. (1–3)
- Cell Biology. (1–3)
- Ecology. (1–3)
- Evolution. (1–3)
- Genetic Engineering. (1–3)
- Genetics. (1–3)
- Physiology. (1–3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Building Design

See [“Master of Science in Building Design,” page 111.](#)



Tinna Traustadottir (left), a Ph.D. candidate, operates CO₂ monitoring equipment while Ph.D. student Pamela Bosch runs on a treadmill during a physical stress test. Tim Trumble photo

Business Administration

Master's and Doctoral Programs

School of Accountancy and Information Systems

www.cob.asu.edu/acct

480/965-3631

BA 223

Department of Finance

www.cob.asu.edu/fin

480/965-3131

BAC 519

Department of Management

www.cob.asu.edu/mgt

480/965-3431

BA 323

Department of Marketing

www.cob.asu.edu/mkt

480/965-3621

BAC 400

Department of Supply Chain Management

www.cob.asu.edu/scm

480/965-6044

BA 318

**Philip M.J. Reckers, Director,
School of Accountancy and Information Systems**

Professors: J.R. Boatsman, Christian, Goul, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: Boyd, David, Golen, Gupta, Hwang, Iyer, Keim, Kulkarni, Moeckel, O'Dell, O'Leary, Regier, Whitecotton, Yen

Assistant Professors: Bhattacharya, Chen, Chenoweth, Comprix, Dowling, Lee, O'Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

Senior Lecturers: Goldman, Maccracken, Shrednick

Lecturers: J.L. Boatsman, Geiger, Hayes

**Herbert M. Kaufman, Chair,
Department of Finance**

Professors: Booth, Coles, Kaufman, Sushka

Associate Professors: Cesta, Gallinger, Hertz, Hoffmeister

Assistant Professors: Deli, Griffin, Juergens, Martin, Nardari, Perry

Lecturer: Durham

**William H. Glick, Chair,
Department of Management**

Professors: Ashforth, Bohlander, Cardy, Dooley, Glick, Gomez-Mejia, Hershauer, Hom, Kinicki, Kulik, Penley, V. Smith-Daniels

Associate Professors: Boyd, Brenenstuhl, Callarman, Choi, Cook, Keats, Keller, Moorhead, Olivas, Roberson, Rungtusanatham, D. Smith-Daniels, Van Hook

Assistant Professors: Blancero, Koka, Lane

Lecturer: Davila

**Michael P. Mokwa, Chair,
Department of Marketing**

Professors: Bitner, Brown, Hutt, Jackson, Kumar,

Lastovicka, Mokwa, L. Ostrom, Reingen, Schlacter, Ward

Associate Professors: Blasko, Nowlis, Sinha, Stephens, Walker

Assistant Professor: A. Ostrom

**Joseph R. Carter, Chair,
Department of Supply Chain Management**

Professors: J. Carter, P. Carter, Ellram, Guntermann, Hendrick, Jennings, Kirkwood, Pearson, Smeltzer

Associate Professors: Aranda, Brooks, Butler, Choi, Davis, Dundas, Keefer, Leonard, Lock, Lynch, Maltz, Siferd, Verdini

The faculty in the College of Business offer a Ph.D. degree in Business Administration and a Master of Business Administration (M.B.A.) degree offered in day (full-time), evening, and executive programs.

Other professional master's degrees offered through the College of Business are described in this catalog under their respective degree program headings.

MASTER OF BUSINESS ADMINISTRATION

The central theme of the program is to build and strengthen capabilities in knowledge and analysis of the functional areas of business, basic skills, and managerial abilities. Knowledge involves textbook and case materials. Basic skills include computing, writing and critical thinking, presentation and speaking, team and group work, interpersonal relations, and time management. There is a strong team emphasis throughout the ASU curriculum.

The M.B.A. program is supported by each of the seven academic units within the College of Business.

Admission. See "[Admission to the Graduate College.](#)" [page 84.](#) All students applying to graduate business administration programs (except those applying to the M.S. degree in Economics) are required to take the GMAT. The TOEFL is required of all international applicants whose native language is not English or who are not graduates of an institution located in the United States. The TSE is not required for admission to the ASU M.B.A. program. However, it may be required for a dual degree program. For more information on testing, call 609/921-9000, fax 609/734-5410, access the Web site at www.toefl.org, send e-mail to etsinfo@ets.org, or write

GRADUATE PROGRAMS AND COURSES



Philip Regier addresses a class.

Tim Trumble photo

EDUCATIONAL TESTING SERVICE
ROSEDALE ROAD
PRINCETON NJ 08541-6103

Students applying to the M.B.A. program are required to have at least two years of full-time work experience and should submit an essay for the degree program addressing commitment, goals, qualifications, and reasons for interest in the program. Applicants are to provide letters of recommendation commenting on the student's motivation, commitment, achievements, work experience, and opportunity for success in the program. In addition to the above data, students are to communicate their interest for either the day, evening, or executive program. Applications are to be completed online.

Registration. Registration in courses numbered 502 and above is limited to students who have been admitted to a graduate degree program, have the approval of the M.B.A. program office, and have the prerequisites of calculus and computer literacy.

Structure of the M.B.A. Program. M.B.A. courses are open only to students admitted to the M.B.A. program.

Program Requirements. While there are no business course prerequisites, applicants must have computer proficiency and expertise in using a spreadsheet package, a word processing package, a presentation software package, an e-mail package, and an Internet browser. Potential students must also demonstrate strong quantitative ability. This is accomplished through an above average performance (65th

percentile or above) on the GMAT quantitative section or a college math course in calculus or advanced statistics.

At least 48 hours are required to complete the evening and executive programs. The day program has additional requirements that vary by area of study. Students are admitted to the fall semester only and, generally, enter and graduate as a class in two years.

The core courses are designed to provide a foundation in business knowledge and skills and must be taken in the prescribed sequence.

Elective courses build upon the business core and focus on the further development of an area of study.

The College of Business does not accept credits earned while students are in nondegree status; moreover, graduate business courses are not open to nondegree students.

Foreign Language Requirements. None.

Thesis Requirements. None.

Comprehensive Examinations. All students must successfully complete the comprehensive requirement established by the College of Business and Graduate College for the M.B.A. degree. The comprehensive exam is integrated with MGT 589 Strategic Management. Students passing this course with a grade of "A" or "B" satisfy the comprehensive exam requirement.

Dual/Concurrent Degree Programs. See ["Dual Degree Programs," page 59.](#)

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Business Administration prepares candidates for scholarly careers at leading educational institutions and for positions in business and government organizations where advanced research and analytical capabilities are required. Major emphasis is placed upon the development of expertise in a chosen subject area, a disciplined and inquiring mind, competence in research methodology, and skill in effectively communicating advanced business concepts.

Students are encouraged to work closely with the faculty from the beginning of their programs. A ratio of resident doctoral students to faculty of less than one to one ensures that faculty may serve effectively as mentors for doctoral students.

Admission. A completed application for admission to the Ph.D. in Business Administration degree program includes

1. application for admission to the Graduate College,
2. undergraduate and postgraduate transcripts,
3. Graduate Management Admission Test score or scores from the Graduate Record Examination,
4. applicant's letter of personal career objectives and rationale for pursuing the Ph.D. program,
5. three letters of recommendation,
6. Test of Spoken English score for applicants whose native language is not English, and
7. Test of English as a Foreign Language score for applicants whose native language is not English and

who have not completed a degree from a U.S. college or university.

Admission is granted for fall semesters only. The deadline for receipt of all required application materials is February 1.

Areas of Concentration. The Ph.D. student may choose from among six areas of concentration: accountancy, computer information systems, finance, management, marketing, and supply chain management.

The accountancy specialization area includes financial accounting, managerial accounting, tax policy, auditing, and information systems. See [“Concentration in Accountancy,” page 133.](#)

Research activities in information management encompass areas of theory and application in computer information systems. See [“Concentration in Computer Information Systems,” page 133.](#)

Research interests of the finance faculty offering the finance concentration focus on corporate finance, investments, financial markets, banking, and entrepreneurial finance.

The management concentration requires three core courses: organizational theory, organizational behavior, and research methodology. In addition to these core courses, students choose one of two specialty tracks: strategic management or human resource management. See [“Concentration in Management,” page 135.](#)

Research conducted by the marketing faculty offering the marketing concentration is focused in several areas: advertising, buyer behavior, distribution channels, services marketing, and other dimensions of marketing, including sales management, industrial marketing, and public-policy implications of marketing.

The faculty in the Department of Supply Chain Management offer the supply chain management concentration and are actively involved in the input-conversion-output process.

Program of Study. See [“Doctor of Philosophy,” page 96,](#) for general requirements. The Ph.D. degree program requires mathematical competence through linear algebra and calculus and computer skills. The program of study includes graduate study in economics, behavioral sciences, and quantitative/statistical analysis. The advanced program is composed of an area of concentration and supporting course work that best prepares students for conducting scholarly work in their areas of interest.

Comprehensive Examinations. A written comprehensive examination, designed to ascertain the candidate’s knowledge and orientation in the major field of study and fitness to proceed to the completion of a dissertation, is required at the end of course work. An additional written comprehensive examination on a candidate’s supporting course work is a departmental option. An oral examination after completion of written examinations is also a departmental option.

Dissertation Requirements. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge, be written in a scholarly manner, and demon-

strate the ability of the candidate to do independent research of high quality.

Final Examinations. A final oral examination in defense of the dissertation is required. The examination covers the subject matter of the dissertation and the field most nearly corresponding with that of the dissertation.

School of Accountancy and Information Systems

DOCTOR OF PHILOSOPHY

Concentration in Accountancy

The objective of the Ph.D. degree in Business Administration with a concentration in accountancy is to prepare scholars to conduct high-quality research. Graduates teach in the fields of financial and managerial accounting, auditing, information systems, and taxation. This program allows students to develop the capability to review, analyze, conduct, and publish research through a series of research seminars and theory-building and statistical course work that supplement and complement students’ abilities and desires. In addition, Ph.D. students participate in ongoing research projects in conjunction with faculty members in the School of Accountancy and Information Management.

Admission. A completed application for admission to the Ph.D. in Business Administration degree program must be submitted by the deadline of February 1. Admission is granted for the fall semester only. For more information, access the College of Business Web site at www.cob.asu.edu/phd.

Program of Study. See [“Doctor of Philosophy,” page 96,](#) for general requirements. The Ph.D. degree program requires mathematical competence and computer skills. The program of study includes graduate study in economics, behavioral sciences, and quantitative/statistical analysis. A minimum of 30 semester hours of doctoral course work and 24 semester hours of dissertation and/or research are required to be taken at ASU Main.

Comprehensive Examination. A written comprehensive examination is required once all course work has been completed. An oral examination after completion of written examinations is a departmental option. Specific questions can be directed to the Accountancy faculty advisor.

Dissertation. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge, be written in a scholarly manner, and demonstrate the ability of the candidate to do independent research of high quality. The final oral examination in defense of the dissertation is mandatory and must be held on the ASU Main campus.

Concentration in Computer Information Systems

The objective of the Ph.D. in Business Administration with a concentration in computer information systems is to prepare scholars for careers at leading educational institutions. This program allows students to develop the capability to review, analyze, conduct, and publish research

GRADUATE PROGRAMS AND COURSES

through a series of research seminars and additional supporting course work. In addition, Ph.D. students participate in ongoing research projects in conjunction with faculty members in the School of Accountancy and Information Management.

Admission. A completed application for admission to the Ph.D. in Business Administration degree program must be submitted by the deadline of February 1. Admission is granted for the fall semester only. For more information, access the College of Business Web site at www.cob.asu.edu/phd.

Program of Study. See [“Doctor of Philosophy,” page 96](#), for general requirements. The Ph.D. degree program requires mathematical competence and computer skills. The program of study includes graduate study in economics, behavioral sciences, and quantitative/statistical analysis. A minimum of 30 semester hours of doctoral course work and 24 semester hours of dissertation and/or research are required to be taken at ASU Main.

Comprehensive Examination. A written comprehensive examination is required once all course work has been completed. An oral examination after completion of written examinations is a departmental option. Specific questions can be directed to the CIS faculty advisor.

Dissertation. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge, be written in a scholarly manner, and demonstrate the ability of the candidate to do independent research of high quality. The final oral examination in defense of the dissertation is mandatory and must be held on the ASU Main campus.

Department of Finance

FINANCE (FIN)

FIN 502 Managerial Finance. (3)

once a year

Financial decision making, including net present value, interest rates, risk and return, efficient capital markets, capital budgeting, and financial forecasting. Lecture, cases, discussion. Prerequisites: ACC 502; ECN 502; QBA 502.

FIN 521 Investment Management. (3)

once a year

Valuation of equities and fixed income securities. Trading strategies and portfolio management. Performance evaluation. Trading mechanisms and market organization. Lecture, cases, discussion. Prerequisites: FIN 502, 551.

FIN 527 Derivatives and Risk Management. (3)

once a year

Characteristics and pricing of forwards, futures, swaps, options. Applications of instruments for hedging strategies, corporate risk management, and capital budgeting. Lecture, cases, discussion. Prerequisites: FIN 502, 551.

FIN 531 Financial Markets and Intermediaries. (3)

once a year

How the financial system affects the firm. Intermediation and capital markets. Risk management strategies, value at risk and financial instruments. Lecture, cases, discussion. Prerequisites: FIN 521, 527.

FIN 551 Applied Fundamental Analysis. (3)

once a year

Analyzes financial documents to determine quality of earnings. Forensic financial analysis to diagnose financial health and sustainable growth. Lecture, cases, discussion. Prerequisite: FIN 502.

FIN 556 International Financial Management. (3)

once a year

Behavior of exchange rates, interest rates, inflation rates. Analyzes corporate exposure to exchange rate risk and hedging strategies. Multicurrency capital budgeting. Lecture, cases, discussion. Prerequisites: FIN 521, 527.

FIN 561 Strategic Financial Management. (3)

once a year

Capstone case-oriented course in strategic applications of corporate finance. Acquisition, allocation, and management of funds within the business enterprise. Cases, discussion. Prerequisites: FIN 531, 556.

FIN 581 Advanced Valuation Methods. (3)

once a year

Analyzes practical aspects of valuing the enterprise using economic value added, free cash flow, and other financial techniques. Lecture, cases, discussion. Prerequisite: FIN 502.

FIN 591 Entrepreneurial Finance. (1–12)

once a year

Applies financial economic principles to solve problems associated with incubating and new ventures. Planning, understanding financial needs, structuring contracts. Lecture, cases, discussion. Prerequisite: FIN 502.

FIN 594 Entrepreneurial Finance. (3)

once a year

Applies financial economic principles to solve problems associated with incubating and new ventures. Planning, understanding financial needs, structuring contracts. Lecture, cases, discussion. Prerequisite: FIN 502.

FIN 781 Theory of Finance. (3)

once a year

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. (1–12)

once a year

Topics may include the following:

- Financial Institutions and Markets. (3)
Economic and monetary theory applied to financial markets and institutions; implications of financial structure for market performance and efficiency.
- Financial Management. (3)
Financial theory pertaining to capital structure, dividend policy, valuation, cost of capital, and capital budgeting.
- Investments. (3)
Investments and market theory; efficient markets hypothesis; option and commodity markets.

Prerequisite: FIN 781.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

Department of Management

MASTER OF BUSINESS ADMINISTRATION

The faculty in the Department of Management participate in offering the high technology M.B.A., executive M.B.A., evening M.B.A., and day M.B.A. programs. These programs are administered by the College of Business. For more information see [“College of Business,” page 58](#). Areas of study offered to high 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.

DOCTOR OF PHILOSOPHY

Concentration in Management

The faculty in the Department of Management offer students the opportunity to obtain a Ph.D. degree in Business Administration with a concentration in management. The doctoral program places primary emphasis on the development of research competence and emphasizes teaching as a vehicle to academic professionalism. The mission of the program is to provide an environment that is conducive to the development of scholars who are prepared to assume the diverse responsibilities of positions at leading research universities. The goal is to prepare students for research careers in the academic community.

Doctoral students are encouraged to design an individually meaningful course of study within the larger context of the management field. Opportunities for doing this are available through course work, individual work with faculty members, and independent research and study. Students in the Ph.D. program select a series of Ph.D. course modules within the department and several supporting courses from other departments on campus. Students develop additional focus and expertise through collaboration on major papers with individual faculty members.

The faculty in the Department of Management cover the areas of human resource management, management science, operations management, organizational behavior, organizational theory, and strategic management. The faculty's research and teaching emphasizes high tech management, quality, process and project management, decision analysis, globalization, diversity, small business and entrepreneurship, change management, stress, job loss, organizational identity, corporate governance, and human resource management practices. The faculty has distinguished itself with research and publications in premier journals. The department ranks 12th internationally for its rate of publication in premier academic journals. The department also ranks sixth internationally in premier journal articles that impact practice in operations and management science.

Further information, links to courses, current faculty, and updates on the Department of Management areas of study for the M.B.A. programs can be found on the Web 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, links to current faculty, and updates on the Ph.D. program in Business with a concentration in management can be found at www.cob.asu.edu/mgt/degree/PhDMainPg.htm.

MANAGEMENT (MGT)

MGT 410 Responsible Leadership. (3)

fall, spring, summer

Values, core beliefs, legal and ethical mandates and cultural norms as they apply to the conduct of organizations; application through a Service Learning project. Interactive, learner-centered. Prerequisites: MGT 310, 320.

MGT 413 Compensation Management. (3)

fall and spring

Establishing base and incentive pay with job analysis, job evaluation, and wage surveys; performance appraisal; conformance to compensation laws. Prerequisite: MGT 420.

MGT 420 Performance Management. (3)

fall, spring, summer

Development of skills and knowledge to lead associates effectively: hiring, developing, evaluating, retaining, and rewarding employees. Preparation for leadership roles. Lecture, discussion, interactive, learner-centered. Prerequisites: MGT 310, 320.

MGT 423 Employee-Management Relations. (3)

fall and spring

Employment relationship in union/nonunion setting. Employee-management rights/responsibilities, complaint administration, negotiations, union structure, and mock negotiations. Prerequisites: MGT 310, 320.

MGT 433 Management Decision Analysis. (3)

fall and spring

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: only MGT 300 or both MGT 310 and 320.

MGT 440 Small Business and Entrepreneurship. (3)

fall and spring

Opportunities, risks, and problems associated with small business development and operation.

MGT 445 Business Plan Development. (3)

fall and spring

Develops a complete strategic business plan emphasizing the planning process undertaken by successful small business owners and entrepreneurs. Lecture, discussion, experiential exercise. Prerequisite: MGT 440.

MGT 459 International Management. (3)

fall and spring

Concepts and practices of multinational and foreign firms. Objectives, strategies, policies, and organizational structures for operating in various environments. Credit is allowed for only MGT 459 or IBS 494 ST: International Management or ST: Multinational Management. Prerequisite: IBS 300.

MGT 460 Strategic Leadership. (3)

fall, spring, summer

Systems theory of organizations, strategy formulation and administration in organizations, creating organizational cohesiveness, and leading change within organizations. Lecture, cases, exercises. Prerequisites: MGT 410, 420; completion of 100 hours including all business administration core requirements. Corequisite: OPM 450.

MGT 494 Special Topics. (1-4)

selected semesters

Current topics in management, primarily designed for business majors. See the *Schedule of Classes* for current offerings of courses at ASU Main and East. Topics may include the following:

- Applied International Management. (3)
- Cultural Factors in International Business. (3)
Prerequisite: IBS 300 (or 494) or MGT 300 (or 459).
- Strategic Management. (3)

MGT 502 Organization Theory and Behavior. (3)

once a year

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 522 Human Resource Activity and the Management of Diversity. (3)

once a year

Applies general and human resource management principles to work effectively with a diverse spectrum of people. Discussion, exercises. Prerequisite: M.B.A. degree program student.

MGT 523 Managing People for Service Advantage. (3)

once a year

Covers HRM practices that are conducive to building and maintaining internal customer equity and maximizing external customer service. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

GRADUATE PROGRAMS AND COURSES

MGT 559 International Management. (2–3)

once a year

Studies international and cross-cultural influences on management processes and development of global leadership capabilities for experienced management professionals. Discussion, company analyses, case analyses, lecture, guest speakers. Prerequisite: M.B.A. degree program student.

MGT 561 Advanced Integrated Project. (2–3)

once a year

Capstone project of the high-technology ASU M.B.A. Student teams develop business plans for new technology-based products. Online project. Prerequisite: M.B.A. degree program student.

MGT 570 Management Consulting. (3)

once a year

Develops understanding of how internal and external consultants add value. Prerequisites: ability to use common business software, including Microsoft Office; familiarity with spreadsheets.

MGT 589 Strategic Management. (3–4)

spring

Formulation of strategy and policy in the organization, emphasizing the integration of decisions in the functional areas. Prerequisite: M.B.A. degree program student.

MGT 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Business Plan Competition. (3)
- Entrepreneurship. (3)
- Human Resource Management and Service Delivery. (3)
- Human Resources and High-Technology Management. (3)
- Organizational Change and Business Process Consulting. (3)

MGT 593 Applied Projects. (3)

once a year

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Pre- or corequisite: all core courses in the M.B.A. program.

MGT 598 Special Topics. (3)

selected semesters

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. (1–12)

selected semesters

Short module seminars. Topics may include the following:

- Causal Modeling. (1)
- Change and Coping. (1)
- Cognition: Micro and Macro Perspectives. (1)
- Dysfunction in Workplace. (1)
- Economic Theories of the Firm. (1)
- Levels of Analysis. (1)
- Motivation and Attitudes. (1)
- Organizational Identity and Identification. (1)
- Organizational Learning and Organizational Identity. (1)
- Organizational Performance and Reward Systems. (1)
- Organizational Strategy and Culture. (1)
- Organizational Structure, Technology, and Information Systems. (1)
- Organizational Withdrawal. (1)
- Performance Appraisal. (1)
- Power and Organizational Change. (1)
- Selection. (1)
- Strategy Overview. (1)
- Teams, Groups, and Leadership. (1)
- The Craft of Research. (1)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

OPERATIONS MANAGEMENT (OPM)

OPM 450 Changing Business Processes. (3)

fall, spring, summer

Describes and analyzes business processes. Generates and evaluates alternatives. Creates improvement and implementation plans. Prerequisite: completion of 100 hours including all business administration core requirements. Pre- or corequisite: FIN 461 or MGT 460 or

MKT 460 or SCM 479 or any other recommended business integrative course.

OPM 540 Quality and Productivity Management. (3)

once a year

Organizational factors influencing quality and productivity in the production of goods and services. Quality and productivity strategies, improvement programs, and measurement systems. Prerequisite: SCM 502 or instructor approval.

OPM 581 Management of Technology and Innovation. (3)

once a year

Technology life cycles, technology forecasting, new product development process, innovation teams, innovation best practices. Prerequisite: M.B.A. degree program student.

OPM 583 Project Management in Service Organizations. (2–3)

once a year

Project management planning, leadership, and control in service organizations. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

OPM 585 Facilities Design and Management of Technology. (3)

once a year

Decisions regarding management of facilities and technology for manufacturing and service firms. Facilities location, layout, process design, and selection.

OPM 586 High-Technology Project Management. (2–3)

fall

Project management processes for high-technology organizations, including planning, scheduling, team development, and control. Prerequisite: M.B.A. degree program student.

OPM 587 Project Management. (3)

once a year

Planning, scheduling, and controlling of projects in R & D, manufacturing, construction, and services. Project selection, financial considerations, and resource management. Prerequisite: QBA 502.

OPM 588 Strategic Project Management. (2–3)

fall

Overview of strategic project management processes, project planning and control, project portfolio management, resource allocation, management of strategic project partners. Discussion, lecture, class exercises, cases. Prerequisite: M.B.A. degree program student.

OPM 591 Seminar. (1–12)

once a year

Topics may include the following:

- High-Performance Management Processes. (3)
- Management of Technology. (3)
- Manufacturing Management in High Technology. (3)
- Manufacturing Strategy. (3)
- New Product and Process Development. (3)
- Technology/Project Management. (3)

OPM 593 Applied Projects. (3)

once a year

Cross-functional teams initiate (possibly implement) organizational change within a local firm. Lecture, discussion, experiential learning. Pre- or corequisite: all core courses in the M.B.A. program.

OPM 791 Doctoral Seminars in Operations and Production Management. (1–12)

selected semesters

Short module seminars. Topics may include the following:

- Management of Technology. (1)
- Manufacturing Strategy. (1)
- Operations Management. (1)
- Project Management. (1)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Department of Marketing

MARKETING (MKT)

MKT 411 Sales Management. (3)

once a year

Applies management concepts to the administration of the sales operation. Prerequisite: MKT 302.

MKT 412 Promotion Management. (3)

once a year

Integrates the promotional activities of the firm, including advertising, personal selling, public relations, and sales promotion. Prerequisite: MKT 302.

MKT 424 Retail Management. (3)

selected semesters

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)

once a year

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 Business-to-Business Marketing. (3)

once a year

Strategies for marketing products and services to commercial, institutional, and governmental markets. Changing industry and market structures. Prerequisite: MKT 302 or instructor approval.

MKT 435 International Marketing. (3)

once a year

Analyzes 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)

fall and spring

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; QBA 221.

MKT 460 Strategic Marketing. (3)

fall and spring

Policy formulation and decision making by the marketing executive. Integrates marketing programs and considers contemporary marketing issues. Prerequisite: professional program business student. Prerequisites with a grade of "C" or higher: MKT 302, 304, 451.

MKT 494 Special Topics. (1–4)

fall, spring, summer

Chosen from topics in the marketing and international marketing arenas to include seminars in international marketing in Europe and Asia. Topics may include the following:

- Applied International Marketing

MKT 499 Individualized Instruction. (1–3)

fall, spring, summer

Topics of special interest chosen by students and agreed to by the departments to do independent studies with a professor acting as a guide.

MKT 502 Marketing Management. (3)

fall, spring, summer

Managing the marketing function; market and environmental analysis; marketing planning, strategy, and control concepts. Development and management of marketing programs. Prerequisite: ECN 502.

MKT 524 Services Marketing. (3)

once a year

Strategies for marketing services emphasizing the distinctive challenges and approaches that make marketing of services different from marketing manufactured goods. Prerequisite: MKT 502 (or its equivalent).

MKT 563 Marketing Strategy. (3)

selected semesters

Planning and control concepts and methods for developing and evaluating strategic policy from a marketing perspective. Prerequisite: MKT 502.

MKT 584 Internship. (3)

fall, spring, summer

MKT 591 Seminar. (1–12)

once a year

Offered in conjunction with the M.B.A. program (see M.B.A. program section). Topics may include the following:

- Business-to-Business Marketing. (3)
- Competitive Strategy for Services. (3)
- Consumer Behavior and Market Strategy. (3)
- Customer Satisfaction/Service Quality Measurement. (3)
- International Marketing. (3)
- Marketing in the Information Age. (3)
- New Product and Service Development. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Department of Supply Chain Management

BUSINESS (BUS)

BUS 451 Business Research Methods. (3)

selected semesters

Methods of collecting information pertinent to business problem solving, including design, collection, analysis, interpretation, and presentation of primary and secondary data.

BUS 502 Managerial Communication. (1–3)

fall and spring

Analyzes various business problems, situations, and development of appropriate communication strategies. Prerequisite: MGT 502.

BUS 591 Seminar. (3)

selected semesters

Selected managerial communication topics.

BUS 594 Study Conference or Workshop. (3)

selected semesters

BUS 700 Research Methods. (3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

LEGAL AND ETHICAL STUDIES (LES)

LES 411 Real Estate Law. (3)

once a year

Legal and ethical aspects of land ownerships, interests, transfer, finance development, and regulations of the real estate industry.

LES 532 Negotiation Agreements. (3)

fall and spring

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)

fall and spring

Studies legal and ethical components of business decisions; self-regulation and social responsibility as strategies. Prerequisites: ACC 503; FIN 502; MGT 502; MKT 502.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

REAL ESTATE (REA)

REA 401 Real Estate Appraisal. (3)

once a year

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)

once a year

Neighborhood and city growth. Municipal planning and zoning. Development of residential, commercial, industrial, and special purpose properties. Prerequisites: REA 300; professional program business student.

GRADUATE PROGRAMS AND COURSES

REA 456 Real Estate Investments. (3)

once a year

Analyzes investment decisions for various property types. Cash flow and rate of return analysis. Prerequisites: FIN 300; professional program business student.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

QUANTITATIVE BUSINESS ANALYSIS (QBA)

Department of Supply Chain Management

QBA 505 Management Science. (3)

selected semesters

Quantitative approaches to decision making, including linear programming and simulation, with emphasis on business applications. Prerequisites: MAT 210; QBA 502.

QBA 508 Product and Service Innovation. (3)

fall and spring

Develops strategies for innovation in products and services. Prerequisites: basic algebra; basic probability concepts; elementary knowledge of Windows.

QBA 550 Intermediate Decision Analysis. (3)

selected semesters

Quantitative decision analysis methods for business decision making under uncertainty, including decision diagrams, subjective probabilities, and preference assessment. Prerequisites: MAT 210; QBA 502.

QBA 591 Seminar. (1–12)

fall and spring

Current topics in quantitative business analysis primarily designed for technology, evening, and executive M.B.A. students. Elective courses for these programs may include the following possible topics:

- Decision Models. (3)
- Decision Models for Consulting. (3)
- Management Problem Solving. (3)
- Strategic Decision Analysis. (3)

QBA 593 Applied Project. (1–12)

selected semesters

QBA 599 Thesis. (1–12)

selected semesters

QBA 791 Doctoral Seminars in Quantitative Business Analysis. (1–12)

selected semesters

The Department of Supply Chain Management has adopted a modular approach to Ph.D. education. Topics may include the following:

- Chaos Theory. (1)
- Risk Analysis. (1)
- Strategic Decision Making. (1)
- Systems Dynamics. (1)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

SUPPLY CHAIN MANAGEMENT (SCM)

SCM 405 Urban Transportation. (3)

selected semesters

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 Planning and Control Systems for Supply Chain Management. (3)

fall and spring

Planning and control systems for product and service flows in supply chain: production planning, master scheduling, MRP, ERP, inventory management. Lab. Fee. Prerequisites: SCM 300; professional program business student. Pre- or corequisites: SCM 345, 355.

SCM 440 Quality Management and Measurement. (3)

fall and spring

Quality management and measurement, relationships with suppliers and customers, quality awards, certifications, programs, tools for process improvement and cost analyses. Prerequisites: SCM 300; pro-

fessional program business student majoring in Supply Chain Management.

SCM 455 Research and Negotiation. (3)

fall and spring

Current philosophy, methods, techniques for conducting strategic and tactical supply chain research and negotiations. Includes supplier price and cost analysis. Prerequisite: professional program business student majoring in Supply Chain Management. Prerequisite with a grade of "C" or higher: SCM 355.

SCM 460 Carrier Management. (3)

selected semesters

Analyzes carrier economics, regulation, management, and rate-making practice; evaluates public policy issues related to carrier transportation. Prerequisite: both SCM 345 and upper-division standing or only instructor approval.

SCM 463 Global Supply Chain Management. (3)

once a year

Supply chain activities in international business with special emphasis on management of transportation, global sourcing, customs issues, and facility location in a global environment.

SCM 479 Supply Chain Strategy. (3)

fall and spring

Integrated supply chain strategies synthesizing supply management, production, logistics, and enterprise systems. Provides a comprehensive perspective of supply chain management. Prerequisite: professional program business student majoring in Supply Chain Management. Prerequisites with a grade of "C" or higher: SCM 345, 355. Pre- or corequisites: SCM 432, 440, 455 (one of these courses must be taken as a prerequisite with a grade of "C" or higher).

SCM 502 Operations and Supply Management. (3)

fall and spring

Contemporary management issues, including environmental, project, and supply chain management; new product development; quality control; TQM. Prerequisite: M.B.A. degree program student.

SCM 511 Integrated Supply Chain Management. (3)

once a year

Management of sourcing, operations, and logistics as an integrated process.

SCM 515 Decision Models for Supply Chain Management. (3)

once a year

Decision modeling approaches for supply chain management such as optimization, simulation, and decision analysis. Emphasizes spreadsheet-oriented approaches.

SCM 521 Supply Management and Negotiation. (3)

once a year

Selecting, developing, and executing appropriate sourcing strategies and processes.

SCM 532 Supply Chain Cost and Design Issues. (3)

once a year

Strategic design and development of supply chains. Focus on cost-management tools applied to supply chain design and supplier management.

SCM 541 Logistics in the Supply Chain. (3)

once a year

Critical issues for customer perception of supply chain performance, including inventory planning, transportation, warehousing, information technology, and integrated logistics service.

SCM 551 Operations Planning and Execution. (3)

once a year

Managing the conversion of raw materials to finished goods, including scheduling, work-in-process inventory management, and postpone-ment/customization.

SCM 591 Seminar. (1–12)

fall and spring

Topics may include the following:

- Buyer/Supplier Relations. (3)
- Decision Models for Supply Chain Management. (3)
- E-commerce. (3)
- Global Supply Chain Management. (3)
- Operations Planning and Control. (3)
- Supply Chain Management Fundamentals. (3)

SCM 791 Doctoral Seminar. (1–12)*once a year*

Topics may include the following:

- Complexity and Chaos Theory for Supply Chain Management. (3)
- Logistics Management. (3)
- Purchasing and Materials Management. (3)
- Supply Chain Management and Organizational Theories. (3)
- Uncertainty in Supply Chain Management. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Business Administration

Master’s Degree

ASU West also offers a Master of Business Administration (M.B.A.) degree. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Chemical Engineering

Master’s and Doctoral Programs

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ECG 202

Subhash Mahajan, Chair

Professors: Mahajan, Raupp

Associate Professors: Beaudoin, Beckman, Burrows, Rivera, Sierks

Assistant Professors: Allen, Dillner, Razatos

The faculty in the Department of Chemical and Materials Engineering offer graduate programs leading to the M.S., Master of Science in Engineering, and the Ph.D. degrees in Chemical Engineering. Areas of research emphasis include biotechnology and biomaterials, chemical therapies for neurodegenerative diseases, adhesion in biological and inorganic systems, electronic materials processing, environmentally-benign manufacturing, process design and operations, water and air purification, surface and reaction engineering, and photocatalysis. Within the Engineering Science major, students may select materials science and engineering as the area of study (see [“Engineering Science,” page 197](#), for program description).

The faculty also participate in offering the interdisciplinary program leading to the Doctor of Philosophy degree with a major in Science and Engineering of Materials (see [“Science and Engineering of Materials,” page 312](#), for program description). A *Graduate Student Handbook*, detailing

information on graduate studies in Chemical Engineering, is available to admitted students. Students should contact the department.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See [“Master of Engineering,” page 190](#), for program description.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

MASTER OF SCIENCE

See [“Master’s Degrees,” page 93](#), for general requirements.

Transition Program. Students applying for the program leading to a master’s degree with a major in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, may have an undergraduate B.S. degree in a major field other than chemical engineering or materials science. The qualifications of transition students are reviewed by the department graduate committee, and a special program is designed for successful applicants. In general, applicants should have had, or should be prepared to take, calculus through differential equations and physics. Transition students are expected to complete the essential courses in their area of study from the undergraduate program to prepare themselves for the graduate courses. Other course work from the undergraduate program may be required depending upon the area of study selected by the student.

Transition students should contact the graduate coordinator for an evaluation of the undergraduate transcript.

Program of Study. All candidates for the Master of Science in Engineering or M.S. degree in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, are required to complete an approved program of study consisting of the minimum required semester hours, including research report (M.S.E.) or thesis (M.S.). Special course requirements for the different areas of study are established by the faculty and are available from the departmental graduate coordinator. In addition to the course/thesis requirements, all full-time graduate students must successfully complete a seminar course during each semester of attendance; part-time students must enroll in a seminar course at least three times during the course of study. Candidates whose undergraduate degree was in a field other than chemical engineering or materials science may be required to complete more than 30 semester hours.

Thesis Requirements. A thesis or equivalent is required.

Final Examinations. A final oral examination is required in defense of the thesis or equivalent.

MASTER OF SCIENCE IN ENGINEERING

See [“Master of Science in Engineering,” page 196](#), for information on the Master of Science in Engineering degree.

GRADUATE PROGRAMS AND COURSES

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, is conferred upon evidence of excellence in research resulting in a scholarly dissertation that is a contribution to existing knowledge.

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Doctoral Program. Upon successful completion of the qualifying examination, a research supervisory committee is formed and the doctoral student is required to submit a research proposal. Following the acceptance of the research proposal, the student is given a comprehensive examination to determine initiative, originality, breadth, and high level of professional commitment to the problem selected for investigation. Upon successful completion of the comprehensive examination, the student applies for admission to candidacy.

Master's Degree in Passing. Students who are enrolled in the Ph.D. degree program in Chemical Engineering, but who do not hold a previously earned master's degree in chemical engineering, can obtain the M.S.E. degree (the "Master's in Passing") upon completion of course requirements, the Ph.D. qualifying examination, prospectus, and the comprehensive examination.

As this degree is only available to students who are enrolled as regular students in the Ph.D. program in Chemical Engineering, all of the above requirements (including course work) can be applied toward the Ph.D. requirements.

Foreign Language Requirements. Candidates in the program leading to the Ph.D. degree in Chemical Engineering, or in the area of study of materials science and engineering under the Engineering Science major, normally are not required to pass an examination showing reading competency of a foreign language. However, the supervisory committee may establish such a requirement in special cases depending upon the research interests of the candidate. If the foreign language is required, the student must successfully fulfill the requirement before taking the comprehensive examination.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Atmospheric Aerosols. Chemistry and physics of aerosols, visibility degradation, climatological effects, human health impacts, atmosphere-biosphere interactions, novel aerosol instrumentation, ultrafine particle characterization, sources of atmospheric particles, environmental fate of pollutants.

Biochemical Engineering. Biological colloids, bioadhesion, biofilms, biochips, protein engineering, enzyme kinetics, biomedical engineering, antibody-based therapeutics, neurodegenerative diseases, atomic force microscopy, protein-protein interactions, coagulation.

Chemical Process Control. Advanced process identification and control. Control oriented approaches to supply chain management. Application to chemical, petroleum, and semiconductor manufacturing industries.

Chemical Process Engineering. Chemical process design fundamentals, optimization techniques and applications, process modeling, simulation, dynamics and control, and applied statistics.

Electronic Materials. Adsorption, catalysis, solid-state materials processing for control of properties, adhesion, surface cleaning, plasma etching, physical vapor deposition, polymer processing, photolithography, semiconductor materials processing, chemical vapor deposition, surface reactions, electrochemical reactions, optimization of electroplating processing, and surface analysis.

Environmental Analysis. Energy and environmental design considerations, purification of effluent streams, water reclamation and purification, sea water desalination, CMP effluent recovery, analysis of air and water pollution, modeling of pollution systems, and recycling for pollution control.

Materials Science and Engineering. Semiconductor processing and characterization, polymeric and ceramic composites, materials for high critical temperature superconductor applications, ferritic thin films for capacitor and memory applications, high temperature materials for space applications, mechanical behavior of high-strength Al-Li alloys, environmentally influenced mechanical effects, and micro-biologically influenced corrosion reactions.

In addition to the strong core programs, the department emphasizes multidisciplinary research at the leading edge of science, where departmental strengths interface with materials and solid-state research, life sciences, bioengineering, atmospheric sciences, and environmental studies.

Faculty in chemical engineering are also involved in numerous research centers and programs across campus, including the Center for Solid State Science, the Molecular and Cellular Biology master's degree program, and the Atmospheric Sciences certificate program.

CHEMICAL ENGINEERING (CHE)

CHE 458 Semiconductor Material Processing. (3)

selected semesters

Introduces the processing and characterization of electronic materials for semiconductor applications. Prerequisites: CHE 333, 342.

CHE 475 Biochemical Engineering. (3)

selected semesters

Applies chemical engineering methods, mass transfer, thermodynamics, and transport phenomena to industrial biotechnology. Prerequisite: instructor approval.

CHE 476 Bioreaction Engineering. (3)

selected semesters

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)

selected semesters

Principles of separation of biologically active chemicals; the application, scale-up, and design of separation processes in biotechnology. Prerequisite: instructor approval.

CHE 501 Introduction to Transport Phenomena. (3)

fall and spring

Transport phenomena, with emphasis on fluid systems. Prerequisite: transition student with instructor approval.

CHE 502 Introduction to Energy Transport. (3)*fall and spring*

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)*fall and spring*

Applies transport phenomena to mass transfer. Design of mass transfer equipment, including staged processes. Prerequisite: transition student with instructor approval.

CHE 504 Introduction to Chemical Thermodynamics. (3)*fall and spring*

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)*fall and spring*

Applies kinetics to chemical reactor design. Prerequisite: transition student with instructor approval.

CHE 527 Advanced Applied Mathematical Analysis in Chemical Engineering. (3)*fall*

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)*spring*

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)*fall*

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. Credit is allowed for only BME 533 or CHE 533.

CHE 534 Transport Processes II. (3)*spring*

Continuation of BME 533 or CHE 533, emphasizing mass transfer. Cross-listed as BME 534. Credit is allowed for only BME 534 or CHE 534. Prerequisite: BME 533 or CHE 533.

CHE 536 Convective Mass Transfer. (3)*selected semesters*

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)*fall*

Classical and statistical thermodynamics of nonideal physicochemical systems and processes; prediction of optimum operating conditions.

Cross-listed as BME 543. Credit is allowed for only BME 543 or CHE 543.

CHE 544 Chemical Reactor Engineering. (3)*spring*

Reaction rates, thermodynamics, and transport principles applied to the design and operation of chemical reactors. Cross-listed as BME 544. Credit is allowed for only BME 544 or CHE 544. Prerequisite: BME 543 or CHE 543.

CHE 548 Topics in Catalysis. (3)*selected semesters*

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)*selected semesters*

Water pollutants, quality criteria and control, chemical treatment processing, and system design. Case studies. Prerequisite: CHE 331 (or its equivalent).

CHE 553 Air Quality Control. (3)*selected semesters*

Air pollutant origins, effects, and control. Physical and chemical processes, including dispersion, combustion, sampling, control equipment design, and special topics. Prerequisite: CHE 331 (or its equivalent).

CHE 554 New Energy Technology. (3)*selected semesters*

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)*selected semesters*

Topics in binary/multicomponent separation, rate governed and equilibrium processes, mass transfer criteria, energy requirements, separating agents and devices, and staged operations.

CHE 558 Electronic Materials. (3)*selected semesters*

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)*spring*

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)*selected semesters*

Computational methods; the design of chemical plants and processes.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," [page 48](#).



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Chemistry

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PS D102A

James P. Allen, Assistant Chair for Graduate Studies

Regents' Professors: Angell, Buseck, C. Moore, O'Keeffe, Pettit

Professors: Allen, Birk, Blankenship, Fuchs, Gust, Holloway, Lohr, A. Moore, T. Moore, Munk, Petuskey, Rose, Skibo, Steimle, Williams, Woodbury

Associate Professors: Kouvetakis, Wolf

Assistant Professors: Booksh, Caudle, Francisco, Gould, Hayes, Matyushov, Richert

The faculty in the Department of Chemistry and Biochemistry offer programs leading to the M.S. and the Ph.D. degrees in Chemistry. Areas of concentration include analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, and solid-state chemistry.

The faculty also participate in offering programs leading to the Master of Natural Science degree when one of the concentrations is chemistry (see "[Natural Science](#)," [page 279](#)), and the interdisciplinary programs, leading to the Ph.D. degrees with majors in Exercise Science (see "[Exercise and Wellness](#)," [page 210](#)) and the Science and Engineering of Materials (see "[Science and Engineering of Materials](#)," [page 312](#)).

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect chemistry as the subject matter field.

The graduate programs offered by the faculty in the Department of Chemistry and Biochemistry prepare students for professional careers in chemistry and related fields in industry, government, and educational institutions. All students applying for admission to one of these programs must submit scores for the Graduate Record Examination.

MASTER OF SCIENCE

See "[Master's Degrees](#)," [page 93](#), for general requirements.

Program of Study. A minimum of 30 semester hours of credit is required. A thesis carrying six semester hours is also included in the total. The remaining courses are selected by the student in consultation with the supervisory committee.

Thesis Requirements. A thesis is required.

Final Examinations. A general oral examination is required of all candidates for the master's degree. A written examination may also be required.

DOCTOR OF PHILOSOPHY

See "[Doctor of Philosophy](#)," [page 96](#), for general requirements.

Program of Study. A minimum of 84 semester hours, including dissertation, is required. Approximately 20–30 hours of this total is formal course work. Courses, including research and dissertation, are selected by the student in consultation with the supervisory committee.

Cumulative Examinations. Written examinations are required. In addition, an oral examination is required which includes material of a general nature, and the presentation and defense of current research and an original research proposal prepared by the student.

Foreign Language Requirements. There is no departmental foreign language requirement, but the student's supervisory committee may specify a reading proficiency in one or more foreign languages.

Dissertation Requirements. A dissertation based on original work of high quality and demonstrating proficiency in the student's special field is required. (See "[Research and Dissertation Requirements](#)," [page 97](#).)

Final Examinations. The final oral examination is a defense of the dissertation, during which the candidate presents a summary of the dissertation research. Evidence of a publishable contribution of original research must be presented.

BIOCHEMISTRY (BCH)

BCH 461 General Biochemistry. (3)

fall

Structure, chemistry, and metabolism of biomolecules and their role in the biochemical processes of living organisms. Credit is allowed for only BCH 461 or 361. Prerequisite: CHM 318 or 332. Corequisite: CHM 341 or 346.

BCH 462 General Biochemistry. (3)

spring

Continuation of BCH 461. Prerequisite: BCH 461 or instructor approval.

BCH 463 Biophysical Chemistry. (3)

spring

Principles of physical chemistry as applied to biological systems. Prerequisite: CHM 341 or 346.

BCH 467 Analytical Biochemistry Laboratory. (3)

spring

Quantitative analysis, separation and purification of biological molecules. Applies chemical and physical methods to the characterization of biological macromolecules. 1 conference, 1 hour lecture, 5 hours lab. Prerequisite: BCH 461. Corequisite: BCH 462.

BCH 501 Current Topics in Biochemistry. (1)

fall and spring

May be repeated for credit. Seminar. Prerequisite: instructor approval.

BCH 561 Advanced Topics in Biochemistry. (3)

spring

Topics selected from emerging areas of biochemistry based primarily on current literature. Prerequisite: BCH 462.

BCH 563 Biophysical Chemistry. (3)*selected semesters*

Physical chemistry of macromolecules, especially proteins, nucleic acids, and polysaccharides. Thermodynamics, hydrodynamics, and spectroscopy of and their relation to structure. Prerequisites: BCH 462; CHM 346.

BCH 568 Molecular Mechanisms of Photosynthesis. (3)*spring*

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as PLB 558. Credit is allowed for only BCH 568 or PLB 558. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" page 48.

CHEMISTRY (CHM)**CHM 424 Separation Science. (3)***selected semesters*

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. Fee. Prerequisite: CHM 318 or 332 or 346 or instructor approval.

CHM 431 Qualitative Organic Analysis. (3)*spring*

Systematic identification of organic compounds. 1 hour lecture, 6 hours lab. Fee. Prerequisites: both CHM 118 (or 327) and 320 (or 336) or only instructor approval.

CHM 452 Inorganic Chemistry Laboratory. (1–2)*spring*

Preparation and characterization of typical inorganic substances, emphasizing methods and techniques. 1 conference, 5 hours lab. Fee. Prerequisite: instructor approval.

CHM 453 Inorganic Chemistry. (3)*fall*

Principles and applications of inorganic chemistry. Prerequisite: CHM 341 or 346.

CHM 460 Biological Chemistry. (3)*spring*

Structure and function of macromolecules and their involvement in the processing of energy and information by living cells. Prerequisites: CHM 318, 346, 453.

CHM 471 Solid-State Chemistry. (3)*fall*

Crystal chemistry, thermodynamics and electrochemistry of solids, nonstoichiometric compounds, diffusion and solid-state reactions, crystal growth, and selected topics. Pre- or corequisite: CHM 346 or instructor approval.

CHM 480 Methods of Teaching Chemistry. (3)*spring*

Organization and presentation of appropriate content of chemistry; preparation of reagents, experiments, and demonstrations; organization of stock rooms and laboratories; experience in problem solving. Fee. Prerequisite: instructor approval.

CHM 481 Geochemistry. (3)*spring*

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as GLG 481. Credit is allowed for only CHM 481 or GLG 481. Prerequisite: CHM 341 (or 346) or GLG 321.

CHM 485 Meteorites and Cosmochemistry. (3)*selected semesters*

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as GLG 485. Credit is allowed for only CHM 485 or GLG 485.

CHM 494 Special Topics. (1–4)*selected semesters*

Topics may include the following:

- Chemistry of Global Climate Change. (3)

CHM 501 Current Topics in Chemistry. (1)*fall and spring*

May be repeated for credit. Prerequisite: instructor approval.

CHM 521 Chemometrics. (3)*selected semesters*

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)*once a year*

Theoretical principles of analytical instrumentation and measurements. Prerequisites: both CHM 325 and 346 or only instructor approval.

CHM 525 Spectrochemical Methods of Analysis. (4)*selected semesters*

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 346 or instructor approval.

CHM 526 X-Ray Methods of Analysis. (4)*selected semesters*

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 346.

CHM 527 Electrical Methods of Chemical Analysis. (4)*selected semesters*

Theoretical and practical considerations of polarographic, potentiometric, amperometric techniques, including modern electrochemical methods. 2 hours lecture, 6 hours lab. Prerequisite: CHM 346.

CHM 531 Advanced Organic Chemistry I. (3)*fall*

Reaction mechanisms, reaction kinetics, linear free energy relationships, transition state theory, molecular orbital theory, and Woodward-Hoffmann rules. Prerequisites: CHM 318 (or 332), 346.

CHM 532 Advanced Organic Chemistry II. (2)*spring*

Continuation of CHM 531. Prerequisite: CHM 531.

CHM 537 Organic Reactions. (3)*spring*

Important synthetic reactions of organic chemistry emphasizing recently discovered reactions of preparative value. Prerequisite: CHM 531.

CHM 541 Advanced Thermodynamics. (3)*fall*

Equilibrium thermodynamics, chemical reactions, and phase equilibria. Introduces statistical thermodynamics, critical phenomena, and kinetics. Prerequisite: CHM 346.

CHM 545 Quantum Chemistry I. (3)*fall*

Basic quantum theory, chemical bonding, and molecular structure. Prerequisite: CHM 346.

CHM 546 Quantum Chemistry II. (3)*spring*

Quantum theory of rate processes. Principles of spectroscopy and nonlinear optics. Prerequisite: CHM 545.

CHM 548 Chemical Kinetics. (2)*selected semesters*

Kinetic theory and rate processes. Prerequisite: CHM 545.

CHM 553 Advanced Inorganic Chemistry. (3)*spring*

Principles of modern inorganic chemistry and their applications over the entire periodic system. Prerequisites: CHM 346 and 453 (or their equivalents).

CHM 556 Topics in Inorganic Chemistry. (3)*selected semesters*

May be repeated for credit. Prerequisites: CHM 553; instructor approval.

CHM 579 Topics in Solid-State Chemistry. (3)*selected semesters*

May be repeated for credit. Prerequisite: instructor approval.

GRADUATE PROGRAMS AND COURSES

CHM 582 Topics in Geochemistry and Cosmochemistry. (3)

selected semesters

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)

selected semesters

Natural reactions at high temperatures and pressures; silicate, sulfide, and oxide equilibria. Prerequisite: instructor approval.

CHM 593 Applied Project. (1–12)

selected semesters

Topics may include the following:

- Glass Blowing Fee.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Civil Engineering

Master’s and Doctoral Programs

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ECG 252

Sandra L. Houston, Chair

Professors: Fox, S. Houston, W. Houston, Mamlouk, Mays, Rajan, Singhal, Witczak

Associate Professors: Abbaszadegan, Fafitis, Hinks, Johnson, Mobasher, Westerhoff

Assistant Professors: Allen, Dillner, Kaloush, Muccino, Owusu-Antwi, Peccia, Zhu

The faculty in the Department of Civil and Environmental Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering, and the Ph.D. degrees in Civil Engineering.

The faculty also participate in offering the Tri-University Master of Engineering degree program. See [“Master of Engineering,” page 190,](#) for program description.

Graduate Record Examination. Submission of Graduate Record Examination (GRE) scores, general test, is required for all degree-seeking applicants.

TOEFL Examination. International applicants, whose native language is not English, are required to have taken the Test of English as a Foreign Language (TOEFL), and achieved a minimum score of 550.

MASTER OF SCIENCE

See [“Master’s Degrees,” page 93,](#) for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See [“Master of Science in Engineering,” page 196.](#)

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon students based on evidence of excellence in research leading to a scholarly dissertation that is a contribution to knowledge in the field of civil engineering.

See [“Doctor of Philosophy,” page 96,](#) for general requirements.

Letters of Recommendation. Submission of three letters of recommendation is required for those applying for admission to the Ph.D. degree program. One letter must be from the chair or advisor of the applicant’s previous degree program.

Program of Study. The program of study must be prepared soon after a student has been admitted to the program, a supervisory committee has been formed, and a preliminary examination (if required by the supervisory committee) has been taken.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the supervisory committee. Students should request permission from the Graduate College to take the comprehensive examinations when they have essentially completed the course work in their approved program of study.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

A broad range of theoretical and experimental research programs have been established in civil and environmental engineering to prepare graduate students for careers in professional practice and research. These programs are constantly evolving with the changes in society and the profession, and many are multidisciplinary in nature.

Experimental and theoretical research conducted by the civil and environmental engineering faculty and students is carried out in the specialized areas of environmental engineering, geotechnical/geoenvironmental engineering, structures/materials engineering, transportation/materials engineering, and water resources engineering. For more information about these activities, access the Web site at www.eas.asu.edu/~civil.

Areas of Study

Areas of study in the civil and environmental engineering curriculum are described below.

Construction Engineering. This area of study includes the analysis, design, and construction of civil engineering structures; construction materials and practice; quality control; and civil engineering project management.

Environmental Engineering. This area of study includes water and wastewater treatment; water reuse and water resource sustainability; chemical and microbial pollutant identification, monitoring, and transport/fate modeling; and chemical and microbial inactivation and removal.

Geotechnical/Geoenvironmental 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, response of foundations and embankments to earthquakes, and solutions to environmental problems.

Structures/Materials Engineering. This area of study considers the planning, analysis, and design of steel and concrete bridges, buildings, dams; special offshore and space structures; Portland cement concrete; composite materials; and structural retrofit of existing bridges.

Transportation/Materials Engineering. This area of study includes (1) transportation planning, design, and operation and (2) pavements and materials. Transportation planning, design, and operation covers urban transport planning, geometric design of facilities, traffic operations, evaluation of highway capacity and safety, and intelligent vehicle/highway systems. The pavements and materials area focuses on pavement analysis and design; pavement maintenance and rehabilitation; pavement evaluation and management; and characterization of highway materials and durability of highway structures.

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.

CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

CEE Note 1. 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*.

CEE Note 2. 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.

CEE 412 Pavement Analysis and Design. (3)

fall

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)

fall

Analysis and design of reinforced concrete steel, masonry, and timber structures. Prerequisite: CEE 323. Pre- or corequisite: CEE 322.

CEE 432 Matrix and Computer Applications in Structural Engineering. (3)

spring

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)

fall

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)

spring

Applies 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 452 Foundations. (3)

fall

Applies soil mechanics to foundation systems, bearing capacity, lateral earth pressure, and slope stability. Prerequisite: CEE 351.

CEE 466 Sanitary Systems Design. (3)

fall

Capacity, planning and design of water supply, domestic and storm drainage, and solid waste systems. Prerequisite: CEE 361.

CEE 471 Intelligent Transportation Systems. (3)

selected semesters

Applies 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)

spring

Design of the visible elements of the roadway. Fundamental design controls with application to rural roads, at-grade intersections, freeways, and interchanges. Lecture, computer lab. Prerequisite: CEE 372.

CEE 486 Integrated Civil Engineering Design. (3)

fall and spring

Requires completion of a civil engineering design in a simulated practicing engineering environment. Limited to undergraduates in their final semester. Lecture, team learning. Prerequisites: CEE 321, 341, 351, 361, 372.

CEE 512 Pavement Performance and Management. (3)

selected semesters

Pavement management systems, including data collection, evaluation, optimization, economic analysis, and computer applications for highway and airport design. Prerequisite: instructor approval.

CEE 514 Bituminous Materials and Mixture. (3)

selected semesters

Types of bituminous materials used in pavement mixtures. Chemical composition, physical properties, desirable aggregate characteristics, optimum asphalt contents, superpave asphalt binder, mixture design. Lecture, lab. Prerequisite: ECE 351.

CEE 515 Properties of Concrete. (3)

selected semesters

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)

fall

Advanced topics in the analytical determination of stress and strain. Prerequisite: CEE 321.

CEE 524 Advanced Steel Structures. (3)

fall

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)

fall

Finite element formulation for solutions of structural, geotechnical, and hydraulic problems. Prerequisite: CEE 432.

CEE 527 Advanced Concrete Structures. (3)

selected semesters

Ultimate strength design. Combined shear and torsion. Serviceability. Plastic analysis. Special systems. Prerequisite: CEE 323.

CEE 530 Prestressed Concrete. (3)

selected semesters

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.

GRADUATE PROGRAMS AND COURSES

CEE 533 Structural Optimization. (3)

selected semesters

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. Credit is allowed for only CEE 533 or MAE 521. Prerequisite: instructor approval.

CEE 536 Structural Dynamics. (3)

selected semesters

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)

selected semesters

Advanced topics, including nonlinear structural analysis, experimental stress analysis, advanced finite elements, plasticity and viscoelasticity, composites, and damage mechanics. Prerequisite: instructor approval.

CEE 540 Groundwater Hydrology. (3)

fall

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)

spring

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 543 Water Resources Systems. (3)

selected semesters

Theory and application of quantitative planning methodologies for the design and operation of water resources systems. Class projects using a computer, case studies. Prerequisite: instructor approval.

CEE 546 Free Surface Hydraulics. (3)

selected semesters

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)

selected semesters

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)

selected semesters

Introduces 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)

selected semesters

Physicochemical aspects of soil behavior, stabilization of soils, and engineering properties of soils. Prerequisite: CEE 351.

CEE 551 Advanced Geotechnical Testing. (3)

selected semesters

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)

selected semesters

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)

selected semesters

Applies 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)

selected semesters

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)

selected semesters

Deep foundations, braced excavations, anchored bulkheads, reinforced earth, and underpinning. Prerequisite: CEE 351.

CEE 557 Hazardous Waste: Site Assessment and Mitigation Measures. (3)

selected semesters

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)

selected semesters

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)

fall

Presents techniques for remediation of contaminated soils and groundwaters with basic engineering principles. Prerequisite: instructor approval.

CEE 561 Physical-Chemical Treatment of Water and Waste. (3)

fall

Theory and design of physical and chemical processes for the treatment of water and wastewaters. Prerequisite: CEE 361.

CEE 562 Environmental Biochemistry and Waste Treatment. (3)

spring

Theory and design of biological waste treatment systems. Pollution and environmental assimilation of wastes. Prerequisite: CEE 362.

CEE 563 Environmental Chemistry Laboratory. (3)

fall

Analyzes 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 565 Modeling and Assessment of Aquatic Systems. (3)

selected semesters

Development of predictive models of water quality; methods to assess environmental impacts; applications to water quality management. Prerequisite: CEE 361 or instructor approval.

CEE 566 Industrial/Hazardous Waste Treatment. (3)

selected semesters

Emphasizes treatment of local industrial/hazardous waste problems, including solvent recovery and metals. Lecture, project. Prerequisites: CEE 561, 563.

CEE 573 Traffic Engineering. (3)

selected semesters

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)

selected semesters

Highway capacity for all functional classes of highways. Traffic signalization, including traffic studies, warrants, cycle length, timing, phasing, and coordination. Prerequisite: CEE 372.

CEE 580 Practicum. (1–12)

selected semesters

See CEE Note 1.

CEE 590 Reading and Conference. (1–12)

selected semesters

See CEE Note 1.

CEE 591 Seminar. (1–12)*selected semesters*

Topics may include the following:

- Transportation Systems Pro-Seminar

CEE 592 Research. (1–12)*selected semesters*

See CEE Notes 1, 2.

CEE 598 Special Topics. (1–4)*selected semesters*

Topics may include the following:

- Intelligent Transportation Systems

CEE 599 Thesis. (1–12)*selected semesters*

See CEE Notes 1, 2.

CEE 792 Research. (1–15)*selected semesters*

See CEE Notes 1, 2.

CEE 799 Dissertation. (1–15)*selected semesters*

See CEE Notes 1, 2.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48](#).

Communication

Master's Program

com.pp.asu.edu/academic/masters.html

480/965-5096

STAUF A412

Jess K. Alberts, Director, Hugh Downs School of Human Communication

Kristin B. Valentine, Director of the Master's Program

Professors: Alberts, Arnold, Broome, Canary, Carlson, Jain, Martin, McPhee, Nakayama, Valentine

Associate Professors: Buley, Corey, Corman, Davey, Guerrero, Mayer, Trost

Assistant Professors: Brookey, Brouwer, Davis, Floyd, Martinez, Messman, Park-Fuller, Tracy, Trethewey

Instructional Professional: Olson

Assistant Instructional Professional: McDonald

The Hugh Downs School of Human Communication strives 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 the principles of communication. Courses of study are designed to provide students with relevant programs adapted to individual academic and professional goals.

MASTER OF ARTS

Faculty in the Hugh Downs School of Human Communication offer a program leading to the M.A. degree in Communication. Current areas of study within the major are intercultural communication, interpersonal communication, performance studies, organizational communication, and rhetoric.

Admission Requirements. Admission is competitive, based upon evidence of the applicant's scholarly and research abilities. All applicants must submit the following:

1. a Graduate College application, completed either online or on paper, along with official undergraduate and graduate transcripts;
2. a statement of professional goals (approximately 500 words);
3. Graduate Record Examination scores (verbal, quantitative, and analytical) taken within the past five years, plus other relevant test data provided by the applicant;
4. three letters of recommendation prepared within the preceding 12 months;
5. writing sample; and
6. all applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). Minimum scores are 550 on the paper and pencil version of this test or 213 on the computer version of this test. The Hugh Downs School of Human Communication also requires a minimum score of 230 on the Test of Spoken English.

A completed application for admission and two transcripts of all undergraduate and graduate work must be submitted to the Graduate Admissions Office. See ["Admission to the Graduate College," page 84](#), for Graduate College general requirements. All application materials must be received by February 1.

Program of Study. The program consists of a minimum of 30 semester hours of graduate course work, which includes six semester hours of thesis credit. All students must successfully complete the following:

1. COM 501 Research Methods in Communication with a minimum grade of "B";
2. COM 504 Theories and Models in Communication with a minimum grade of "B";
3. at least one of the following three courses: COM 508 Quantitative Research Methods in Communication, COM 509 Qualitative Research Methods in Communication, or COM 521 Rhetorical Criticism of Public Discourse with a minimum grade of "B";
4. at least three content seminars;
5. a written comprehensive examination on theory and methodology, and an area of study (an oral examination may be required); and
6. a thesis, which is an account of original research, and an oral examination in defense of the thesis.

GRADUATE PROGRAMS AND COURSES

Applicants with undergraduate deficiencies must remove such deficiencies, and these courses do not count toward the master's degree. The student's program of study is the mutual responsibility of the student and the supervisory committee. A foreign language is not required, but is encouraged as appropriate. Descriptions of current program options and requirements are available from the Hugh Downs School of Human Communication, STAUF A412.

RESEARCH ACTIVITY

Both applied and theoretical research are an integral part of the master's and doctoral degree programs in Communication. The general areas of study include intercultural communication, interpersonal communication, organizational communication, performance studies, and rhetoric. A variety of metatheoretical approaches are used for studying communication issues, including traditional social science perspectives as well as interpretive and critical approaches. A variety of methodologies are also employed, including quantitative methods such as surveys and questionnaires, ethnographic methods such as interviewing and participant observation, and also discourse and textual analyses. Attention is also given to the integration of theory and practice.

HUGH DOWNS SCHOOL OF HUMAN COMMUNICATION (COM)

COM 400 CIP: Communication in Professions. (3)

fall, spring, summer

Specialized study of communication processes in professional and organizational settings. Open to B.I.S. majors only. May be repeated for credit. Lecture, discussion. Prerequisites: both COM 100 and 225 or only COM 259; 2.00 GPA.

COM 404 Research Apprenticeship. (3)

fall and spring

Direct research experience on faculty projects. Student/faculty match based on interests. Lecture, apprenticeship. Prerequisites: COM 308 (or instructor approval); minimum cumulative ASU GPA of 2.50; application required.

COM 407 Advanced Critical Methods in Communication. (3)

spring

Examines critical approaches relevant to communication, including textuality, social theory, cultural studies, and ethnography. Lecture, discussion. Prerequisites: COM 308; minimum cumulative ASU GPA of 2.50.

COM 408 Quantitative Research Methods in Communication. (3)

fall and spring

Advanced designs, measurement techniques, and methods of data analysis of communication research. Prerequisites: COM 308 and a course in generic statistics (EDP 454 or POS 401 or PSY 230 or QBA 221 or SOC 390 or STP 226); minimum cumulative ASU GPA of 2.50.

COM 410 Interpersonal Communication Theory and Research. (3)

fall, spring, summer

Survey and analysis of major research topics, paradigms, and theories dealing with message exchanges between and among social peers. Prerequisites: COM 110 (or 310), 308; minimum cumulative ASU GPA of 2.50.

COM 411 Communication in the Family. (3)

once a year

Broad overview of communication issues found in marriage and family life, focusing on current topics concerning communication in the family. Prerequisites: COM 110 (or 310), 207; minimum cumulative ASU GPA of 2.50.

COM 414 Crisis Communication. (3)

selected semesters

Role of communication in crisis development and intervention. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 417 Communication and Aging. (3)

selected semesters

Critical study of changes in human communicative patterns through the later adult years, with attention on intergenerational relationships and self-concept functions. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 421 Rhetoric of Social Issues. (3)

fall and spring

Critical rhetorical study of significant speakers and speeches on social issues of the past and present. Prerequisites: COM 308, 321 (or 323).

COM 422 Advanced Argumentation. (3)

selected semesters

Advanced study of argumentation theories and research as applied to public forum, adversary, scholarly, and legal settings. Prerequisites: COM 222; minimum cumulative ASU GPA of 2.50.

COM 426 Political Communication. (3)

fall

Theories and criticism of political communication; including campaigns, mass persuasion, propaganda, and speeches. Emphasis on rhetorical approaches. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 430 Leadership in Group Communication. (3)

selected semesters

Theory and process of leadership in group communication, emphasizing philosophical foundations, contemporary research, and applications to group situations. Prerequisites: COM 230; minimum cumulative ASU GPA of 2.50.

COM 441 Performance Studies. (3)

fall, spring, summer

Theory, practice, and criticism of texts in performance. Emphasis on the interaction between performer, text, audience, and context. Prerequisites: COM 241, 308; minimum cumulative ASU GPA of 2.50.

COM 445 Narrative Performance. (3)

selected semesters

Theory and practice of performing narrative texts (e.g., prose fiction, oral histories, diaries, essays, letters). Includes scripting, directing, and the rhetorical analysis of storytelling. Prerequisites: COM 241; minimum cumulative ASU GPA of 2.50.

COM 446 Performance of Literature Written by Women. (3)

selected semesters

Explores, through performance and critical writing, literature written by women. Prerequisite: minimum cumulative ASU GPA of 2.50.

COM 450 Theory and Research in Organizational Communication. (3)

fall, spring, summer

Critical review and analysis of the dominant theories of organizational communication and their corollary research strategies. Prerequisites: COM 250, 308; minimum cumulative ASU GPA of 2.50.

COM 453 Communication Training and Development. (3)

once a year

Examines the procedures and types of communication training and development in business, industry, and government. Prerequisites: COM 250; minimum cumulative ASU GPA of 2.50.

COM 463 Intercultural Communication Theory and Research. (3)

fall, spring, summer

Surveys and analyzes major theories and research dealing with communication between people of different cultural backgrounds, primarily in international settings. Lecture, discussion, small group work. Cross-listed as AFR 463. Credit is allowed for only AFR 463 or COM 463. Prerequisites: COM 263 (or AFR 263), 308; minimum cumulative ASU GPA of 2.50.

COM 465 Intercultural Communication Workshop. (3)

selected semesters

Experientially based study of communication between members of different cultures designed to help improve intercultural communication skills. Prerequisites: minimum cumulative ASU GPA of 2.50; instructor approval.

COM 494 Special Topics. (1-3)

fall, spring, summer

Prerequisite: minimum cumulative ASU GPA of 2.50.



Jody Nyquist, associate dean in the Graduate School at the University of Washington, was a guest lecturer in the ASU Graduate College's "Changing Landscape of Graduate Education" speaker series.

Dennis Durband photo

COM 501 Research Methods in Communication. (3)

fall

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)

fall

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)

fall

Empirical research designs, measurements, and statistical strategies and techniques in analyzing and evaluating experimental and descriptive research in communication. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 509 Qualitative Research Methods in Communication. (3)

spring

Qualitative research methods, including interviewing, field methods, and other nonquantitative techniques for analyzing communication. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 512 Death, Society, and Human Experience. (3)

selected semesters

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)

selected semesters

History and significance of rhetorical theory and criticism in the analysis of public discourse. Prerequisites: both COM 501 and 504 or only instructor approval.

COM 584 Communication Internship. (1–12)

fall, spring, summer

Fee.

COM 596 Pro-Seminar in Communication. (0)

fall

Discussion of research projects with the faculty. Prerequisite: admission to the graduate program.

COM 604 Theory Construction in Communication. (3)

fall

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)

spring

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)

spring

Statistical analysis of communication research data. Multivariate procedures used in communication research and methods of causal analysis. Prerequisites: COM 501 and 508 (or their equivalents).

COM 609 Advanced Qualitative Research Methods in Communication. (3)

fall

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 680 Practicum: Research in Communication. (3)

spring

Guided practice in the conduct of communication research. Topic identification; procedures, formats, and ethics of publishing. Prerequisite: COM 604.

COM 691 Seminar. (1–12)

fall, spring, summer

Lecture, discussion. Topics may include the following:

- Current Organizational Approaches to Communication. (3)
- Examination of Privacy and Disclosure. (3)
- Intercultural Aspects of Communication. (3)
- Interpersonal and Relational Communication. (3)
- Research in Performance Studies. (3)
- Rhetorical Issues. (3)
- Social Influence. (3)

Prerequisite: instructor approval.

COM 792 Research. (1–12)

selected semesters

GRADUATE PROGRAMS AND COURSES

COM 799 Dissertation. (1–15)
selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Communication

Interdisciplinary Doctoral Program

com.pp.asu.edu/academic/doctorate.html

480/965-3844

STAUF A412

**Jess K. Alberts, Director, Hugh Downs School of
Human Communication**

Robert D. McPhee, Director of the Doctoral Program

Educational Leadership and Policy Studies

Associate Professor: Margolis

English

Professor: Roen

Associate Professor: Miller

Family and Human Development

Professors: Christopher, Fabes

Human Communication

Professors: Alberts, Arnold, Broome, Canary, Carlson, Jain,
Martin, McPhee, Nakayama, Valentine

Associate Professors: Buley, Corey, Corman, Davey,
Guerrero, Mayer, Trost

Assistant Professors: Brookey, Brouwer, Davis, Floyd,
Martinez, Messman, Park-Fuller, Tracy, Trethewey

Industrial Management Systems Engineering

Professor: Dooley

Journalism and Mass Communication

Professor: Godfrey

Justice Studies

Regents' Professor: Altheide

Professors: Johnson, Romero

Recreation Management and Tourism

Professor: Allison

Sociology

Professor: Nagasawa

Supply Chain Management

Professor: Smeltzer

DOCTOR OF PHILOSOPHY

The Committee of Faculty offers an interdisciplinary graduate program leading to the Ph.D. degree in Communication. Concentrations are available in communicative

development, intercultural communication, and organizational communication.

The program is housed in the Hugh Downs School of Human Communication and is designed to prepare scholars for research-oriented careers in universities and in the public or private sectors. Students are provided training in communication theory, research methodology, and a specialization in one or more areas of concentration. The goal of the program is to meet the needs of students whose interests transcend traditional disciplinary boundaries.

See [“Doctor of Philosophy,” page 96,](#) for general requirements.

Admission Requirements. Admission to the program is competitive. Applications are considered once a year for fall admission with a supplemental admission deadline late in the spring term. Applicants must have earned either a bachelor's or master's degree and must present evidence of scholarly writing (e.g., an undergraduate honors thesis, a master's thesis, or their equivalent). All applicants should be knowledgeable in the basic principles of both qualitative and quantitative methods of research, social statistics, and communication theory. If course work in these areas has not been completed, admitted students are required to successfully complete COM 501 Research Methods in Communication and COM 504 Theories and Models in Communication (plus any other courses stipulated by the admissions committee) before enrolling in the required theory and methodology sequence. Knowledge in statistics must be demonstrated either by completion of a graduate-level statistics course within two years before admission to the program, by completion of COM 508 within the first two years of course work, or by some other option approved by the director of the doctoral program. In addition to meeting the minimum Graduate College admission requirements, the applicant's scholastic and professional record must indicate special interest in and aptitude for systematic research in communication. All applicants must submit the following:

1. a completed Graduate College application and official undergraduate and graduate transcripts;
2. a formal *curriculum vitae*, including a statement of career goals and the relevance of this degree program to those goals;
3. Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical) taken within the past five years, plus other relevant test data volunteered by the applicant;
4. three letters of recommendation written within the preceding 12 months, including at least one letter from a previous faculty member;
5. a sample of writing (e.g., master's thesis, course paper); and
6. a minimum score of 600 on the Test of English as a Foreign Language and a minimum score of 230 on the Test of Spoken English for all applicants whose native language is not English.

All application materials must be in the program office by January 15 to be considered. Late applications are processed once late in the spring term.

Supervisory/Dissertation Committee. This committee consists of a chair and at least two other members appointed by the dean of the Graduate College based upon the director's recommendation. At least two-thirds of the committee must be full-time faculty at the ASU Main Campus and at least two-thirds of the committee must be from the communication faculty. At least one member must be from an academic discipline outside of communication. The chair of the supervisory committee, who serves as the student's advisor, must be knowledgeable in the student's area of concentration, have an active research agenda, publish regularly in appropriate refereed academic journals, and be experienced in graduate education. Members of the committee must represent more than one academic discipline. The purpose of the committee is to guide the student through the completion of the program of study, the comprehensive examinations, and the dissertation research.

Areas of Concentration. Students admitted to the program select a formal area of concentration in any of the three broad areas of communicative development, intercultural communication, and organizational communication. However, the interdisciplinary nature of the program and breadth of its faculty allow students to design individual programs of study geared toward more specialized topics in human communication. As a rule, these cut across the formal areas of concentration and generally follow the areas of expertise of program faculty. Program graduates study areas such as interpersonal communication, organizational communication, performance studies, rhetoric, critical/cultural studies, relational communication, and information technology. Contact the director for an up-to-date list of program faculty and their areas of interest.

Communicative Development. This area includes the study of communicative behaviors and functions as they evolve and change over time. Students in this area study the role of communication in interpersonal processes, performance studies, and rhetoric.

Intercultural Communication. The theoretical relationship between culture and communication is the focus of this area. Students in this area study the effects of cultural/ethnic differences and similarities on a wide range of communication processes. Students may also explore the communication of culture and ethnicity.

Organizational Communication. This area examines the role of communicative processes and systems in public and private organizations with an emphasis on the interaction between organizational participants and organizational structures, practices, informational channels, networks, and message forms.

Because of the interdisciplinary nature of the Ph.D. program, students may explore relevant course work in disciplines such as communication, social and development psychology, family studies, educational psychology, cultural anthropology, comparative sociology, linguistics, justice studies, industrial psychology, management, and public administration, among others.

Program of Study. If the student has completed an appropriate master's degree, the Ph.D. requires a minimum of 66 hours beyond the master's degree. Course work for a typical

program of study is distributed as follows: required core courses (9 semester hours), area of concentration (33 semester hours), dissertation (COM 799) and research (COM 792) (24 semester hours) for a total of 66 hours (minimum). Three interdisciplinary theory and methodology courses are required of all students entering the program. The required theory course is COM 604 Theory Construction in Communication. Students are also required to take COM 792 Practicum: Research in Communication. In addition, students must take two of the three methods courses, which consist of COM 607 Contemporary Rhetorical Methods, COM 608 Multivariate Statistical Analysis of Data in Communication, and COM 609 Advanced Qualitative Research Methods in Communication.

In addition to the three-hour section of COM 792 described above, students are required to complete at least three additional hours of 792 in conjunction with a scheduled graduate seminar.

The student is also required to demonstrate proficiency in research methods (statistics, computer languages, content analysis methods, participant observation, etc.) which, in the judgment of the supervisory committee, is needed for the student's dissertation research. Evidence of required proficiency may be demonstrated by established university examination procedures or by successful completion of a sequence of courses designated by the student's program committee.

For students who have completed only the bachelor's degree before admission to the Ph.D. program, a minimum of 90 hours of interdisciplinary graduate work is required for the program, including the same 66-hour requirement for students with the master's degree. The initial course work for students admitted with only a bachelor's degree is similar to the M.A. degree requirements in Communication except that no thesis is required. These requirements include a general overview of research in communication (COM 501), an overview of theories and models of communication (COM 504), a statistics course (COM 508), and electives from communication or other disciplines to total 24 hours of course work. The methods, theory, and statistics courses must be completed before beginning the required theory and methodology sequence for the Ph.D. (i.e., they are prerequisites for the required courses).

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before the formal approval of the dissertation proposal, the student is examined in the relevant area of concentration and research methods. The examination consists of written and oral components designed to test the student's interdisciplinary knowledge in the field and chosen area of concentration and the student's readiness to undertake interdisciplinary dissertation research. The examination is conducted by the student's supervisory committee.

Admission to Candidacy. After the student has passed both the written and oral portions of the comprehensive examination and the student's dissertation topic has been approved, the student may apply to the Graduate College for admission to candidacy. Before admission to candidacy, it is expected that students have completed a mixture of

GRADUATE PROGRAMS AND COURSES

academic experiences, including formal course work, participation in doctoral seminars, research with faculty, and independent research that are related to the topic of the dissertation and lead up to the dissertation. It is also expected that students have been exposed to both quantitative and qualitative methods of research before candidacy. No dissertation hours (COM 799) may be taken before admission to candidacy, but six hours of research (COM 792) may be taken before admission to candidacy. Students must enroll for 12 hours of research (COM 792)/dissertation (COM 799) credit following the semester in which they are advanced to candidacy.

Dissertation Proposal. Before conducting the research for the dissertation, each student must submit a dissertation proposal that is defended orally and approved by the student's dissertation committee.

Research and Dissertation. The dissertation consists of a fully documented written analysis of a problem that extends the knowledge and/or theoretical framework of the field and reflects the student's creativity and competence in independent, interdisciplinary research using an appropriate research methodology.

Final Examinations. An oral examination in defense of the dissertation, conducted by the dissertation committee, is required.

Communication Disorders

Master's Program

www.asu.edu/clas/shs

480/965-8230

LL 173D

David Ingram, Chair

Professors: S. Bacon, Dorman, D. Ingram, Sinex, Wilcox

Associate Professor: Liss

Assistant Professors: Azuma, Gray

Clinical Professor: Mathy

Clinical Associate Professors: C. Bacon, Brown, Mintz, Remson

Clinical Assistant Professors: K. Ingram, McBride, Wexler

MASTER OF SCIENCE

The faculty in the Department of Speech and Hearing Science offer a program leading to the M.S. degree in Communication Disorders. Thesis and nonthesis degree options are available, and students may study either speech-language pathology or audiology. The program is accredited by

the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

Admission Requirements. Students applying for admission to this program should have their undergraduate transcripts mailed to the Graduate Admissions Office. In addition, candidates should have their Graduate Record Examination scores, a statement of professional and academic goals not to exceed 200 words, and three letters of recommendation sent to the Department of Speech and Hearing Science. All materials must be received in the department by January 15 for fall admission, which is the only term in which students may begin their program of study. Candidates who have undergraduate deficiencies may need to take required prerequisite courses.

Academic Requirements. A student must complete a minimum of 30 or 33 semester hours of graduate course work, exclusive of credit for practicum, approved by the supervisory committee.

Statistical Proficiency Requirements. A student pursuing the M.S. degree must provide satisfactory evidence of competency in statistical methods appropriate to the behavioral sciences.

Clinical Requirements. A student in the M.S. program must complete at least 375 clock hours of supervised clinical practicum experience, of which a minimum of 250 clock hours must be obtained at the graduate level.

Thesis Option. Students wishing to pursue the thesis option will complete 30 semester hours of course work, six hours of which must be thesis credit, excluding practicum and internship hours. The thesis must meet requirements established by the Graduate College.

Nonthesis Option. Students choosing the nonthesis option will complete 33 semester hours of course work, excluding practicum and internship hours.

Final Examinations. For a candidate for the M.S. degree (thesis option), two final examinations are required: (1) the National Teacher Examination in speech pathology, or the National Teacher Examination in audiology, administered by Educational Testing Service and available at ASU through the University Testing Service, and (2) an oral defense of the thesis. For a candidate for the M.S. degree (nonthesis option), two final examinations are required: (1) the National Teacher Examination in speech pathology, or the National Teacher Examination in audiology, administered as described above, and (2) a four-hour comprehensive written examination administered in October and March of each year by the departmental graduate faculty.

Students should expect to spend two years completing the academic, practicum, and research requirements for either degree option.

SPEECH AND HEARING SCIENCE (SHS)

SHS 401 Introduction to Audiologic Evaluation. (3)

fall

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 (or their equivalents).

SHS 402 Modifying Communicative Behavior. (3)

fall

Principles and techniques of modifying speech and language behavior. Prerequisite: SHS 250 (or its equivalent).

SHS 465 Speech and Language Acquisition. (3)

spring

Speech and language development in the normal child. Prerequisite: SHS 367 (or its equivalent).

SHS 485 Acquired Speech and Language Disorders. (3)

spring

Introduces acquired speech and language disorders across the lifespan. Prerequisites: SHS 250, 310.

SHS 496 Aural Rehabilitation. (3)

spring

Approaches to aural rehabilitation of children and adults. Introduces educational audiology and assistive listening devices. Prerequisites: SHS 375 and 376 and 401 (or their equivalents).

SHS 501 Introduction to Audiologic Evaluation. (3)

fall

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Prerequisites: SHS 311 and 376 and 384 (or their equivalents).

SHS 502 Differential Diagnosis for Audiology. (4)

fall

Differential diagnosis of cochlear and retrocochlear disorders, and assessment of vestibular system. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 504 Hearing Aids. (4)

fall

Operation, application, and fitting of amplification devices for the hearing impaired. 3 hours lecture, 2 hours lab. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 508 Pediatric Audiology. (3)

fall

Audiologic assessment, screening, and development considerations for infants and young children. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 511 Auditory Perception by the Hearing Impaired. (3)

fall

Studies 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)

spring

Correlation of history and physical findings with pathologic physiology and test results in speech and hearing abnormalities.

SHS 515 Audiologic Instrumentation and Calibration. (3)

fall

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 its equivalent).

SHS 516 Auditory-Evoked Potentials. (4)

spring

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)

fall

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)

spring

Studies 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)

spring

Current status of cochlear implant research and development. Prerequisites: both SHS 504 and 545 or only instructor approval.

SHS 565 Speech and Language Acquisition. (3)

spring

Speech and language development in the normal child. Prerequisite: SHS 367 (or its equivalent).

SHS 566 Psychology of Language. (3)

spring

Psycholinguistic study of the production and comprehension of language across the lifespan.

SHS 567 Neural Bases of Communication Disorders. (3)

fall

Neuroscience and its application to matters of normal and disordered communication. Pre- or corequisite: SHS 310 (or its equivalent).

SHS 570 Communication Disorders and Multicultural Populations. (3)

spring

Studies racial and ethnic biases and the communication behaviors and disorders in various cultural groups.

SHS 571 Augmentative Communication and Language Programming. (3)

fall

Focuses on individuals across the age span who are unable 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)

fall

Focuses on the birth to 5-year-old population who are at risk for or who have communication and language disabilities. Prerequisite: SHS 470 (or its equivalent).

SHS 573 Language Assessment and Intervention with School-Age Populations. (3)

spring

Focuses on later language development, linguistic demands of academic settings, assessment and intervention strategies for older children and adolescents. Prerequisite: SHS 565 (or its equivalent).

SHS 574 Fluency Disorders and Treatment. (3)

fall

Presents phenomena, etiology, assessment, and theories of stuttering, followed by various treatment procedures for children and adults who stutter. Prerequisite: SHS 431 (or its equivalent).

SHS 575 Aphasia and Related Neurogenic Language Disorders. (3)

fall

Assessment and treatment of acquired neurolinguistic impairment. Prerequisite: SHS 567.

SHS 576 Neuromotor Speech Disorders. (3)

spring

Evaluation and treatment of the dysarthrias and apraxia of speech. Emphasizes acquired adult disorders.

SHS 577 Craniofacial Disorders of Communication. (3)

spring

Communication disorders related to anomalies of the craniofacial structures, including orofacial clefting of the lip and palate. Prerequisite: SHS 310 (or its equivalent).

SHS 578 Disorders of Voice. (3)

summer

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)

fall

Focuses on individuals across the age span who have feeding and/or swallowing disorders. Presents assessment and treatment strategies. Prerequisite: SHS 567.

SHS 580 Clinical Practicum. (1-6)

fall, spring, summer

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.

GRADUATE PROGRAMS AND COURSES

SHS 581 Right Hemisphere Syndrome, Traumatic Brain Injury, and Dementia. (3)

spring

Studies the nature, characteristics, and clinical management of cognitive and communicative impairments accompanying right hemisphere damage, TBI, and dementia. Prerequisite: SHS 567.

SHS 582 Differential Diagnosis of Communication Disorders. (3)

spring

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 their equivalents).

SHS 584 Internship. (1–6)

fall, spring, summer

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)

spring

Assessment and treatment of developmental articulation and phonological disorders. Prerequisites: SHS 250 and 310 (or their equivalents).

SHS 591 Seminar. (1–12)

fall, spring, summer

Topics may include the following:

- Central Auditory Mechanisms and Learning Impairment. (3)
spring
- Cognitive and Linguistic Interactions in Adult Neurogenic Disorders. (3)
fall
- Fundamentals of Vestibular Evaluations. (3)
fall
- Research Methods in Communication Disorders. (3)
spring

SHS 596 Aural Rehabilitation. (3)

spring

Approaches to aural rehabilitation in children and adults. Introduces educational audiology and assistive listening devices. Prerequisite: SHS 401 or 501 (or its equivalent).

SHS 792 Research. (1–12)

selected semesters

SHS 799 Dissertation. (1–15)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Communication and Human Relations

Certificate Program

ASU West offers a postbaccalaureate certificate in Communication and Human Relations. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Communication Studies

Master's Program

ASU West offers a Master of Arts degree in Communication Studies. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Composition

See "[Music](#)," page 273.

Computational Biosciences

Interdisciplinary Master's Program

www.asu.edu/compbiosci

480/965-3951

PS A216

Rosemary Renaut, Director

Biology

Professors: Capco, McGaughey
Assistant Professor: Kumar

Chemistry and Biochemistry

Professor: Woodbury

Computer Science and Engineering

Professor: Farin
Associate Professor: Xue

Mathematics and Statistics

Professors: Hoppensteadt, Kostelich, Lai, Lohr, Renaut
Associate Professor: Baer

Plant Biology

Professors: Frasch, Hooper, Vermaas

MASTER OF SCIENCE

The disciplines of the life sciences are rapidly requiring more mathematical and computational analyses than have typically been employed. While some mathematical approaches have been applied to biological questions for many years, the advance in computational capability has increased the pace of bioscience research to unprecedented levels of speed, precision, and detail, and thus dramatically transformed the kinds of problems tackled. This degree

serves to produce students capable of meeting the demands of today's bioinformatics/biomedical industries.

Admissions. In addition to the minimum requirements for admission established by the Graduate College, the interdisciplinary nature of this program makes individual aptitudes and experiences of high importance with regard to a student's competitive status.

Prerequisites. Requirements include one-year sequences in chemistry and biology, one semester of calculus and differential equations, a course in data structures and analysis of algorithms, and a course with a substantial programming component. Appropriate courses are available during the two summer sessions at ASU. Students deficient in a limited number of courses that can be taken over one summer may be admitted conditionally on their completion of the prerequisites in the preceding summer sessions.

Program of Study. The master's program requires a total of 30 semester hours of course work and an additional six hours for internship or further advanced study. Students pursuing the professional option of the program also complete six semester hours of graduate-level study on professional issues in biotechnology for a total of 42 semester hours of study.

Comprehensive Examinations. None.

Thesis Requirements. None.

Internships and Research Projects. An internship with either a campus-based research group or a local bioinformatics/biomedical facility associated with ASU, culminating in a written report and/or an oral presentation and examination, is required of all students.

Elective Fields. Computational molecular biology, bioinformatics, mathematics, computer science engineering, biochemistry and chemistry, biology, plant biology, and microbiology.

COMPUTATIONAL BIOSCIENCES (CBS)

CBS 520 Modeling and Computational Biology. (4)

fall

Key mathematical and computational techniques for bioinformatics. Numerical and visualization software; scripting, database management. Lecture, computing lab. Prerequisites: both MAT 271 and 274 (or 275) or only instructor approval.

CBS 521 Applications and Complex Problem Solving in Computational Biology. (4)

spring

Continuation of CBS 520. Key mathematical concepts. Team solution of bioinformatics applications, project writing, and presentation. Lecture, computing lab. Prerequisite: CBS 520 or instructor approval.

CBS 530 Introduction to Structural and Molecular Biology. (4)

fall

Structure and function of cells, proteins, membranes, and the genome; gene expression and biogenesis of structures; application of computer imaging. Cross-listed as PLB 530. Credit is allowed for only CBS 530 or PLB 530. Prerequisites: one year of biology; one semester of organic chemistry.

CBS 584 Internship. (6)

selected semesters

Internship with a local biotechnical/biomedical group culminating in a written and/or oral representation.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Computer Science

Master's and Doctoral Programs

cse.asu.edu

480/965-3190

GWC 206

Charles J. Colbourn, Chair

Professors: Collofello, Farin, Golshani, Kambhampati, Lee, Lewis, Nielson, Panchanathan, Tsai, J. Urban, S. Urban, Yau

Associate Professors: Baral, Bhattacharya, Dasgupta, Dietrich, Faltz, Gupta, Huey, Liu, Miller, O'Grady, Pheanis, Sen, Xue

Assistant Professors: Bazzi, Cam, Candan, Chatha, Gannod, Richa, Ryu, Sarjoughian, Wagner

The faculty in the Department of Computer Science and Engineering offer graduate programs leading to M.S. and Ph.D. degrees in Computer Science. The faculty also offer a professional graduate program leading to the Master of Computer Science degree.

Areas of study include algorithms, software engineering, computer-aided geometric design, artificial intelligence, database and multimedia, operating systems, computer architecture, networking, and parallel and distributed systems.

MASTER OF SCIENCE

The M.S. degree program in Computer Science stresses formal course work to provide breadth of material, and it culminates with a thesis that demonstrates depth in a particular research area.

Admission. See "[Admission to the Graduate College](#)," page 84, for general requirements. An applicant for the M.S. program should normally have a baccalaureate degree in computer science, computer engineering, or a closely related area. The applicant's undergraduate GPA and depth of preparation in computer science and engineering are the primary factors affecting admission. Every applicant must submit scores for the Graduate Record Examination (GRE) (verbal, quantitative, and analytical required; the subject test in computer science is optional). An international student must also submit Test of English as a Foreign Language (TOEFL) scores. The application deadline for admission in the fall semester is March 15, and the deadline for admission in the spring semester is September 1. The

GRADUATE PROGRAMS AND COURSES

deadlines for financial aid are January 15 and August 15, respectively.

Program of Study. Each student defines a potentially unique program of study in conjunction with an advisor, subject to approval of the department and the Graduate College. The program of study must include courses in four focus areas, at least nine credit hours in a research area, and a minimum of 30 semester hours of approved graduate-level course work (including a thesis). At least 21 semester hours must be formal course work, and at least 18 hours must be CSE 500-level credits (excluding CSE 598). The department may prescribe additional courses based on the background of the candidate. No foreign language is required.

Final Examinations. The student must pass a final oral examination in defense of the thesis and over the course work taken for the degree and the appropriate undergraduate prerequisites.

MASTER OF COMPUTER SCIENCE

The faculty in the Department of Computer Science and Engineering offer a professional program leading to the Master of Computer Science (M.C.S.) degree. The M.C.S. program provides a professionally oriented, graduate-level education in computer science and engineering. The program reflects the dual nature of computer science as both a scientific and engineering discipline by allowing emphasis on theory as well as practical applications. Students can study topics such as artificial intelligence, computer-aided geometric design, computer architecture, computer graphics, computer science theory, database concepts, digital systems design, distributed systems, language processing, networking, operating systems, and software engineering.

Admission. An applicant for the M.C.S. program should normally have a baccalaureate degree in computer science, computer engineering, or a closely related area. The applicant's undergraduate GPA, GRE (verbal, quantitative, and analytical) score, and depth of preparation in computer science and engineering are the primary factors affecting admission. The GRE subject test in computer science is optional. An international student must also submit the results of the TOEFL. The application deadline for admission in the fall semester is March 15, and September 1 for the spring semester. The deadlines for financial aid are January 15 and August 15, respectively. See "[Admission to the Graduate College](#)," page 84.

Program of Study. Each student defines a potentially unique program of study subject to approval by the department and the Graduate College. The program of study must include courses in four focus areas and must contain a minimum of 30 semester hours of approved graduate-level course work. At least 18 hours must be CSE 500-level credits (excluding CSE 598), and at least 27 hours must be for formal course work. A three-semester hour course, CSE 593 Applied Project, is also required. The department may prescribe additional courses based on the background of the candidate.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. M.C.S. students must complete a graded final project (CSE 593) and submit a report on the project.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Computer Science is available for students of high ability who show promise for original research.

Admission. An applicant for the Ph.D. program should have the equivalent of a baccalaureate major in computer science, computer engineering, or a closely related area. Most applicants should have earned the master's degree, but applicants with exceptional attainments in their baccalaureate are admitted directly into the Ph.D. program. The primary factors affecting admission include the applicant's GPA, depth of preparation in computer science and engineering, GRE (verbal, quantitative, analytical, and computer science) scores, a statement of purpose and three letters of recommendation. An international student must submit TOEFL scores. The application deadline for admission in the fall semester is March 15, and the deadline for admission in the spring semester is September 1. The deadlines for financial aid are January 15 and August 15, respectively. See "[Doctor of Philosophy](#)," page 96, for general requirements.

Residency. In addition to the Graduate College's requirement for one year of full-time residency, the Department of Computer Science and Engineering stipulates one additional year of full-time residency for dissertation research.

Program of Study. Each student must file a program of study for approval by the supervisory committee, the department, and the Graduate College.

Foreign Language Requirements. None. The program committee, however, may establish a requirement depending upon the research interests of the candidate.

Comprehensive Examinations. A student must pass a comprehensive examination, which has a mandatory written component, before being admitted to candidacy. The exam will have both oral and written components, testing the student's general knowledge in the dissertation area as well as closely related areas. International students must achieve a passing score on the TSE/SPEAK exam prior to comprehensive examinations.

Dissertation Requirements. A student must complete a dissertation based on original work to demonstrate creativity in research and scholarly proficiency in the subject area.

Final Examinations. The student must pass a final oral examination in defense of the dissertation.

RESEARCH ACTIVITY

Research areas include graph algorithms, combinatorial optimization, design and analysis of algorithms, artificial intelligence, distributed and incremental planning, computer aided geometric design, graphics, multiresolution flow visualization, distributed and visualization of databases, multi-

media systems, parallel and distributed systems and networking, fault tolerant applications, software development, formal methods, reverse engineering, object oriented analysis and design, protocols, security, microprocessors, embedded systems, software engineering, software life cycle, and the Internet.

COMPUTER SCIENCE AND ENGINEERING (CSE)

CSE 408 Multimedia Information Systems. (3)

fall

Design, use, and applications of multimedia systems. Introduces 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)

fall and spring

Introduces DBMS concepts. Data models and languages. Relational database theory. Database security/integrity and concurrency. Prerequisite: CSE 310.

CSE 420 Computer Architecture I. (3)

once a year

Computer architecture. Performance versus cost tradeoffs. Instruction set design. Basic processor implementation and pipelining. Prerequisite: CSE 330.

CSE 421 Microprocessor System Design I. (4)

fall and spring

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 225 or EEE 225.

CSE 422 Microprocessor System Design II. (4)

fall and spring

Design of microcomputer systems using contemporary logic and microcomputer system components. Requires assembly language programming. Prerequisite: CSE 421.

CSE 423 Microcomputer System Hardware. (3)

once a year

Information and techniques presented in CSE 422 are used to develop the hardware design of a multiprocessor, multiprogramming, microprocessor-based system. Prerequisite: CSE 422.

CSE 428 Computer-Aided Processes. (3)

selected semesters

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)

fall and spring

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 432 Operating System Internals. (3)

fall

IPC, exception and interrupt processing, memory and thread management, user-level device drivers, and OS servers in a modern microkernel-based OS. Prerequisite: CSE 430.

CSE 434 Computer Networks. (3)

fall and spring

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)

once a year

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)

once a year

Introduces 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 445 Distributed Computing with Java and CORBA. (3)

fall and spring

Frameworks for distributed software components. Foundations of client-server computing and architectures for distributed object systems. Dynamic discovery and invocation. Lecture, projects. Prerequisite: CSE 360 or instructor approval.

CSE 446 Client-Server User Interfaces. (3)

spring

Client-server model and its use in creating and managing window interfaces. Toolkits and libraries including X11, Microsoft Foundation Classes, and Java Abstract Window Toolkit. Lecture, projects. Prerequisite: CSE 310 or instructor approval.

CSE 450 Design and Analysis of Algorithms. (3)

fall and spring

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)

once a year

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. (3)

selected semesters

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, Dijkstras logic, proof obligations, and program proving. Prerequisite: CSE 355.

CSE 460 Software Analysis and Design. (3)

fall and spring

Requirements analysis and design; architecture and patterns; representations of software; formal methods; component-based development. Lecture, projects. Prerequisite: CSE 360.

CSE 461 Software Engineering Project I. (3)

fall and spring

First of two-course software team-development sequence. Planning, management, design, and implementation using object-oriented technology, CASE tools, CMM-level-5 guidelines. Lecture, lab, oral and written communications. Prerequisite: CSE 360.

CSE 462 Software Engineering Project II. (3)

fall and spring

Second of two-course software team-development sequence. Software evolution, maintenance, reengineering, reverse engineering, component-based development, and outsourcing. Lecture, lab, oral and written communications. Prerequisite: CSE 461.

CSE 470 Computer Graphics. (3)

fall and spring

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)

fall and spring

State space search, heuristic search, games, knowledge representation techniques, expert systems, and automated reasoning. Prerequisites: CSE 240, 310.

CSE 473 Nonprocedural Programming Languages. (3)

selected semesters

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)

selected semesters

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.

GRADUATE PROGRAMS AND COURSES

CSE 477 Introduction to Computer-Aided Geometric Design. (3)

once a year

Introduces parametric curves and surfaces, Bezier and B-spline interpolation, and approximation techniques. Prerequisites: CSE 210, 470; MAT 342.

CSE 484 Internship. (1–12)

selected semesters

CSE 507 Virtual Reality Systems. (3)

selected semesters

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)

once a year

Digital image fundamentals, image transforms, image enhancement and restoration techniques, image encoding, and segmentation methods. Prerequisite: EEE 303 or instructor approval.

CSE 510 Database Management System Implementation. (3)

once a year

Implementation of database systems. Data storage, indexing, querying, and retrieval. Query optimization and execution, concurrency control, and transaction management. Prerequisite: CSE 412.

CSE 512 Distributed Database Systems. (3)

once a year

Distributed database design, query processing, and transaction processing. Distributed database architectures and interoperability. Emerging technology. Prerequisite: CSE 412.

CSE 513 Rules in Database Systems. (3)

selected semesters

Declarative and active rules. Logic as a data model. Evaluation and query optimization. Triggers and ECA rules. Current research topics. Prerequisite: CSE 412.

CSE 514 Object-Oriented Database Systems. (3)

selected semesters

Object-oriented data modeling, definition, manipulation. Identity and inheritance. Query languages. Schema evolution. Versioning. Distributed object management. Extended relational systems. Prerequisite: CSE 412.

CSE 515 Multimedia and Web Databases. (3)

spring

Data models for multimedia and Web data; query processing and optimization for inexact retrieval; advanced indexing, clustering, and search techniques. Prerequisites: CSE 408, 412.

CSE 517 Hardware Design Languages. (3)

fall and spring

Introduces hardware design languages. Modeling concepts for specification, simulation, and synthesis. Cross-listed as EEE 517. Credit is allowed for only CSE 517 or EEE 517. Prerequisite: CSE 423 or EEE 425 or instructor approval.

CSE 518 Synthesis with Hardware Design Languages. (3)

selected semesters

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)

fall

Computer architecture description languages, computer arithmetic, memory-hierarchy design, parallel, vector, multiprocessors, and input/output. Prerequisites: CSE 420, 430.

CSE 521 Microprocessor Applications. (4)

selected semesters

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)

selected semesters

Developing system software for a multiprocessor, multiprogramming, microprocessor-based system using information and techniques presented in CSE 421, 422. Prerequisite: CSE 422.



Gazebo located in the courtyard near Old Main

Tim Trumble photo

CSE 526 Parallel Processing. (3)

selected semesters

Real and apparent concurrency. Hardware organization of multiprocessors, multiple computer systems, scientific attached processors, and other parallel systems. Prerequisite: CSE 330 or 423.

CSE 531 Distributed and Multiprocessor Operating Systems. (3)

once a year

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 432 or instructor approval.

CSE 532 Advanced Operating System Internals. (3)

selected semesters

Memory, processor, process and communication management, and concurrency control in the Windows NT multiprocessor and distributed operating system kernels and servers. Prerequisites: CSE 432, 531 (or 536).

CSE 534 Advanced Computer Networks. (3)

fall and spring

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 Advanced Operating Systems. (3)

spring

Protection and file systems. Communication, processes, synchronization, naming, fault tolerance, security, data replication, and coherence in distributed systems. Real-time systems. Prerequisite: CSE 430.

CSE 539 Applied Cryptography. (3)

spring

Use of cryptography for secure protocols over networked systems, including signatures, certificates, timestamps, electrons, digital cash, and other multiparty coordination. Prerequisite: CSE 310 or instructor approval.

CSE 540 Compiler Construction II. (3)

selected semesters

Formal parsing strategies, optimization techniques, code generation, extensibility and transportability considerations, and recent developments. Prerequisite: CSE 440.

CSE 545 Programming Language Design. (3)

selected semesters

Language constructs, extensibility and abstractions, and runtime support. Language design process. Prerequisite: CSE 440.

CSE 550 Combinatorial Algorithms and Intractability. (3)*once a year*

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 Theory of Computation. (3)*once a year*

Rigorous treatment of regular languages, context-free languages, Turing machines and decidability, reducibility, and other advanced topics in computability theory. Prerequisite: CSE 355 or instructor approval.

CSE 562 Software Process Automation. (3)*once a year*

Representing the software process; creating a measured and structured working environment; using, constructing, and adapting component-based tools. Prerequisite: CSE 360.

CSE 563 Software Requirements and Specification. (3)*selected semesters*

Examines the definitional stage of software development; analysis of specification representations, formal methods, and techniques emphasizing important application issues. Prerequisite: CSE 460.

CSE 564 Software Design. (3)*once a year*

Examines software design issues and techniques. Includes a survey of design representations and a comparison of design methods. Prerequisite: CSE 460.

CSE 565 Software Verification, Validation, and Testing. (3)*once a year*

Test planning, requirements-based and code-based testing techniques, tools, reliability models, and statistical testing. Prerequisite: CSE 460.

CSE 566 Software Project, Process, and Quality Management. (3)*once a year*

Project management, risk management, configuration management, quality management, and simulated project management experiences. Prerequisite: CSE 360.

CSE 570 Advanced Computer Graphics I. (3)*once a year*

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)*once a year*

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)*once a year*

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)*once a year*

Reasoning about time and action, plan synthesis and execution, improving planning performance, applications to manufacturing intelligent agents. Prerequisite: CSE 471 (or its equivalent).

CSE 576 Topics in Natural Language Processing. (3)*selected semesters*

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)*once a year*

General interpolation; review of curve interpolation and approximation; spline curves; visual smoothness of curves; parameterization of curves; introduces surface interpolation and approximation. Prerequisites: both CSE 470 and 477 or only instructor approval.

CSE 578 Advanced Computer-Aided Geometric Design II. (3)*selected semesters*

Coons patches and Bezier patches; triangular patches; arbitrarily located data methods; geometry processing of surfaces; higher dimensional surfaces. Prerequisites: both CSE 470 and 477 or only instructor approval.

CSE 579 NURBS: Nonuniform Rational B-Splines. (3)*selected semesters*

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.

CSE 593 Applied Project. (1–12)*selected semesters***CSE 598 Special Topics. (1–4)***selected semesters*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Construction

Master's Program

construction.asu.edu

480/965-3615

SCOB 241

W.W. Badger, Director

Professors: Badger, Mulligan

Associate Professors: Ariaratnam, Bashford, Chasey, Duffy, Ernzen, Kashiwagi, Sawhney, Walsh, Weber, Wiesel

Assistant Professors: Fiori, Knutson

Visiting Eminent Scholar: Schexnayder

MASTER OF SCIENCE

The faculty in the Del E. Webb School of Construction offer a graduate program leading to the M.S. degree in Construction. Concentrations are available in construction science, facilities management, and construction management. The interdisciplinary nature of the program allows a candidate's program of study to reflect both individual interests and career goals.

The primary objective of the program is to allow students with a baccalaureate degree in construction or a related field such as architecture, business, or engineering to broaden and improve their professional capabilities in construction. The program is designed to meet the growing need for professionals with advanced technical, management, and applied research skills in the construction industry.

The *construction science* concentration allows students with an interest in field engineering or supervision of heavy and industrial construction projects to pursue a more technically oriented course of study. The *facilities management* concentration supports the needs of the student desiring a career in the maintenance, operation, renovation, or decommissioning of existing facilities. The *construction management* concentration allows students seeking upper-level management positions in various sectors of the construction industry to improve their competency in project, program, and company management areas.

GRADUATE PROGRAMS AND COURSES

Admission Requirements. Applicants are expected to satisfy all requirements for admission to the Graduate College. In addition, applicants are expected to be competent in basic construction topics. Admission is based upon an evaluation of the student's academic background and potential for success. Students whose native language is not English must also submit a Test of English as a Foreign Language (TOEFL) score of at least 550.

Graduate Record Examination (GRE). Applicants must submit scores on the verbal, quantitative, and analytical sections of the GRE for admission.

Application Deadline. Completed college and departmental application materials should be received by February 1 for admission in the fall semester.

Program of Study. As soon as possible after selecting the student's supervisory committee, the student must file a program of study with the Graduate College.

The program of study consists of the following: thesis option—30 semester hours of graduate study culminating in a thesis and an oral defense; or nonthesis option—36 semester hours of graduate study culminating in an oral and written comprehensive examination.

RESEARCH ACTIVITY

Applied research is an integral part of the M.S. degree in Construction. The Del E. Webb School of Construction has several major ongoing research projects. The general fields of study include Alliance for Construction Excellence, Construction Research Education Advanced Technology Environments, Advanced Technology Homes, Performance-Based Studies Research Group, alternative project delivery systems, construction productivity studies, construction information technology, and construction and behavior of deep foundation. For more information, access the Web site at construction.asu.edu.

CONSTRUCTION (CON)

CON 424 Structural Design. (3)

fall

Economic use of concrete, steel, and wood in building and engineered structures. Design of beams, columns, concrete formwork, and connections. Lecture, field trips. Prerequisite: CON 310.

CON 453 Construction Labor Management. (3)

fall and spring

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 Project Management. (3)

fall and spring

Study of methods for coordinating people, equipment, materials, money, and schedule to complete a project on time and within approved cost. Lecture, class projects. Prerequisite: CON 371. Pre- or corequisite: CON 495.

CON 463 Foundations. (3)

spring

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: CON 424, 450.

CON 468 Mechanical and Electrical Estimating. (3)

fall

Analysis and organization of performing a cost estimate for both mechanical and electrical construction projects. Computer usage. Prerequisites: a combination of CON 273 and 345 and 383 or only instructor approval.

CON 471 Mechanical and Electrical Project Management. (3)

spring

Specialty contracts and agreements, scheduling, material handling, labor unit analysis, and job costing for mechanical and electrical construction. Prerequisite: CON 371.

CON 472 Development Feasibility Reports. (3)

fall and spring

Integrates economic location theory, development cost data, market research data, and financial analysis into a feasibility report. Computer orientation. Prerequisite: REA 380.

CON 477 Residential Construction Business Practices. (3)

fall

Topics addressed include development, marketing, financing, legal issues, and sales. Prerequisite: CON 377 or instructor approval.

CON 483 Advanced Building Estimating. (3)

fall and spring

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)

fall

Methods analysis and cost estimation for construction of highways, bridges, tunnels, dams, and other engineering works. Lecture, field trips. Prerequisites: CON 344, 383.

CON 495 Construction Planning and Scheduling. (3)

fall and spring

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.

CON 496 Construction Contract Administration. (3)

fall and spring

Surveys administrative procedures of general and subcontractors. Studies documentation, claims, arbitration, litigation, bonding, insurance, and indemnification. Discusses ethical practices. Lecture, field trips. Prerequisites: COM 225 or ECE 300; senior standing.

CON 533 Strategies of Estimating and Bidding. (3)

fall

Explores 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)

fall

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)

spring

Analyzes 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)

spring

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)

fall

Business planning process of the construction enterprise. Differences between publicly held and closely held businesses and their exposure.

CON 561 International Construction. (3)

spring

Investigation of the cultural, social, economic, political, and management issues related to construction in foreign countries and remote regions.

CON 565 Performance-Based Systems. (3)*fall*

Identifying the multicriteria methodology in the procurement of facilities contractual work. Prerequisite: instructor approval.

CON 567 Advanced Procurement Systems. (3)*spring*

Development of multicriteria decision procurement model for selecting the performing contractor. Prerequisite: instructor approval.

CON 570 Cleanroom Construction I. (3)*fall*

Design issues for cleanroom facilities; the construction's viewpoint including planning, structures, mechanical, and tool installation. Lecture, site visits. Prerequisite: instructor approval.

CON 571 Cleanroom Construction II. (3)*spring*

Construction issues for cleanroom facilities, including scheduling, cost estimating, project management, mechanical, safety certification, and tool hook-up. Lecture, site visits. Prerequisite: CON 570 or instructor approval.

CON 575 Information Technology in Construction. (3)*spring*

Use of information technology in the construction enterprise for improved communications, process modeling, and decision making. Prerequisite: instructor approval.

CON 589 Construction Company Financial Control. (3)*fall*

Financial accounting and cost control at the company level in construction companies. Accounting systems. Construction project profit calculations. Financial analysis. Lecture, case studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Counseling

Master's Programcoe.asu.edu/psyched

480/965-6339

EDB 446

Terence Tracey, Program Leader

Professors: Bernstein, Claiborn, Hackett, Horan, Kerr, Kinnier, McWhirter, Robinson Kurpius, Tracey

Associate Professors: Arciniega, Arredondo, Hood

Assistant Professor: Ota Wang

Clinical Associate Professor: Homer

Clinical Assistant Professor: Glidden-Tracey

MASTER OF COUNSELING

The Master of Counseling (M.C.) degree is a two-year, 60-semester-hour professional program. The program is designed to prepare students for counseling as a profession, and it includes a set of required professional studies sup-

ported by elective subjects in related disciplines. Practitioner, research, and school counseling options are available. The M.C. program, which is in community counseling, is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The school counseling option is appropriate for school counselor certification in Arizona and other states.

The M.C. degree identifies the recipient as a professional counselor and prepares individuals to work in a variety of human service fields.

Admission. A student initiates application for admission to the M.C. degree program with the Graduate College. Admission is determined by a variety of criteria in addition to GPAs. Applications are reviewed once a year. Applicants to the M.C. degree must submit all application materials by January 15 to be considered for admission for the following academic year. The number of students admitted to the M.C. degree program is limited by the size of the faculty and the facilities available for practica. Applicants may get the complete program brochure from the Division of Psychology in Education and the program Web site, coe.asu.edu/psyched.

Supervisory Committee. Following admission to the M.C. program, a supervisory committee consisting of a chair and two other faculty members are appointed to plan a program of study with the student and to prepare, administer, and evaluate the final examination(s).

Program of Study. The program of study should be planned in consultation with the supervisory committee. Candidates for the M.C. degree must complete COE 501 Introduction to Research and Evaluation in Education. In addition to course work, the program may include supervised practica in consultation, individual and group counseling, marriage and family counseling, and stress management. These experiences involve a variety of client populations. The program of study must be approved by the supervisory committee, the division director, and the dean of the Graduate College.

Credit Before Admission. A maximum of 32 semester hours of graduate course work earned in a completed master's degree from an accredited institution may be applied to the program. In all other circumstances, a maximum of nine semester hours of prior course work may be applied to the M.C. degree program.

Final Examinations. Students in the practitioner option are required to take a final written comprehensive examination or prepare a final written paper.

Students in the research option are required to complete a thesis. An oral examination in defense of the thesis is also required.

RESEARCH ACTIVITY

See "[Counseling Psychology](#)," page 162, for research activity.

GRADUATE PROGRAMS AND COURSES

COUNSELOR EDUCATION (CED)

CED 512 Introduction to Helping Relationships. (3)

fall, spring, summer

Introduces the skills used in the helping professions and examines the settings in which they occur.

CED 522 Theories of Counseling and Psychotherapy. (3)

fall, spring, summer

Presents major theories of psychological intervention as well as underlying personality theory upon which they are based.

CED 523 Psychological Tests. (3)

fall, spring, summer

Standardized tests in the study of the individual, with emphasis on test score interpretation in counseling. Prerequisite: COE 502 (or its equivalent).

CED 527 Community Counseling. (3)

fall and summer

Community focus with emphasis on outreach, prevention, psychoeducation, consulting, and advocacy from a systematic multicultural perspective. Lecture, discussion, visitations, experiential activities.

CED 534 Occupations and Careers. (3)

fall, spring, summer

The world of work, career development, education, and training for occupational entry and mobility.

CED 545 Analysis of the Individual. (3)

fall, spring, summer

Theory and methods commonly used in studying the individual. Observational methods, diagnostic interviews, structured, and semi-structured methods for assessing personality. Pre- or corequisite: CED 523.

CED 567 Group Dynamics and Counseling. (3)

fall, spring, summer

Group process factors, theory, and diversity issues determining effective interaction in small groups. Emphasis placed on lecturettes, self awareness, and experiential components. Lecturettes, discussion, experiential. Prerequisite: admission to graduate degree program.

CED 577 Counseling Prepracticum. (3)

fall, spring, summer

Focus on racial, social, and cultural factors in the development of helping relationships through integration of cognitive and affective self-awareness with counseling skills. Lecture, lab. Prerequisite: admission to M.C. or school counselor certification program. Pre- or corequisite: CED 522.

CED 655 Student Development Programs in Higher Education. (3)

once a year

Emerging conceptual models of student development. Overview of student personnel and student affairs programs in community colleges, four-year colleges, and universities. Observation on campuses.

CED 656 The American College Student. (3)

spring

Overview of American college student from demographic, background characteristics, and values/attitudes/perspectives. Includes access, persistence, and degree completion. Lecture, group discussion, research projects. Cross-listed as HED 679. Credit is allowed for only CED 656 or HED 679.

CED 672 Marriage and Family Counseling. (3)

fall

Introduces marriage and family counseling theories. Emphasizes a systems-communication model utilizing cocounseling.

CED 684 Internship in Community Counseling. (3-6)

fall, spring, summer

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Counseling Psychology

Doctoral Program

coe.asu.edu/psyched

480/965-6339

EDB 446

Terence Tracey, Training Director and Academic Program Leader

Professors: Bernstein, Claiborn, Hackett, Horan, Kerr, Kinnier, McWhirter, Robinson Kurpius, Tracey

Associate Professors: Arciniega, Arredondo, Hood

Assistant Professor: Ota-Wang

Clinical Associate Professor: Homer

Clinical Assistant Professor: Glidden-Tracey

DOCTOR OF PHILOSOPHY

The faculty in the Division of Psychology in Education offer a graduate program leading to the Ph.D. degree in Counseling Psychology. The Ph.D. program in Counseling Psychology is accredited by the American Psychological Association. The Ph.D. program adheres closely to the scientist-practitioner model in preparing graduates for positions in academic and psychological service settings. Although faculty interests are diverse, there is a strong emphasis on empirical data as the basis for professional decision making. All applicants must submit scores of the Graduate Record Examination and submit all application materials by December 1 to be considered for admission for the following academic year.

Curriculum requirements of the Counseling Psychology program include course work from several domains (general psychology core, empirical foundations, and counseling theory and methods), as well as practicum and internship experiences. Comprehensive examinations cover the psychology core, empirical foundations, and counseling theory and practice. Applicants should contact the Division of Psychology in Education and request the Counseling Psychology Program brochure for a complete description of admissions and curricular requirements. A copy of the program brochure is also available on the Web site, coe.asu.edu/psyched.

RESEARCH ACTIVITY

Research activity includes career development and self-efficacy, counseling process, drug abuse prevention, adolescent suicide, problem solving and decision making, small-group process, interpersonal skill development, ethnic and gender issues, health psychology topics, student development, program evaluation, gerontological counseling, eth-

ics, marriage and family counseling, at-risk youth, and the counseling of the gifted and talented.

COUNSELING PSYCHOLOGY (CPY)

CPY 613 Child Counseling. (3)

selected semesters

Applications of counseling theory in working with children in clinics and elementary schools. Integrated practicum available with instructor approval. Prerequisite: CED 577 (or its equivalent).

CPY 622 Group Counseling. (3)

fall and spring

Theories and methodologies used in group counseling. Prerequisites: CED 567 and 577 (or their equivalents).

CPY 634 Organizational Development and Planned Change. (3)

selected semesters

Organizational/individual dynamics, including theory, analysis, techniques, and consultation/intervention strategies used in organizational development. Field consultation projects. Prerequisites: CED 567 and 577 (or their equivalents).

CPY 644 Psychology of Careers. (3)

spring

Advanced career counseling, including theory, research, and practice. Prerequisite: CED 577 (or its equivalent).

CPY 645 Professional Issues and Ethics. (3)

fall and spring

Ethical, legal, and professional issues of concern to practitioners and researchers functioning in a variety of settings. Prerequisites: CED 512 and 523 (or their equivalents).

CPY 667 Patterns of Behavior Disorders. (3)

once a year

Etiology and treatment of a variety of psychological problems, particularly those represented in DSM III-R. Prerequisite: CED 577 (or its equivalent).

CPY 671 Multicultural Counseling. (3)

fall

Provides awareness of the influence of sociocultural variables on human development and explores implications for counseling minority populations.

CPY 672 Human Diversity: Social Psychological Perspectives. (3)

once a year

Implications for psychological practice of social, psychological, and biological factors in the development of behavioral differences.

CPY 674 Counseling Women. (3)

fall

Explores women's development and its implications for counseling. Sexism in mental health, sex differences in diagnosis and psychopathology, and women's particular treatment needs.

CPY 675 Health and Wellness Counseling. (3)

selected semesters

Theory, research, and practice in health and wellness counseling. Prerequisite: CED 577.

CPY 677 Advanced Counseling. (3)

selected semesters

Advanced topics in counseling theory, research, and practice. Prerequisite: CED 577 (or its equivalent).

CPY 679 History and Systems of Psychology. (3)

once a year

Examines the development and differentiation of the discipline of psychology from its origins in philosophy to the present.

CPY 701 Science and Practice of Counseling Psychology. (3)

fall

Directed experiences involving the integration of theory, research, and practice in counseling psychology. Prerequisite: instructor approval.

CPY 702 Research Methods in Counseling Psychology. (3)

once a year

Applies experimental and/or quasi-experimental methods to theory construction and treatment evaluation in counseling psychology. Prerequisite: COE 502 (or its equivalent).

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48](#).

Counselor Education

Master's Program

coe.asu.edu/psyched

480/965-3384

EDB 302

Terence Tracey, Academic Program Leader

Professors: Bernstein, Claiborn, Hackett, Horan, Kerr, Kinnier, McWhirter, Robinson Kurpius, Tracey

Associate Professors: Arciniega, Arredondo, Hood

Assistant Professor: Ota-Wang

Clinical Associate Professor: Homer

Clinical Assistant Professor: Glidden-Tracey

The faculty in the Division of Psychology in Education offer a degree program leading to the Master of Education degree in Counseling.

MASTER OF EDUCATION

The Master of Education degree in Counseling is a 30-semester-hour program for certified or certifiable teachers. The degree is designed to provide a greater understanding of the psychological and behavioral development of individual students; the dynamics and use of groups in the instructional process; principles of testing and vocational and career dynamics that have applications in the instructional process; the effective utilization of school specialists in aiding student development; and the role of the school counselor in the instructional process. While the M.Ed. program is generally chosen as a student's fifth year of teacher preparation, the M.Ed. does not result in certification as a school counselor. Those wishing to be certified for school counseling should apply to the Master of Counseling (M.C.) degree program.

Admission to the M.Ed. in Counseling is based on the applicant's potential for graduate study and completion of an undergraduate degree in education or certification as a teacher in Arizona public schools. To balance student demand with resources available, the program is limited in the number of students admitted each admissions period.

Applicants to the M.Ed. in Counseling must submit all application materials by October 15 or April 15 to be considered for admission for the following semester. Applicants should get the complete program brochure from either the Division of Psychology in Education or from the Web site.

See ["Master of Education," page 181](#), for more information.

GRADUATE PROGRAMS AND COURSES

RESEARCH ACTIVITY

See [“Counseling Psychology,” page 162](#), for research activity.

COURSES

For courses, see [“Counseling,” page 161](#).

Creative Writing

Interdisciplinary Master’s Program

www.asu.edu/clas/english/creativewriting

480/965-3528

LL 315C

Beckian Fritz Goldberg, Director, Executive Committee

English

Regents’ Professors: Dubie, Ríos

Professors: Boyer, Carlson, Rhodes

Associate Professors: Goldberg, Pritchard, Savard

Theatre

Professors: Bedard, Knapp, Mason

Associate Professor: Edwards

Assistant Professors: Reyes, Sterling

Faculty of the Creative Writing Committee offer an interdisciplinary Master of Fine Arts degree in Creative Writing. The program is offered jointly by the Department of English in the College of Liberal Arts and Sciences and the Department of Theatre in the Herberger College of Fine Arts.

MASTER OF FINE ARTS

One of the unique features of this interdisciplinary program is that, because it utilizes faculty research, creative activity, and teaching interests of two academic units, a student may tailor a course of study to fit individual needs, talents, and goals. The Department of English administers the program and reviews the applications for admission. In the English Department, the studio/academic program requires poets and prose writers to divide work equally between writing workshops and literature courses. This flexible curriculum allows candidates time to study with several gifted writers and scholars in a stimulating atmosphere, time to get quality advice on writing, and time to explore and develop their talents. In the Department of Theatre, the studio/academic program emphasizes the collaborative process of playwriting. Working with actors and directors, playwrights’ workshops include informal readings, staged readings and workshop production of students’ plays.

Admission. In addition to meeting the general requirements of the Graduate College, applicants must have an undergraduate major in English or Theatre, with a GPA of 3.00 or above. Applicants who do not have an undergraduate major in English or Theatre may be admitted provisionally, on the condition that they make up deficiencies in course work.

Deficiencies in undergraduate preparation may be removed while pursuing the M.F.A. degree; courses taken to remove deficiencies may not be counted toward the degree. Applicants must also submit the following:

1. an acceptable score on the Miller Analogies Test or the Graduate Record Examination (GRE);
2. three letters of recommendation;
3. a professional résumé; and
4. a statement of career goals, including the designation of an area of specialization (options include fiction, poetry, and playwriting) and a manuscript sample of one of the following: 30 pages of drama; 20 pages of poetry; 30 pages of prose fiction or creative nonfiction; or 40 total pages of work in two of these literary forms.

Selection Procedures. Completed application forms should be sent directly to the Graduate College. All other materials and manuscripts, including the teaching assistant application form, should be submitted to the Department of English by February 1. The Creative Writing Committee reviews the materials and manuscripts and makes recommendations for admission by March 15. Guidelines for admission recommendations used by the committee include the following: applicant’s academic record and capabilities for successful graduate study; talent and promise demonstrated in the manuscript sample; strength of letters of recommendation; quality of applicant’s undergraduate background; and compatibility of the applicant’s career goals with the purpose of the degree program.

Program of Study. In poetry and fiction, the program of study requires a minimum of 48 semester hours of graduate credit approved by the student’s supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. Of these, 24 semester hours must be creative writing courses and must include nine semester hours of ENG 580, and nine semester hours of any combination of ENG 455, 594, and 598. The course 594 Conference and Workshop may be taken twice to varied offerings. The literature component of 24 semester hours must include ENG 591 and two ENG courses in literature selected by the student’s supervisory committee or the director of the creative writing committee. In playwriting, the program of study requires a minimum of 60 semester hours of graduate credit approved by the student’s supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. The program of study must include the following: THP 519 (six semester hours), 560 (15 semester hours), 561 (three semester hours), 598 (three semester hours), and 693 (nine semester hours). The literature component of 30 semester hours must include THE 500, 504, 505, 520, and 521.

Credit Before Admission. Subject to the recommendation of the supervisory committee, students with a completed M.A. or Ph.D. degree in English or Theatre may have up to 15 semester hours of literature credit applied to the M.F.A. program of study. A maximum of nine semester hours taken before admission and not as part of a completed degree at ASU and/or another institution may be used to fulfill degree

requirements. All course work for the degree must be completed within the six-year time limit.

Comprehensive Examinations. A final written comprehensive examination is required and is scheduled once each semester and once during the summer. Upon completion of course work, the student is required to take the written examination. Official application is made through the Graduate College. The student is also required to notify the Creative Writing Committee of intent to take the examination at least 30 days in advance. A student is not eligible to apply for the written examination until a program of study has been filed. If the candidate fails the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Permission for reexamination must be obtained from the student's supervisory committee, the director of the Creative Writing Committee, and the dean of the Graduate College. Only one reexamination is permitted. Students are examined in the following areas:

1. 20th-Century American Writers: Modern Period;
2. 20th-Century Writers: Contemporary Period; and
3. 20th-Century Critical Theory.

Playwrights are examined in the following areas: (1) European and American Drama and (2) Dramatic Theory and Criticism. The examination is constructed and graded by members of the Creative Writing Examination Committee.

Practicum and Performance Requirements. ENG 580 Practicum or THP 693 Applied Project is required of all students in the program. For nine semester hours of credit, the student creates a book-length volume of poetry, short stories, novel, drama, translation, or creative nonfiction (except literary criticism). This project must be approved in advance by the student's supervisory committee on the basis of sample pages and a summary of the proposal. The supervisory committee must evaluate and approve the final project. As the last requirement for the degree, the candidate must read or perform from the practicum or applied project before students and members of the faculty.

RESEARCH AND SCHOLARLY ACTIVITY

Research and scholarly endeavors inform the creative work of the faculty, which includes publication of poetry, fiction, and drama; collaborative production with musicians, fine printers, and visual artists. Special research courses are offered on contemporary perspectives emphasizing such topics as "Magical Realism," "The Long Poem," "Pedagogy Forum for Creative Writers," "The Literature of Obsession," "Sexing the Modern," "Internship for Community Outreach," and "Latino and Latina Theatre."

Research and creative activity is enhanced by vigorous faculty and student involvement in producing a national literary magazine, *Hayden's Ferry Review*, an ASU student publication. Creative writing faculty and graduate students participate in public outreach programs, including workshops at ASU for adults and high school students in rural and metropolitan areas of the region. Public lectures and readings by faculty members, original play productions and

reader's theatre, and a regular series of public readings, lectures and conferences featuring writers of national renown provide a forum for exchange among artist, audience, scholar, and student. Recent conferences, with support from the National Endowment for the Arts and other agencies, have brought together writers, editors, and publishers, focusing attention on issues in publishing creative work.

COURSES

For courses, see "English (ENG)," page 199, "Theatre (THE)," page 345, and "Theatre Performance and Production (THP)," page 346.

Criminal Justice

Master's Program

ASU West offers a Master of Arts degree in Criminal Justice. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Curriculum and Instruction

Master's and Doctoral Programs

hal.asu.edu/cni

480/965-4602

ED 434

Carlos Julio Ovando, Director

**Robert B. Rutherford Jr., Associate Director
of Research and Graduate Education**

Professors: Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, Gryder, Guzzetti, Hudelson, McGowan, Ovando, Piburn, Rutherford, Searfoss, Stahl, Staley, Surbeck, Swadener, Tobin, Zucker

Associate Professors: Anijar, Arias, Benavides, Blumenfeld-Jones, Cohen, Cohn, Di Gangi, Gomez, McCoy, Middleton, Rader, Smith, Vallejo

Assistant Professors: Baek, Fischman, Lamorey, MacSwan, Rolstad, Trujillo, Young

Clinical Associate Professor: Garcia

Clinical Assistant Professor: Christine

Lecturers: Bardsley, Burstein, Cocchiarella, Glass, Hansen, Kortman, Poynor, Spanias, Vogel

The faculty of the Division of Curriculum and Instruction offer the Master of Arts, Master of Education, and Doctor of

GRADUATE PROGRAMS AND COURSES

Education degree programs in Curriculum and Instruction.

The Ph.D. degree in Curriculum and Instruction is offered by the Interdisciplinary Committee on Curriculum and Instruction. See [“Interdisciplinary Doctoral Program,” page 171](#), for information regarding the Ph.D. curriculum.

Graduate-level endorsement programs in bilingual education, English as a second language, and reading are available and may be completed in conjunction with an M.Ed. or the Postbaccalaureate Program for Teacher Certification.

M.A. and M.Ed. students majoring in Curriculum and Instruction complete requirements by choosing one of the following concentrations: bilingual education, early childhood education, elementary education, English as a second language, language and literacy, Indian education, mathematics education, professional studies, science education, secondary education, and social studies education. The Ed.D. degree in Curriculum and Instruction offers areas of concentration in bilingual education, curriculum studies, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, secondary education, and social studies education.

Admission. Applicants for admission to the M.Ed. and M.A. degrees are required to

1. meet Graduate College requirements for admission,
2. provide letter of intent that includes a statement of purpose and a summary of the applicant’s professional teaching experience,
3. provide proof of teacher certification (photocopy of the certificate[s] held), and
4. provide three letters of recommendation.

Applicants who have junior-senior GPAs of 3.00 or higher, have an acceptable application package, and have proof of teacher certification are not required to take the Graduate Record Examination or Miller Analogies Test. Applicants who do not meet this minimum GPA requirement should contact the Division of Curriculum and Instruction graduate programs office for more information.

For admission to the Ed.D. degree program, contact the Division of Curriculum and Instruction graduate programs secretary for information regarding specific test scores and materials that need to be submitted with applications.

Applicants should note that meeting minimal admissions requirements does not guarantee admission. In addition, international students are required to submit the Test of English as a Foreign Language scores.

Programs of Study. The M.Ed. degree requires 30 semester hours of graduate course work and completion of a culminating activity. Students have two options for a culminating activity: either an applied project and an oral defense or a written comprehensive exam. Students should meet with their advisor early in their program to discuss the culminating activity.

The M.A. degree requires a minimum of 30 semester hours of graduate course work, including a thesis. An oral examination in defense of the thesis is required.

Candidates for the Ed.D. degree are required to complete at least 90 hours of graduate course work and research and dissertation credit.

Endorsements. The Arizona Reading endorsement requires 15 semester hours of upper-division or graduate-level course work in reading. The teaching endorsements in bilingual education and English as a second language require 21 semester hours. Middle school endorsement requirements include six semester hours of upper-division or graduate course work in middle-level education along with student teaching within fifth through ninth grades or one year of verifiable, full-time teaching experience within fifth through ninth grades. A valid Arizona teaching certificate is required to secure each of the above endorsements. Those interested in qualifying for one of these endorsements should seek advising from a faculty member in the program area.

Initial Teacher Certification Program. The initial teacher certification (ITC) program offers, to those who have completed baccalaureate degrees outside the College of Education, course work needed to qualify for Arizona teacher certification. ITC programs are offered in early childhood education, elementary education, multilingual/multicultural, principalship, secondary education, special education, superintendent, and supervisor. Concurrent ITC and admission to the M.Ed. program in special education is required for those seeking certification by the State of Arizona. This requirement is waived for ITC applicants in special education who have already completed a master’s degree.

A maximum of nine semester hours completed after receiving a bachelor’s degree and before formal admission to a graduate program may be applied to an M.Ed. or M.A. degree. The maximum time limit for the program of study is six years.

Prospective ITC students should call 480/965-5555, or visit the Office of Student Services in EDB LI-13, for information about specific admission requirements.

MASTER OF ARTS

See [“Master’s Degrees,” page 93](#), for general requirements.

MASTER OF EDUCATION

M.Ed. students in the secondary education concentration who are certified teachers may select a general or academic specialization option. Those selecting the academic specialization option complete 15 semester hours of core and secondary education course work and 15 hours in their academic specialization. The 15 hours of course work in the academic area must be selected in consultation with a faculty member involved in the area of study. This person serves as cochair of the student’s supervisory committee.

DOCTOR OF EDUCATION

The Doctor of Education program is designed to provide an opportunity for practitioner-scholars to expand their skills and knowledge related to curriculum and instruction. The program produces practitioner-scholars for leadership roles in curriculum, program evaluation, or teacher education and professional development in school. Students

choose one of the curriculum and instruction concentration areas. The program prepares students for comprehending, interpreting, and applying theories, models, and research methods that have application to curriculum and instruction.

See [“Doctor of Education,” page 182](#), for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Current faculty research activities include the e-learning network: learning anytime anywhere; family-centered early identification of children with learning disabilities and behavior disorders; bilingual/English as a second language/special education; Arizona behavior initiative: creating school environments that support high academic standards for all students; relationship-based practice in early intervention settings; explaining low achievement in limited English proficient students; and extending and sustaining use of reforms in mathematics classrooms.

BILINGUAL EDUCATION (BLE)

BLE 511 Introduction to Language Minority Education. (3)

once a year

Historical, philosophical, theoretical, and pedagogical foundations of language minority education in the United States.

BLE 514 Bilingual/Multicultural Aspects of Special Education. (3)

spring

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

BLE 515 Instructional Methods for Bilingual Students. (3)

fall

Introduces 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)

spring

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)

spring

Examines bilingual/biliterate development of elementary school children, bringing together native and second language, oral language, and literacy development findings with educational practices. Prerequisite: BLE 511.

BLE 522 Literacy/Biliteracy Development. (3)

fall

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. Credit is allowed for only BLE 522 or RDG 522. Prerequisite: BLE 511.

BLE 524 Secondary Sheltered ESL Content Teaching. (3)

fall

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)

spring

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)

spring

Examines first- and second-language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as RDG 533. Credit is allowed for only BLE 533 or RDG 533. Prerequisite: BLE 511.

BLE 535 Sociolinguistic Issues in Bilingual Education. (3)

fall

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)

once a year

Bilingual and second language acquisition, with emphasis on children and adolescents. Stresses cognitive, social, and cultural aspects. Prerequisite: BLE 511.

BLE 543 Bilingual Education Models. (3)

once a year

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)

fall and spring

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)

spring

Selects, analyzes, and utilizes literature for Hispanic and Spanish-speaking children and adolescents. Cross-listed as LIS 565. Credit is allowed for only BLE 565 or LIS 565.

BLE 580 Practicum. (1–6)

fall and spring

Provides for practical application in school settings of principles of BLE/ESL. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

BUSINESS EDUCATION (BUE)

BUE 480 Teaching Business Subjects. (3)

spring

Organization and presentation of appropriate content for business subjects in the secondary school.

BUE 481 Technology in Business and Vocational Education. (3)

spring in even years

Emerging curricula and instructional technology in business and vocational education. Lecture, hands-on computer instruction.

BUE 501 Principles of Business Education. (3)

fall

History, philosophy, principles, and objectives of business and distributive education.

BUE 502 Organization and Management of Cooperative Programs. (3)

fall

Work-study programs for business occupations in high schools and community colleges.

BUE 503 Competency-Based Business and Vocational Education. (3)

spring

Development and administration of competency-based individualized programs in business and vocational education.

BUE 505 Current Literature in Business and Vocational Education. (3)

spring

Critical analyses, generalizations, and trends in business and vocational education.

GRADUATE PROGRAMS AND COURSES

BUE 506 Information Processing for Business and Vocational Teachers. (3)

summer

Development of curriculum and strategies for teaching information processing; hardware/software evaluation and equipment acquisition techniques in business and vocational education.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

CURRICULUM AND INSTRUCTION (DCI)

DCI 510 Teacher as Researcher. (3)

fall, spring, summer

Introduces teacher research as a new research genre; offers teachers guidance on planning and conducting research on their practice. Lecture, workshop.

DCI 511 Establishing Effective Teaching Practice. (2–3)

fall and spring

Helps beginning teachers establish and strengthen best practices. Interactive.

DCI 512 Developing Strategies for Teaching Practice. (2–3)

fall and spring

Helps beginning teachers refine management strategies and instructional methods. Interactive.

DCI 520 Teaching Standards Applied to Professional Practice. (1–3)

fall and spring

Develops teacher skills and self-reflective practices to assess instruction and document and achieve professional growth in teaching standards. Interactive.

DCI 521 Reflective Practice in Teaching Standards. (1–3)

fall and spring

Teachers apply reflective practices to develop professional presentation portfolios. Interactive.

DCI 530 Establish a Mentoring Partnership. (2–3)

fall and spring

Prepares veteran educators for mentoring. Mentors collaborate, reflect on their practice, and become teacher leaders through professional development. Interactive.

DCI 531 Analyzing and Planning for Professional Growth Through Mentoring. (2–3)

fall and spring

Refines strategies for assessing instruction and provides collegial feedback. Interactive.

DCI 591 Seminar. (1–12)

selected semesters

DCI 701 Curriculum Theory and Practice. (3)

fall and spring

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.

DCI 791 Interdisciplinary Research Seminar. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

EARLY CHILDHOOD EDUCATION (ECD)

ECD 501 Interprofessional Collaboration. (3)

fall

Dispositions, knowledge, experiences, and skills necessary for interprofessional collaboration required of professionals who work with multineed families with young children. Preparation 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)

spring

Examines bilingual/biliterate development of elementary school children, bringing together native and second language, oral language,

and literacy development findings with educational practices. Prerequisite: BLE 511.

ECD 522 Developmental Social Experiences in Early Childhood Education. (3)

fall

Materials, techniques, aesthetic expression, creative activities, and values in the integrated curriculum.

ECD 525 Emergent Literacy. (3)

spring

Examines recent research on oral language and literacy development and effective strategies for teaching language and literacy in prekindergarten to grade 3. Lecture, discussion. Cross-listed as RDG 525. Credit is allowed for only ECD 525 or RDG 525.

ECD 527 Mathematics in Early Childhood Education. (3)

fall

Theory and practice in the use of manipulative materials for teaching mathematics to preschool and primary grade children. Prerequisite: ECD 402 (or its equivalent).

ECD 544 Play Education. (3)

spring and summer

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)

fall and summer

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)

fall and summer

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)

once a year

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)

spring

Critical examination and use of developmentally appropriate evaluative procedures for children from birth through age 8.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ELEMENTARY EDUCATION (EED)

EED 511 Principles of Curriculum Development. (3)

fall, spring, summer

Contemporary curriculum theories. Curriculum as an interrelated entity. Principles of conceiving and effecting change.

EED 526 Communication Arts in the Elementary School. (3)

spring and summer

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)

fall and summer

Problems and trends of current programs. Development of a balanced and articulated program of social studies.

EED 529 Science in the Elementary School. (3)

spring

Problems and trends of current programs. Development of a balanced and articulated science program.

EED 530 Outdoor/Environmental Education. (3)

summer

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)

fall and summer

Contemporary mathematics teaching. Content, materials, and approaches to instruction.

EED 538 Teaching Social Studies with Literature. (3)

fall and summer

Develops the rationale, resources, and strategies for adopting a literature-based approach to social studies teaching in grades K–8. Lecture, discussion, cooperative learning. Prerequisite: EED 455 (or its equivalent).

EED 578 Student Teaching in the Elementary School. (3–15)

fall and spring

Supervised teaching for postbaccalaureate students, synthesized experience in curriculum, instruction, and classroom management. Fee. Prerequisites: completion of 21 hours of identified course work from an approved program of study; 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)

fall and spring

Specific skills in diagnosing and treating children’s learning difficulties in mathematics. Includes practicum experiences, both on and off campus, in identifying strengths and weaknesses and initial remediation. Prerequisite: instructor approval.

EED 584 Internship. (1–12)

selected semesters

EED 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Using Math Manipulatives/Elementary Schools
Fee.
- Using Math Manipulatives/Middle Schools
Fee.

EED 720 Language in Education. (3)

once a year

Sociolinguistic seminar on language issues in education, including language acquisition, classroom interaction, language attitudes, relation language, and class-gender ethnicity.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

INDIAN EDUCATION (IED)

IED 430 Issues in Language and Literacy of Indigenous Peoples. (3)

spring

Examines issues, policies, theoretical foundations, and practices of indigenous peoples and other language minority communities from a sociolinguistics and language reclamation perspective.

IED 444 The Role of Governments in Native Education Policy and Administration. (3)

fall

Examines the interrelationship of federal Indian policy, federal/state/tribal law, and tribal sovereignty as they have shaped American Indian education. Analyzes administrative practices and personnel, program and fiscal management, and resources as they reflect the historic and present influence of this triad of factors. Credit is allowed for only IED 444 or 544. Lecture, seminar.

IED 460 Yaqui History and Culture. (3)

fall

Yaqui history and culture ranging from precontact to the present. Larger themes of Yaqui identity, belief systems, family, traditions, community, resistance, dispersion, and survival.

IED 500 Administration and Management of Indian Education Programs. (3)

fall

Emphasizes educational leadership research and practice in the schooling of American Indian students. Examines effective practices.

IED 510 History of American Indian Education. (3)

fall and spring

Philosophical and historical review of the development of American Indian education policies in both traditional and contemporary society.

IED 530 Issues in Language and Literacy of Indigenous Peoples. (3)

spring

Examines issues, policies, theoretical foundations, and practices of indigenous peoples and other language minority communities from a sociolinguistics and language reclamation perspective.

IED 544 The Role of Governments in Native Education Policy and Administration. (3)

fall

Examines the interrelationship of federal Indian policy, federal/state/tribal law, and tribal sovereignty as they have shaped American Indian education. Analyzes administrative practices and personnel, program and fiscal management, and resources as they reflect the historic and present influence of this triad of factors. Credit is allowed for only IED 544 or 444. Lecture, seminar.

IED 560 Yaqui History and Culture. (3)

fall

Yaqui history and culture ranging from precontact to the present. Larger themes of Yaqui identity, belief systems, family, traditions, community, resistance, dispersion, and survival.

IED 594 Workshop in Indian Education. (6)

summer

Examines curriculum, pedagogy, community involvement, current issues, and research.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

LIBRARY SCIENCE (LIS)

LIS 410 Children’s Literature. (3)

fall, spring, summer

Selects, analyzes, and utilizes modern and classic literature with young readers.

LIS 510 Computers and Technology in the School Library. (3)

fall

Library uses of technology and computers. Fundamental concepts and issues in library media centers. Prerequisites: both LIS 571 and 581 or only instructor approval.

LIS 533 Current Library Problems. (3)

fall

Critical analysis of current practices and problems in school librarianship. Prerequisites: a combination of LIS 540 and 561 and 571 and 581 or only instructor approval.

LIS 540 Classification and Cataloging. (3)

fall

Descriptive cataloging and Dewey Decimal Classification of print and nonprint library materials.

LIS 561 Selection of Library Materials. (3)

fall

Principles and procedures used in the selection of materials for the school library.

LIS 563 Children’s Literature. (3)

fall, spring, summer

Selects and uses children’s literature and related nonprint media to support the elementary school curriculum. Cross-listed as RDG 563. Credit is allowed for only LIS 563 or RDG 563.

LIS 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3)

spring

Selects, analyzes, and utilizes literature for Hispanic and Spanish-speaking children and adolescents. Cross-listed as BLE 565. Credit is allowed for only BLE 565 or LIS 565.

LIS 571 Basic Reference Resources. (3)

spring

Provides reference service in the school library. Content and use of basic resources.

LIS 581 School Library Administration. (3)

spring

Administration of K–12 libraries and media centers.

GRADUATE PROGRAMS AND COURSES

LIS 584 School Library Internship. (1–6)

fall and spring

Prerequisites: LIS 410, 540, 561, 571, 581; instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

READING EDUCATION (RDG)

RDG 481 Reading Practicum. (3)

fall, spring, summer

Applies concepts from RDG 414 in classroom settings. Students demonstrate teaching strategies under supervision. Required for Elementary Education candidates. Prerequisite: ITC admission.

RDG 505 Developmental Reading. (3)

fall, spring, summer

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)

fall, spring, summer

Theory, teaching strategies, and practical application concerning learning from text across subject matter disciplines.

RDG 522 Literacy/Biliteracy Development. (3)

fall

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. Credit is allowed for only BLE 522 or RDG 522. Prerequisite: BLE 511.

RDG 525 Emergent Literacy. (3)

spring

Examines recent research on oral language and literacy development and effective strategies for teaching language and literacy in prekindergarten to grade 3. Lecture, discussion. Cross-listed as ECD 525. Credit is allowed for only ECD 525 or RDG 525.

RDG 530 Research Issues in Literacy. (3)

spring in odd years

For graduate students interested in research on major issues related to literacy instruction. Seminar activities include reviewing quantitative and qualitative methods and analyzing literacy research. Prerequisite: COE 501 or DCI 510 or EDP 502.

RDG 533 Literacy in Secondary BLE/ESL Settings. (3)

spring

Examines first- and second-language literacy research, practice, and assessment across content areas in secondary school settings. Lecture, discussion. Cross-listed as BLE 533. Credit is allowed for only BLE 533 or RDG 533. Prerequisite: BLE 511.

RDG 544 Adolescent Literacy Programs for New Times. (3)

selected semesters

Theories, strategies, and issues in developing, implementing, and assessing approaches to literacy instruction for today's diverse adolescent students (grades 7–12). Prerequisite: RDG 507 or instructor approval.

RDG 550 Practicum Experiences in Elementary and Secondary Reading. (3)

spring and summer

Practicum experience utilizing assessment and instructional techniques for classroom settings. See RDG 557 for State of Arizona reading endorsement. Lab. Prerequisite: RDG 505 (or its equivalent).

RDG 556 Assessment and Procedures in Elementary and Secondary Reading. (3)

fall

Techniques for classroom and clinical reading assessment and instruction. Emphasizes continuous assessment. May be taken concurrently with RDG 557. Recommended for State of Arizona reading endorsement. Lecture, lab. Prerequisite: RDG 505.

RDG 557 Advanced Elementary and Secondary Reading Practicum. (3)

spring and summer

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. Lab. Prerequisites: RDG 505; instructor approval.

RDG 563 Children's Literature. (3)

fall, spring, summer

Selects and uses children's literature and related nonprint media to support the elementary school curriculum. Cross-listed as LIS 563. Credit is allowed for only LIS 563 or RDG 563.

RDG 581 Literature-Based Reading Programs. (3)

fall, spring, summer

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. Introduces literature studies. Prerequisite: teaching certificate.

RDG 582 Practicum: Literature Studies. (3)

spring

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)

spring

Influence of gender and culture on written, oral, and post-typographical texts. Seminar.

RDG 630 Research in Literacy. (3)

selected semesters

For advanced graduate students interested in applied research problems, literature of literacy instruction, and major issues related to literacy research. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

SECONDARY EDUCATION (SED)

SED 400 Principles of Effective Instruction in Secondary Education. (3)

fall, spring, summer

Examines different models of education. Develops and applies appropriate teaching practices for each model to secondary school classrooms. Lecture, discussion. Prerequisite: ITC admission.

SED 480 Special Methods of Teaching Social Studies. (3)

fall and spring

Interdisciplinary approaches; production and collection of materials. Prerequisite: ITC admission.

SED 501 Introduction to Effective Instruction. (6)

fall, spring, summer

Introductory course for postbaccalaureate certification program in secondary education. Emphasizes 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)

fall, spring, summer

Social processes, issues, principles, patterns, and procedures in curriculum development.

SED 533 Improving Instruction in Secondary Schools. (3)

fall, spring, summer

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)

selected semesters

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. (3–15)

fall and spring

Practice of teaching. Relationship of theory and practice in teaching. Postbaccalaureate students only. Fee. Prerequisites: completion of approved postbaccalaureate program; minimum 2.50 GPA; approval of the Office of Professional Field Experiences.

SED 588 Human Relations in the Secondary Schools. (3)

once a year

Problems in human relations inherent in the interaction of pupils, teachers, administrators, nonprofessional staff, and laymen. Prerequisites: SED 478, 578.

SED 598 Special Topics. (1–4)*selected semesters*

Topics may include the following:

- Using Math Manipulatives/Middle Schools Fee.

SED 711 Secondary Curriculum Development. (3)*spring and summer*

Theories and processes of developing curriculum; evaluation of research. Prerequisites: SED 478, 522 (or its equivalent), 578.

SED 722 Improvement of Instruction in the Secondary School. (3)*fall*

Evaluates the research; issues and theories related to the improvement of instruction. Prerequisite: SED 533.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

Curriculum and Instruction

Interdisciplinary Doctoral Program

hal.asu.edu/cni

480/965-4602

ED 434

Robert B. Rutherford Jr., Associate Director of Research and Graduate Education

Art

Professors: Erickson, Stokrocki, B. Young

Biology

Professor: Lawson

Chemistry and Biochemistry

Professor: Birk

Communication

Professor: Arnold

Curriculum and Instruction

Professors: Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, Guzzetti, Hudelson, McGowan, Ovando, Piburn, Rutherford, Staley, Swadener, Tobin, Zucker
 Associate Professors: Anijar, Arias, Blumenfeld-Jones, Cohn, Di Gangi, Gomez, McCoy, Middleton, Surbeck
 Assistant Professors: Lamorey, MacSwan, J. Young

Educational Leadership and Policy Studies

Regents' Professor: Berliner
 Professor: Edelsky
 Associate Professor: Margolis

English

Professors: Donelson, Nilsen

Exercise Science and Physical Education

Professors: Darst, Pangrazi

Exercise and Wellness (ASU East)

Professors: Burkett, Corbin, Stone
 Associate Professor: Swan
 Assistant Professors: Jones, Phillips, Tudor-Locke
 Lecturer: Woodruff

Mathematics and Statistics

Professors: Flores, Leonard
 Associate Professors: Carlson, Middleton
 Assistant Professor: Zandieh

Music

Professors: Humphreys, Stauffer

Nutrition (ASU East)

Professor: Vaughan

The Interdisciplinary Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. The interdisciplinary committee sets guidelines and supervises programs of study.

Areas of concentration are available in

1. art education;
2. curriculum studies;
3. early childhood education;
4. elementary education;
5. English education;
6. exercise and wellness education;
7. language and literacy;
8. mathematics education;
9. music education;
10. physical education;
11. science education; and
12. special education.

One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, students may work in concert with their program committee to tailor a course of study to fit individual needs and goals.

The interdisciplinary Ph.D. committee mentors set guidelines and supervise programs of study, while an executive committee, appointed by the dean of the College of Education and the dean of the Graduate College, has primary responsibility for the operation of the program. It is composed of faculty representing the various concentrations.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Curriculum and Instruction is an individualized interdisciplinary degree that integrates graduate courses from a variety of academic units. This course work provides a substantive knowledge base in the concentration area and a sound foundation for research leading to a dissertation.

See [“Doctor of Philosophy,” page 96](#), for general requirements.

GRADUATE PROGRAMS AND COURSES

Admission. In addition to meeting minimum Graduate College admission requirements, each applicant must provide the following:

1. a letter of career goals and statement of reasons for seeking the interdisciplinary Ph.D. in Curriculum and Instruction,
2. Graduate Record Examination (GRE) verbal and quantitative test scores,
3. a sample of written work, and
4. three academic letters of recommendation.

One year of full-time teaching experience at the appropriate level, or its equivalent, is strongly recommended. In the absence of prior teaching experience, a teaching internship is required but may not be counted toward the Ph.D. degree.

Admission decisions are based upon the compatibility of the applicant's career goals with the purpose of the degree program, previous academic training and performance, GRE scores, letters of recommendation, and the availability of a potential mentor in the candidate's concentration area. It should be noted that, because of enrollment limits, applicants who meet minimum requirements are not automatically admitted.

Program Committee. The student's program committee, consisting of a chair and at least two other members, oversees the preparation of the initial program of study and the preparation and evaluation of the comprehensive examination. Though the program committee may consist of only three members for early advising, it must have *at least five members* for the administration and evaluation of the comprehensive examination, three of whom must be members of the interdisciplinary committee and two of whom must be experts in the student's area of concentration. At least one member of the program committee must be a faculty member of the Division of Curriculum and Instruction. The committee must be approved by the dean of the Graduate College.

The program committee and the student must decide on the area of concentration and cognate area to be included in the student's comprehensive examination. They also must develop a program of study to establish a professional knowledge base and methods of inquiry and analytical tools for research.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed, upon the approval of the dean of the Graduate College. The basic functions of the dissertation committee are as follows:

1. overseeing the development and approval of a dissertation proposal,
2. providing guidance while the candidate conducts the dissertation study/analysis,
3. reviewing the dissertation manuscript, and
4. conducting an oral defense of the dissertation.

Members of the program committee may also serve as members of the dissertation committee; however, the committees may have different memberships. At least one member of the dissertation committee must be a faculty member of the Division of Curriculum and Instruction. The disserta-

tion committee chair must be a faculty member designated eligible to serve in this capacity by the interdisciplinary committee and the dean of the Graduate College.

Program of Study. The program requires at least 93 semester hours, or the equivalent of four academic years of full-time study, beyond the bachelor's degree. Students with a master's degree directly related to the anticipated course of study must complete a minimum of 54 semester hours beyond the master's degree. At least 30 semester hours in the approved program of study, exclusive of research and dissertation, must be taken at ASU. Each candidate must also register for a minimum of 24 semester hours of research and dissertation credit, with the dissertation directed by a dissertation chair approved by the interdisciplinary committee and the dean of the Graduate College. The program of study is divided into four general areas:

1. Ph.D. core course requirements;
2. professional focus;
3. cognate study; and
4. independent research and dissertation.

Core Course Requirements. All doctoral students are required to complete two designated core courses: DCI 791 Interdisciplinary Research Seminar and DCI 701 Curriculum Theory and Practice.

Professional Focus. With the advice and approval of the student's program committee, a student must select a sequence of courses and experiences designed to focus subsequent efforts on a particular aspect of curriculum and instruction, culminating in a dissertation. The professional focus is divided into three areas:

1. methods of inquiry and analytical tools associated with empirical study of curriculum and instruction;
2. a substantive knowledge base in the area of concentration; and
3. internships in research and college teaching.

Semester hours counted under one category may not be counted under another. Courses (42 semester hours) are drawn from program courses in the student's area of concentration.

Cognate Study. Students are expected to choose interrelated courses (12 semester hours minimum) outside their declared area of concentration that have a clear link to their dissertation efforts. Cognate studies can be drawn from a broad range of offerings, both within and outside the College of Education.

Foreign Language Requirements. None.

Annual Report for Ph.D. Candidates. At the end of each school year (before the last day of final exams), the student's Ph.D. mentor prepares a report to be reviewed by the director of the interdisciplinary Ph.D. degree program. Copies of the report are distributed to the members of the student's program or dissertation committee. The report from the mentor, which is accompanied by the student's transcript and an up-to-date *curriculum vitae*, includes the following:

1. a statement concerning the status of the student's program of study (with a copy);
2. a statement of the status of preparation toward the student's comprehensive examination (including a projected date for completion);
3. a statement about the student's performance in course work; and
4. a statement about the student's accomplishments during the academic year (and summer, if appropriate), including research activity, writings, presentations, and professional accomplishments.

Comprehensive Examinations. Upon completion of course work in the Ph.D. program of study and before admission to candidacy and the start of the dissertation research, the student completes an examination in the areas of concentration, cognate study, and methods of inquiry and analytical tools. The examination is designed to test the student's accumulation of interdisciplinary knowledge and ability to communicate across disciplines. The comprehensive examination is developed and administered by the student's five-member program committee.

Dissertation Proposal. The proposal prospectus typically constitutes a draft of the first three chapters of the dissertation, but may vary with the dissertation committee's approval. Following approval of the proposal by the dissertation committee chair, a proposal meeting is scheduled. Approval of the proposal at that meeting indicates that the faculty agree that the rationale, review of the literature, method, and proposed analyses are appropriate and that the study may proceed as planned. If problems are identified in the proposal meeting, the dissertation committee may meet again to hear a revised proposal or arrange a more relevant way to reexamine the proposal.

Research and Dissertation. Twenty-four semester hours of research and dissertation credit are required. Twelve dissertation credits must be reserved for postcandidacy registration. The dissertation is designed to be the student's culminating experience. The dissertation must consist of a fully documented written study demonstrating a high level of expertise in research and scholarship in the student's area of concentration. The dissertation should make an original contribution to inquiry in the area of curriculum and instruction and be worthy of publication by an established press as a book or monograph or as one or more articles in a refereed, scholarly journal. The dissertation should not only demonstrate that the student is able to conduct quality research, but also should be conceived and carried out in such a way that it should make a contribution to advancing scholarship in the field of curriculum and instruction.

Final Examinations. The final oral examination in defense of the dissertation is scheduled and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination.

RESEARCH ACTIVITY

Current faculty research activities include the E-Learning network; learning anytime anywhere; family-centered early identification of children with learning disabilities and behavior disorders; bilingual/English as a second language/special education; Arizona behavior initiative: creating school environments that support high academic standards for all students; relationship-based practice in early intervention settings; explaining low achievement in limited English proficient students; and extending and sustaining use of reforms in mathematics classrooms.



ASU Computing Commons

Tim Trumble photo

Dance

Master's Program

herbergercollege.asu.edu/dance

480/965-5029

PEBE 107A

Claudia Murphey, Chair

Professors: Kaplan, Keuter, Ludwig, Murphey

Associate Professors: Jackson, Matt, Mooney

Assistant Professors: Fitzgerald, Lindholm Lane, Parrish, Rolnick, Tsukayama, Vissicaro

Associate Research Professional: Mitchell

Lecturer: Tongret

MASTER OF FINE ARTS

The M.F.A. degree in Dance is a 60-semester-hour program. The program is designed to provide opportunities for the student to continue to develop in the areas of dance technique, choreography, performance and production; to gain further understanding of the philosophy, history, theory, education and science and somatics of dance; and to begin charting future directions through technology, media opportunities, and community partnerships.

Admission. All students must apply to the M.F.A. program in Dance through the Graduate College. A bachelor's degree with a major in Dance or its equivalent is required. Applicants must submit an application form, fee, transcripts, and other materials to the Graduate College Admissions office. An application packet and list of guidelines are available online at www.asu.edu/graduate/admissions. They may also be obtained from Graduate Admissions by calling 480/965-6113 or by sending e-mail to gradadmiss@asu.edu. The GRE examination is not required for admission into this program. The TOEFL exam is required for international students.

Three letters of reference, a current résumé, and a statement of intent must be filed with the Department of Dance to assess the qualifications of each candidate. In addition to submitting this material, the candidate must participate in a technique audition in modern dance and ballet and present a self-choreographed solo dance work approximately five minutes in length. The technique audition and solo work may be submitted on videotape (VHS format, Standard Play [SP] speed) or CD-ROM (Macintosh format); however, auditioning in person is preferred. Each candidate must also submit a videotape of a group work choreographed by the applicant within the last three years and/or a portfolio of relevant work in a chosen area(s) of expertise. Applicants for admission also participate in an interview with the faculty.

Program of Study. A total of 60 semester hours of graduate credit is required, including

1. 30 to 37 semester hours in foundational studio/theory course work (in the areas of technique and movement arts, choreography and art-making practices, interactive arts, education and community partnerships, theory, and professional preparation);
2. eight hours of individual M.F.A. project (choreography, performance, or other approved project);
3. 15 to 30 semester hours of electives in chosen area(s) of study.

In consultation with the graduate directors, the graduate policy committee, and the student's supervisory committee, a program of study may be tailored to meet specific interests, needs, and abilities.

Credit Before Admission. Upon approval of the supervisory committee, a maximum of 24 semester hours of graduate credit completed before admission may be applied to the program if these courses were part of a completed master's degree in Dance. All course work appearing on the program of study must meet the seven-year time limit requirement.

Foreign Language Requirements. None.

M.F.A. Project. The M.F.A. project serves as the capstone experience in the graduate dance curriculum. Each candidate submits a prospectus to his or her supervisory committee outlining the nature of the M.F.A. project. This project may be choreography and/or performance, or projects designed to incorporate technology or other approved research components. The department welcomes projects in the areas of dance science and somatics, multimedia, community education and professional outreach, theory, and history whose approaches are interdisciplinary in nature. Required supporting documentation of the project may be written and bound, realized on CD-ROM, or completed through other means which meet format approval from both the student's supervisory committee and the Graduate College.

Final Examinations. An oral defense of the M.F.A. project is required.

DANCE HISTORY (DAH)

DAH 501 Philosophy of Dance. (3)

once a year

Analyzes traditional and contemporary theories of dance with regard to issues of expression, form, and meaning.

DAH 502 Cultural Concepts of Dance. (3)

once a year

Examines the close connection between culture, dance, and movement through writings in cultural theory, dance ethnology, and philosophy.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

DANCE (DAN)

DAN 500 Research Methods. (1-12)

selected semesters

DAN 510 Dance Stagecraft and Production. (1–3)*fall and spring*

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 its equivalent).

DAN 521 Sound Lab. (2)*fall*

Audio mixing for analog/digital recording and editing. Lecture, lab. Prerequisite: instructor approval.

DAN 522 Sound Design. (2)*spring*

Focus on digital recording/editing of audio compositions for choreographic and video projects. Lecture, lab. Pre- or corequisite: DAN 423 or 521.

DAN 523 Dance, Computers, and Multimedia. (3)*fall and spring*

Introduces desktop multimedia as it relates to dance creation, production, education, and research. Lecture, lab.

DAN 534 Technique and Theory of Modern Dance. (3)*fall and spring*

Preparation in the performance and comprehension of professional-level modern dance for first-year graduate students. 6 hours weekly. May be repeated for credit. Prerequisite: placement audition.

DAN 535 Technique and Theory of Ballet. (2)*fall and spring*

Graduate study of ballet technique. May be repeated for credit. Studio. Prerequisite: placement audition.

DAN 540 Advanced Problems in Dance Kinesiology. (3)*fall*

Principles of kinesiology applied to the torso and shoulders. Focus on identifying muscular imbalances, pathomechanics, and analysis of dance conditioning practices. Lecture, lab.

DAN 542 Ideokinesis. (2)*fall*

Theoretical examination of ideokinetic methods of facilitating postural change and movement efficiency.

DAN 545 Laban Movement Analysis. (3)*spring*

Theory and practice of Laban movement analysis and Bartenieff fundamentals through movement integration, observation, critical research, notation, and analysis. Lecture, studio.

DAN 550 Graduate Dance Pedagogy: Modern. (3)*spring*

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)*fall*

Advanced analysis of teaching techniques for ballet. Prerequisite: instructor approval.

DAN 564 Solo and Group Choreography I. (3)*fall*

Original choreography created for solo and group performance. Studio. Prerequisites: DAN 364 and 365 (or their equivalents).

DAN 565 Solo and Group Choreography II. (3)*spring*

Continuation of DAN 564. Studio. Prerequisite: DAN 564.

DAN 571 Dance Theatre. (1–3)*fall and spring*

Performance in specially choreographed dance productions. May be repeated for credit. Prerequisite: instructor approval.

DAN 580 Performance Studies Practicum. (1–3)*spring*

Focus on developing rehearsal skills and achieving performance excellence through the preparation of three completed works. Studio, lab.

DAN 591 Seminar. (1–3)*fall and spring*

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. (3)*fall and spring*

Preparation in the performance and comprehension of professional-level modern dance for second-year graduate students. 6 hours weekly. May be repeated for credit. Prerequisite: placement audition.

DAN 640 Paradigms for the Analysis of Dance Technique. (3)*spring*

Motor learning, cognitive science, motor development, dance medicine, and somatics paradigms applied to the practice of dance technique. Prerequisite: DAN 500 or instructor approval.

DAN 664 Choreography Workshop. (1–3)*fall*

Choreographic study in a seminar context with faculty and guest artists. May be repeated for credit. Studio. Prerequisites: DAN 564, 565.

DAN 671 Dance Arizona Repertory Theatre. (3–4)*fall and spring*

Preprofessional modern dance company, emphasizing outreach and performance. Opportunity to work with guest artists and community schools and organizations. Lecture, studio. Prerequisite: instructor approval.

DAN 693 M.F.A. Project. (1–8)*fall, spring, summer*

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.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Design

Master's Program

www.asu.edu/caed/design/designHome.html

480/965-4135

AED 154

Jacques R. Giard, Director

Professors: Brandt, Giard, Kroelinger

Associate Professors: Bernardi, Cutler, Johnson, McDermott, Patel, Ratner, Sanft, Witt

Assistant Professors: Boradkar, Herring, McCoy, Rothstein, Thibeau Catsis, Weed

The faculty in the School of Design, College of Architecture and Environmental Design, offer a postprofessional research degree program leading to the Master of Science in Design degree in Design with concentrations in graphic design, industrial design, and interior design. Course offerings focus on such areas as facilities planning and management, human factors, and methodology, theory and criticism.

The faculty in the school also participate in offering the Ph.D. in Environmental Design and Planning program. See "[Environmental Design and Planning](#)," page 202, for information on this interdisciplinary, college-wide Ph.D. degree program.

GRADUATE PROGRAMS AND COURSES

MASTER OF SCIENCE IN DESIGN

The Master of Science in Design (M.S.D.) degree with a major in Design has three concentrations: graphic design, industrial design, and interior design.

Graphic Design Concentration

The graphic design concentration is for individuals interested in advanced studies in visual language; history; theory; criticism; and methodology, design processes, and technology. This program develops an understanding of contemporary graphic design issues through specialized research and design skills. It also prepares the graduate student for a career in graphic design education.

Industrial Design Concentration

This concentration is for individuals interested in advanced studies in human factors, history, theory, criticism and methodology, design processes, and technology. This program develops an understanding of contemporary industrial design issues through specialized research and design skills. It also prepares the graduate student for a career in industrial design education.

Interior Design Concentration

The interior design concentration is for individuals interested in advanced studies in facilities planning and management, or history, theory, criticism and methodology. This program develops an understanding of contemporary interior design issues through specialized research and design skills. It also prepares the graduate student for a career in interior design education.

Program Goals

The Master of Science in Design (M.S.D.) degree with a major in Design and concentrations in graphic design, industrial design, and interior design prepares students for leadership positions in industry, research, and teaching. The program has four goals:

1. to provide graduate education for students who have a baccalaureate degree in Graphic Design, Industrial Design, Interior Design, or a related design discipline;
2. to provide the opportunity for the development of specialized research and design skills to support the graphic design, industrial design, and interior design professions;
3. to provide the opportunity for professionals to gain the necessary research and design skills for academic careers; and
4. to develop critical skills which enable the graduates to contribute to the literature of design through articles, essays, and books, or to participate in conferences related to their concentrations.

There are three areas of study.

Areas of Study

Design Methodology, Theory, and Criticism in Design.

This area of study is available to majors with backgrounds in art, architecture, design history, graphic design, industrial design, interior design, sociology, environmental psychol-

ogy, or research methods. Students choosing this area of study may focus on methodology, theory, or criticism, or they may choose to combine any or all of these three.

Courses in this area of study address: selected design methodologies that stimulate creativity; methodologies for critical analysis; methodologies that lead to development of or application of theories and philosophies; the historical origins of theories and philosophies that form the basis of contemporary design; the implication of theory in design knowledge and its discourse; strategies for recognizing and interpreting emerging design issues and trends; the evolution of the literature of design criticism; definition of design criticism; the qualifications of design critics' application of theories or philosophies in making judgments; and qualities constituting effective critical writing. Applications include design research, design education, design marketing and production decision, and design criticism.

Facilities Planning and Management in Design. This area of study focuses on the coordination of the work place, equipment, and visual (graphic) environment with the people and organizational structure of the institution. The intent is to combine programming and management practices with current professional and technical expertise to provide humane and effective work environments. Facility-related responsibilities to support this concentration cluster into seven functional units: programming; facilities analysis; space management; interior planning and design; human factors; interior codes; public welfare and safety; and interior installation.

Human Factors in Design. This area of study identifies the problems, establishes the strategies, and develops the design solutions needed for issues surrounding the human/product interface. The human/product interface focus applies systems (such as interactive design) and environments (such as museum and exhibition design). Special emphasis is placed on the relationship between human and test performance factors. Emphases include qualities of function; methods of forming organizational relationships; factors of environmental control systems (acoustics and illumination, way-finding, etc.); and human factors in graphic, product, and interior design. Subject matter also includes the design of equipment, machines, and spaces; ergonomics and forms of ergonomic documentation; and analysis of relationships between spaces, objects, and people as simulated through computer animation, imaging, and traditional modeling techniques.

Program of Study. This program of study applies to the areas of study described in the preceding text. The program of study consists of 36 semester hours of course work at the 500-level or above with the following distribution:

DSC 580 Practicum: Methods of Teaching Design	3
Approved courses in the concentration area of study	12
Approved electives outside the school	9
Approved research methods courses	6
Thesis or Applied Project	6
Total	36

Admission Requirements. Applicants must hold a baccalaureate degree in Graphic Design, Industrial Design, Inte-

rior Design, or a related design discipline to participate in this degree program. When applying for admission, applicants must declare one of three concentrations: graphic design, industrial design, or interior design. Additionally, all areas of study must be identified from the following: design methodology, theory, and criticism; facility planning and management; or human factors in design. Admission to the M.S.D. program is selective and is done on a space-available basis.

Application Procedures. Applicants must file separate application materials to both the Graduate College and the School of Design.

School of Design Requirements. Submit materials to

SCHOOL OF DESIGN
COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO BOX 872105
TEMPE, AZ 85287-2105

1. A 3.0 or above baccalaureate GPA is required for application.
2. Minimum TOEFL score of 550 on paper-based test or 213 on computer-based test is required of international students whose native language is not English.
3. A statement of intent (maximum 600 words), which must include the following points:
 - a. Specify intended concentration: graphic design, industrial design, interior design.
 - b. Specify area of study: facilities planning and management; human factors in design; design methodology, theory, and criticism.
 - c. Discuss proposed research topic. What will be the research focus? Why is this research important to the applicant, the design community, and the general population?
 - d. Specify proposed mentor for intended research. Faculty biographies can be found on the Web site at www.asu.edu/caed/design/designHOME.html.
 - e. Discuss personal academic background and professional experience that has prepared the applicant for or will support proposed research topic.
4. Three letters of recommendation from persons who are qualified to comment on the applicant's potential in the selected concentration.
5. An additional statement from applicants wishing to be considered for teaching or research assistantships outlining areas in which they feel competent to serve as a teaching or research assistant (international students who wish to be considered for a teaching assistantship and whose first language is not English are required to pass the Test of Spoken English or the SPEAK test administered by the American English and Culture Program at ASU); and
6. An 8.5" x 11" portfolio documenting papers and imaginative projects that support the intended con-

centration and that demonstrate drawing, rendering, and modeling skills.

The portfolio is returned after final admission procedures, provided sufficient prepaid postage is enclosed, or if the materials are claimed in person within one year of submission. Unclaimed portfolios are retained for only one year. The School of Design assumes no liability for lost or damaged materials.

Application Deadlines. Primary consideration is given to completed applications received by the deadlines. Applications for assistantships and scholarships normally are considered at the same time.

All materials must be received by the Graduate College and the School of Design by January 15 for fall semester.

Selection Procedures and Notifications. The faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Foreign Language Requirements. None.

Practicum. All students in the program must enroll in a three-hour teaching practicum (DSC 580) that focuses on the problems and issues surrounding studio, lecture, and seminar instruction. Emphasis is on the techniques of criticism and individual and group studio teaching.

Thesis or Applied Project. For students choosing the thesis option, six semester hours of DSC 599 Thesis apply toward the thesis. Guidelines in the *Format Manual* must be followed. For students choosing the applied project option, six hours of DSC 593 Applied Project apply.

Final Examinations. An oral examination in defense of the thesis or applied project is required for all students in the M.S.D. program.

Web Addresses

Information about the program in Design, and the College of Architecture and Environmental Design in general, may be found on the Web site at www.asu.edu/caed/design/designHome.html. E-mail inquiries or requests should be sent to designmsd@asu.edu.

RESOURCES

Faculty

Faculty in graphic design, industrial design, and interior design are involved in the following areas of research: human factors, material design, computer-assisted design, lighting and acoustical design, design history, material culture studies, exhibit design, furniture design, environmental design, facilities planning and management, methodology, theory and criticism, creative thinking, design evaluation, and wayfinding.

GRADUATE PROGRAMS AND COURSES

Facilities

The College of Architecture and Environmental Design maintains a high-bay research facility, a lighting laboratory, ethnographic studies laboratory, an extensive shop facility, as well as a state-of-the-art material resource center. The college's Research and Service Foundation provides facilities for basic research and community service activities in energy technology, design, and planning.

DESIGN (DSC)

DSC 500 Research Methods. (1–12)

selected semesters
Fee.

DSC 520 Contemporary Design Issues. (3)

fall
Projected applications in design production, planning, and decision-making processes. Lecture, seminar. Prerequisites: INT 310 and 311 (or their equivalents).

DSC 524 Illumination and Acoustics. (3)

selected semesters
Research and laboratory investigation of advanced illumination and acoustics issues of facility design. Emphasizes human factors and performance aspects. Prerequisites: INT 457 and 458 (or their equivalents).

DSC 525 Design Methodologies. (3)

fall
Practical exercises and studies in problem-solving strategies; problem definition and supporting theory for the designer. Lecture, seminar, lab. Fee. Prerequisite: senior or graduate standing.

DSC 527 Modern Design Theory. (3)

spring
Aesthetic, political, economic, and social theories that have shaped modern design; theory as the basis for design philosophies. Lecture, seminar. Prerequisite: DSC 525 (or its equivalent).

DSC 529 Design Criticism. (3)

fall
Critical methods applied to design as material culture and human expression; evaluation of achievement versus intention. Lecture, seminar. Prerequisite: DSC 527 (or its equivalent).

DSC 544 Human Factors Systems and Documentation. (3)

fall
Advanced topics associated with theory and methods of human factors in design. Individual projects stressing problem organization, evaluation, and documentation. Lecture, seminar, lab. Prerequisite: DSC 344 (or its equivalent).

DSC 552 Computer Simulation in Design. (3)

selected semesters
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)

selected semesters
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)

selected semesters
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)

spring
Background and development of design education theories. Concepts of studio teaching methods. Comprehensive student project development and evaluation methods. Prerequisite: graduate standing.

DSC 592 Research. (1–12)

selected semesters

DSC 593 Applied Project. (1–12)

selected semesters
Fee.

DSC 598 Special Topics. (1–4)

selected semesters
Topics may include the following:
• Facilities Planning II
Fee.

DSC 599 Thesis. (1–12)

selected semesters
Fee.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Economics

Master's and Doctoral Programs

www.cob.asu.edu/ecn/programs.cfm

480/965-3531

BAC 659

Arthur E. Blakemore, Chair

Professors: Blakemore, Boyes, Brada, Burdick, Burgess, Deserpa, Faith, Gooding, Happel, Hoffman, Hogan, Kingston, Low, Manelli, Mayer, McDowell, McPheters, Melvin, Méndez, Ormiston, Rogerson, Santos, Schlee, Zhou

Associate Professors: Ahn, Cogley, Datta, Reffett, Reiser, Wilson, Winkelman

Assistant Professors: Chade, Datta, Hendricks

Senior Lecturer: Roberts

The faculty in the Department of Economics, College of Business, offer programs leading to the M.S. and the Ph.D. degrees in Economics.

The faculty also participate in offering the professional program leading to the Master of Business Administration (see "[Master of Business Administration](#)," page 131), the program leading to the M.S. in Statistics (see "[Master of Science](#)," page 327) and the program leading to the Ph.D. degree in Business Administration (see "[Master of Business Administration](#)," page 131). Further information concerning the degree programs in Economics can be obtained from the Director of Graduate Programs, Department of Economics.

Admission. See "[Admission to the Graduate College](#)," page 84. In addition, each applicant to either graduate program must submit three letters of recommendation from academic sources and test scores for the general aptitude portion of the Graduate Record Examination (GRE). Submission of scores from the GRE advanced test in economics is recommended. Applications should be received at the Department of Economics by March 1 if the student is seeking a graduate assistantship.

Students are expected to have demonstrated competency in economics at a minimum level through ECN 313 and 314 and in mathematics through MAT 271. Passing grades in the equivalents of these courses taken at other colleges are

accepted as a demonstration of competency. Additional courses in calculus, linear algebra, and statistics are recommended before the first semester in the program.

Students with inadequate undergraduate preparation in economics or mathematics may be required to remove deficiencies before enrolling in graduate courses.

FIELDS OF STUDY

Graduate students may choose from several fields of study: econometrics, industrial organization, international economics, labor economics, macroeconomics, and public economics. The goal of the econometrics field is to provide students with the tools needed to empirically assess economic models using data obtained from observation of real world phenomena. Course work emphasizes applications as well as theory. The field of industrial organization is concerned with the theory and empirical evidence concerning the organization of firms and industries. Topics include the “law and economics” of monopoly, collusion, business pricing and marketing practices, corporate control, mergers, and acquisitions. The international economics field examines both the theoretical and empirical literature associated with the determinants of comparative advantage, trade patterns and commercial policy effects on such patterns, the determinants of exchange rates and international financial flows, and effects of international linkages on the domestic economy. The labor economics field includes the study of labor force participation, unemployment, the role and effect of education and other personal variables on earnings, geographical and interfirm earning differentials, the demand for labor, discrimination, the role and economic effects of unions, personnel practices and policies, and similar topics. The intent of the macroeconomic field is to provide the student with tools needed to assess both theoretically and empirically modern macroeconomic models. Public economics is concerned with the positive and normative study of government’s effect on the economy. Course work focuses on evaluating the economic consequences of government policies and on the application of economics to political science. See the *Department of Economics Graduate Student Handbook* for specific field requirements.

MASTER OF SCIENCE

The M.S. program in Economics is designed to give students a broad understanding of critical analysis of business problems and the quantitative skills necessary for their analysis. Graduates of the program will have distinctive capabilities in quantitative skills and business data analysis applied to markets and firm behavior, customer behavior, business strategies and processes, and global impacts on business.

Program of Study. See [“Master’s Degrees,” page 93](#), for general requirements. See the *Department of Economics Graduate Student Handbook* for specific requirements.

Course Load. Students are limited to 15 semester hours per semester.

Foreign Language Requirements. None.

Thesis Requirements. Students have the option of a non-thesis or thesis track. For the nonthesis track, students are

required to conduct an applied research project under the supervision of a faculty member. The applied research project often is conducted in conjunction with an internship, and three hours of credit is granted for the project. For the thesis option, six semester hours of credit is granted for completion of the thesis.

Final Examinations. A final oral examination in defense of the thesis or applied research project is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree program is designed to provide the student with a more fundamental command of basic economic analysis and of the subject matter in several specialized fields. It is designed to qualify students for teaching at higher education institutions and for research positions in public agencies and private business organizations.

Program of Study. See [“Doctor of Philosophy,” page 96](#), for general requirements. In addition to completing 60 semester hours of credit beyond the bachelor’s degree (30 semester hours beyond the master’s degree) and 24 semester hours research dissertation credit, the Ph.D. student must accomplish five tasks:

1. meet qualification requirement,
2. present at least two fields of study,
3. pass the comprehensive examination,
4. pass the dissertation proposal defense, and
5. complete a dissertation with an oral defense.

See the *Department of Economics Graduate Student Handbook* for details concerning these tasks.

Qualifying Examinations. The student must demonstrate proficiency in economic theory and application by passing both the microeconomic and macroeconomic qualifying examinations. These examinations are given at the beginning of the fall semester of the second year of graduate study. The student must demonstrate proficiency in statistical and econometric analysis by passing ECN 525 and 526.

Fields of Study. Students are required to present at least one primary field and one secondary field for the Ph.D. The primary field must be the one in which the comprehensive examination is taken; usually this is the field in which dissertation work is contemplated.

Comprehensive Examination. The comprehensive examination consists of a written and oral test. The written examination consists of questions designed to test the student’s knowledge of the proposed research area. Examination questions are designed to cause the student to examine the research topic in considerable depth and breadth. The oral examination consists of questions designed to test the student’s knowledge of the proposed research area. Examination questions are designed to expand on the written examination as well as to provide guidance on the dissertation research.

Dissertation Proposal Defense. Students prepare a preliminary draft of the dissertation proposal before taking the

GRADUATE PROGRAMS AND COURSES

comprehensive examination. Upon passing the comprehensive examination, students submit a revised dissertation proposal to their supervisory committee that formalizes the research agenda and incorporates the supervisory committee's suggestions. The dissertation proposal must be defended orally.

Admission to Candidacy. The student should apply promptly for admission to candidacy after passing the comprehensive field examination, oral examination, and the dissertation proposal defense.

Dissertation Requirements. A dissertation representing original research work of high quality, demonstrating the student's proficiency in the field, is required.

Foreign Language Requirements. None.

Final Examinations. An oral examination in defense of the dissertation is required.

ECONOMICS (ECN)

ECN 436 International Trade Theory. (3)

fall and spring

Comparative-advantage doctrine, including practices under varying commercial policy approaches. Economic impact of international disequilibrium. Prerequisite: ECN 314 or instructor approval.

ECN 438 International Monetary Economics. (3)

fall and spring

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.

ECN 441 Public Finance. (3)

once a year

Public goods, externalities, voting models, public expenditures, taxation, and budget formation with emphasis on the federal government. Prerequisite: ECN 314 or instructor approval.

ECN 453 Government and Business. (3)

once a year

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)

once a year

Elements of regression analysis: estimation, hypothesis tests, prediction. Emphasizes use of econometric results in assessment of economic theories. Prerequisite: instructor approval.

ECN 485 Mathematical Economics. (3)

once a year

Integrates economic analysis and mathematical methods into a comprehensive body of knowledge within contemporary economic theory. Prerequisite: instructor approval.

ECN 498 Pro-Seminar. (3)

selected semesters

Topics chosen from current area of interest. Prerequisites: both ECN 313 and 314 or only instructor approval.

ECN 502 Managerial Economics. (3)

fall and spring

Applies microeconomic analysis to managerial decision making in areas of demand, production, cost, and pricing. Evaluates competitive strategies. Prerequisite: M.B.A. degree program student.

ECN 503 Global Economics for Managers. (3)

fall and spring

Macroeconomic analysis of issues related to economic growth, inflation, interest rates behavior, unemployment, exchange rate determination, and global competitiveness. Prerequisite: M.B.A. degree program student.

ECN 504 History of Economic Thought. (3)

once a year

Historical development of economic theory. Emphasizes the development of economic analysis from preclassical economics through Keynes. Prerequisite: ECN 510 or instructor approval.

ECN 509 Macroeconomic Theory and Applications. (3)

fall

Theory of income, output, employment, and price level. Influence on business and economic environment. Prerequisites: both ECN 111 and calculus or only instructor approval.

ECN 510 Microeconomic Theory and Applications. (3)

fall

Applies economic theory to production, consumer demand, exchange, and pricing in a market economy. Prerequisites: both ECN 112 and calculus or only instructor approval.

ECN 511 Macroeconomic Analysis I. (3)

fall

Current theories of output, employment, inflation, and asset prices as well as major aggregates. Introduces dynamic optimization techniques. Prerequisites: both ECN 313 and calculus or only instructor approval.

ECN 512 Microeconomic Analysis I. (3)

fall

Theory of production, consumer demand, resource use, and pricing in a market economy. Prerequisites: both ECN 314 and calculus or only instructor approval.

ECN 513 Macroeconomic Analysis II. (3)

spring

Focuses on growth theory, dynamic general equilibrium models, monetary theory, open-economy issues. Prerequisite: ECN 511 or instructor approval.

ECN 514 Microeconomic Analysis II. (3)

spring

General equilibrium, welfare economics, production, and capital theory. Prerequisite: ECN 512 or instructor approval.

ECN 515 Advanced Macroeconomic Analysis. (3)

fall

Focuses 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)

fall

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)

fall

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)

spring

Development of basic theoretical models for analyzing labor market issues. Prerequisite: ECN 510 or instructor approval.

ECN 522 Labor Economics II. (3)

selected semesters

Extensions/criticisms of labor market theories. Applications to a variety of policy issues. Prerequisite: ECN 521.

ECN 525 Econometrics I. (3)

spring

Problems in the formulation of econometric models. Emphasizes estimation, hypothesis testing, and forecast of general linear models. Prerequisite: 6 hours in statistics or instructor approval.

ECN 526 Econometrics II. (3)

fall

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)

spring

Generalized method of moment estimation, estimation with censored and truncated samples, nonlinear models, panel-data models, econo-

metrics of nonstationarities. Prerequisite: ECN 526 or instructor approval.

ECN 536 International Trade Theory. (3)

spring

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: both ECN 509 and 510 or only instructor approval.

ECN 538 International Monetary Theory and Policy. (3)

fall

Foreign exchange market, balance of payments, and international financial institutions and arrangements; theory and applications. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 541 Public Economics. (3)

fall

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)

spring

Analyzes 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)

fall

Economic problems, issues, and policy decisions facing the developing nations of the world. Prerequisites: both ECN 509 and 510 or only instructor approval.

ECN 584 Economics Internship. (1–3)

summer

Academic credit for professional work organized through the Internship Program. Prerequisites: both ECN 510 and 511 or only instructor approval.

ECN 585 Mathematics for Economists. (3)

fall

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)

fall, spring, summer

Presentations by outside speakers, department faculty, and graduate students of work in progress. Prerequisite: instructor approval.

ECN 593 Applied Projects. (3)

fall

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)

fall

Workshops offered include: economic analysis, microeconomic analysis, macroeconomics.

ECN 598 Special Topics. (3)

selected semesters

Advanced topics in economics. Consult the *Schedule of Classes* for offerings. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" [page 48](#).

QUANTITATIVE BUSINESS ANALYSIS (QBA)

Department of Economics

QBA 410 Applied Business Forecasting. (3)

spring

Applies forecasting techniques in business and institutional environments. Prerequisite: QBA 221.

QBA 421 Applied Quality Analysis II. (3)

fall, spring, summer

Applies statistical tools employed in quality analysis. Topics include experimental design, customer surveys, and process control and capability. Prerequisite: QBA 221.

QBA 502 Managerial Decision Analysis. (3)

fall and spring

Fundamentals of quantitative analysis to aid management decision making under uncertainty. Prerequisites: MAT 210; computer literacy; graduate degree program student.

QBA 525 Applied Regression Models. (3)

once a year

Simple linear regression, multiple regression, indicator variables, and logistic regression. Emphasizes business and economic applications. Prerequisite: MAT 210.

QBA 527 Categorical Data Analysis. (3)

once a year

Discrete data analysis in business research. Multidimensional contingency tables and other discrete models. Prerequisite: QBA 525.

QBA 530 Experimental Design. (3)

once a year

Experimental designs used in business research. Balanced and unbalanced factorial designs, repeated measures designs, and multivariate analysis of variance. Prerequisite: QBA 525 (or its equivalent).

QBA 535 Multivariate Methods. (3)

once a year

Advanced statistical methods used in business research. Multivariate analysis of association and interdependence. Prerequisite: QBA 525.

QBA 540 Forecasting. (3)

selected semesters

Foundation of statistical forecasts and forecast intervals; applies classical and computer-assisted forecasting methods to business forecasting problems. Prerequisites: MAT 210; QBA 502.

QBA 593 Applied Project. (1–12)

selected semesters

QBA 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" [page 48](#).

Education

Master's and Doctoral Programs

MASTER OF EDUCATION

Master of Education (M.Ed.) programs in the College of Education prepare scholarly professionals. Programs are available in Counselor Education, Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology, Educational Technology, Higher and Postsecondary Education, and Special Education. Concentrations within the M.Ed. in Curriculum and Instruction include bilingual education, early childhood education, elementary education, English as a second language, Indian education, language and literacy, mathematics education, professional studies, science education, secondary education, and social studies education. Within Special Education, M.Ed. areas of concentration are education of the gifted, the mildly disabled, the multicultural exceptional, and severely/multiply disabled children.

Admission. The College of Education requires above-average performance on the verbal scale of the GRE in addition to the general requirements for admission to the Graduate College. (For some programs the Miller Analogies Test may be substituted for the GRE.) Individual divisions or programs, however, may require superior test scores or GPA for

GRADUATE PROGRAMS AND COURSES

admission. Division admission committees review a variety of evidence presented by applicants for admission consideration. Applicants with lower test scores or grades below minimum levels may be considered for admission recommendation if counterbalancing evidence suggesting the potential for outstanding performance in a master's program is available to division admission committees.

Program of Study. A minimum of 30 to 36 semester hours of course work approved by the student's supervisory committee, division director, and the Graduate College is required for the Master of Education degree. Candidates for the Master of Education degree should contact the division offering the graduate degree they are seeking for specific core requirements. *A program of study should be filed as early as possible and not later than upon completion of nine semester hours of graduate course work.*

Examinations. All M.Ed. programs require successful completion of a written comprehensive examination or applied project. These examinations focus on the specialized content of the specific M.Ed. program of study. Comprehensive examinations are written and evaluated by program faculty. If the student should fail the written comprehensive examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval of the reexamination must be obtained from the supervisory committee, division director, and the dean of the Graduate College.

DOCTOR OF EDUCATION

The Doctor of Education (Ed.D.) degree is primarily a professional degree, designed for persons who wish to pursue careers as leaders in education or as applied researchers. Emphasis is on application of research and theory in education, and on acquisition of professional skills. Prospective students must demonstrate superior scholarship and leadership in professional education. Each student is expected to acquire broad knowledge in the major field and to produce a dissertation addressing a significant educational issue or problem.

Admission. Applicants must meet the general requirements established by the Graduate College as well as College of Education requirements. Satisfaction of these requirements does not guarantee admission. All divisions require submission of a two-page formal letter of application describing the applicant's prior relevant experience and accomplishments and specifying areas of greatest interest as well as career goals. Individual divisions or programs may have standards higher than these minimums or may require submission of additional materials. Applicants should consult the division director or program coordinator for specific admission requirements.

Program of Study. The program requires a minimum of 60 semester hours beyond the master's degree. Of these, at least six hours must be in internship. College of Education core courses must also be completed. These vary according to the degree sought. See "[Courses](#)," [page 183](#) for a listing. The recommendation for the program committee is reviewed simultaneously with the program of study.

The quality of student work is evaluated through written comprehensive examinations, formal oral and written presentation of the dissertation proposal, and a final oral examination in defense of the dissertation. Students must demonstrate competence both in the application of research findings and in conducting research. The dean of the Graduate College, upon recommendation of the division director, appoints the dissertation committee for each Ed.D. student. This committee reviews and evaluates the student's dissertation proposal and conducts the final oral examination.

Residency. The minimum residence requirement for the Ed.D. degree is completion of 30 semester hours within a period of 18 consecutive months after admission to the doctoral program at ASU. Not more than 10 semester hours of Research (792), Applied Project (793), and Dissertation (799) credit may be included in the course work used to meet the 30-hour residence requirement.

Continuous Enrollment and Reentry. Graduate students in the College of Education who have not been in attendance at ASU for one or more semesters must apply to the Graduate College for reentry and, following approval of the reentry application, must register for a minimum of one semester hour of graduate credit in the degree area during each of the following semesters. Applications for reentry are considered along with all other new applications to the degree program.

Reentry is not an issue for students who maintain continuous enrollment and make satisfactory progress toward their degrees. If a program of study must be interrupted for one or more semesters, the student must apply to the supervisory committee and the division director for leave status, not to exceed one calendar year.

Foreign Language Requirements. None.

Comprehensive Examinations. When students have essentially completed the course work in an approved program of study, they should take the comprehensive examinations. The written and oral examinations are designed to assess the student's mastery of the field of specialization. Failure in the comprehensive examinations is considered final unless the supervisory committee and the director of the division recommend, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, except the dissertation. These requirements include passing the comprehensive examinations and other requirements specified by the division.

Research and Dissertation Requirements. The dissertation should demonstrate advanced analytic competence and contribute to the understanding and improvement of professional practice. Each candidate must register for a combined total of 24 semester hours credit for 792 Research and 799 Dissertation. The final copy of the dissertation must be reviewed by the supervisory committee and the staff of

the Graduate College at least three weeks before the degree conferral date. Copies of the *Format Manual* are available in the Graduate College.

Final Examinations. The final oral examination in defense of the dissertation is mandatory and must be held on the campus of ASU. The oral defense is scheduled by the supervisory committee with the approval of the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the director of the division and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

Maximum Time Limit. The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

Courses. The core courses for the College of Education graduate programs carry the prefix “COE.” These courses are no longer required for all graduate majors in the College of Education. Contact the appropriate division to obtain specific core requirements.

COLLEGE OF EDUCATION (COE)

COE 501 Introduction to Research and Evaluation in Education. (3)

fall, spring, summer

Overview of educational inquiry from controlled, quantitative to qualitative, naturalistic. Emphasizes locating and critically interpreting published research.

COE 502 Introduction to Data Analysis. (3)

fall, spring, summer

Descriptive statistics, visual approaches, estimation, and inferential methods for univariate and bivariate educational research problems. Experience using statistical software. Cross-listed as EDP 502. Credit is allowed for only COE 502 or EDP 502.

COE 503 Introduction to Qualitative Research. (3)

fall, spring, summer

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 EDP 503. Credit is allowed for only COE 503 or EDP 503.

COE 504 Learning and Instruction. (3)

fall, spring, summer

Introduces psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as EDP 504. Credit is allowed for only COE 504 or EDP 504.

COE 505 American Education System. (3)

fall, spring, summer

Political, social, historical, and philosophical analyses of American education at all levels. Examines primary sources, legal findings, and case studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Educational Administration and Supervision

Master’s and Doctoral Programs

coe.asu.edu/elps

480/965-6357

ED 120

Kay Hunnicutt, Coordinator, D.E.L.T.A. Doctorate

M. Scott Norton, Coordinator, ASU Main

Donna Macey, Coordinator, Internships

Professors: González, Norton, Valverde, Webb

Associate Professors: Danzig, Hunnicutt, Peña

Clinical Professor: Dyer

Clinical Associate Professor: Macey

The faculty in the Division of Educational Leadership and Policy Studies offer graduate programs leading to the Master of Education and Doctor of Education degrees in Educational Administration and Supervision.

Students interested in the Ph.D. degree with a field of study encompassing educational administration should refer to [“Educational Leadership and Policy Studies,” page 185.](#) See also [“Doctor of Philosophy,” page 96,](#) for general information on the Ph.D. degree.

For admission to the M.Ed. degree program applicants must submit scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT); scores on the GRE are preferred. A minimum of 36 semester hours is required for the M.Ed. degree. Applicants for admission to the doctoral degree programs must submit scores on the GRE.

Candidates for all degrees must pass a written comprehensive examination. An oral examination over the written portion of the comprehensive examination may be required of Ed.D. candidates at the discretion of the student’s program committee. In addition, candidates for the Ed.D. must pass a final oral examination in defense of the dissertation. Candidates for the M.Ed. and Ed.D. programs may be required to take certain College of Education core courses depending upon previous experience and education. Pre-approval by an advisor is required. The core courses are COE 501, 502, 503, 504, and 505. A set of research courses is required for the Ed.D. degree.

MASTER OF EDUCATION

See [“Master of Education,” page 181,](#) for information on the Master of Education degree.

DOCTOR OF EDUCATION

See [“Doctor of Education,” page 182,](#) for information on the Doctor of Education degree.

GRADUATE PROGRAMS AND COURSES

RESEARCH ACTIVITY

Current faculty research activities include legal issues in educational administration, school violence prevention, sexual harassment, school administration policies, including human resource policy, and urban education policy.

EDUCATIONAL ADMINISTRATION AND SUPERVISION (EDA)

EDA 501 Competency/Performance in Educational Administration. (3)

fall and summer

Nature of educational administration and the concept of competency as it applies to educational administration.

EDA 510 Introduction to Organization and Administration of American Public Schools. (3)

fall and spring

Explores organizational structure and administration of public education through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as SPF 510. Credit is allowed for only EDA 510 or SPF 510.

EDA 511 School Law. (3)

spring

Constitutional, statutory, and case law that relates to all school personnel, pupils, the school district, and other governmental units. Contracts, dismissals, tenure, retirement, pupil injuries, liability of personnel and district, school district boundary changes, and bonding.

EDA 525 Human Relations and Societal Factors in Education. (3)

selected semesters

Interrelations between problems of educational administration and interdisciplinary social sciences. Communications skills, morale, authority, and perception. Concepts from political science, economics, and social-psychology useful to the administrator.

EDA 526 Instructional Supervision. (3)

fall, spring, summer

Administering curriculum improvement, in-service education, evaluating, and improving teaching competence; administrative instructional responsibilities.

EDA 544 Public School Finance. (3)

fall

Measures of ability, efforts, and educational need; capital outlay funding; tax revenues; federal, state, and local financing alternatives; major issues and trends in the financing of public education.

EDA 548 Community Relations in Education. (3)

selected semesters

Administrative factors of primary importance in developing community involvement in public schools. Emphasizes theory and skill of school system and individual communication.

EDA 555 Educational Facility Planning. (3)

selected semesters

School building needs, educational planning for facilities, responsibilities of architects, duties of contractors, and equipping and furnishing of school buildings.

EDA 571 School Business Management. (3)

fall, spring, summer

Purchasing, budgeting, accounting, payroll management, auditing, financial reporting, insurance, and administration of nonteaching personnel and services.

EDA 573 Human Resources Administration. (3)

spring

Organization for human resources services; development of policy to govern the human resources function and its related processes.

EDA 576 The School Principalship. (3)

fall

Problem and laboratory approaches used to provide application of administrative activities of elementary and secondary schools. Prerequisites: EDA 501, 526.

EDA 611 Educational Policy and the Law. (3)

summer in odd years

Emphasizes policy analysis and application of federal and state law to policy evaluation and development in public schools. Lecture, case

studies. Prerequisite: EDA 511 or HED 649. Corequisite: admission to doctoral program in education.

EDA 624 Organizational Development and Management of Schools. (3)

spring

Current organizational patterns for public schools. Emphasizes the organizations, human, and social dimensions on organizations. Lecture, discussion, projects.

EDA 634 Instructional Leadership. (3)

selected semesters

Curricular practices and processes used by instructional leaders who plan, organize, and coordinate the professional activities in elementary and secondary schools. Prerequisite: EDA 526.

EDA 645 Leadership Development for Education Leaders. (3)

spring

Principles, theories, attributes, and skills related to individual leadership development. Lecture, online computer modules. Also offered as a Web-only course. Prerequisite: admission to doctoral program in education or instructor approval.

EDA 675 Politics of Education. (3)

spring

Uses social science theory and research to consider the political context of educational policy making. Prerequisite: COE 505.

EDA 676 The School Superintendency. (3)

spring

Critical examination of the school superintendency and the primary functions of this educational position. Includes duties, responsibilities, activities, and problems of the school superintendent. Examines the unique leadership role of the school superintendent. Prerequisite: instructor approval.

EDA 677 Foundations of Educational Reform Movements. (3)

fall

Historical and contemporary survey of curricular reform movements in the United States with emphasis on equity and social justice issues. Cross-listed as SPF 677. Credit is allowed for only EDA 677 or SPF 677. Prerequisite: admission to doctoral program in education or instructor approval.

EDA 679 Administration of Special Programs in Education. (1–3)

selected semesters

For personnel administering special educational services; responsibilities of superintendents, principals, supervisors, and directors for special education, student personnel, audiovisual, library science, and others.

EDA 685 Global Education. (3–6)

spring

Global perspectives on education in contemporary society with emphasis on social, political and economic factors that affect access and equity. Lecture, travel. Cross-listed as SPF 680. Credit is allowed for only EDA 680 or SPF 680. Prerequisite: admission to doctoral program in education or instructor approval.

EDA 711 Administrative Leadership. (3)

fall

Emphasizes research in leadership; application of research findings to administrative and supervisory functions in educational endeavors. Prerequisites: EDA 624; 30 semester hours in educational administration; admission to doctoral program in education.

EDA 722 Administration of Instructional Improvement. (3)

spring

Recent research relating to administrative and supervisory responsibilities for the improvement of the educational program. Effective processes by administrators, supervisors, consultants, and coordinators. Prerequisites: 30 semester hours in educational administration; admission to doctoral program in education.

EDA 723 Diversity in Education for School Leaders. (3)

spring

Discusses current issues and leadership strategies for meeting the needs of diverse student populations combating inequity and inequality in education. Lecture, field experience. Prerequisite: admission to doctoral program in education or instructor approval.

EDA 733 Administrative Management. (3)

spring

Recent research relating to school management. School finance, law, buildings, transportation, food services, and supply management. Pre-

requisites: EDA 544, 571; 30 semester hours in educational administration; admission to doctoral program in education.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Educational Administration and Supervision

Master’s Degree

ASU West also offers a Master of Educational Administration and Supervision (M.Ed.) degree. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Educational Leadership and Policy Studies

Doctoral Program

coe.asu.edu/elps

480/965-6357

ED 134C

**Terrence G. Wiley and Gary Hanson,
Academic Program Coordinators**

Regents’ Professor: Berliner

Professors: Appleton, Barone, Fenske, Glass, González, Hanson, Molnar, Norton, Smith, Tobin, Turner, Valverde, Webb, Wiley

Associate Professors: Danzig, Hunnicutt, Margolis, Peña

Assistant Professors: Moses, Powers

The faculty in the Division of Educational Leadership and Policy Studies offer a Ph.D. degree with an interdisciplinary approach to complex problems of educational policy and leadership. It brings together scholarly interests found in educational administration, higher education, and social and philosophical foundations of education. Emphasis is placed upon critical thought, theories and practice within political, demographic, historical, sociocultural, and intellectual contexts in the United States and other nations. The purpose of the program is to develop educational researchers, policy analysts, and leaders for careers in schools, colleges, universities, and government and private agencies.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Admission. In addition to meeting Graduate College minimum requirements, applicants must submit scores on the Graduate Record Examination, a statement of intent, a résumé, and three letters of recommendation. Application materials are available from the division and are submitted to the division (ED 120). The admission committee meets in early February. All required materials must be in the division office in early January to assure review. Students entering the program must have a bachelor’s or master’s degree in either education or an appropriate subject field (e.g., anthropology, economics, history, philosophy, or sociology), or additional courses are required in the areas of deficiency before admission to the program. Contact the division office for the appropriate admissions application. In selecting applicants, the program looks for background and career aspirations consistent with program goals and willingness to devote primary attention to courses and experiences on campus.

Program Committee. The program committee (chair and at least two other members) advises in the preparation of the program of study and administers the comprehensive examinations. The committee must be approved by the dean of the Graduate College.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed upon the approval of the dean of the Graduate College. The dissertation committee approves the subject and title of the dissertation. Members of the program committee may also serve as members of the dissertation committee; however, the committees may have different memberships. The dissertation chair must be a faculty member designated eligible to serve in this capacity by the dean of the Graduate College.

Program of Study. Students entering the Ph.D. program are expected to meet the requirement of an 84-semester-hour program of study (including the semester hours transferred from the master’s degree in a related discipline). The following represents components of a program of study.

Policy Studies Foundation. At the heart of the Ph.D. program are 27 semester hours of course work on the foundations of policy studies. During the students’ first year in the program, they take a two-semester sequence, Proseminar I and II (six hours). In addition, they take Evaluation Theory (three hours). In the second year, students enroll for Theoretical Issues in Policy Studies (three hours). Other required courses in this category are Foundations of American Education, Politics of Education, Policy Issues in Learning and Instruction, Theory of Educational Organization, and Social and Historical (three hours each). To understand the economic and financial aspects of educational policy, students take one of the following three courses (three hours each): Higher Education Finance and Budgeting, Political Economy, or Public School Finance.

Advanced Research Methods. Students must complete a minimum of nine semester hours of research methods plus

GRADUATE PROGRAMS AND COURSES

Introduction to Qualitative Research. Advanced Quantitative Research is required of all students and presumes an introductory course in statistics has been taken successfully. If not, COE 502 must be taken for no credit. Courses satisfying this requirement can be taken outside the College of Education curricula with the committee chair's approval. The courses taken deepen the student's research emphasis, whether it is qualitative or quantitative.

Specialty Studies. Each student completes 12 semester hours of course work in an area of special interest. This course work represents added depth in the specialty in which the student plans to practice as a scholar, administrator, or policy analyst. The speciality areas are policy analysis, economics, finance, K–12 education, social and philosophical foundations, and research and evaluation methodology.

Practicum. Students must earn three semester hours of credit for a supervised practicum. This work is planned in conjunction with the student's committee chair and involves applied work in a practical setting relating to the student's intended postdoctoral position.

Research and Dissertation. Each Ph.D. candidate is required to complete a minimum of 24 semester hours of research and dissertation.

Foreign Language Requirements. None.

Comprehensive Examinations. The examination centers on the professional focus and the cognate study and must be passed before admission to candidacy. A written examination is required; an oral examination over the written portion may be required by the student's program committee.

Dissertation Precis and Proposal. The precis is a 15-page summary of the dissertation research proposed by the student. Upon approval of the precis by the dissertation committee, the student proceeds with developing a dissertation proposal.

Research and Dissertation. Twenty-four semester hours of research and dissertation credit are required. The dissertation must consist of a fully documented written study demonstrating a high level of research competence and scholarship in the student's area of professional focus. The dissertation should make an original contribution to knowledge in the area of educational leadership and policy studies and be worthy of publication by an established press as a book or monograph or as one or more articles in a refereed, scholarly journal.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Current research activities include issues on the relationship between poverty and educational achievement, the efficacy of educational policies for diverse groups, including educational language policies.

COURSES

For courses, see "Educational Administration and Supervision (EDA)," page 184, "Higher and Postsecondary Education (HED)," page 229, and "Social and Philosophical Foundations (SPF)," page 314.

Educational Psychology

Master's and Doctoral Programs

coe.asu.edu/psyched

480/965-3384

EDB 302

Edward A. Nelsen, Academic Program Leader

Regents' Professors: Berliner, Kulhavy

Professors: Barona, Blanchard, Glass, Green, Krus, Nelsen, Santos de Barona, Strom, Zimilies

Associate Professors: Behrens, Moore, Stafford

Assistant Professors: Brem, Ladd, Nakagawa, Thompson

Clinical Assistant Professor: Stamm

The faculty in the Division of Psychology in Education offer graduate programs leading to the M.A., Master of Education, and Ph.D. degrees in Educational Psychology. In the Ph.D. program, concentrations are available in learning; lifespan developmental psychology; measurement, methodological studies, and statistics; and school psychology.

Students applying for admission to any of these programs are required to submit scores on the Graduate Record Examination (GRE).

MASTER OF EDUCATION

The Master of Education degree program requires 36 semester hours of graduate course work. The M.Ed. program is intended for persons who wish to further prepare themselves as classroom teachers or for other positions related to instruction. A written evaluation is required as the culminating experience for the degree. Students completing this program are not expected to continue for a Ph.D. degree in Educational Psychology at ASU. For more information, access the program Web site at seamonkey.ed.asu.edu/~gail/division/divintro.htm.

See "[Master of Education](#)," page 181, for more information on the Master of Education degree.

MASTER OF ARTS

The M.A. degree program requires 30 semester hours of graduate course work, which includes a thesis. The M.A. program leads to the Ph.D. and offers areas of study in learning; lifespan developmental psychology; and measurement, methodological studies, and statistics. All applicants must submit scores on the GRE. These M.A. areas of Edu-

cational Psychology have deadlines of October 15 and February 15 for receiving all application materials, including test scores, to be considered for admission for the following semester. These M.A. programs require written comprehensive examinations. Additional information on these degree programs may be obtained from the Division of Psychology in Education and from the program Web site, coe.asu.edu/psyched.

See “[Master’s Degrees](#),” page 93, for general requirements.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Psychology offers areas of study in learning; lifespan developmental psychology; measurement, methodological studies, and statistics; and school psychology. Complete descriptions of each area are available from the Division of Psychology in Education and from the program Web site, coe.asu.edu/psyched. The school psychology concentration is accredited by the American Psychological Association and approved by the National Association of School Psychologists.

School Psychology. The faculty specializing in school psychology offer a scientist-practitioner program leading to the Ph.D. degree. The program provides preparation in academic and professional areas through course work, research, practica, and internship. Graduates are employed in school districts, behavioral health settings serving children and adolescents, and universities. All application materials, including test scores, must be received by January 15 to be considered for admission the following academic year. For more information on the faculty, the programs of study, and admission requirements, applicants should contact the Division of Psychology in Education and request the *School Psychology Program* brochure. The same information is available at the program Web site, coe.asu.edu/psyched.

See “[Doctor of Philosophy](#),” page 96, for general information on the Ph.D. degree.

RESEARCH ACTIVITY

Research in learning includes teacher education, argumentation and discourse, reading, spatial cognition, and neuropsychological development in early childhood. Research in lifespan development includes studies of preschool and family literacy programs, social and moral development, peer relations, and intergenerational relationships. Research in methodology includes quantitative and qualitative methodology, personnel and program evaluation, and the use of computers for instruction and testing.

School psychology research involves assessment of cognitive and academic skills, classroom processes, interventions with high-risk children and youth, informed consent, substance abuse prevention, and assessment of minority individuals, as well as ethnic and gender issues.

EDUCATIONAL PSYCHOLOGY (EDP)

EDP 502 Introduction to Data Analysis. (3)

fall, spring, summer

Descriptive statistics, visual approaches, estimation, and inferential methods for univariate and bivariate educational research problems.

Experience using statistical software. Cross-listed as COE 502. Credit is allowed for only COE 502 or EDP 502.

EDP 503 Introduction to Qualitative Research. (3)

fall, spring, summer

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. Credit is allowed for only COE 503 or EDP 503.

EDP 504 Learning and Instruction. (3)

fall, spring, summer

Introduces psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as COE 504. Credit is allowed for only COE 504 or EDP 504.

EDP 510 Essentials of Classroom Learning. (3)

fall, spring, summer

Theoretical and empirical foundations of learning in the classroom milieu. Critical exposure to research and method in instructional psychology.

EDP 513 Child Development. (3)

fall, spring, summer

Examines problems and achievements experienced by children growing up in a technological society. Emphasizes discovering the child’s perspective.

EDP 514 Psychology of the Adolescent. (3)

fall, spring, summer

Cognitive, physical, and social development of adolescents in contemporary society. Impact of family, school, and workplace on adolescent development. Prerequisite: EDP 310 or PGS 101 (or its equivalent).

EDP 530 Theoretical Issues and Research in Human Development. (3)

fall

Psychological theories, research, and methods relevant to human development, emphasizing the relations between early development and later performance.

EDP 535 Applied Behavior Analysis. (3)

fall

Principles of conditioning as applied to behavior. Current research on the experimental analysis of behavior in educational psychology.

EDP 536 Physiology of Behavioral Disorders. (3)

fall

Critical study of nervous system, brain function for fundamental behaviors, and system dysfunctions in mental/neurological disorders. Prerequisite: instructor approval.

EDP 540 Theoretical Views of Learning. (3)

fall and spring

Classical and cognitive theories of learning, plus recent orientations. Illustrative experimental and rational foundations; implications for educational practice.

EDP 542 Research Methods in the Learning Sciences. (3)

spring

Students read, design, and carry out original research in the learning sciences. Lecture, discussion. Prerequisites: EDP 540; instructor approval.

EDP 544 Psychology of Reading. (3)

fall

Alternate analyses of the reading process; designs and procedures for investigating instructional and noninstructional variables related to reading achievement.

EDP 545 Higher-Order Processes in the Learning Sciences. (3)

spring

Examines original research on induction, deduction, analogy and transfer, knowledge representation, and other issues in learning. Discussion. Prerequisite: EDP 540 or instructor approval.

EDP 550 Introduction to Measurement in Education. (3)

fall and spring

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.

GRADUATE PROGRAMS AND COURSES

EDP 552 Multiple Regression and Correlation Methods. (3)

fall, spring, summer

Educational applications of regression techniques. Quantitative and qualitative predictors, curvilinear trends, and interactions. Emphasizes analyzing data and interpreting results. Lecture, lab. Prerequisite: EDP 502 or instructor approval.

EDP 554 Analysis-of-Variance Methods. (3)

fall, spring, summer

Educational applications of ANOVA techniques. Between- and within-subjects designs, multiple comparisons. Emphasizes using statistical software and interpreting results. Lecture, lab. Prerequisites: EDP 502, 552.

EDP 556 Data Processing Techniques in Measurement and Research. (3)

once a year

Use of statistical packages for data analysis. Emphasizes data management, data structures, and related statistical procedures. Lecture, lab. Prerequisite: EDP 552. Pre- or corequisite: EDP 554 or instructor approval.

EDP 560 Individual Intellectual Assessment. (3)

fall and spring

Issues in administration and interpretation of individual intelligence tests. Theoretical basis, ethical considerations, and diagnostic use of test results. Fee. Prerequisite: admission to a program in professional psychology or instructor approval.

EDP 561 Lab in Psychological Assessment. (3)

spring

Lab experience in administration, scoring, and interpretation of individual intelligence tests. Lab. Prerequisite: admission to a program in professional psychology or instructor approval. Corequisite: EDP 560.

EDP 562 School Psychology: Ethics, Theory, and Practice. (3)

fall

Provides information regarding the ethics, history, and theory of current school psychology practice.

EDP 563 Interventions in School Psychology. (3)

fall

Examines case-based consultation and consultation research relevant to school psychology practice. Field experience. Prerequisite: school psychology program or instructor approval.

EDP 564 Academic Interventions. (3)

spring

Skills-building course emphasizing academic interventions and outcome-based educational decisions. Prerequisite: EDP 535.

EDP 566 Diagnosis of Learning Difficulties. (3)

spring

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 their equivalents); instructor approval.

EDP 567 School Psychological Services to Minority Students. (3)

spring

Historical perspectives and major issues in psychological and academic assessment and interventions with minority school children.

EDP 568 Diagnosis and Interventions for Children and Adolescents with Emotional Handicaps. (3)

fall

Clinical diagnosis of emotional handicaps in children and adolescents with emphasis on interpretation of diagnostic instruments and designing appropriate interventions in school settings. Lecture, lab. Prerequisites: EDP 566; PSY 578 (or its equivalent).

EDP 651 Methods and Practices of Qualitative Research. (3)

spring

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 for Data Analysis. (3)

fall

Educational applications of multivariate methods, including MANOVA, discriminant analysis, and exploratory factor analysis. Emphasizes analyzing data and reporting results. Lecture, lab. Prerequisite: EDP 554 or instructor approval.

EDP 654 Structural Equation Modeling in Educational Research. (3)

spring

Educational applications of confirmatory factor analysis, path analysis, and full latent variable models. Experience in conducting analyses and reporting results. Lecture, lab. Prerequisite: EDP 652 or instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Educational Technology

Master's and Doctoral Programs

coe.asu.edu/psyched

480/965-3384

EDB 302

Thomas Brush, Academic Program Leader

Professors: Bitter, Klein, Sullivan

Associate Professors: Brush, Savenye

Assistant Professor: Julian

Clinical Assistant Professor: Iggoe

The faculty in the Division of Psychology in Education offer graduate programs leading to the Master of Education (M.Ed.) and Doctor of Philosophy (Ph.D.) degrees in Educational Technology. The focus of these programs is on design, development, and evaluation of instructional systems and on educational technology applications to support learning. The doctoral program emphasizes research using educational technology in applied settings.

The graduate programs leading to a degree in Educational Technology prepare students for a variety of positions consistent with their professional goals. Most doctoral graduates of the program accept appointments as university faculty members; educational technologists in universities, community colleges, and schools; or as training managers in corporate settings. Potential employment opportunities for master's degree graduates include positions as educational technologists in schools, community colleges, and universities; or as training specialists in corporate settings.

Applicants for admission to the Ph.D. degree program in Educational Technology must submit scores for the Graduate Record Examination (GRE). Master of Education program applicants must submit scores for either the GRE or the Miller Analogies Test. All application materials should be received at least three months prior to the semester in which the applicant wishes to begin study.

MASTER OF EDUCATION

The M.Ed. degree in Educational Technology requires the completion of a minimum of 30 semester hours beyond a bachelor's degree. Eighteen semester hours of prescribed

course work is required for all students in the Master of Educational Technology program. In addition, students select a minimum of 12 semester hours from a variety of specialty areas such as instructional design technology, media development, technology integration, and distance education. For a complete description of the M.Ed. program in Educational Technology, access the Web site at coe.asu.edu/psyched. For more information, see “[Master of Education](#),” page 181, for general requirements.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Technology requires a minimum of 84 semester hours beyond the bachelor’s degree. At least 54 of these hours must be taken at ASU. Each Ph.D. student in Educational Technology is required to complete 54 to 60 semester hours of prescribed course work and a minimum of 24 semester hours of elective courses. In addition, each Ph.D. student in Educational Technology must satisfy a publication requirement prior to beginning work on their dissertation. For a complete description of the Ph.D. in Educational Technology, access the Web site at coe.asu.edu/psyched. For more information, see “[Doctor of Philosophy](#),” page 96.

RESEARCH ACTIVITY

Research activity includes design, development, and evaluation of instructional environments and educational technology applications, emerging technologies, and instructional effectiveness. Students participate in research activities and course work that lead to conference participation and journal publication.

EDUCATIONAL TECHNOLOGY (EDT)

EDT 455 Authoring Tools. (3)

fall, spring, summer
Use of current authoring tools to design and deliver computer-based instructional materials.

EDT 501 Foundations and Issues in Educational Technology. (3)

fall and spring
Introduction to educational technology. Examines accomplishments and issues in the field.

EDT 502 Design and Development of Instruction. (3)

fall and spring
Design, development, and formative evaluation of objectives-based instructional materials.

EDT 503 Instructional Media Design. (3)

fall and spring
Uses media selection, design, and production principles to prepare design specifications for solutions to instructional messages and products. Pre- or corequisite: EDT 502.

EDT 504 Development of Computer-Based Instruction. (3)

fall and spring
Systematic design, development, and formative evaluation of computer-based instruction. Prerequisites: EDT 455 (or instructor approval), 502.

EDT 505 Multimedia Presentation Technologies. (3)

fall
Explores the design of multimedia presentations and the utilization of tools and resources to effectively deliver those presentations. Lecture, lab.

EDT 506 Educational Evaluation. (3)

spring
Procedures for evaluating educational programs, training systems, and new-technology applications. Prerequisite: EDT 502.

EDT 511 Technology Applications in Education. (3)

fall and summer
Integration and evaluation of emerging technologies into K–12 and adult teaching and learning. Online and lecture.

EDT 520 Educational Technology and Training. (3)

spring
Applications of educational technology to training and human performance systems in business, industry, and government; emphasizing trends and project management. Lecture, lab. Prerequisites: EDT 501, 502.

EDT 523 Distance Education Theory and Practice. (3)

fall
Explores development of distance learning principles by examining national and international systems and applications. Online and lecture.

EDT 525 Web Resources for Educators. (3)

spring
Explores Web-based and distance learning applications for educators. Online and lecture.

EDT 527 Instructional Video Production. (3)

spring
Design and production of instructional video. Lecture, lab. Prerequisite: EDT 503 or instructor approval.

EDT 528 Development of Web-Based Instruction. (3)

fall
Design and development of online instruction using advanced technologies. Prerequisite: EDT 502.

EDT 531 Hypermedia. (3)

fall
Design, development, and evaluation of open-ended, nonlinear computer-based tools and applications. Lecture, lab. Prerequisites: EDT 455 (or instructor approval), 502.

EDT 701 Research in Educational Technology. (3)

spring
Review and analysis of research studies in educational technology. Methodology for designing, conducting, and reporting educational technology research. Prerequisites: EDT 501, 502; instructor approval.

EDT 702 Research in Technology-Based Education. (3)

fall
Critical exposure to theories, research, and methods in technology-based education.

EDT 703 Research in Distance Education. (3)

spring
Seminar with emphasis on research in telecommunications and distance education.

EDT 704 Emerging Technologies in Education. (3)

spring
Examines the role and impact of emerging technologies in education.

EDT 780 Advanced Instructional Development. (3)

spring
Conducting and documenting selected instructional development activities. Prerequisites: EDT 502; instructor approval.

EDT 792 Advanced Educational Technology Research. (3)

fall and spring
Design and execution of educational technology research on selected topics. Prerequisites: EDT 701; instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “[Omnibus Courses](#),” page 48.

Electrical Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~eee

480/965-3590

ENGR 555

Joseph C. Palais, Director of Graduate Studies

Regents' Professors: Balanis, Ferry, Heydt

Professors: Backus, Crouch, El-Ghazaly, Goodnick, Gorur, Higgins, Hoppensteadt, Hui, Karady, Kiaei, Kozicki, Lai, Palais, Pan, Roedel, Schroder, Shen, Si, Spanias, Tao, Thornton, Y. Zhang

Associate Professors: Aberle, Allee, Bird, Chakrabarti, Cochran, Diaz, El-Sharawy, Greeneich, Grondin, Holbert, Karam, Kim, Morrell, Rodriguez, Skromme, Tsakalis, Tylavsky

Assistant Professors: Ayyanar, Duman, Joo, Papandreou-Suppappola, Reisslein, Tepedelenlioglu, Vasileska, Yazdi, J. Zhang

The faculty in the Department of Electrical Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering (M.S.E.), and the Ph.D. degrees in Electrical Engineering.

The faculty also participate in offering the tri-university Master of Engineering program and the interdisciplinary program leading to the Ph.D. degree in the Science and Engineering of Materials. See "[Science and Engineering of Materials](#)," page 312, for program description.

Admission. See "[Admission to the Graduate College](#)," page 84. A student whose undergraduate degree is not based on an ABET-accredited program must submit scores on the Graduate Record Exam and must have earned the equivalent of a 3.50 GPA in the final two years of study. All applicants must submit a short statement of purpose to the department. This statement must include the desired area of study within electrical engineering. Refer to the department's Web site for further information on programs, faculty, financial aid, and for admission and statement of purpose forms.

Internship. An internship program is available to full-time, on-campus, graduate students. Students spend a semester or a summer session at an engineering company. Up to three semester hours of credit are allowed under courses EEE 584, 684, or 784.

MASTER OF SCIENCE

See "[Master's Degrees](#)," page 93, for general information.

MASTER OF ENGINEERING

The Master of Engineering requires 30 semester hours of course work. It is a practice-oriented degree. Included in the 30 semester hours are three hours of applied mathematics and three hours of engineering management. Up to six semester hours of credit can be obtained for a practice-oriented project. A final examination is also required. Courses may be taken at any of Arizona's three state universities. Courses are offered by distance delivery whenever practical. For more information access the Web site at Tri-Univ.engr.arizona.edu.

MASTER OF SCIENCE IN ENGINEERING

See "[Master of Science in Engineering](#)," page 196, for information on the M.S.E. degree.

A final written comprehensive exam is required for Option two in this program. Most master's degree students are admitted to the M.S.E. program, Option two. Those who are offered financial support or who are outstanding students showing research potential are admitted to the M.S. program. A tentative program of study must be filed during the first semester enrolled for classes.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Electrical Engineering is awarded based upon evidence of excellence in research leading to a scholarly dissertation that is a contribution to knowledge.

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Program of Study. The official program of study must be filed no later than the semester before all degree requirements are met.

Foreign Language Requirements. None.

Qualifying Examinations. Every student must pass a qualifying examination consisting of a short research paper and an oral presentation of the research. The exam must take place before the end of the second semester in attendance at ASU.

Comprehensive Examinations. Written and oral comprehensive examinations are required before the student is admitted to candidacy. The examinations are administered by the supervisory committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Opportunities at the level of the master's or doctoral degree are offered to students whose goals are research, development, design, manufacturing, systems, engineering management, teaching, or other professional activities in electrical engineering or related disciplines.

Research opportunities in the Department of Electrical Engineering are available in a broad spectrum of subjects

encompassing traditional as well as new specialties. Significant research activity exists in coherent optics, communications, control systems, electromagnetics, power systems, signal processing, and solid-state electronics, reflecting the continuing strong interest and cooperation of local industry in these disciplines. Engineering education, low-power electronics, power systems, solid-state electronics, telecommunications, and system science and engineering have been selected for support as part of a program establishing excellence centers at ASU.

The list that follows provides an indication of the breadth of subjects available for research in the department. A research project may embrace more than one of the topics listed and may involve cooperative activity with local industry. The list is not meant to be exhaustive; topics other than those shown may also be suitable.

Antennas, Microwaves, Computational Electromagnetics, and Radar. Antennas: antenna analysis, design, and measurements; electromagnetic wave radiation, propagation, scattering, smart antennas and penetration; patch antennas; antenna broadbanding techniques. Microwaves: microwave circuits, devices, and systems; microwave, millimeter wave, and optical integrated circuits and transmission lines; printed lines on anisotropy substrates; microwave solid-state circuits and devices and measurement techniques. Packaging of microwave integrated circuits. Computational electromagnetics: geometrical and physical theories of diffraction; moment method; finite-difference time-domain; finite element; High Intensity Radiated Fields (HIRF). Radar: wideband radar techniques, radar cross section, radar multipath, and tracking.

Communications. Communication theory. Information theory. Modulation. Coding: source coding, channel coding, turbo codes, coding for digital storage systems. Wireless communications: coding for wireless systems, channel equalization, multiple access and diversity systems, synchronization for OFDM systems, spread spectrum systems, power control, CDMA, TDMA, FDMA, and SDMA. Communication networks: switching, wireless networks, network performance analysis, ad hoc networks, quality of service, protocols, integrated services, wireless multimedia networking, video traffic characterization, optical networking.

Control systems. Nonlinear systems analysis and control; adaptive control; robust control; sampled-data and real-time digital control, virtual instrumentation; neural networks; system identification and model validation; control of distributed parameter systems; robust multivariable control system design; control of systems with multiple hard nonlinearities; modeling, simulation, and graphical visualization of dynamical systems. Applications to aerospace systems, robotics and autonomous vehicles, semiconductor processes, manufacturing systems, and power systems.

Lasers and Coherent Optics. Fiber optics: communications, active and passive components, and networks.

Power Engineering. Research efforts in power engineering are coordinated through the NSF-sponsored center for Advanced Control of Energy and Power Systems. Power

systems: operation analysis, transient stability and reliability analysis, generation and transmission planning, system protection, application of expert systems, and short-term load forecasting using neural networks. Transmission and distribution: electric power quality, distribution system design, load management, and automation. Power electronics: rectifiers and inverters, high power switching devices, power supplies for fusion devices, accelerators, and power conditioning. High-voltage techniques: electrical strength of dielectrics, insulation coordination, aging of non-ceramic insulators, electric field calculation, remote data gathering, status assessment, and high-voltage effects on fiber-optic cables. Computer applications: software development, real-time control, large network techniques, and neural networks. Power generation: power plant dynamics, modeling, diagnostics, and advanced instrumentation.

Signal Processing. Digital signal processing (DSP) algorithms; signal processing architectures; DSP chips; detection and estimation; statistical decision theory; sensor management; spectral estimation; array signal processing; sampling theory; wavelet analysis; time-frequency representations; sonar and radar applications; signal processing in communication systems; image processing and compression; speech coding and recognition; multimedia signal processing; audio coding algorithms; adaptive signal processing; adaptive noise cancellation.

Solid-State Electronics. Semiconductor crystal growth: epitaxial, and thin films. Processing: oxidation, diffusion, rapid thermal processing, low pressure CVD, reactive ion etching, evaporation, and optical and electron beam lithography. Devices: quantum functional devices, neural network circuits, discrete and integrated circuits, thin film devices, lasers, microwave devices, and integrated optical circuits. Characterization: electrical, optical, physical, and chemical measurements, SEM, STM/AFM, Auger surface analysis, low temperature magneto-transport. Modeling: three-dimensional modeling of heterostructures and Si-based MOSFETs, bipolar transistor modeling, charge carrier ballistics, ensemble Monte Carlo simulations of particle transport in devices and in optically probed material characterization, quantum device modeling, quantum transport, theory of optical processes and effects. Circuit design: analog and mixed signal design, A/D converters, rf communication circuits, integrated microsystems and sensors, low-power electronics, VLSI design and novel architectures.

In addition, students are encouraged to undertake interdisciplinary research projects encompassing several technical areas in electrical engineering, as well as other areas of engineering, science and mathematics.

ELECTRICAL ENGINEERING (EEE)

EEE 405 Filter Design. (3)

fall

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)

fall and spring

Time and frequency domain analysis, difference equations, z-transform, FIR and IIR digital filter design, discrete Fourier transform, FFT,

GRADUATE PROGRAMS AND COURSES

and random sequences. Lecture, lab. Prerequisites: EEE 303; MAT 342.

EEE 425 Digital Systems and Circuits. (4)

fall and spring

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. (4)

spring

Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies. Lecture, lab. Prerequisite: ECE 334.

EEE 434 Quantum Mechanics for Engineers. (3)

fall

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)

spring

Introduces basic CMOS processing and fabrication tools. Covers the fundamentals of thermal oxidation, CVD, implantation, diffusion, and process integration. Internet lecture, internet or on-campus lab. Fee. Pre- or corequisite: EEE 436.

EEE 436 Fundamentals of Solid-State Devices. (3)

fall and spring

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)

selected semesters

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)

fall

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)

spring

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.

EEE 443 Antennas for Wireless Communications. (3)

spring

Fundamental parameters; radiation integrals; wireless systems; wire, loop, and microstrip antennas; antenna arrays; smart antennas; ground effects; multipath. Prerequisite: EEE 340.

EEE 445 Microwaves. (4)

fall

Waveguides; circuit theory for waveguiding systems; microwave devices, systems, and energy sources; striplines and microstrips; impedance matching transformers; measurements. Lecture, lab. Prerequisite: EEE 340.

EEE 448 Fiber Optics. (4)

fall

Principles of fiber-optic communications. Lecture, lab. Prerequisites: EEE 303, 340.

EEE 455 Communication Systems. (4)

fall and spring

Signal analysis techniques applied to the operation of electrical communication systems. Introduction to and overview of modern digital and analog communications. Lecture, lab. Prerequisite: EEE 350.

EEE 459 Communication Networks. (3)

spring

Fundamentals of communication networks. Study of Seven-Layer OSI model. Focus on functionality and performance of protocols used in communication networks. Prerequisite: EEE 350.

EEE 460 Nuclear Concepts for the 21st Century. (3)

spring

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)

fall

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 201, 340 (or PHY 241).

EEE 470 Electric Power Devices. (3)

fall

Analyzes 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)

spring

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)

fall

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)

fall and spring

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)

fall

Discrete and continuous systems in state space form controllability, stability, and pole placement. Observability and observers. Pre- or corequisite: EEE 480.

EEE 506 Digital Spectral Analysis. (3)

spring

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)

fall

Processing and representation of multidimensional signals. Design of systems for processing multidimensional data. Introduces image and array processing issues. Prerequisite: EEE 407 or instructor approval.

EEE 508 Digital Image Processing and Compression. (3)

spring

Fundamentals of digital image perception, representation, processing, and compression. Emphasizes image coding techniques. Signals include still pictures and motion video. Prerequisites: EEE 350 and 407 (or their equivalents).

EEE 511 Artificial Neural Computation Systems. (3)

selected semesters

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 517 Hardware Design Languages. (3)

fall and spring

Introduces hardware design languages. Modeling concepts for specification, simulation, and synthesis. Cross-listed as CSE 517. Credit is allowed for only CSE 517 or EEE 517. Prerequisite: CSE 423 or EEE 425 or instructor approval.

EEE 523 Advanced Analog Integrated Circuits. (3)*fall*

Analysis and design of analog integrated circuits: analog circuit blocks, reference circuits, operational-amplifier circuits, feedback, and nonlinear circuits. Prerequisite: EEE 433 (or its equivalent).

EEE 524 Communication Transceiver Circuits Design. (3)*selected semesters*

Communication transceivers and radio frequency system design; fundamentals of transceivers circuits; RF, IF, mixers, filters, frequency synthesizers, receivers, CAD tools, and lab work on IC design stations. Lecture, lab. Prerequisites: EEE 433 and 455 (or their equivalents). Pre- or corequisite: EEE 523.

EEE 525 VLSI Design. (3)*fall and spring*

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)*fall*

Special-purpose architectures for signal processing. Design of array processor systems at the system level and processor level. High-level synthesis. Prerequisites: both CSE 330 and EEE 407 or only instructor approval.

EEE 527 Analog to Digital Converters. (3)*fall*

Detailed introduction to the design of Nyquist rate, CMOS analog to digital converters. Prerequisite: EEE 523.

EEE 530 Advanced Silicon Processing. (3)*spring*

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)*fall*

Transport and recombination theory, pn and Schottky barrier diodes, bipolar and junction field-effect transistors, and MOS capacitors and transistors. Prerequisite: EEE 436 (or its equivalent).

EEE 532 Semiconductor Device Theory II. (3)*spring*

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)*fall*

Process simulation concepts, oxidation, ion implantation, diffusion, device simulation concepts, pn junctions, MOS devices, bipolar transistors. Prerequisite: EEE 436 (or its equivalent).

EEE 534 Semiconductor Transport. (3)*spring*

Carrier transport in semiconductors. Hall effect, high electric field, Boltzmann equation, correlation functions, and carrier-carrier interactions. Prerequisites: EEE 434, 436 (or 531).

EEE 535 Electron Transport in Nanostructures. (3)*spring*

Nanostructure physics and applications. Two-dimensional electron systems, quantum wires and dots, ballistic transport, quantum interference, and single-electron tunneling. Prerequisites: EEE 434, 436.

EEE 536 Semiconductor Characterization. (3)*spring*

Measurement techniques for semiconductor materials and devices. Electrical, optical, physical, and chemical characterization methods. Prerequisite: EEE 436 (or its equivalent).

EEE 537 Semiconductor Optoelectronics I. (3)*fall*

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)*selected semesters*

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)*fall*

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)*selected semesters*

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 its equivalent).

EEE 543 Antenna Analysis and Design. (3)*fall*

Impedances, broadband antennas, frequency independent antennas, miniaturization, aperture antennas, horns, reflectors, lens antennas, and continuous sources design techniques. Prerequisite: EEE 443 (or its equivalent).

EEE 544 High-Resolution Radar. (3)*selected semesters*

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 their equivalents).

EEE 545 Microwave Circuit Design. (3)*spring*

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)*selected semesters*

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)*spring*

Applies 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)*selected semesters*

Diffraction, lenses, optical processing, holography, electro-optics, and lasers. Prerequisite: EEE 440 (or its equivalent).

EEE 549 Lasers. (3)*selected semesters*

Theory and design of gas, solid, and semiconductor lasers. Prerequisite: EEE 448 or instructor approval.

EEE 550 Transform Theory and Applications. (3)*selected semesters*

Introduces 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 Theory. (3)*selected semesters*

Entropy and mutual information, source and channel coding theorems, applications for communication and signal processing. Prerequisite: EEE 554.

EEE 552 Digital Communications. (3)*spring*

Complex signal theory, digital modulation, optimal coherent and incoherent receivers, channel codes, coded modulation, Viterbi algorithm. Prerequisite: EEE 554.

EEE 553 Coding and Cryptography. (3)*selected semesters*

Introduces algebra, block and convolutional codes, decoding algorithms, turbo codes, coded modulation, private and public key cryptography. Prerequisite: EEE 554.

EEE 554 Random Signal Theory. (3)*fall*

Applies statistical techniques to the representation and analysis of electrical signals and to communications systems analysis. Prerequisite: EEE 350 or instructor approval.

GRADUATE PROGRAMS AND COURSES

EEE 555 Modeling and Performance Analysis. (3)

selected semesters

Modeling and performance analysis of stochastic systems and processes such as network traffic queueing systems and communication channels. Prerequisite: EEE 554.

EEE 556 Detection and Estimation Theory. (3)

selected semesters

Combines 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 Wireless Communications. (3)

fall

Cellular systems, path loss, multipath fading channels, modulation and signaling for wireless, diversity, equalization coding, spread spectrum, TDMA/FDMA/CDMA. Prerequisite: EEE 552.

EEE 571 Power System Transients. (3)

spring

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. Introduces computer analysis of transients. Prerequisite: EEE 471.

EEE 572 Advanced Power Electronics. (3)

fall

Analyzes 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 uninterruptible power supplies. Prerequisite: EEE 470.

EEE 573 Electric Power Quality. (3)

spring

Sinusoidal waveshape maintenance; study of momentary events, power system harmonics, instrumentation, filters, power conditioners, and other power quality enhancement methods. Prerequisite: EEE 360 (or its equivalent).

EEE 574 Computer Solution of Power Systems. (3)

selected semesters

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)

fall

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)

spring

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)

selected semesters

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)

selected semesters

Controllability, observability, and realization theory for multivariable continuous time systems. Stabilization and asymptotic state estimation. Disturbance decoupling, noninteracting control. Prerequisite: EEE 482.

EEE 584 Internship. (3)

fall, spring, summer

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

EEE 585 Digital Control Systems. (3)

selected semesters

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)

selected semesters

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)

selected semesters

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as MAE 507. Credit is allowed for only EEE 587 or MAE 507. Prerequisite: EEE 482 or MAE 506.

EEE 588 Design of Multivariable Control Systems. (3)

selected semesters

Practical tools for designing robust MIMO controllers. State feedback and estimation, model-based compensators, MIMO design methodologies, CAD, real-world applications. Prerequisite: EEE 480 (or its equivalent).

EEE 606 Adaptive Signal Processing. (3)

fall

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 607 Speech Coding for Multimedia Communications. (3)

spring

Speech and audio coding algorithms for applications in wireless communications and multimedia computing. Prerequisite: EEE 407. Pre-corequisite: EEE 506.

EEE 631 Heterojunctions and Superlattices. (3)

fall

Principles of heterojunctions and quantum well structures, band line-ups, optical, and electrical properties. Introduces heterojunction devices. Prerequisites: EEE 436, 531.

EEE 632 Heterojunction Devices. (3)

selected semesters

Applies heterostructures, quantum wells, and superlattice to modulation-doped FETs, heterostructure bipolar transistors, lasers, detectors, and modulators. Prerequisites: EEE 434, 631 (or 537).

EEE 641 Advanced Electromagnetic Field Theory. (3)

selected semesters

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 its equivalent).

EEE 643 Advanced Topics in Electromagnetic Radiation. (3)

spring

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)

fall

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 684 Internship. (1–2)

fall, spring, summer

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

EEE 686 Adaptive Control. (3)

selected semesters

Main topics covered: adaptive identification, convergence, parametric models, performance and robustness properties of adaptive controllers, persistence of excitation, and stability. Prerequisites: both EEE 582 and 586 or only instructor approval.

EEE 731 Advanced MOS Devices. (3)

spring

Threshold voltage, subthreshold current, scaling, small geometry effects, hot electrons, and alternative structures. Prerequisite: EEE 531.

EEE 770 Advanced Topics in Power Systems. (3)*selected semesters*

Power system problems of current interest, approached at an advanced technical level, for mature students. Prerequisites: EEE 577 and 579 (or their equivalents); instructor approval.

EEE 784 Internship. (3)*fall, spring, summer*

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning processes.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Elementary Education

Postbaccalaureate Program (ASU East)

The ASU East education courses below have been created as part of the postbaccalaureate program in Elementary Education. The postbaccalaureate program combines 400- and 500-level courses to fulfill the course work requirements leading to K–8 state certification. For information about the program, call the ASU East Education Office at 480/727-1103.

ELEMENTARY EDUCATION (EDC)

EDC 560 Principles of Instructional Technology. (3)*fall, spring, summer*

Examines effective practices related to instructional technologies, including classroom delivery, student engagement, and evaluation of resources. Prerequisite: approval of ASU East Education Office.

EDC 565 Research-Based Phonics for the K–8 Classroom. (3)*fall, spring, summer*

Current research in phonics instruction, including systematic and analytic approaches, and their application to classroom practice. Interactive forum. Prerequisites: EDC 465 (or its equivalent); approval of ASU East Education Office.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Elementary Education

Master's Program (ASU West)

ASU West offers a Master of Education (M.Ed.) degree in Elementary Education. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Engineering

Master's Programs

MASTER OF ENGINEERING—M.E.

Arizona's three state universities—Arizona State University, Northern Arizona University, and the University of Arizona—are cooperating in offering a tri-university degree program: the Master of Engineering (M.E.).

The M.E. program is intended to meet the educational needs of Arizona's practicing engineers. With input from industry professionals, the three universities are developing courses that address the enhancement and development of skills, knowledge, and understanding that are critical to today's practicing engineer. These courses are offered through a variety of distance-delivery methods and in flexible formats. Students enrolled in Web delivered courses may incur a special course fee.

For more information, see the M.E. Web site at tri-univ.engr.arizona.edu. Students enrolled in the program are able to take advantage of course offerings at any of the three universities. These offerings reflect the diversity of strengths across the state.

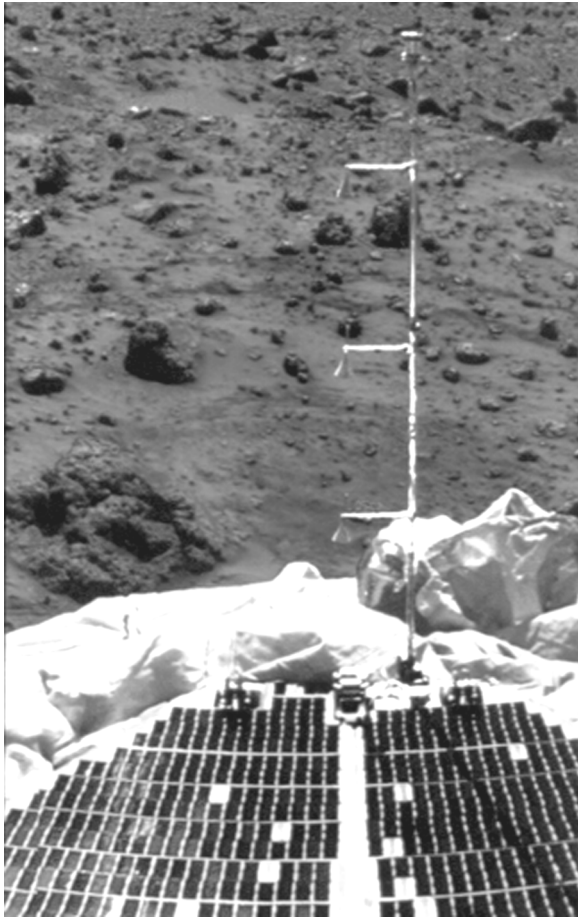
The M.E. program offers the practicing engineer the opportunity to design, in conjunction with an advisory committee, a program of study that can reflect the increasingly interdisciplinary nature of engineering practice.

Admission. For application materials, students may visit the program's Web site at triuniv.engr.arizona.edu, contact the College of Engineering and Applied Sciences at 480/965-1726, or address e-mail to m.eng@asu.edu.

Applicants who have graduated from accredited U.S. institutions and who have a suitable background for the desired field of study must have a minimum grade point average of 3.00 (on a 4.00 scale) for the last 60 units of the undergraduate transcript (or for the last 12 units of the post-baccalaureate transcript). The Graduate Record Exam (GRE) may be required for a particular area of study or concentration by the tri-university coordinating board for the program. Graduates of non-U.S. institutions must satisfy admission requirements, in addition to those specified above.

Individuals not meeting the requirements for regular admission may be recommended for provisional admission or deferred admission status at the discretion of the M.E. Admission Committee. Upon completion of recommended course work, provisional and/or deferred admission status students will be elevated to regular status. Refer to the M.E. Web site for program admission details.

Individuals wanting to take courses offered in the M.E. program while not seeking a degree, are encouraged to obtain nondegree admission status through the Graduate School.



The vertical stand holding wind-measuring instruments developed at ASU was a vital part of the Mars Pathfinder lander mission in 1997.

Photo courtesy of NASA

Program of Study. Graduate College requirements of the home institution must be followed. All programs of study require the completion of at least 30 semester hours of graduate credit. Each program of study requires three semester hours of course work in each of the following subject areas: engineering management/business and applied engineering mathematics.

All students are expected to take at least 10 semester hours from their home institution. During the first month of the semester in which the 10th semester hour is taken, the M.E. student should prepare a program of study. Once the program of study has been approved by the student's advisory committee, it should be forwarded for approval by the campus director of the home institution. See the M.E. Web site for detailed information regarding the program of study.

At the discretion of an academic unit or academic working group, a practice-oriented project may constitute a limited part of the program of study not to exceed six semester hours. Students must maintain a minimum GPA of 3.00 in courses taken as part of their program of study and maintain a 3.00 or higher for all graduate courses (500-level or above).

Foreign Language Requirements. None.

Thesis Requirements. None.

Capstone Event. An appropriate capstone event is defined and managed by the student's advisory committee. A capstone event could include, but is not limited to, the following: a written and/or oral defense of an applied project; a final examination that captures the essence of the master's degree focus and represents a major portion of the student's course work; or an overview presentation incorporating knowledge gained from the program with integration and reflection of learning as applied to the job. The student's advisory committee has the authority to determine the format of the capstone event.

Time Limit. The time limit for completing the M.E. degree is six years from the time of admission.

MASTER OF SCIENCE IN ENGINEERING

The faculty in the College of Engineering and Applied Sciences offer professional programs leading to the Master of Science in Engineering (M.S.E.) degree with majors in Aerospace Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Science, Industrial Engineering, and Mechanical Engineering. The programs are designed to bridge the gap between knowledge of engineering sciences and creative engineering practice while at the same time increasing the depth and breadth of knowledge in selected areas of emphasis. The pattern of course work applicable to the degree is potentially unique for each student, although it must conform to the general guidelines for subject matter content for the degree as authorized in the *Graduate Catalog*.

Two options are available within the M.S.E. degree program. Option one requires a thesis and is designed primarily for full-time students. Option two is designed for full-time students not intending to write a thesis and for students who hold full-time jobs and must attend university classes on a part-time basis. A thesis or equivalent is not required of students who elect this option.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Entry into this program normally requires a bachelor's degree with a major in engineering or in a closely related bachelor's degree program.

Deficiencies for admission to the graduate degree programs are specified at the time of admission. The verbal, quantitative, and analytical components of the Graduate Record Examination (GRE) are recommended but not required unless specified by the respective academic unit in which the major is offered. TOEFL scores must be submitted by international applicants before admission is considered. Applicants with TOEFL scores of 550 or higher may be regularly admitted without requiring further language study. Applicants with scores below 550 may be regularly admitted but must complete study in ASU's American English and Culture Program (AECPP) before enrolling in course work in the academic program.

Program of Study. In general, all candidates for the M.S.E. degree program are required to complete 30 semester hours. Additional courses may be assigned by the supervisory committee depending on the background of the candidate.

Option 1. A minimum of six semester hours of research and thesis credit must be included in the 30 hours.

Option 2. A minimum of 30 semester hours and a comprehensive examination are required.

Foreign Language Requirements. None.

Thesis Requirements. Only students who elect Option one are required to write a thesis.

Final Examinations. A final oral examination in defense of the thesis is required for students who choose Option one. A final comprehensive examination is required for students in Option two. Examination format and times should be obtained from the academic unit.

COURSES

For courses, refer to the catalog section for the major.

Engineering Science

Master's and Doctoral Programs

The faculty of the School of Engineering offer graduate programs leading to the M.S., the M.S.E., and the Ph.D. degrees in Engineering Science. Faculty offer programs of a special and interdisciplinary nature. An area of study is also available in materials science and engineering. Contact the Department of Chemical and Materials Engineering.

See "[Master's Degrees](#)," page 93, and "[Doctor of Philosophy](#)," page 96, for information.

Graduate Record Examination. A student whose undergraduate degree program is not ABET accredited must submit scores on the Graduate Record Examination (GRE) General Test as part of the admission process. Certain disciplines also require GRE scores for application to the M.S., M.S.E., and Ph.D. programs in Engineering Science.

MATERIALS SCIENCE AND ENGINEERING

Faculty members who advise students in this area of study are located within the Department of Chemical and Materials Engineering. Courses offered carry the MSE prefix and are listed on page [257](#).

For more information call 480/965-3313, send e-mail to cmerec@asu.edu, or visit ECG 202.

Each student admitted as a regular degree candidate is required to complete an approved program of study. Students who have an undergraduate degree in an area other than materials science, or a similarly named program, may qualify for admission to a transition program and may be required to take one or more undergraduate courses in preparation for enrollment in graduate courses in materials science and engineering. The program of study of transition students is determined by the student's supervisory committee after review of the student's academic record.

Research activities in materials science and engineering include: growth, processing and characterization of electronic materials; electroceramics; deformation behavior of materials at different length scales; computational materials science; and nanoscience and nanotechnology. Some of the research projects that are currently being pursued are: growth of group III nitrides by organometallic vapor phase epitaxy and molecular beam epitaxy and their fabrication into high frequency, high power, and high temperature devices; fabrication of spintronic devices for very high frequency applications; synthesis of high k dielectric films by organometallic vapor phase epitaxy and correlation of properties with microstructures; process-induced defects in implantation and annealing of GaN; creep and thermal fatigue behaviors of lead-free solder balls used in electronic packaging; modeling of the evolution of thin film microstructures; and synthesis and characterization of quantum dots.

Courses

Graduate courses offered by the College of Engineering and Applied Sciences that apply to degree requirements are listed under degree majors in this catalog. Basic courses that may be required, or taken as electives, are shown below.

ANALYSIS AND SYSTEMS (ASE)

ASE 496 Professional Seminar. (0)

fall and spring

Topics of interest to students in the engineering special and interdisciplinary studies.

ASE 582 Linear Algebra in Engineering. (3)

fall

Development and solution of systems of linear algebraic equations. Applications from mechanical, structural, and electrical fields of engineering. Prerequisite: MAT 242 (or its equivalent).

ASE 586 Partial Differential Equations in Engineering. (3)

spring

Development and solution of partial differential equations in engineering. Applications in solid mechanics, vibrations, and heat transfer. Prerequisites: MAT 242, 274.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

English

Master's and Doctoral Programs

www.asu.edu/clas/english/gradstudies/enggrad.htm

480/965-3168

LL 542

Regents' Professors: Dubie, Ríos

Professors: Adams, Bender, Bjork, Boyer, Brack, Brink, Candelaria, Carlson, Crowley, Donelson, Gutierrez, Helms, Kehl, Lester, Lightfoot, Major, A. Nilsen, D. Nilsen, Rhodes, Richard, Roen, Sands, Sensibar, Tobin

Associate Professors: Bates, Bivona, Castle, Chancy, Corse, DeLamotte, M. Goggin, Goldberg, Horan, Lussier, Mahoney, McNally, Miller, Nelson, Perry, Pritchard, Ramage, Savard, Schwalm, Tohe, van Gelderen, Voaden

Assistant Professors: Blasingame, Fox, Fuse, P. Goggin, Harris, Johnson, Milun, Webb Peterson

Senior Lecturers: Cook, Cooper, Duerden, Dugan, Dwyer, Heenan, Norton, Sudol, Wheeler

Lecturers: Binkely, Duttagupta, Stancliff, Ray

Academic Professionals: Glau, McNeil

The faculty in the Department of English offer the M.A. degree in English, the Master of Teaching English as a Second Language degree, and the Ph.D. degree in English.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect English as the subject matter field. For information on the Master of Education degree, see "[Master of Education,](#)" page 181.

Students may also pursue an interdisciplinary program leading to the Master of Fine Arts degree in Creative Writing, offered by the faculties in the Departments of English and Theater. See "[Master of Fine Arts,](#)" page 164.

MASTER OF ARTS

This degree is designed to provide further cultural and professional advancement for students of English.

Admission Requirements. The department requires that applicants have an undergraduate major in English and a 3.00 GPA in courses taken in the major field. Those who do not have a major in English are encouraged to register as nondegree students while they take courses in areas of deficiency as identified by the advisor.

Deadline for admission applications and requests for financial assistance, including teaching assistantships, is February 1. Incomplete files are not considered.

Applicants for the M.A. program in English with concentrations in literature and language and rhetoric and composi-

tion are required to submit Graduate Record Examination (GRE) General Test scores, three letters of recommendation, a personal statement of aims and purposes, and an academic writing sample.

Applicants for the M.A. program with a concentration in English linguistics must show completion of one upper-division course in a linguistics-related field, and must submit a personal statement of aims and purposes and three letters of recommendation. GRE scores are not required.

Applicants for the M.A. program in English with a concentration in comparative literature must prove fluency in a foreign language to a level sufficient for graduate study.

Program of Study. A student may pursue a concentration in comparative literature, English linguistics, literature and language, or rhetoric and composition.

For the concentration in comparative literature, a candidate must complete 36 semester hours of graduate courses, with a minimum of 12 semester hours being taken in the Department of Languages and Literatures. Included in the hours must be ENG 500 Research Methods, ENG 501 Introduction to Comparative Literature, and ENG 599 Thesis.

For the concentration in English linguistics, a candidate must complete a minimum of 30 semester hours of graduate courses. The 30 semester hours must include LIN 500 Research Methods, LIN 511 Phonetics and Phonology, LIN 514 Syntax, one LIN 591 Seminar, or their equivalents chosen in consultation with the advisor, and LIN 599 Thesis. Electives are chosen in consultation with the advisor.

For the concentration in literature and language, a candidate must complete a minimum of 30 semester hours. The hours must include ENG 500 Research Methods; a course in Literary Theory; ENG 599 Thesis, a 12-hour distribution requirement; and six hours of other electives. Two courses selected must carry ENG 591 Seminar credit.

For the concentration in rhetoric and composition, a candidate must complete a minimum of 30 hours of graduate courses, including a 12 semester hour core, a six semester hour thesis, and 12 elective hours that must include six semester hours of ENG 591 Seminar and may include nine semester hours of appropriate graduate courses outside the English department.

Foreign Language Requirements. A reading knowledge of French, German, Spanish, or another natural language is required. The choice of language must be approved by the student's supervisory committee.

Comprehensive Examinations. A comprehensive examination is required for students in the comparative literature concentration. (A detailed description of its scope is available in the Department of English.)

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

M.TESL

The Master of Teaching English as a Second Language degree is designed for students who seek a professionally oriented graduate education. For information, see "[Teaching English as a Second Language,](#)" page 328.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Admission Requirements. Applicants for the Ph.D. degree in English must submit scores on the GRE (verbal and advanced literature sections), three letters of recommendation, a personal statement of aims and purposes, and an academic writing sample. Deadline for admission applications and requests for financial aid, including teaching assistantships, is February 1. Incomplete files are not considered.

Areas of Concentration. The Ph.D. degree in English offers concentrations in the following areas:

Literature. At least 60 semester hours of graduate courses (exclusive of dissertation) beyond the bachelor’s degree constitute the formal course preparation. Specifically required are three semester hours in history of the English language (for example, ENG 507 Old English, ENG 508 Old English Literature, ENG 509 Middle English, LIN 505 American English, and LIN 548 Studies in English Language); six semester hours in theory courses; and the following distribution requirement: English literature before 1660 (including one course in each of the following: Chaucer, Shakespeare, and Milton); English literature 1660–1900; British literature since 1900; American literature before 1900; and American literature since 1900. Students must take at least five graduate seminars en route to the Ph.D. degree, at least three of which must be taken in the doctoral program at ASU. Up to 12 semester hours taken outside the department may be counted toward the degree.

Rhetoric/Composition and Linguistics. A minimum of 60 semester hours of graduate courses (exclusive of dissertation) beyond the bachelor’s degree constitutes the formal course preparation. Specifically required are three semester hours of language (for example, ENG 507 Old English, ENG 508 Old English Literature, ENG 509 Middle English, LIN 505 American English, LIN 548 Studies in English Language); six semester hours in theory courses; and the following distribution requirements: Syntax/Semantics; Rhetorical Theory; Composition Theory and Method; Philosophy and Theories of Pedagogy; Pragmatics/Sociolinguistics. Students must take a minimum of five graduate seminars en route to the Ph.D. degree, at least three of which must be taken in the doctoral program at ASU. Up to 12 semester hours of course work taken outside the department may be counted toward the degree.

Foreign Language Requirements. A competent reading knowledge of a language other than modern English is required. The requirement can be met by

1. earning a grade of “B” or higher in a 400- or 500-level course in an appropriate language;
2. demonstrating proficiency by taking a language examination approved by the supervisory committee; and
3. showing native speaker proficiency in a language approved by the supervisory committee.

Ph.D. Examinations. The Ph.D. examination consists of three parts. Part I is a portfolio of three essays, representing

different historical periods or fields of concentration and employing more than one critical approach. After successful completion of Part I, the student may advance to Part II, a three-hour written exam in the student’s area of specialization based on a bibliography compiled by the student and approved by the student’s supervisory committee. Part III is a colloquy, based on a written prospectus, defining the topic, scope, and significance of the dissertation.

Dissertation Requirements. (See [“Research and Dissertation Requirements,” page 97](#).) The subject of the dissertation is decided in consultation with the chair of the student’s supervisory committee, subject to approval of the director of the Ph.D. program.

Final Examinations. A final examination in defense of the dissertation, arguing for its method and conclusions, is required.

RESEARCH ACTIVITY

Research in English and its various subdisciplines fall into three broad areas of inquiry:

1. historical/textual studies;
2. comparative/interdisciplinary studies; and
3. pedagogical/theoretical studies.

The first category (historical/textual Studies) concerns the production, preparation, and publication of texts and explores the historical context of publication. Work in this area encompasses the writing of the creative writing faculty as well as the historical/material criticism of rhetoricians, linguists, and literary historians.

Research in the second category (comparative/interdisciplinary Studies) analyzes the dynamic play of language across cultures and disciplines and seeks to establish critical difference and similitude as the vehicle for comprehending the function of language and texts in a broadened context that includes all literatures and disciplines.

The third category (pedagogical/theoretical Studies) involves the theory and practice of those subdisciplines currently defining “English Studies.” A concern for operative theories and efficacious practices involves every component of the department, encouraging the exploration of how language and literature interact in the subdisciplines and within wider spheres of cultural authority. For more information about faculty publications and specializations, access the Web site at www.asu.edu/clas/english/who/facspecial.html.

ENGLISH (ENG)

ENG Note 1. Completion of the First-Year Composition requirement (ENG 101 and 102 [or 105] or ENG 107 and 108 with a grade of “C” or higher) is a prerequisite for all English courses above the 100 level.

ENG Note 2. A term paper or equivalent out-of-class written work is required in all upper-division (300- and 400-level) ENG courses.

ENG Note 3. English majors and minors are expected to have completed ENG 200 before taking 400-level literature courses.

ENG 400 History of Literary Criticism. (3)

selected semesters

Major critics and critical traditions in the Western world. See ENG Notes 1, 2. Prerequisite: 6 hours in literature or instructor approval.

GRADUATE PROGRAMS AND COURSES

ENG 401 Topics in Critical Theory. (3)

selected semesters

Major critical schools of recent decades—postcolonialist, psychoanalytic, deconstructionist, feminist, new historicist. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2. Prerequisite: 6 hours in literature or instructor approval.

ENG 409 Advanced Screenwriting. (3)

selected semesters

Applies the principles taught in a complete feature-length screenplay. See ENG Notes 1, 2. Prerequisite: instructor approval.

ENG 411 Advanced Creative Writing. (3)

fall and spring

Poetry, fiction, and drama for experienced writers, emphasizing individual style. Each genre may be taken once. See ENG Notes 1, 2. Prerequisite: ENG 310 or instructor approval.

ENG 412 Creative Nonfiction. (3)

selected semesters

Lectures, discussion, and criticism concerning techniques of writing creative nonfiction for publication. See ENG Notes 1, 2. Prerequisite: ENG 310 or 411 or instructor approval.

ENG 413 History of the English Language. (3)

once a year

Development of English from the earliest times to the modern period. See ENG Notes 1, 2. Prerequisite: junior standing or instructor approval.

ENG 415 Topics in Medieval Literature and Culture. (3)

selected semesters

Interdisciplinary approach to medieval literature, emphasizing cultural and historical context. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 416 Chaucer in Middle English. (3)

once a year

Yearly alternate between Chaucer's *The Canterbury Tales* and *Troilus and Criseyde*. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 418 Renaissance Literature. (3)

once a year

Selected topics, authors, contexts, and themes in Renaissance literature. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 419 English Literature in the Early 17th Century. (3)

once a year

Topics, authors, and themes in English literature, 1603–1660. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 423 Renaissance Drama. (3)

spring

Topics, authors, and themes in the drama of the Tudor and early Stuart periods. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 424 Milton. (3)

once a year

Selected prose and poetry, emphasizing *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or instructor approval.

ENG 425 Studies in Romanticism. (3)

fall

Romanticism in continental, British, and American literature and culture. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or 241 or instructor approval.

ENG 427 Studies in 18th-Century Literature and Culture. (3)

selected semesters

Literary, social, and cultural issues of the period studied in an interdisciplinary format. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or 222 or instructor approval.

ENG 429 Studies in European Literature and Culture. (3)

selected semesters

Literary, cultural, and historical issues. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3.

ENG 430 Studies in Victorian Literature and Culture. (3)

once a year

Literary, social, and cultural issues of the period studied in an interdisciplinary format. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

ENG 434 Studies in the Literature and Culture of the Americas. (3)

selected semesters

Literature and culture of North America, South America, and the Caribbean. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

ENG 436 Studies in Anglophone Literature and Culture. (3)

selected semesters

Literary, social, and cultural issues of English-speaking former colonial territories. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or 242 or instructor approval.

ENG 440 Studies in American Literature and Culture. (3)

once a year

Various genres in their literary, political, theoretical, and historical contexts. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

ENG 442 Studies in 20th-Century British and Irish Literature and Culture. (3)

once a year

Major literary genres (novel, poetry, and drama) in their cultural and historical contexts. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or instructor approval.

ENG 444 Studies in American Romanticism. (3)

once a year

Fiction, poetry, and essays of such nineteenth-century authors as Hawthorne, Emerson, Melville, Thoreau, Fuller, Whitman, and Dickinson. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or instructor approval.

ENG 445 Studies in American Realism. (3)

once a year

Writers and influences that shaped the development of literary realism. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 242 or instructor approval.

ENG 446 Studies in Modernism. (3)

selected semesters

Cultural, historical, and literary problems in American and European modernism. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or 242 or instructor approval.

ENG 448 Studies in Irish Literature and Culture. (3)

selected semesters

Themes and problems pertaining to Irish literature, film, and social and cultural history. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3. Prerequisite: ENG 222 or 242 or instructor approval.

ENG 452 Studies in the Novel. (3)

selected semesters

May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or 222 or 241 or 242 or instructor approval.

ENG 453 Studies in the American Novel. (3)

fall and spring

Poetics and politics of the novel, 18th through 21st centuries. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

ENG 455 Forms of Verse: Theory and Practice. (3)

selected semesters

Types, history, analysis of traditional poetic forms and contemporary adaptations. Writing of poetry in forms such as sonnet, villanelle, sestina. See ENG Notes 1, 2. Prerequisite: ENG 310 or instructor approval.

ENG 457 Studies in American Poetry. (3)

selected semesters

May be repeated for credit when topics vary. See ENG Notes 1, 2, 3. Prerequisite: ENG 241 or 242 or instructor approval.

ENG 459 Studies in African American/Caribbean Literatures. (3)*selected semesters*

Studies in African American or Caribbean literatures according to genre, period, theory, or selected authors. May be repeated for credit when topics vary. Cross-listed as AFH 459. Credit is allowed for only AFH 459 or ENG 459. See ENG Notes 1, 2, 3.

ENG 461 Studies in Women and Literature. (3)*selected semesters*

Advanced topics in literature by or about women. May be repeated for credit when topics vary. See ENG Notes 1, 2, 3.

ENG 464 Studies in Drama. (3)*selected semesters*

Selected topics in the history and theory of the genre. See ENG Notes 1, 2, 3. Prerequisite: ENG 221 or 222 or 241 or 242 or instructor approval.

ENG 465 Studies in Film. (3–4)*selected semesters*

Advanced topics in cinema. Lecture, viewing, discussion. See ENG Notes 1, 2.

ENG 469 Science and Literature. (3)*selected semesters*

Historical and theoretical links between science and literature, from Francis Bacon to the present, examined in cultural context. May be repeated for credit when topics vary. Lecture, discussion. See ENG Notes 1, 2, 3.

ENG 471 Literature for Adolescents. (3)*fall and spring*

Prose and poetry that meet the interests and capabilities of junior high and high school students. Stresses recent literature. Requires passing grade of at least "C" before students are permitted to student teach in English. See ENG Notes 1, 2, 3.

ENG 480 Methods of Teaching English: Composition. (3)*fall or spring and summer*

Methods of instruction, organization, and presentation of appropriate content in the teaching of composition and other writing skills. See ENG Notes 1, 2.

ENG 482 Methods of Teaching English: Language. (3)*fall or spring and summer*

Methods of instruction, organization, and presentation of appropriate content in language and usage for junior and senior high schools. Lecture, discussion, lab. See ENG Notes 1, 2.

ENG 500 Research Methods. (3)*once a year*

Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.

ENG 501 Introduction to Comparative Literature. (3)*selected semesters*

Problems, methods, and principles, illustrated by selected critical essays and literary texts.

ENG 502 Contemporary Critical Theory. (3)*once a year*

Advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as HUM 549. Credit is allowed for only ENG 502 or HUM 549.

ENG 507 Old English. (3)*selected semesters*

Elements of Old English grammar, with selected readings.

ENG 508 Old English Literature. (3)*selected semesters*

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)*selected semesters*

Study of the principal dialects of the language, with selected readings. Prerequisite: graduate standing.

ENG 512 The Teaching of Composition. (3)*selected semesters*

Theory and practice of teaching writing at all levels. Emphasizes current research. Prerequisites: teaching experience; instructor approval.

ENG 515 Middle English Literature. (3)*selected semesters*

English literature from the 12th through the 15th centuries, exclusive of Chaucer. Prerequisite: ENG 509 or instructor approval.

ENG 517 Contemporary Rhetorical Theory. (3)*once a year*

Investigates the work of such important rhetorical theorists as Burke, Toulmin, Perelman, Gates, and Cixous.

ENG 520 Renaissance Literature. (3)*selected semesters*

Poetry and prose of the English Renaissance, excluding drama.

ENG 521 Shakespeare. (3)*once a year*

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)*selected semesters*

Analysis and discussion of leading historical and critical interpretations of American literature from the beginnings to the present.

ENG 530 Classical Rhetoric and Written Composition. (3)*fall*

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)*spring*

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)*selected semesters*

Intensive study in the rhetorical categories of invention, arrangement, style, aims, modes, and forms of written discourse.

ENG 545 Studies in English Literature. (3)*selected semesters*

Selected authors or issues. May be repeated for credit.

ENG 547 Studies in American Literature. (3)*selected semesters*

Selected authors or issues. May be repeated for credit.

ENG 549 Studies in Comparative Literature. (3)*selected semesters*

Selected authors or issues. May be repeated for credit.

ENG 550 Contemporary Comparative Literature. (3)*selected semesters*

Comparative studies in modern literature in English and other literatures in translation. May be repeated for credit when topics vary.

ENG 559 Advanced Study in African American/Caribbean Literatures. (3)*selected semesters*

Advanced study in African American or Caribbean literatures, theory, and criticism. May be repeated for credit when topics vary.

ENG 560 Studies in Dramatic Forms. (3)*selected semesters*

Selected topics in dramatic and cinematic literature, history, criticism, theory, and crossdisciplinary study. May be repeated for credit when topics vary. Lecture, studio.

ENG 571 Advanced Study in Literature for Adolescents. (3)*selected semesters*

History and criticism of adolescent literature. Prerequisite: ENG 471 or instructor approval.

ENG 573 Censorship and Literature. (3)*selected semesters*

History of censorship, primarily in the United States, and significant court decisions that affected writers and books.

ENG 580 Practicum. (1–12)*selected semesters***ENG 591 Seminar. (3)***fall and spring*

Selected topics regularly offered in the various areas of English studies.

ENG 594 Conference and Workshop. (1–12)*selected semesters*

GRADUATE PROGRAMS AND COURSES

ENG 598 Special Topics. (1–4)

selected semesters

ENG 599 Thesis. (1–2)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses.](#)" [page 48.](#)

LINGUISTICS (LIN)

LIN 500 Research Methods. (3)

fall

Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources.

LIN 505 American English. (3)

spring

Development of the English language in America, including a survey of geographical and social dialects.

LIN 510 English Linguistics. (3)

fall

Current approaches to the study of the English language.

LIN 511 Phonetics and Phonology. (3)

spring

Current trends in phonological theory and its basis in acoustic and articulatory phonetics. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 513 Semantics. (3)

fall in even years

Current approaches to linguistic meaning with particular attention to English. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 514 Syntax. (3)

spring

Analyzes syntactic structure by contemporary theoretical models with a focus on English. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 516 Pragmatics and Discourse Theory. (3)

fall in odd years

Study of language use in context and of language structures in conversation and written text. Lecture, discussion. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

LIN 548 Studies in English Language. (3)

selected semesters

Selected authors or issues. May be repeated for credit.

LIN 572 Theories Underlying the Acquisition of English as a Second Language. (3)

fall

Theories of second language acquisition including the linguistic, cognitive, affective, and sociocultural aspects.

LIN 574 The Teaching of English as a Second Language. (3)

spring

Methods of teaching English as a second language, language teaching trends, practical applications, and the teaching of different skills. Prerequisite: LIN 572 or instructor approval.

LIN 575 Advanced Studies in the Teaching of English as a Second Language. (3)

once a year

Current research issues in the teaching and learning of English as a second language. Prerequisite: LIN 572 or instructor approval.

LIN 576 Sociolinguistic Aspects of Second Language Acquisition. (3)

selected semesters

Survey of studies in second language acquisition in the context of recent sociolinguistic theory.

LIN 577 Grammar for TESL. (3)

selected semesters

Survey of major grammatical structures in English and how they can be taught to ESL speakers. Lecture, discussion. Prerequisite: LIN 510.

LIN 591 Seminar. (3)

fall and spring

Selected topics.

LIN 593 Applied Project. (3)

fall and spring

Preparation of a supervised applied project that is a graduation requirement in the TESL professional major. Independent study with consultation.

LIN 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses.](#)" [page 48.](#)

Environmental Design and Planning

Interdisciplinary Doctoral Program

www.asu.edu/caed/phd_program

480/965-4620

ARCH 126

K. David Pijawka, Director, Executive Committee

Agribusiness and Resource Management

Professors: Brady, Brock

Associate Professors: Green, Miller, Whysong

Architecture

Regents' Professor: J. Cook

Professor: Ozel

Associate Professors: Bryan, Ellin, Zygas

Assistant Professors: Caicco, Hejduk, Kobayashi, Lerum

Design

Professors: Brandt, Giard, Kroelinger

Assistant Professor: McCoy

Planning and Landscape Architecture

Professors: Kihl, Lai, Mushkatel, Pijawka

Associate Professors: Cameron, E. Cook, Guhathakurta,

Kim, Yabes

Assistant Professors: Crewe, Musacchio

The Executive Committee on Environmental Design and Planning offers a collegewide interdisciplinary program leading to the Ph.D. degree in Environmental Design and Planning. Three areas of concentration are available: design; history, theory, and criticism; and planning. The faculty of the Schools of Architecture, Design, and Planning and Landscape Architecture participate in offering the degree. Faculty from disciplines outside of the College of Architecture and Environmental Design may participate in offering the program if appropriate to the interdisciplinary nature of the student's research interest.

For more information, access the program Web site at www.asu.edu/caed/phd_program, or send e-mail to caed.phd@asu.edu.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Environmental Design and Planning is an individualized collegewide interdisciplinary degree that integrates graduate courses and faculty research expertise from a variety of academic areas: architecture, building design, environmental planning, environmental resources, graphic design, industrial design, and interior design. The program is at the cutting edge of creating new knowledge in environmental design and planning. It complements interdisciplinary research in other disciplines within the university. Broad in scope, the program involves multidisciplinary research interests at both micro- and macro-scale levels of design and planning. The program provides research experience for students wishing to pursue careers in academe and in industry as members of interdisciplinary design and planning teams on environmental and energy issues, as well as for those wishing to teach in the architecture, design, or planning fields.

Areas of Concentration

The Ph.D. degree in Environmental Design and Planning offers concentrations in the following areas based on the research and teaching expertise of participating faculty.

Design. Design—microscale issues in the designed environment—includes the study of architecture, building science, graphic design, industrial design, interior design, and landscape architecture. Research fields include acoustics, affordable housing, climate-responsive building, computer-aided design, energy modeling, exhibit design, facilities planning and management, fire protection, human factors in design, industrialized housing, landscape architecture, lighting, passive solar energy and conservation, and site planning and wayfinding.

History, Theory, and Criticism. History, theory, and criticism—cultural and theoretical issues in the history of the environment—includes the study of architecture, environmental planning, industrial design, interior design, landscape architecture, and urbanism. Research fields include study of the arts and crafts movement, contemporary criticism and analysis, design theories and methods, history of architecture and design, history of building science, history of city planning, and landscape theory and criticism.

Planning. Planning—macroscale issues in the planned environment—includes the study of environmental resource management, landscape architecture, planning, and urban design. Research fields include contemporary urban design, economic development, environmental assessment, environmental planning, ethics in planning, housing and urban development, international development planning, landscape ecology, legal aspects of planning, planning for ethnically diverse populations, the protection of environmentally sensitive areas, public participation, social dimensions of planning, urban design policy, urban planning, and urban and regional development.

Admission Requirements. Students are admitted to the Ph.D. program only upon completion of a master's degree in architecture, environmental resources, design, landscape

architecture, or planning or upon the demonstration of equivalent standing.

In addition to meeting Graduate College admission requirements, applicants must submit the following to:

PH.D. PROGRAM IN ENVIRONMENTAL DESIGN
AND PLANNING
COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO BOX 871905
TEMPE AZ 85287-1905

1. a minimum of three letters of reference;
2. a sample of written work and any other evidence relevant to admission to the program;
3. a statement of purpose (summarizing career objectives, the reasons for pursuing a doctoral education, an indication of the proposed area of concentration, and a potential mentor in the College of Architecture and Environmental Design); and
4. Graduate Record Examination (GRE) scores.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English.

Submitted materials are returned after final admission procedures, provided sufficient prepaid postage is enclosed, or if the materials are claimed in person within one year of submission. Unclaimed materials are retained for only one year. The Ph.D. program assumes no liability for lost or damaged materials.

Application Deadlines. All application materials should be received on or before February 1 for fall semester admissions. Applications for associateships and scholarships normally are considered at the same time.

Selection Procedures. The Ph.D. Executive Committee evaluates the applications and supporting materials and recommends to the Graduate College whether the applicant should be granted admission or if admission should be denied. Admission decisions are based on the compatibility of the applicant's career goals with the purpose of the degree program and research interests of faculty, previous academic training and performance, GRE scores, reference letters, and the ability of the potential mentor to devote time to the student.

Program of Study. The Ph.D. degree in Environmental Design and Planning is structured as a 54-semester-hour post-master's program, not as an 84-semester-hour postbaccalaureate program. Students must be thoroughly familiar with design and planning and are expected to demonstrate a high level of academic maturity before being admitted to the program.

Of the 54 semester hours, 24 must be research and dissertation credit. At least 30 semester hours of the remainder, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. program at ASU. No transfer credits are allowed to fulfill the 54-semester-hour minimum requirement for the program.

GRADUATE PROGRAMS AND COURSES

The student is required to take 15 semester hours in the area of concentration and a minimum of nine semester hours of specialized course work outside the area of concentration; a minimum of six semester hours in current research and research methods is required.

Each student entering the Ph.D. program is required to submit a program of study during the first year. The director of the Ph.D. program appoints a program committee composed of a minimum of three faculty from the areas of concentration. This committee includes a prospective mentor and is responsible for approving the student's program of study and monitoring the student's progress in the program.

Preliminary Candidate Evaluation. Before the end of the first academic semester of course work, the student's mentor and the program director conduct a preliminary evaluation of the student. The evaluation is based on the student's program check sheet, a progress evaluation by the mentor, and an informal meeting with the program director. It is directed at the student's selected area of concentration at the time of their admission to the program.

Performance on the preliminary candidate evaluation serves as a guide to the student's program committee as the committee members counsel the student and formulate a program of study.

Academic Standard and Evaluation. Each student in the program receives an annual evaluation. Students submit, to their mentor and the program director, a two-page summation of the academic year. The summation must include proposed research, including progress toward dissertation; a list of goals accomplished during the past academic year; and projected goals for the upcoming academic year. In addition, students present their summation to the CAED core faculty.

Students must meet the minimum Graduate College requirements, but program standards may exceed these requirements. For example, students are expected to

1. have all grades in graduate courses 3.00 GPA or higher,
2. have made sufficient progress in their research projects,
3. have attended or presented papers at seminars/meetings,
4. have accomplished their goals from the previous year, and
5. set realistic goals for the upcoming academic year.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work in the Ph.D. program of study and before admission to candidacy and the start of dissertation research, the student must take a written examination on his or her knowledge of the chosen area of concentration and interdisciplinary knowledge, including the ability to communicate across disciplines. The student's program committee conducts an oral examination following the review of the written examination.

Dissertation Requirements. The dissertation must consist of a fully documented written analysis of a problem that is

original in nature and extends the knowledge and/or theoretical framework of the field. The research must demonstrate the student's creativity and competence in independent research.

Final Examinations. A final oral examination in defense of the dissertation is required. A candidate must pass the final examination within five years after completing the comprehensive examination.

Research Activity. The list that follows provides an indication of some of the research topics currently being explored by the doctoral students in the program, as well as core faculty within the college. Topics may change during the course of the research, either by expanding or narrowing the focus of the topic. This list is not inclusive of all research. For more information about student and faculty research, access the Web site at www.asu.edu/caed/phd_program/index.html.

School of Architecture. Architectural design methodology, solar architecture design, energy performance in buildings, architectural computing and graphics, facilities development and management, environments for aging, housing, urban design, building technology, environmental analysis and programming, passive cooling and heating, ecotechniques, arid region building and systems design, and architectural history.

School of Design. Problem-solving strategies; problem definition; aesthetic, political, economic, and social theories; design history, methodology, theory, and criticism; methods as applied to materials; culture and human expression; theories and methods of human factors and ergonomics; design production, planning, and marketing; acoustics and lighting design; perception and visual performance; computer imaging, visualization, analysis, and perception; human-machine interface design; product semantics, appropriate technology, and environmental issues; environmental graphics; environmental psychology; corporate, institutional, and healthcare design; postoccupancy evaluation; aging and design; public welfare and safety; rehabilitation, restoration, and preservation design; facility management methodology; design education theory; design forecasting; and collaborative learning and design journalism.

School of Planning and Landscape Architecture—Environmental Resources. Research is primarily conducted in the following four areas.

Urban and Regional Development. Housing, economic and community development, citizen participation, policy analysis, transportation, and the politics of planning.

Urban Design. Urban landscape design, planning and land-use law, urban design theory, development controls, and design guidelines.

Landscape Ecological Planning. Public land management, the conservation of renewable and nonrenewable resources, sustainable development, hazards planning, environmental impact assessment, riparian and wetlands protection, and land-use planning.

International Planning. Housing, economic and community development, urban design, landscape ecology, and agroforestry.

Environmental Resources. Through faculty from the Morrison School of Agribusiness and Resource Management research programs include applications of geographic information systems to resource management, monitoring of ecological change, wildlife habitat ecology, vegetation dynamics, fire ecology, soil ecology and ecosystem restoration.

Range ecology studies investigate various problems, from shrub control and hydrologic research in Arizona chaparral to the use of microcomputers in field data acquisition and the effects of power plant emission on vegetation. Other research has considered the relationships between both livestock and wildlife and their environments.

Environmental Design and Planning

In addition to the EPD 700-level courses, refer to the course listing under the following majors for courses that are available to support the collegewide interdisciplinary degree program in Environmental Design and Planning: architecture, building design, environmental planning, environmental resources, industrial design, interior design, and landscape architecture.

ENVIRONMENTAL DESIGN AND PLANNING (EPD)

EPD 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Arts and Crafts Movement in Design
- Computational Models in Environmental Design
- Ecological Assessment and Evaluation
- Elderly Housing Issues in the U.S. Southwest
- Ethics in Environmental Design and Planning
- Human Comfort
- Integral Urbanism
- Issues in Environment and Behavior Studies
- Issues in Industrial Design
- Issues in Sustainable Design
- New Evaluation Methods for the Built Environment
- Philosophy of Environmental Design Research

EPD 700 Interdisciplinary Research Methods. (3)

fall

Introduces the philosophy and methodology of interdisciplinary research in environmental design and planning. Seminar. Fee.

EPD 710 Current Research in Design. (3)

spring

Review and critical evaluation of contemporary literature and method in architecture, building science, interior design, industrial design, and landscape architecture. Seminar. Fee.

EPD 712 Current Research in Planning. (3)

spring

Review and critical evaluation of contemporary literature and method in environmental planning, landscape ecology, urban design, and urban and regional planning. Seminar. Fee.

EPD 714 Current Research in History, Theory, and Criticism. (3)

spring

Review and critical evaluation of contemporary literature and method in the theory and history of architecture, design, and planning. Seminar. Fee.

EPD 792 Research. (1–12)

selected semesters

EPD 799 Dissertation. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Environmental Planning

Master’s Program

www.asu.edu/caed

480/965-7167

AED 158

Hemalata Dandekar, Director

Professors: Kihl, Lai, Mushkatel, Pijawka

Associate Professors: Cameron, Cook, Guhathakurta, Kim, McSherry, Yabes

Assistant Professors: Crewe, Ewan, Fish Ewan, Musacchio

The faculty in the School of Planning and Landscape Architecture offer a graduate program leading to the professional Master of Environmental Planning degree. Three areas of concentration are offered: urban and regional development, urban design, and landscape ecological planning.

The faculty in the school also participate in offering the Ph.D. degree in Environmental Design and Planning program. See [“Doctor of Philosophy,” page 96,](#) for general information on the Ph.D. degree.

MASTER OF ENVIRONMENTAL PLANNING

The faculty in the School of Planning and Landscape Architecture offer a program leading to the professional degree Master of Environmental Planning (M.E.P.). Three areas of concentration are offered: urban and regional development; urban design; and landscape ecological planning. Graduates acquire the knowledge and skills necessary for leadership roles in the planning profession. Students take a core and select additional courses from the area of specialty. *Urban and regional development* prepares students for employment in areas such as housing, economic and community development, policy analysis, transportation, and the politics of planning. *Urban design* provides a link between the School of Planning and Landscape Architecture and the other disciplines in the College of Architecture and Environmental Design—architecture, graphic design, interior design, and industrial design. Students selecting this area of specialty should have a degree in design or planning or be prepared to take basic design courses as a prerequisite. Students are prepared to work in land-use planning, the design of specific parcels of land, the preparation of development controls, and the drafting of guidelines for development controls and design. *Landscape ecological planning* prepares students for careers in public land management, conservation of renewable and nonrenewable resources, the management of solid and hazardous wastes, environmental impact assessment, and land-use planning. All areas of specialty emphasize environmental and urban planning in rapidly developing metropolitan areas, preparing graduates for advanced careers in either the public or private sector.

GRADUATE PROGRAMS AND COURSES

A common core of required lecture, seminar, and studio courses provides knowledge of community and environmental planning issues and fundamental theories, practices, and skills in planning. The areas of specialty in urban design and landscape ecological planning offer a series of fundamental and advanced design studios that enhance knowledge of urban form and land planning.

Individual practical experience in planning is provided through an internship program and independent work on a required final thesis. In addition to the planning faculty, the program is enriched by the interdisciplinary participation of faculty from other academic units of the university as well as leading planning and landscape architecture practitioners from the Phoenix area.

Admission Requirements and Procedures. To be considered for the program, the applicant must fulfill all admission requirements of the Graduate College, in addition to meeting admission requirements of the School of Planning and Landscape Architecture. Separate application materials must be submitted.

School of Planning and Landscape Architecture. The following materials should be submitted to

SCHOOL OF PLANNING AND LANDSCAPE
ARCHITECTURE
COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO BOX 872005
TEMPE AZ 85287-2005

1. a statement of intent (maximum 600 words) explaining (a) the applicant's interest in planning; (b) the applicant's academic background, and if appropriate, preparation for the selected area of specialty: urban and regional development, urban design, or landscape ecological planning (these may include written samples or a portfolio); and (c) the applicant's educational objectives;
2. test scores: TOEFL scores from international students whose native language is not English;
3. three letters of recommendation from references who are qualified to comment on the applicant's potential in the selected area of study; and
4. a résumé.

International students who wish to be considered for a teaching assistantship and whose first language is not English are required to pass the TSE administered by the American English and Culture Center at ASU.

Application Deadlines. For fall enrollment, application materials are due in the School of Planning and Landscape Architecture and the Graduate College on March 15.

For spring enrollment, application materials are due in the School of Planning and Landscape Architecture and the Graduate College on October 15.



The College of Architecture and Environmental Design/North building
Jeff Havir photo

Selection Procedures and Notifications. School faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Program of Study. An approved program of study is 47 semester hours or 50 with an optional internship. The program has the typical distribution as follows:

Required core courses, including two four-hour studios	28
Specialization courses	15
Optional internship.....	3
Thesis	4
Total	50
Total without internship	47

Students are encouraged to take the required core courses and then to select an area of specialization. The program of study must be approved by the student's supervisory committee and be completed as specified for graduation.

Requests for changes in the program must be made in writing. Some graduate courses may require undergraduate-level prerequisites; specifically, all students are expected to have taken statistics. Inquiries regarding the M.E.P. program should be directed to the School of Planning and Landscape Architecture.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A comprehensive oral examination based on the student's thesis is required. The oral examination is administered by the supervisory committee.

RESEARCH ACTIVITY

Scholarly activity of the School of Planning and Landscape Architecture can be clustered into eight areas:

1. community-based and urban design studies,
2. environmental planning,
3. historical research and preservation,
4. housing and urban policy,
5. international research,
6. landscape ecology and design,
7. planning theory and education, and
8. urban-environmental modeling.

Community-based and Urban Design Studies. The community-based and urban design studies often relate to growth management and development concerns. Many local communities support this work including Native American groups such as the Hopi nation and the Town of Guadalupe. The National Endowment for the Arts has provided support through the Your Towns Program—focusing on rural communities—and the Mayor's Institute—focusing on design issues of cities.

Environmental Planning. The faculty have published numerous articles and received funding in such environmental planning areas as siting hazardous facilities, measuring impacts of land uses on biodiversity, analyzing environmental hazards, and designing land evaluation and site assessment systems.

Historical Research and Preservation. Historical research and preservation concerns the study of special places and the people who created them.

Housing and Urban Policy. The housing and urban policy cluster involves social and health concerns, affordable housing, sustainable home design, and transportation planning.

International Research. International research includes funded studies along the U.S. Mexico border as well as work in other countries.

Landscape Ecology and Design. Landscape ecology and design research includes work focused on river corridors, watersheds, riparian areas, wetlands, and environmentally sensitive lands. The landscape ecological research has received significant support from many federal, state, and city agencies.

Planning Theory and Education. The planning theory and education cluster concerns critical urban, landscape, and environmental issues that advance the disciplines in the school: landscape architecture and planning.

Urban-environmental Modeling. Urban-environmental modeling involves long-term urban ecological research and integrated models for large-scale planning.

LANDSCAPE ARCHITECTURE (PLA)

PLA 411 Landscape Architecture Theory and Criticism. (3)

spring

Critically analyzes landscape architecture theories and projects to evaluate validity of design and contribution to society. Prerequisites: PLA 310, 361, 362, 420, 461.

PLA 461 Landscape Architecture V. (4)

fall

Landscape ecological planning: collection and application of ecological data relevant to planning and design at landscape scale. Studio. Fee. Prerequisite: PLA 362.

PLA 485 International Field Studies in Planning and Landscape Architecture. (1–12)

fall, spring, summer

Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with school approval. Study abroad. Cross-listed as PUP 485. Credit is allowed for only PLA 485 or PUP 485.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

URBAN AND ENVIRONMENTAL PLANNING (PUP)

PUP 412 History of the City. (3)

fall

The city from its ancient origins to the present day. Emphasizes European and American cities during the last five centuries. Cross-listed as APH 414. Credit is allowed for only APH 414 or PUP 412.

PUP 420 Theory of Urban Design. (3)

spring

Analyzes the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Prerequisite: junior standing.

PUP 433 Zoning Ordinances, Subdivision Regulations, and Building Codes. (3)

spring

Analyzes zoning ordinances, subdivision regulations, building codes, and other planning implementation techniques relative to local development. Prerequisite: admission to upper division or instructor approval.

PUP 434 Urban Land Economics. (3)

spring

Interaction between space and economic behavior. Examines the use and value of land through economic theories. Prerequisite: admission to upper division or instructor approval.

PUP 436 City Structure and Planning. (3)

spring

Political structure and organization of government as it relates to planning. Prerequisite: PUP 301.

PUP 442 Environmental Planning. (3)

fall

Environmental planning problems, including floodplains, 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)

spring

History, theory, and principles of historic preservation. Emphasizes legal framework and methods practiced. Lecture, off-campus field study. Prerequisite: instructor approval.

PUP 445 Women and Environments. (3)

fall

Examines the role women play in shaping the built environment; ways built/natural forms affect women's lives. Focuses on contemporary U.S. examples. Prerequisite: admission to upper division or graduate standing.

PUP 452 Ethics and Theory in Planning. (3)

fall

Ethics and theory of professional planning practice in urban and regional communities. Prerequisite: admission to upper division or instructor approval.

GRADUATE PROGRAMS AND COURSES

PUP 485 International Field Studies in Planning and Landscape Architecture. (1–12)

fall, spring, summer

Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with school approval. Study abroad. Cross-listed as PLA 485. Credit is allowed for only PLA 485 or PUP 485.

PUP 498 Pro-Seminar. (1–7)

fall

Topics may include the following:

- Senior Pro-Seminar. (1)

PUP 501 The Idea of Planning. (3)

fall

Comprehensive review of planning profession within a political, governmental, multicultural, and gender framework.

PUP 510 Citizen Participation. (3)

spring

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)

fall

Reviews 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)

fall

Tools useful for urban planning research; emphasizes research design and survey methods. Pre- or corequisite: PUP 501 or instructor approval.

PUP 525 Urban Housing Analysis. (3)

fall

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)

spring

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)

spring

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 542 Environmental Administration and Planning. (3)

spring

Environmental administration of policies and their relationship to environmental planning practices. Prerequisite: PUP 442.

PUP 544 Urban Land Use Planning. (3)

spring

Theory and methods of urban land use planning, including the rational planning process, comprehensive, functional, and neighborhood plans. Pre- or corequisite: PUP 501 or instructor approval.

PUP 546 Urban Design Policy. (3)

selected semesters

Advanced study of local, state, and federal urban design policy. Prerequisite: PLA 420 or PUP 420.

PUP 561 Urban Design Studio. (4)

selected semesters

Current urban form and urban landscape design problems within the Phoenix-centered region. Studio.

PUP 572 Planning Studio I: Data Inventory and Analysis. (4)

fall

Comprehensive planning workshop dealing with real community problems. Focuses on the data gathering and analysis steps of the planning process. Fee. Prerequisite: Master of Environmental Planning major or instructor approval.

PUP 574 Planning Studio II: Options and Implementation. (4)

spring

Comprehensive planning workshop dealing with real community problems. Focuses on the development of options, plan making, and plan implementation. Studio. Fee. Prerequisite: PUP 572 or instructor approval.

PUP 575 Environmental Impact Assessment. (3)

spring

Criteria and methods for compliance with environmental laws; develops skills and techniques needed to prepare environmental impact statements/assessments.

PUP 576 GIS Studio. (3)

spring

GIS as a tool to address large, multifaceted planning problems. Prerequisites: a combination of GPH 373 (or 598) and PAF 591 and PUP 322 or only instructor approval.

PUP 584 Internship. (3)

fall, spring, summer session 1

Internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit.

PUP 591 Seminar. (1–12)

fall and spring

Topics may include the following:

- Transportation Systems Pro-Seminar

PUP 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Air Transportation Regulation
- Airport Systems
- Transportation Planning and the Environment

PUP 599 Thesis. (1–12)

fall, spring, summer session 1

Fee.

PUP 622 Planning Methods II: Quantitative Planning Analysis. (3)

spring

Methods and models used as the basic quantitative techniques of urban, regional, and environmental planning and policy analysis. Prerequisites: PUP 524; a course in statistics; instructor approval.

PUP 642 Land Economics. (3)

fall

Land use and locational impact of economic activity and the urban real property market. Prerequisite: instructor approval.

PUP 644 Public Sector Planning. (3)

spring

Urban fiscal problems and public goods provision in state and local governments. Prerequisites: a course in microeconomics; instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Environmental Resources

Master's Program

cactus.east.asu.edu

480/727-1585

CNTR 20

Raymond A. Marquardt, Dean

Professors: Brady, Brock

Associate Professors: Green, Miller, Whysong

The faculty of the Morrison School of Agribusiness and Resource Management, at ASU East, offer a program leading to the M.S. degree in Environmental Resources. Areas of concentration are offered in natural resource management, GIS/remote sensing, and range ecology. The faculty

in this program also participate in offering the Ph.D. in Environmental Design and Planning program. See [“Doctor of Philosophy,” page 96](#), for general information on the Ph.D. degree.

MASTER OF SCIENCE

Admission. Applicants to the program are expected to meet the minimum requirements for admission to the Graduate College. In addition, scores from the Graduate Record Examination or Miller Analogies Test are required. Applicants are expected to have completed 18 semester hours in environmental sciences or closely related courses. Applicants not meeting these requirements may be considered for admission with deficiencies.

Submit the following separate application materials to:

ENVIRONMENTAL RESOURCES PROGRAM
MORRISON SCHOOL OF AGRIBUSINESS
AND RESOURCE MANAGEMENT
ARIZONA STATE UNIVERSITY EAST
7001 E WILLIAMS FIELD ROAD
MESA AZ 85212-6032

1. a statement of intent (maximum 600 words) explaining
 - (a) the applicant’s interest in environmental resources,
 - (b) the applicant’s academic background, and
 - (c) the applicant’s educational objectives;
2. three letters of recommendation from references who are qualified to comment on the applicant’s potential in the selected area of study; and
3. a résumé.

Application Deadlines. For fall enrollment, application materials are due in the Morrison School of Agribusiness and Resource Management and the Graduate College on March 15.

For spring enrollment, application materials are due in the Morrison School of Agribusiness and Resource Management and the Graduate College on October 15.

Selection Procedures and Notifications. School faculty evaluate the applications and supporting materials and recommend to the Graduate College whether the applicant should be granted regular or provisional admission or if admission should be denied. If admission is provisional, the Graduate College specifies in its letter of admission the provisions to be met to gain regular status. The school informs successful applicants of the procedures for enrollment.

Program of Study. A minimum of 30 semester hours of approved graduate course work is required. All students are required to complete a 13-semester-hour core curriculum. A minimum grade of “B” is required in all core courses. First-year students are expected to complete ERS 550 Vegetation Dynamics, ERS 591 Environmental Resources Seminar, and ERS 551 Advanced Environmental Statistics. Second-year students are required to complete ERS 691 Seminar in the fall semester. Students can complete ERS 485 GIS in Natural Resources or ERS 486 Remote Sensing in Environmental Resources (or an approved substitute if the student has

previously taken both ERS 485 and 486) at any time during their residence. All students are also expected to complete a minimum of three semester hours of research and three semester hours of thesis. The remaining hours (11 semester hours) are chosen to support the student’s educational objectives.

Foreign Language Requirements. None.

Comprehensive Examinations. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination covering the thesis and related subject matter is required.

RESEARCH ACTIVITY

The faculty of environmental resources is engaged in a number of research projects of global, national, regional, or state importance. Scholarship in service to community is the hallmark of a state-supported university and continues to be in the Morrison School of Agribusiness and Resource Management.

A few examples of this scholarship are a project involved in “The Adaptation of Sonoran Desert Vegetation to Wildfire on the Tonto National Forest”; a “Wildlife Vegetation Inventory for Northern Phoenix”; an extensive program in “Transborder Watershed Resources”; and an investigation into the “Effects of Livestock Use Levels on Riparian Trees on the Verde River.”

ENVIRONMENTAL RESOURCES (ERS)

ERS 402 Vegetation Measurement. (4)

spring

Vegetation sampling and inventory as related to animal-habitat relations. Lecture, lab, 1 weekend field trip. Prerequisites: a combination of ERS 301 and 307 and 350 and program major or only instructor approval.

ERS 415 Wildlife Life Histories. (4)

spring

Life histories of the major mammal, reptile/amphibian, and avian species found in the Southwest, with emphasis on management. Lecture, lab. Prerequisite: BIO 370 or 385.

ERS 420 Ecological Restoration. (3)

spring

Techniques of ecological restoration applied for the improvement of arid and semiarid land and sensitive habitats. Weekend field trips.

ERS 425 Soil Classification and Management. (3)

selected semesters

Principles of soil genesis, morphology, and classification. Presents management and conservation practices. Prerequisite: ERS 225.

ERS 433 Riparian Ecosystem Management. (3)

selected semesters

Examines 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 434 Wetland Ecosystems and Soils. (3)

selected semesters

Wetland ecosystems structure and function including hydrology and biogeochemistry with special emphasis on soils. Lecture, weekend field trip. Prerequisite: ERS 225 or instructor approval.

ERS 448 Soil Ecology. (3)

selected semesters

Soils viewed in an ecosystem context, soil-plant relationships, nutrient budgets, and abiotic factors that influence soil processes. Prerequisites: a combination of BIO 320 and ERS 225 and 226 or only instructor approval.

GRADUATE PROGRAMS AND COURSES

ERS 449 Landscape Ecology. (3)

selected semesters

Causes and ecological consequences of spatial and temporal patterns in the environment. Prerequisite: ERS 301.

ERS 460 Applied Systems Ecology. (3)

selected semesters

Systems approach applied to analysis and management of natural resource ecosystems. Uses simulation models. 2 hours lecture, 3 hours lab. Prerequisites: ERS 350 (or its equivalent); a course in ecology.

ERS 465 Surface Water Quality. (3)

spring in odd years

Examines factors that impact water quality. Surface water sampling and analysis with interpretation for wildlife, humans, and other users. Prerequisites: ERS 364, 365.

ERS 474 Wildlife Ecology. (3)

selected semesters

Integrates ecological concepts as applied to wildlife populations and their interaction with the habitat and other species. Lecture, lab, 1 weekend field trip.

ERS 475 Wildlife Management. (4)

spring

Principles and techniques of applied ecology for the management and wildlife populations. Lecture, lab. Prerequisites: ERS 311 and 474 (or their equivalents).

ERS 480 Ecosystem Management and Planning. (3)

spring

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 its equivalent); senior standing.

ERS 485 GIS in Natural Resources. (3)

fall

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 its equivalent).

ERS 486 Remote Sensing in Environmental Resources. (4)

spring

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 its equivalent).

ERS 490 Recent Advances in Environmental Resources. (1)

fall and spring

Current literature and significant developments involving environmental resources. May be repeated for credit.

ERS 500 Research Methods. (1–12)

selected semesters

ERS 533 Riparian Ecology. (3)

selected semesters

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)

selected semesters

Reaction of plants to environmental stresses; aerial pollutants, fire, herbivores, mechanical treatments, pesticides, and soil amendments. 1 weekend field trip. Prerequisite: instructor approval.

ERS 550 Vegetation Dynamics. (4)

fall

Dynamics of vegetation emphasizing ecological succession, applications of landscape ecology and GIS, and analysis of vegetation data. Field trips, studio. Prerequisite: a course in introductory statistics.

ERS 551 Advanced Environmental Statistics. (4)

spring

Advanced statistical procedures for environmental resources. Techniques for analyzing research data that do not meet assumptions. Studio. Prerequisite: ERS 350 (or its equivalent).

ERS 553 Advanced Animal Nutrition. (4)

selected semesters

Metabolic and physiological interactions of nutrients in wild and domesticated animals consuming natural feeds. Lecture, lab.

ERS 560 Systems Ecology. (3)

selected semesters

Quantitative description and mathematical modeling of ecosystem structure and function. Techniques for model construction and simulation. Lecture, lab. Prerequisites: ERS 350 (or its equivalent); computer programming; 6 hours in ecological studies.

ERS 561 Spatial Statistics and GIS. (3)

fall

Dependent spatial data, analysis and description, semivariograms, variograms, kriging, and GIS analysis. Lecture, lab. Prerequisites: ERS 350 and 485 (or their equivalents).

ERS 580 Practicum. (1–12)

selected semesters

ERS 584 Internship. (1–12)

selected semesters

ERS 585 Spatial Modeling with GIS. (3)

fall

GIS technology for spatial modeling of natural resources. Practical application of GIS technology for problem solving. Lecture, lab. Prerequisite: ERS 485 (or its equivalent) or instructor approval.

ERS 590 Reading and Conference. (1–12)

selected semesters

ERS 591 Environmental Resources Seminar. (1–12)

selected semesters

ERS 592 Research. (1–12)

selected semesters

ERS 593 Applied Project. (1–12)

selected semesters

ERS 594 Conference and Workshop. (1–12)

selected semesters

ERS 595 Continuing Registration. (1)

selected semesters

ERS 598 Special Topics. (1–4)

selected semesters

ERS 599 Thesis. (1–12)

selected semesters

ERS 691 Seminar. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Exercise and Wellness

Master's Program

William J. Stone, Chair

Professors: Burkett, Corbin, Stone

Associate Professor: Swan

Assistant Professors: Jones, Phillips, Tudor-Locke

Lecturer: Woodruff

The faculty of Exercise and Wellness at ASU East offer a graduate program leading to the M.S. degree in Exercise and Wellness. Faculty also participate in an interdisciplinary Ph.D. program in Curriculum and Instruction with a concentration in exercise and wellness. For more information, see "[Curriculum and Instruction](#)," page 171.

MASTER OF SCIENCE

All applicants for the M.S. degree program in Exercise and Wellness are required to submit scores from the Graduate Record Examination (GRE). Admission decisions are based upon previous academic training and performance, GRE scores, recommendations, and the availability and compatibility of research interests with a potential mentor. International applicants whose native language is not English must also submit a Test of English as a Foreign Language score. Applications are reviewed by faculty only once a year. Priority is given to applications completed by January 1. The program requires a minimum of 30 semester hours, including a minimum of 12 semester hours of research course work (EXW 500, 501, 599), 12 to 15 semester hours of EXW graduate concentration courses and three semester hours of an approved elective. Course work is selected by the student in consultation with an advisor and supervisory committee.

Deficiencies. Applicant transcripts are evaluated to assure competency in the following areas: health behavior change (health psychology), use of computers, basic nutrition, basic wellness, exercise prescription, and exercise testing. Competency in areas considered to be prerequisite to each of the listed competencies are also evaluated. Deficiencies are noted at the time of admission and may be satisfied by completing undergraduate or graduate courses or by a competency examination.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

Research in Exercise and Wellness is enhanced by the existence of research laboratories. Extensive research is also conducted in the field (work site, community, school). The research of Exercise and Wellness faculty and graduate students focuses on the fitness, health and wellness benefits of healthy lifestyles; such as regular physical activity, sound nutrition, and effective stress management. The focus is also on disease prevention and fitness. All groups in the developmental spectrum (children to senior adults) are studied. Among the areas of current interest to faculty and graduate students are physical activity and fitness program effectiveness (strength, cardiovascular fitness, flexibility, and body composition), women’s health issues, motivation to adhere to healthy lifestyles, physical activity and fitness assessment, and environmental health and wellness issues.

EXERCISE AND WELLNESS (EXW)

EXW 420 Exercise Testing. (3)

fall and spring

Theoretical basis and practical application of pre-exercise screening, exercise testing, estimates of energy expenditure, and interpretation of results. Lecture, lab. Fee. Prerequisites: EXW 315; current CPR certification.

EXW 425 Exercise Prescription. (3)

spring

Theoretical basis for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisites: EXW 320, 330. Pre- or corequisite: EXW 420.

EXW 442 Physical Activity in Health and Disease. (3)

spring

Examines the role of physical activity and fitness in the development of morbidity and mortality throughout the human life span. Prerequisite: EXW 315.

EXW 450 Cultural and Social Issues in Exercise and Wellness. (3)

spring

Examines contemporary cultural and social issues in physical activity. Focus on theories of social behavior, racial, ethnic, and cultural differences. Prerequisite: PGS 101.

EXW 460 Resistance Training Application and Theory. (3)

fall

Fosters critical thinking as it applies to resistance training theory. Pre- or corequisite: EXW 315.

EXW 500 Research Methods. (3)

fall

Introduces the basic aspects of research, including problem selection, literature review, instrumentation, data handling, methodology, and writing the report.

EXW 501 Research Statistics. (3)

spring

Statistical procedures; sampling techniques, hypothesis testing, and experimental designs as they relate to research publications.

EXW 505 Applied Exercise and Wellness Laboratory Techniques. (3)

spring

Investigative techniques used in the applied exercise testing/prescription laboratory. Emphasizes cardiorespiratory assessment, energy balance, body composition, and electrocardiography. Lecture, lab. Fee.

EXW 534 Sports and Fitness Conditioning. (3)

fall

Bases of sports and fitness conditioning, including aerobic and anaerobic power, strength, flexibility, and analysis of conditioning components for sports and fitness.

EXW 536 Physiological Aspects of Physical Activity and Chronic Disease. (3)

fall

Role of physiological mechanisms associated with acute and long-term physical activity and its influence on chronic disease and wellness.

EXW 542 Health Promotion. (3)

spring

Theory and research concerning fitness and wellness programs in nutrition, physical activity, smoking cessation, and stress management.

EXW 544 Fitness/Wellness Management. (3)

spring

Development of the fitness/wellness industry. Planning, organizing, promoting, and managing fitness/wellness programs.

EXW 575 Teaching Lifetime Fitness. (3)

spring

Organizing and implementing physical fitness programs in the schools with emphasis on individual problem solving.

EXW 591 Seminar. (1–12)

selected semesters

EXW 599 Thesis. (1–12)

selected semesters

EXW 640 Analysis of Variance for Exercise and Wellness. (3)

fall

Analysis of variance methods with an emphasis on research measures of human performance. Prerequisite: graduate introduction to statistics.

EXW 642 Exercise Epidemiology. (3)

spring

Physical activity, exercise, and physical fitness and the development of chronic disease.

GRADUATE PROGRAMS AND COURSES

EXW 643 Correlation/Regression/Multivariate Statistics. (3)

spring

Graduate-level statistics course for Ph.D./master's students who will be doing research in the area of exercise and wellness. Prerequisite: graduate ANOVA course.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Exercise Science

Interdisciplinary Doctoral Program

www.asu.edu/clas/espe/ExScPhD.htm

480/965-9580

PEBE 107B

Kathleen S. Matt, Director, Executive Committee

Anthropology

Professor: Marzke

Bioengineering

Associate Professors: He, Sweeney, Yamaguchi

Biology

Professors: Hazel, Satterlie

Associate Professor: Harrison

Exercise Science and Physical Education

Regents' Professor: Landers

Professors: Krahenbuhl, Martin, Matt, Stelmach

Associate Professors: Hinrichs, Morgan, Treasure, Willis

Assistant Professors: Etnier, Robertson, Santello

Psychology

Professors: Karoly, Linder

Assistant Professors: E. Amazeen, P. Amazeen, McBeath

Psychology in Education

Regents' Professor: Kulhavy

Professor: Glass

The Committee on Exercise Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Exercise Science. The committee functions in setting guidelines and supervising programs of study. One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, a student may tailor a course of study to fit individual needs and goals. The present committee is composed of members from the following academic units: Anthropology, Bioengineering, Biology, Exercise Science and Physical Education, Family and Human Development, Psychology, and Psychology in Education. Courses, however, are not limited to these academic units. Concentrations are available in biomechanics, motor behavior, physiology of exercise, and sport psychology.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Exercise Science is an individualized interdisciplinary degree that integrates graduate courses from a variety of academic units to provide a sound foundation for research leading to a dissertation in Exercise Science. Topics for these dissertations come from one of four research areas: biomechanics, motor behavior, physiology of exercise, and sport psychology.

Admission. In addition to meeting Graduate College requirements, students must submit a letter designating a potential area of interest, the name of a potential mentor (from the list of faculty), and a statement of career goals to the director of the Committee on Exercise Science. Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical), a professional résumé, and three letters of recommendation must also be submitted. All applicants whose native language is not English must submit a Test of English as a Foreign Language score. Preference is given to applicants already holding a master's degree, although exceptional students possessing only a baccalaureate degree may apply. Admission decisions are based on the compatibility of the applicant's career goals with the purpose of the degree program, previous academic training and performance, GRE scores, recommendations, and match of research interests with those of available mentors. To be considered for research or teaching assistantships, all application materials should be received before January 15.

Program of Study. The program of study consists of a minimum of 54 semester hours of graduate work beyond the master's degree (84 hours of graduate credit for applicants holding only the baccalaureate degree). Of the 84 semester hours, at least 30 hours (which may include research credit) of the approved Ph.D. program, and 24 research and dissertation hours must be completed after admission to a Ph.D. program at ASU. An individual program of study is selected in consultation with the student's supervisory committee. The program of study reflects the interdisciplinary nature of the degree program. Students are expected to have fulfilled a majority of the foundational course work before admission. Prerequisites that have not been completed must be taken as remedial work in addition to the program of study.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before commencing dissertation research, the student is given written and oral examinations. After the student has passed the comprehensive examinations, a dissertation committee is appointed by the dean of the Graduate College. After the dissertation committee has approved the dissertation prospectus, the student is eligible to apply for admission to candidacy.

Dissertation Requirements. The dissertation must consist of a fully documented written analysis of a problem that extends the knowledge and/or theoretical framework of the field. The research should demonstrate the student's creativity and competence for independent research.

Final Examinations. A final oral examination in defense of the dissertation is required. The candidate must take the

final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee, the director of the Committee on Exercise Science, and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

COURSES

For courses, refer to the course listings under the following majors: Anthropology, Bioengineering, Biology, Chemical Engineering, Chemistry, Educational Psychology, Family and Human Development, Exercise Science/Physical Education, and Psychology. A limited number of applicable courses are also available through other departments.

Exercise Science/Physical Education

Master's Programs

www.asu.edu/clas/espe

480/965-9580

PEBE 107B

Philip E. Martin, Chair

Regents' Professor: Landers

Professors: Darst, Krahenbuhl, Martin, Matt, Pangrazi, Stelmach

Associate Professors: Hinrichs, Morgan, Treasure, Willis

Assistant Professors: Etnier, Huey, Robertson, Santello

The faculty in the Department of Exercise Science and Physical Education offer graduate programs leading to the M.S. degree in Exercise Science/Physical Education, and the Master of Physical Education. Faculty also participate in two interdisciplinary Ph.D. programs: (1) Exercise Science with concentrations in biomechanics, motor behavior/sport psychology, and physiology of exercise, and (2) Curriculum and Instruction with a concentration in physical education.

The Committee on Exercise Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Exercise Science. The present committee is composed of members from several academic units. For more information about this program, see "[Exercise Science.](#)" [page 212.](#)

The Committee on Curriculum and Instruction offers an interdisciplinary graduate program leading to the Ph.D. degree in Curriculum and Instruction. For more information, see "[Curriculum and Instruction.](#)" [page 165.](#)

MASTER OF SCIENCE

Applicants for the M.S. degree program in Exercise Science/Physical Education may choose from five areas of study: biomechanics, exercise physiology, physical education (elementary, secondary, and adapted), motor behavior (motor learning and control, motor development), and sport and exercise psychology. All applicants are required to sub-

mit scores from the Graduate Record Examination (GRE). Admission decisions are based upon previous academic training and performance, GRE scores, recommendations, and the ability of potential mentors to devote time to an additional student. International applicants whose native language is not English must also submit a Test of English as a Foreign Language score. Applications are reviewed by department faculty only once a year. To be considered for admission in the fall semester, all application materials must be received by the department by January 15. The program requires a minimum of 30 semester hours, at least 21 of which must be EPE courses. Required courses with corresponding semester hours include EPE 500 (three), 501 (three), and 599 (six). Remaining course work is selected by the student in consultation with an advisor and supervisory committee.

Deficiencies. All applicants recommended for admission are evaluated for deficiencies in their academic preparation. Deficiencies are divided into two areas: (1) those associated with the discipline of exercise science and physical education (human anatomy and physiology, biomechanics, exercise physiology, motor learning and development, and psychosocial aspects of physical activity) and (2) those associated with the area of study (a maximum of six deficiency semester hours pertinent to study may be specified).

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF PHYSICAL EDUCATION

The faculty in the Department of Exercise Science and Physical Education offer a program leading to the Master of Physical Education (M.P.E.) degree. The M.P.E. degree is designed to prepare scholarly professionals (i.e., teachers of physical education). Emphasis is placed on improving instructional effectiveness and developing a quality physical education curriculum in a school setting. Three areas of study are available: elementary, secondary, and adapted physical education.

Admission. Applicants who hold a bachelor's degree in education and who are certified to teach may apply to the M.P.E. degree directly. Applicants with a bachelor's degree in physical education but who are not certified to teach will apply to the postbaccalaureate/M.P.E. degree. Deficiencies will be assessed where applicable.

Program of Study. A minimum of 33 semester hours of course work is required for the M.P.E. program, with 18 semester hours of required core courses, six semester hours of cognate area, and nine semester hours of recommended electives. A total of 58 semester hours is required of students completing both the postbaccalaureate program and the M.P.E.

Foreign Language Requirements. None.

Final Examinations. A final written comprehensive examination is required.

GRADUATE PROGRAMS AND COURSES



Caroline Ketcham, a doctoral student in exercise science, conducts eye-tracking experiments with college students, healthy senior citizens, and Parkinson's Disease patients.

Tim Trumble photo

EXERCISE SCIENCE/PHYSICAL EDUCATION (EPE)

EPE 400 Teaching Physical Activity Concepts. (3)

fall and spring

Analyzes and critiques teaching concepts, principles, and skills outlined in Arizona Physical Activity Standards. Evaluates national guidelines for promoting physical activity. Prerequisites: ENG 101 (or 107), 102 (or 108); EPE 200 (or its equivalent).

EPE 413 Qualitative Analysis in Sport Biomechanics. (3)

spring

Develops 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)

fall

Muscular contributions to human movement, muscle mechanics, electrophysiological basis, and practical application of electromyography. Lecture, discussion. Prerequisites: EPE 335, 340; instructor approval.

EPE 444 Metabolic Adaptations to Exercise Training. (3)

fall, spring, summer

Examines physiologic adaptations to exercise training as they relate to metabolism and tissue functions. Prerequisite: EPE 340.

EPE 452 Exercise Psychology. (3)

spring

Contemporary research and theory as related to human behavior and health in an exercise setting. Prerequisite: EPE 352.

EPE 460 Theory of Strength Training. (3)

spring

Research and theories on developing muscular strength; programs for developing muscular strength. Lecture, discussion. Prerequisites: EPE 335, 340.

EPE 500 Research Methods. (3)

fall

Introduces 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)

spring

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)

fall

Investigative techniques used in the applied exercise physiology laboratory. Emphasizes pulmonary function, body composition, and cardiorespiratory assessment. Lecture, lab. Fee. Prerequisite: EPE 340.

EPE 510 Introduction to Biomechanics Research Methods. (3)

fall

Applies 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. (3)

fall

Current research in sport psychology with an emphasis on performance enhancement. Includes questionnaire, psychophysiological, and behavioral research methods. Lecture, discussion. Prerequisites: EPE 448, 500.

EPE 521 Motor Development, Control, and Learning. (4)

spring

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)

spring

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)

fall

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)

spring

Physiological aspects of women engaging in physical activity. Emphasizes factors affecting performance and health throughout life. Prerequisite: EPE 340.

EPE 561 Administration of Athletics. (3)

selected semesters

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)

fall

Contemporary adapted, developmental, remedial, and corrective physical education programs; understanding of principles, problems, and recent developments in this area.

EPE 572 Trends and Issues in Physical Education. (3)

spring

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)

fall

Current curriculum and instruction practices and research in secondary school physical education. Prerequisite: ESPE major or teaching experience.

EPE 576 Physical Education for Elementary School Children. (3)
fall

Current practices and research pertaining to elementary school physical education programs.

EPE 578 Student Teaching in Secondary Schools. (6–12)
fall and spring

Practice of teaching. Relationship of theory and practice in teaching. Prerequisite: completion of all required course work (or its equivalent) prior to student teaching.

EPE 599 Thesis. (1–12)
selected semesters

EPE 610 Advanced Topics in Biomechanics. (3)
spring

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 621 Motor Learning/Control. (3)
fall

Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: EPE 521.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Family and Human Development

Master’s Program

www.asu.edu/clas/fhd

480/965-6978

COWDN 106

Richard A. Fabes, Chair

Professors: Christopher, Fabes, Griffin, Hoover, Ladd, Martin, Roosa

Associate Professors: Boulin Johnson, Dumka, Wilson

Assistant Professors: Hanish, Liu, Madden-Derdich, Spinrad, Updegraff

Senior Lecturer: Weigand

Lecturer: Bodman

Students may pursue the M.S. degree in Family and Human Development with a concentration in family studies. Areas of study are available in child development and family relationships.

Students applying to this program are required to submit scores on the Graduate Record Examination (verbal and quantitative sections).

MASTER OF SCIENCE

Admission. Admission to the M.S. degree program in Family and Human Development is determined by the following criteria:

1. official transcripts of all undergraduate and graduate course work;
2. verbal, quantitative, and analytical Graduate Record Examination scores;
3. statement of goals relevant to the Master of Science program;
4. three letters of recommendation; and
5. an application for admission to the Graduate College.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English. Applicants interested in the marriage and family therapy (MFT) specialization must indicate this on their application form. Evaluation of applicants includes a personal interview. Separate application and acceptance, including an interview, is required for admission to the MFT program.

Program of Study. Courses are selected by the student along guidelines of the specific areas, after consultation with the supervisory committee. The program of study should be completed and approved by the supervisory committee by the end of the second semester of full-time graduate study upon completion of 12 semester hours. A program of study may include more than 30 semester hours, and the exact number will be determined by program requirements and the student’s supervisory committee. Acceptance of the proposed program of study must be verified by signature of the student and committee members. After approval within the department or college, the program of study is submitted to the Graduate College for final approval. The following requirements must be met for the concentration.

Family Studies. Students complete the requirements for a master’s in either child development or family relationships. Within the family relationships area, students may take courses in marriage and family therapy (MFT) sufficient to meet MFT certification requirements for the state of Arizona. Typically, the MFT specialization is a three-year program.

Core Requirements. All students must take the following courses: FAS 500, FAS 531, CDE 531, CDE 534 or FAS 580; PSY 530; PSY 529 or FAS 580.

Child Development. The required courses are CDE 533 and six semester hours of CDE elective selected (with approval of the student’s advisor). Six semester hours of thesis work is also required.

Family Relationships. The required courses are FAS 539 and six semester hours of FAS elective selected (with approval of the student’s advisor). Six semester hours of thesis work is also required.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

The research activities of the faculty and students in the Department of Family and Human Development (FHD) are

GRADUATE PROGRAMS AND COURSES

devoted to understanding and finding solutions to some of the most contemporary and critical problems faced by children and families. These topics include issues related to the effects of social and cultural environments on children and families; such as the effects of poverty, schooling, community violence, and child care.

In addition, FHD faculty research focuses on topics related to family and marital functioning. Specific areas include marital interaction, parenting and parent-child relationships, sexuality, dating relationships, family diversity, approaches to marital and family therapy, divorce, step families, and public policy. Research topics related to children, adolescents, and infants include the development of emotion, gender-role development, early intervention for children who are biologically or socially at risk, the factors that promote positive infant development, the causes and treatment of childhood autism, sibling and peer relationships, and how family relationships influence childhood development. Strong emphasis is placed on the acquisition of sophisticated theoretical, methodological, and statistical skills necessary to conduct and evaluate basic and applied research.

CHILD DEVELOPMENT (CDE)

CDE 430 Infant/Toddler Development in the Family. (3)

fall and spring

Examines the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 (or its equivalent).

CDE 437 Observational and Naturalistic Methods of Studying Children. (3)

selected semesters

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 in psychology.

CDE 444 Children and Poverty. (3)

fall

Impact that poverty has on children and their families. 2 hours lecture, 3 hours lab. Prerequisites: CDE 232 (or its equivalent); 6 hours in upper-division social sciences.

CDE 531 Theoretical Issues in Child Development. (3)

fall

Major developmental theories, related research, and their application to family interaction. Prerequisites: both CDE 430 and 437 (or their equivalents) or only instructor approval.

CDE 533 Research Issues in Child Development. (3)

spring

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)

spring

Integrates child development, family theory, and research to understand developmental problems and provide a foundation for intervention. Prerequisites: CDE 531; FAS 500.

CDE 634 Advanced Applied Child Development. (3)

spring

Advanced training in research and theory-based approaches to developing and evaluating prevention programs for children at risk. Prerequisite: CDE 534 or instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" [page 48](#).

FAMILY STUDIES (FAS)

FAS 431 Parent-Adolescent Relationships. (3)

fall

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)

selected semesters

Normative changes in families over time from formation until dissolution. Emphasizes the marital subsystem in middle and later years. Prerequisites: both CDE 232 and FAS 331 or only instructor approval.

FAS 435 Advanced Marriage and Family Relationships. (3)

fall and spring

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.

FAS 440 Fundamentals of Marriage and Family Therapy. (3)

fall and spring

Introduces the fundamental orientations of marriage and family therapy.

FAS 500 Research Methods. (4)

fall

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)

fall

Introduces major marriage and family therapy orientations. Reviews history, theory, application, and outcome research for each orientation. Prerequisite: admission to graduate program in Family and Human Development with a concentration in family studies or instructor approval.

FAS 531 Family Theory Development. (3)

spring

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)

fall

Critical review of current theory and empirical evidence connecting marital and family interaction patterns with aberrant behavior. Prerequisite: PGS 466 or PSY 573 (or its equivalent) or instructor approval.

FAS 537 Interpersonal Relationships. (3)

fall

Critical examination of current theoretical and research developments in the area of interpersonal relationships. Emphasizes applications for research and intervention. Prerequisite: FAS 435 (or its equivalent) or instructor approval.

FAS 538 Advanced Techniques in Marriage and Family Therapy. (3)

spring

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)

fall

Critical review of current and past research in the area of family dynamics. Emphasizes interactional processes within the family. Prerequisite: FAS 435 (or its equivalent) or instructor approval.

FAS 540 Assessment in Marriage and Family Therapy. (3)

spring

Assessment and outcome evaluation of couples and families involved in marital and family therapy. Lecture, lab. Prerequisites: FAS 500 (or its equivalent); PSY 530; instructor approval.

FAS 580 Marriage and Family Therapy Practicum. (1–12)

fall and spring

Supervised clinical experience in marriage and family therapy; includes development of assessment and outcome evaluation skills. Lecture, lab. Topics may include the following:

- First semester. (3)
- Second semester. (3)

- Third semester. (3)
Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Family Science

Doctoral Program

www.asu.edu/clas/fhd

480/965-6978

COWDN 106

Richard A. Fabes, Chair

Professors: Christopher, Fabes, Griffin, Hoover, Ladd, Martin, Roosa

Associate Professors: Boulin Johnson, Dumka, Wilson

Assistant Professors: Hanish, Liu, Madden-Derdich, Spinrad, Updegraff

The faculty in the Department of Family and Human Development offer a degree program leading to the Ph.D. degree in Family Science. Programs of study are available in child development and family studies. An area of concentration is available in marriage and family therapy (MFT).

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Family Science prepares researchers in the fields of family processes, family relationships, and human development within the context of families. Students can receive advanced training in theory, clinical strategies (MFT), research methodology, and several substantive fields that are part of family and human sciences.

The program is designed to prepare graduates to assume leadership roles in public or privately funded mental health agencies, governmental posts, or as researchers and academicians in universities. The MFT concentration also prepares students for state certification to practice as certified marriage and family therapists.

A description of the program, along with opportunities for assistantships and fellowships, may be obtained from the director of the program.

Admission. Admission to the Ph.D. in Family Science is determined by the following criteria:

1. official transcripts of all undergraduate and graduate course work;
2. verbal, quantitative, and analytical Graduate Record Examination scores;
3. statement of goals relevant to the Ph.D. program;
4. three letters of recommendation; and
5. an application for admission to the Graduate College.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English.

Program of Study. Each student must prepare and submit a program of study in conjunction with the chair and members of his or her supervisory committee during the first year in the program. The program of study consists of a minimum of 105 semester hours for students entering after the bachelor's degree and 63 semester hours for students entering after the master's degree. Of the 105 semester hours for a postbaccalaureate program, six are thesis credit and 24 are research and dissertation credit. Correspondingly, the 63 semester hours of the postmaster's program include 24 semester hours of research and dissertation credit. The additional hours in both the postbaccalaureate and postmaster's tracks involve

1. family science courses,
2. clinical approaches and clinical supervision courses (MFT),
3. statistics and research methods, and
4. a collateral area of study relating to family science taken outside the Department of Family and Human Development.

Foreign Language Requirements. None.

Evaluation and Comprehensive Examinations. Progress through the program involves (1) annual evaluations of the student's performance and (2) comprehensive written examinations at the end of the student's course work.

Practicum and Internship Requirements. For the MFT concentration, a total of 14 semester hours (postbaccalaureate) is required in clinical supervision, practicum, and internship. The practicum is for one year, and the internship lasts nine months.

Dissertation Requirements. The doctoral dissertation must be a work of original scholarship, make a significant contribution to knowledge about families, and reflect a mastery of systemic research methods.

Final Examinations. A final oral examination in defense of the dissertation is required.

Research and Clinical Facilities. The department's clinical and research facilities include a marriage and family clinic, marital interaction laboratory, children's social development laboratory, child development laboratory, and collaborative arrangements with the ASU Prevention Intervention Research Center. The Department of Family and Human Development also provides access to sophisticated microcomputing technology within the department as well as to centralized computing services at ASU. The department offers several fellowships that provide students with collaborative research experiences under the supervision of faculty members.

COURSES

For courses, see listings under “Family and Human Development,” page [215](#).

Fine Arts

COLLEGE OF FINE ARTS (CFA)

CFA 422 Concepts in Collaborative Multimedia. (3)

spring

Designed to bring students from different disciplines throughout the Herberger College of Fine Arts to experience the collaboration process in creating art. Lab, studio.

CFA 522 Concepts in Collaborative Multimedia. (3)

spring

Designed to bring students from different disciplines throughout the Herberger College of Fine Arts to experience the collaboration process in creating art. Lab, studio.

CFA 584 Internship. (1–12)

fall and spring

CFA 598 Special Topics. (1–4)

fall and spring

CFA 684 Internship. (1–12)

fall and spring

CFA 784 Internship. (1–12)

fall and spring

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

French

See "[Languages and Literatures](#)," page 245.

Geographic Information Science

Interdisciplinary Certificate Program

www.asu.edu/giscert

480/965-3414

LSE 218

480/727-1288

AGB2 114

John Briggs, Director, Executive Committee

William Miller, Director, Executive Committee

Geography

Professor: Burns

Assistant Professor: Wentz

Planning and Landscape Architecture

Associate Professor: Guhathakurta

Assistant Professor: Musacchio

Plant Biology

Professor: Klopatek

Public Affairs

Associate Professor: Briggs

Assistant Professor: DeLorenzo

Under the auspices of the Graduate College, the interdisciplinary certificate program in Geographic Information Science (GIS) is administered by an Executive Committee. The objective of this program is to enable existing ASU graduate students and GIS professionals with advanced degrees to learn how to apply GIS concepts and technology for the purposes of spatial analysis.

A minimum of 16 semester hours consisting of three required and two elective courses (three semester hours each) plus a capstone seminar (one semester hour) is required to complete the GIS Certificate. For a full description of the program course work, access the GIS Web site at www.asu.edu/giscert.

Current graduate students receive priority admission to the certificate program. Students qualify for admission to the certificate program by maintaining good standing in a cooperating department and completing an application specific to the GIS Certificate. Practicing professionals who already hold a graduate degree furnish proof of an advanced degree by a formal transcript and enroll as nondegree graduate students through the Graduate College. Prospective students must complete prerequisites listed for the level one required course, or pass a proficiency test.

Geography

Master's and Doctoral Programs

geography.asu.edu

480/965-7533

SCOB 330

Breandán Ó hUallacháin, Chair

Professors: Arreola, Balling, Brazel, Burns, Cervený, Dorn, Gober, Ó hUallacháin, Pasqualetti, Zehnder

Associate Professors: Fall, Kuby, McHugh

Assistant Professors: Edsall, Ellis, Li, Wentz

Lecturer: Shaeffer

The faculty in the Department of Geography offer graduate programs leading to the M.A. and Ph.D. degrees in Geography. Departmental research and graduate education focuses upon seven areas of study: climatology, earth-surface processes, natural resources and environment, urban-economic geography, population, Latin America and the Southwestern United States, and spatial analysis methods.

Students admitted to the Master of Education degree program with a major in Secondary Education may also elect

geography as the subject matter field. See [“Master of Education,” page 181](#), for information on the Master of Education degree.

MASTER OF ARTS

The M.A. program is designed to offer a specialized program of academic and professional training in geography so that the student may secure a sound graduate background for further specialization or for immediate employment. The program has sufficient flexibility to allow for individual needs and interests of the student. A minimum of 30 semester hours beyond the bachelor’s degree is required. At least 24 semester hours must be in geography.

Admission. Applications for the M.A. program must be accompanied by the applicant’s scores on the Graduate Record Examination (verbal and quantitative) and three letters of recommendation from professors. All applications are reviewed by the Graduate Recruiting and Admissions Committee and the chair of the Department of Geography. To be considered for financial assistance for the next academic year, students must be admitted by February 15.

It is presumed that all students entering the master’s program have an adequate background in geography, including course work that is the equivalent of GPH 371 Cartography and GCU 495 Quantitative Methods in Geography. Additional prerequisite course work is required of students insufficiently prepared in geography. The program of study consists of the following elements:

GCU 529 Contemporary Geographic Thought	3
GCU 585 Advanced Research Methods in Geography	3
GCU 591 Seminar	3
or GPH 591 Seminar (3)	
or graduate 500-level course in geography (3)	
GCU 599 Thesis	6
or GPH 599 Thesis (6)	
Total	15

The remaining 15 semester hours are composed of a suitable combination of course work and/or research.

A student in the M.A. program is required to pass an oral and a written examination administered by the student’s supervisory committee. The written examination consists of questions from the area of interest. The oral examination serves as a defense of the thesis.

DOCTOR OF PHILOSOPHY

Admission to the Ph.D. program requires a completed master’s degree in Geography or equivalent preparation. At a minimum this preparation should include competence in cartography and quantitative methods and basic course work in human and physical geography. Students who have not already acquired these basic skills or taken these basic courses must do so during the first year of their graduate program. These courses are considered prerequisites.

To be considered for financial assistance for the next academic year, students must be admitted by February 15.

The specific academic program is carefully planned by the student in consultation with a supervisory committee. Special efforts are taken to plan a course of study compatible with the student’s career objectives.

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Program of Study. A minimum of 30 semester hours of course work at ASU beyond the master’s degree is required, plus a minimum of 24 semester hours of credit in research and dissertation. All Ph.D. students are required to take

1. GCU 529;
2. GCU 585;
3. and two three-semester-hour seminars (GCU 591 or GPH 591) or graduate courses (500-level) in geography.

Foreign Language Requirements. At the discretion of the student’s supervisory committee, a reading proficiency in a foreign language may be required.

Field Examination. The Department of Geography requires Ph.D. students to pass a two-week field problem examination before taking the comprehensive examination.

Comprehensive Examinations. Written and oral comprehensive examinations are required. These are taken at the completion of all course work. After students have passed the comprehensive examinations and satisfied the other requirements, they are eligible to apply for candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

CULTURAL GEOGRAPHY (GCU)

GCU 414 Teaching Geography Standards. (3)
fall and summer
Introduces Arizona Geography Standards for K–12 educators, emphasizing exciting curricula and illustrated with best practices by master teachers. Internet.

GCU 421 Geography of Arizona and Southwestern United States. (3)
fall and spring
Geography of the Southwest with an emphasis on Arizona. Divided into physical geography, history, people, and economy.

GCU 423 Geography of South America. (3)
selected semesters
Prerequisite: GCU 323 or instructor approval.

GCU 424 Geography of Mexico and Middle America. (3)
once a year
Central America and Mexico. Prerequisite: GCU 323 or instructor approval.

GCU 425 Geography of the Mexican American Borderland. (3)
spring
Geography of a binational and bicultural region. Examines settlement, boundary issues, ethnic subregions, population change, industrial development, and urban growth. Field trip. Fee.

GCU 426 Geography of Russia and Surroundings. (3)
selected semesters
Examines the geography of Russia and other post-Soviet states. Prerequisite: GCU 121 or instructor approval.

GCU 433 Geography of Southeast Asia. (3)
spring
Examines the biophysical and social features of Southeast Asian nations and peoples. Prerequisite: GCU 326 or instructor approval.

GRADUATE PROGRAMS AND COURSES

GCU 441 Economic Geography. (3)

once a year

Spatial distribution of primary, secondary, and tertiary economic and production activities. Prerequisite: GCU 141 or instructor approval.

GCU 442 Geographical Analysis of Transportation. (3)

fall

Networks, modes, economics, and flows at the urban, national, and international scales. Prerequisite: GCU 141 or 441.

GCU 444 Geographic Studies in Urban Transportation. (3)

spring

Current urban transportation issues in metropolitan Phoenix. Lecture, team project. Prerequisite: GCU 361.

GCU 453 Recreational Geography. (3)

selected semesters

Examines problems surrounding the organization and use of space for recreation. Introduces geographic field survey methods of data collection and analysis. Possible Saturday field trips.

GCU 455 Historical Geography of U.S. and Canada. (3)

selected semesters

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)

selected semesters

Geographic aspects of federal public lands, policy, management, and issues. Emphasizes western wilderness and resource development problems.

GCU 495 Quantitative Methods in Geography. (3)

fall and spring

Statistical techniques applied to the analysis of spatial distributions and relationships. Introduces models and theory in geography. Prerequisite: MAT 119.

GCU 496 Geographic Research Methods. (3)

fall and spring

Scientific techniques used in geographic research. Prerequisites: GCU 495; GPH 371, 491.

GCU 515 Human Migration. (3)

fall

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)

selected semesters

Determination, classification, and analysis of spatial variations in land-use patterns. Examines the processes affecting land-use change. Prerequisite: 15 hours in geography or instructor approval.

GCU 529 Contemporary Geographic Thought. (3)

fall

Comparative evaluation of current philosophy concerning the nature and trends of geography. Prerequisites: 15 hours in geography; instructor approval.

GCU 585 Advanced Research Methods in Geography. (3)

spring

Specialized research techniques and methodologies in economic, political, or cultural geography.

GCU 591 Seminar. (1–3)

fall, spring, summer

Selected topics in economic, political, or cultural geography. Possible field trips. Topics may include the following:

- Transportation Systems Pro-Seminar
- Urban Geographic Information Systems

GCU 596 History of Geographic Thought. (3)

selected semesters

Historical development of geographic thought from pre-Greek days to the early 20th century.

GCU 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Geography of the Mexican American Borderland. (3)
Fee.

GCU 599 Thesis. (6)

fall and spring

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

PHYSICAL GEOGRAPHY (GPH)

GPH 401 Topics in Physical Geography. (1–3)

once a year

Open to students qualified to pursue independent studies. Possible field trips. Prerequisite: instructor approval.

GPH 405 Energy and Environment. (3)

spring

Sources, regulatory and technical controls, distribution, and consequences of the supply and human use of energy. Prerequisite: a course in physical or life sciences or instructor approval.

GPH 409 Synoptic Meteorology I. (4)

fall

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)

spring

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)

once a year

Introduces physiography and the physical elements of the environment. Credit is allowed for only GPH 411 or 111. Field trips.

GPH 412 Physical Climatology. (3)

once a year

Physical processes in the earth-atmosphere system on regional and global scales; concepts and analysis of energy, momentum, and mass balances. Prerequisites: both GPH 212 and 213 or only instructor approval.

GPH 413 Meteorological Instruments and Measurement. (3)

once a year

Design and operation of ground-base and aerological weather measurement systems. Collection, reduction, storage, retrieval, and analysis of data. Field trips. Prerequisites: both GPH 212 and 213 or only instructor approval.

GPH 414 Climate Change. (3)

spring

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)

once a year

Studies 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. Fee. Prerequisites: GPH 211 (or its equivalent); a General Studies L course.

GPH 422 Plant Geography. (3)

selected semesters

Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as PLB 422. Credit is allowed for only GPH 422 or PLB 422. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 or only GPH 111.

GPH 433 Alpine and Arctic Environments. (3)

selected semesters

Regional study of advantages and limitations of the natural environment upon present and future problems involving resource distribution, human activities, and regional and interregional adjustments. Field trips. Prerequisite: GPH 111 or instructor approval.

GPH 471 Geographics: Interactive and Animated Cartography and Geovisualization. (3)

selected semesters

Advanced cartography, stressing influence and application of the computer on geographic representation. Emphasizes creation of maps for the Internet. Lecture, lab. Prerequisites: GPH 371 or instructor approval.

GPH 473 Geographic Information Science II. (3)*fall*

GIS as a basis for microcomputer spatial analysis and synthesis. Includes digitizing, database organization, spatial retrieval, and graphics. Lecture, lab. Prerequisites: GPH 373 (or instructor approval); CSE 100.

GPH 474 Dynamic Meteorology I. (3)*fall*

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)*spring*

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)*once a year*

Problems of environmental quality, including uses of spatial analysis, research design, and field work in urban and rural systems. Field trips. Prerequisite: instructor approval.

GPH 483 Geographic Information Analysis. (3)*fall*

Basics of spatial data analysis. Topics include point pattern analysis, spatial autocorrelation, spatial regression, and kriging. Lecture, lab. Prerequisites: both one 200-level or above course in geography or biology or plant biology or geology or planning and one basic statistics course (GCU 495).

GPH 491 Geographic Field Methods. (3)*spring and summer*

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. Fee. Prerequisites: GCU 102, 121; GPH 111.

GPH 494 Special Topics. (1–4)*selected semesters*

Topics may include the following:

- Geographic Information Analysis

GPH 511 Fluvial Processes. (3)*once a year*

Geographical aspects of processes of river erosion, transportation, sedimentation: emphasizing spatial characteristics of forces, resistance, landforms, sediment; includes computer applications. Prerequisites: both GPH 111 (or GLG 101) and 211 (or GLG 362) or only instructor approval.

GPH 533 Snow and Ice. (3)*spring*

Processes, distribution, climatic interactions of snow/ice emphasizing mass balance, snow stratigraphy/metamorphism and glacier/snow-pack climatology. Lecture, field work. Prerequisite: instructor approval.

GPH 573 Geographic Information Science III. (3)*spring*

In-depth look at programming within GIS. Focuses on programming and methodology, utilizing specific software, and basic scientific computing. Lecture, lab. Prerequisite: GPH 473 or instructor approval.

GPH 575 Geographic Applications of Remote Sensing. (3)*selected semesters*

Uses 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. Prerequisites: GCU 585 (or GPH 491); GPH 372.

GPH 591 Seminar. (1–3)*fall and spring*

Selected topics in physical geography. Possible field trips.

GPH 596 Advanced Spatial Statistics. (3)*spring*

Multivariate and advanced statistical techniques including Box-Jenkins modeling and spectral analysis. Requires project papers and presentations. Seminar. Prerequisite: GCU 495 (or its equivalent).

GPH 598 Special Topics. (1–4)*selected semesters*

Topics may include the following:

- Intermediate Geographic Information Systems

GPH 599 Thesis. (6)*fall and spring*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Geological Sciences

Master's and Doctoral Programs

geology.asu.edu

480/965-5081

PS F686

Simon M. Peacock, Chair
Regents' Professors: Buseck, Greeley, Moore**Professors:** Burt, Christensen, Farmer, Fink, Holloway, Knauth, Peacock, Reynolds, Shock, Stump, Tyburczy, Williams**Associate Professors:** Arrowsmith, Leshin, O'Day, Sharp**Assistant Professors:** Fouch, Garnero

The faculty in the Department of Geological Sciences offer graduate programs leading to the M.S. and Ph.D. degrees in Geological Sciences.

Students admitted to the Master of Education degree program in Secondary Education may also elect geological sciences as the subject matter field. See "[Master of Education](#)," page 181, for information on the Master of Education degree.

The faculty also participate in the programs leading to the Master of Natural Science degree when one of the concentrations is geological sciences. See "[Natural Science](#)," page 279, for information on the Master of Natural Science degree.

Students applying for admission to the M.S., M.N.S., or Ph.D. degree program must submit scores on the Graduate Record Examination (GRE) Aptitude Test. The deadline for applications for the fall term is December 15.

FIELD CAMP REQUIREMENT FOR M.S. AND PH.D. STUDENTS

All Geological Sciences graduate students must have completed the equivalent of the department's six-semester-hour GLG 451 Field Geology I and 452 Field Geology II sequence. A summer field mapping course completed as part of the student's undergraduate course work may fulfill this requirement. Upon the student's admission to the graduate program, the graduate committee will evaluate previous field course work and will determine whether the student must take a field course while a graduate student at ASU. The purpose of this requirement is to ensure that all geological sciences graduate students possess basic geological mapping skills, whatever their ultimate specialty.

GRADUATE PROGRAMS AND COURSES

MASTER OF SCIENCE

The M.S. degree consists of a minimum of 30 semester hours of work beyond the bachelor's degree; 20 or more semester hours consist of course work other than research and thesis. The program is designed to provide fundamental graduate training in geology and to prepare the student for certain careers in geology or for further graduate study.

Breadth Requirement. All students must demonstrate breadth in Geological Sciences by taking graduate courses covering a range of subdisciplines.

Program of Study. The student, with the approval of the advisor, selects courses that make a coherent program of study. Each M.S. candidate must include on the program of study one hour of GLG 500 Geology Colloquium and six hours of GLG 592 Research and GLG 599 Thesis, at least three of which must be GLG 599 Thesis. A maximum of six hours of thesis may appear on a program of study. One-half of the credits applicable toward the degree must be in geological sciences courses; the remainder may include work either in geological sciences or related fields.

Thesis Requirements. A thesis based on field, laboratory, and library study is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree consists of a minimum of 54 semester hours of work beyond the master's degree. At least 25 semester hours must consist of course work other than research and dissertation. The program is designed to develop creative scholarship and to prepare the student for a professional career in geology.

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Breadth Requirement. All students must demonstrate breadth in Geological Sciences by taking graduate courses covering a range of subdisciplines.

Program of Study. The program of study is selected with the recommendation of the student's supervisory committee. Each Ph.D. candidate must include on the program of study one hour of GLG 500 Geology Colloquium and at least 24 semester hours of a combination of GLG 792 Research and GLG 799 Dissertation.

Foreign Language Requirements. None.

Comprehensive Examinations. The student's supervisory committee must determine the content of the comprehensive examination, consisting of a written and an oral examination. Students are required to take the comprehensive examination during their third semester in residence in the Ph.D. program.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Recent faculty and student research topics include the following.

Geochemistry. Isotope geochemistry; environmental and aqueous geochemistry; geochemistry and microbiology of hydrothermal systems; paleoclimate records; thermodynamics of fluid-mineral interfaces; synchrotron-based X-ray spectroscopies; secondary ion mass spectrometry; analytical and theoretical chemical studies of meteorites with application to Mars and early solar system evolution; geochemical exploration for ore deposits; trace element partitioning between minerals, fluids, and magmas; atmospheric geochemistry; paleoceanography; and stable isotopic applications in geobiology.

Geomorphology. Fault zone landforms and structure; earthquake surface rupture and paleoseismology; theoretical studies of faulting and hillslope development; engineering geologic field methods.

Geophysics. Seismology; mantle anisotropy; core-mantle boundary region; geodynamics, mantle flow and rheology; seismotectonics; earthquake surface rupture and paleoseismology; environmental geophysics; high pressure experimental geophysics; mantle structure; physics and chemistry of earth and planetary interiors; thermal modeling of subduction zones.

Mineral Physics. Electrical properties of silicate minerals, melts, and partial melts; effects of shock on hydrous minerals; shock-induced metamorphism and phase transitions in meteorites; grain boundary diffusion; kinetic processes and reaction mechanisms; mineral deformation and deformation microstructures; high temperature, high pressure studies of mantle materials.

Mineralogy. High-resolution transmission electron microscopy; order/disorder in clays and related minerals; amorphous to crystalline transitions; graphitic carbon and the structures of poorly crystalline materials; polytypism and stacking sequences in sheet silicates (micas, chlorites, clays); mechanisms of phase transitions; surface studies: scanning tunneling and atomic force microscopy of mineral surfaces; determination of oxidation states and specific site environments through electron energy-loss spectroscopy (EELS); TEM cathodoluminescence studies of defects; airborne minerals: small airborne particles, air quality, air pollution; mineral thermodynamics and spectroscopy; high pressure mineralogy; phase transformation studies.

Paleontology/Paleoecology. Geobiology and the role of organisms in sedimentary processes; early biosphere evolution and the fossil record of early multicellular life; invertebrate paleontology; evolutionary paleoecology; stable isotopic and geochemical techniques; biological response to global change; ichnology; exopaleontology and the exploration for fossil records of extraterrestrial life.

Petrology. High temperature, high pressure phase equilibrium experiments, and models for the origin of major igneous rock types; volatile diffusion in silicate melts; experimental determination of mantle minerals and melts; field

and analytical studies of temperature, pressure, and fluids during metamorphism; computer modeling of heat and mass transfer at convergent plate margins; subduction zones; continental extension; mineral equilibria in ore deposits.

Planetary Studies. Compositional and physical properties of the terrestrial planets; comparative geomorphology of the moon, Earth, Mars, Mercury, Venus, and the outer planet satellites; Venus tectonics; thermal infrared spectroscopy of planetary materials; planetary volcanic processes; laboratory simulation of eolian processes on Venus, Mars, and Earth; impact cratering experiments; meteorite studies; micro- and isotopic analysis of meteorites and planetary materials.

Remote Sensing. Geologic mapping based on integrated field and remote sensing studies; multispectral mineralogical investigations; urban environmental studies.

Structure and Tectonics. Structural and tectonic evolution of Arizona and the North American Cordillera; regional geology of the Transantarctic Mountains; Cordilleran tectonics; relation between fluid and tectonic processes; active tectonic processes.

Volcanology. Explosive eruption processes; mechanisms of dike intrusion; structures in lava flows; multiphase flow in volcanic and geothermal systems; textures and volatile contents of volcanic domes; mineralization related to rhyolite domes; laboratory simulation of lava flow processes; field studies throughout the western United States, Hawaii, and Central and South America.

For details about the most current research activity, see the Geological Sciences Web site at geology.asu.edu.

Astrobiology Institute. Astrobiology is broadly defined as “the study of the origin, evolution, and distribution of life in the universe.” ASU is one of 11 partnering institutions in the United States composing the NASA Astrobiology Institute (NAI). In addition to supporting basic research in astrobiology, the NAI seeks to enhance opportunities for graduate students desiring cross-disciplinary training in such areas as the organic chemistry of extraterrestrial materials, origin of life studies, early biosphere evolution, and the exploration for life elsewhere in our solar system and beyond. The ASU Astrobiology Program is made up of a distributed faculty drawn from the Departments of Geological Sciences, Chemistry and Biochemistry, Biology, and Physics and Astronomy. The ASU Astrobiology Program also provides opportunities for regular interactions with other institute partners around the country through the use of advanced telecommunications and the next generation Internet.

Center for Solid State Science, Materials Research Science and Engineering Center, and Affiliated Departments. Analytical equipment routinely used by Geological Sciences students includes: a JEOL JSX-8600 electron microprobe analyzer/SEM equipped with an image analysis system; 10 transmission electron microscopes specialized for high-resolution imaging ($\leq 1.7 \text{ \AA}$ resolution), EELS and EDS chemical analysis; surface analytical microscopies (XPS, Auger and probe microscopies). Automated X-ray diffraction and fluorescence facilities are available, as is an ion microprobe. The high-pressure laboratory for experimental petrology is equipped with a complete range of vessels for

investigations ranging from hydrothermal alteration to partial melting of planetary mantles.

Space Photography Laboratory. The Space Photography Laboratory contains an extensive research collection of photographs of the moon, Mars, Mercury, and outer planet satellites. A dedicated image processing facility with interactive and hardcopy capabilities is available for research utilizing spacecraft images.

Center for Meteorite Studies. The Department of Geological Sciences houses one of the largest collections of meteorites in the world. Geochemical and cosmochemical research is being undertaken in the Center for Meteorite Studies, including the following topics: trace element geochemistry, nature of asteroidal interiors, computer models of condensation in the nebula, meteorite mineralogy, organic compound investigations, chemical fractionation in meteorites, elemental partitioning in meteoritic minerals, transmission electron microscopy of chondritic meteorites, and fluid-rock interactions on asteroids and Mars.

GEOLOGICAL SCIENCES (GLG)

GLG 405 Geology of the Moon. (3)

selected semesters

Current theories of the origin and evolution of the moon through photogeological analyses and consideration of geochemical and geophysical constraints. Possible field trips to examine Arizona geology. Fee. Prerequisite: GLG 105 or instructor approval.

GLG 406 Geology of Mars. (3)

selected semesters

Geological evolution of Mars through analyses of spacecraft data, theoretical modeling, and study of terrestrial analogs; emphasizes current work. Possible field trips to examine Arizona geology. Fee. Prerequisite: GLG 105 or instructor approval.

GLG 410 Computers in Geology. (3)

fall

Geological computer skills including data processing, visualization, presentation, numerical analysis, software and hardware applications. 2 hours lecture, 3 hours lab. Prerequisites: both GLG 101 and an upper-division course in geology or only instructor approval.

GLG 412 Geotectonics. (3)

selected semesters

Earthquakes, earth's interior, formation of oceanic and continental crust, and plate tectonics. Emphasizes current work. Prerequisite: GLG 310.

GLG 416 Field Geophysics. (3)

spring

Methods of applied geophysical exploration; seismic refraction, gravity, electrical resistivity, geomagnetics. Includes survey planning, data acquisition, processing, analysis, and interpretation. Lecture, field exercises. Prerequisite: a course in geology or instructor approval.

GLG 418 Geophysics. (3)

fall

Solid earth geophysics; geomagnetism, gravity, seismology, heat flow. Emphasizes crust and upper mantle. Prerequisites: a combination of GLG 310 and MAT 272 and PHY 131 or only instructor approval.

GLG 419 Geodynamics. (3)

selected semesters

Emphasizes application of continuum principles to geological problems, including lithospheric stresses, heat transfer, fluid mechanics, and rock rheology. Prerequisite: PHY 131.

GLG 420 Volcanology. (3)

once a year

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. Fee. Prerequisite: GLG 424.

GRADUATE PROGRAMS AND COURSES

GLG 424 Petrology. (3)

fall

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. Fee. Prerequisite: GLG 321.

GLG 435 Sedimentology. (3)

spring

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. Fee. Prerequisites: GLG 102, 321.

GLG 441 Ore Deposits. (3)

selected semesters

Origin, occurrence, structure, and mineralogy of ore deposits. Possible weekend field trips. Fee. Prerequisite: GLG 424 or instructor approval.

GLG 451 Field Geology I. (3)

spring

Geological mapping techniques using topographic maps and aerial photos. Intensive field-based instruction. Lab. Prerequisites: GLG 310, 321.

GLG 452 Field Geology II. (3)

summer

Continuation of GLG 451. Lab. Prerequisite: GLG 451.

GLG 455 Advanced Field Geology. (3–4)

once a year

Geologic mapping in igneous, sedimentary, and metamorphic terrains of the Basin and Range province of Arizona. May be repeated for credit. Weekend field trips. Fee. Prerequisite: instructor approval.

GLG 456 Cordilleran Regional Geology. (3)

selected semesters

Systematic coverage through space and time of the geological development of western North America, emphasizing the western United States. Fee. Prerequisite: senior major or graduate student in Geological Sciences or instructor approval.

GLG 461 Geomicrobiology. (3)

spring

Past and present interactions among microbial life, geological materials, and biogeochemical cycles involving carbon, sulfur, phosphate, nitrogen, and minerals. Cross-listed as MIC 461. Credit is allowed for only GLG 461 or MIC 461. Prerequisites: introductory courses in chemistry and microbiology (or geological sciences); instructor approval.

GLG 470 Hydrogeology. (3)

spring

Geology of groundwater occurrence, aquifer and well hydraulics, water chemistry and quality, contaminant transport, remediation. Emphasizes quantitative methods. Prerequisites: GLG 101 (or 103); MAT 270; PHY 121.

GLG 481 Geochemistry. (3)

spring

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as CHM 481. Credit is allowed for only CHM 481 or GLG 481. Prerequisite: CHM 341 (or 346) or GLG 321.

GLG 485 Meteorites and Cosmochemistry. (3)

selected semesters

Chemistry of meteorites and their relationship to the origin of the earth, solar system, and universe. Cross-listed as CHM 485. Credit is allowed for only CHM 485 or GLG 485.

GLG 490 Topics in Geology. (1–3)

fall, spring, summer

Special topics in a range of fields in geology. May be repeated for credit. Fee. Prerequisite: instructor approval.

GLG 500 Geology Colloquium. (1)

fall and spring

Presentation of recent research by faculty and invited guests. 1 semester required for all Geological Sciences graduate students. May be repeated for a total of 2 semester hours. Requires research paper. Prerequisite: instructor approval.

GLG 501 Geology of Arizona. (3)

once a year

Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Requires research paper.

GLG 504 Geology of the Grand Canyon. (2)

selected semesters

Reviews the discovery, history, origin, and geology of the Grand Canyon of the Colorado River in Arizona. Requires 6-day field trip down the river (first 6 days after commencement in May) at student's expense. Requires field research and term paper on trip.

GLG 510 Advanced Structural Geology. (3)

selected semesters

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. Fee. Prerequisites: both GLG 310 and 424 or only instructor approval.

GLG 520 Advanced Physical Volcanology. (2–3)

selected semesters

Selected volcanologic topics, including explosive eruption processes, lava flow mechanics, and intrusive mechanisms. Possible field trips. Fee. Prerequisite: GLG 420 or instructor approval.

GLG 524 Advanced Igneous Petrology. (3)

selected semesters

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. Fee. Prerequisite: GLG 424.

GLG 581 Isotope Geochemistry. (3)

selected semesters

Geochemistry and cosmochemistry of stable and radioactive isotopes; geochronology; isotope equilibria. Prerequisite: instructor approval.

GLG 582 Physical Geochemistry. (3)

selected semesters

Applies thermodynamic and kinetic principles to geochemical processes. Prerequisite: CHM 341 (or 346) or GLG 321.

GLG 591 Seminar. (1–3)

fall, spring, summer

Topics in a range of fields in geology. May be repeated for credit. Fee. Prerequisite: instructor approval.

GLG 592 Research. (1–12)

fall, spring, summer

GLG 598 Special Topics. (1–4)

fall, spring, summer

Special topics in geological sciences. May be repeated for credit. Topics may include the following:

- Advanced Field Geology. (1–3)
Fee.
- Clastic Sedimentology and Petrology. (1–3)
Fee.
- Cordilleran Regional Geology. (1–3)
Fee.
- Fundamental Planetary Geology. (1–3)
- Geology of Mars. (1–3)
Fee.
- Methods in Geoscience Teaching. (1–3)
- Ore Deposits. (1–3)
Fee.
- Orogenic Systems. (1–3)
- Petrology-Petrography. (1–3)
Fee.
- Principles of Stratigraphy. (1–3)
Fee.
- Remote Sensing. (1–3)
- Sedimentology. (1–3)
Fee.
- Volcanology. (1–3)
Fee.

Prerequisite: instructor approval.

GLG 599 Thesis. (1–12)

fall, spring, summer

GLG 792 Research. (1–12)*fall, spring, summer***GLG 799 Dissertation. (1–15)***fall, spring, summer*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

German

See [“Languages and Literatures,” page 245.](#)

Gerontology

Interdisciplinary Certificate Program

ASU Main

www.asu.edu/graduate/gerontology

480/965-3225

WHALL 116

ASU West

www.west.asu.edu/chs/grn

602/543-6642

FAB S170

William E. Arnold, Director, ASU Main

Anthropology

Professor: Carr

Communication

Professor: Arnold

Design

Associate Professor: Cutler

Economics

Professor: Hogan

English

Professor: Kehl

Exercise Science and Physical Education

Regents' Professor: Landers

Professor: Stelmach

Assistant Professor: Etnier

Exercise and Wellness (ASU East)

Professor: Corbin

Associate Professor: Swan

Assistant Professor: Phillips

Family and Human Development

Professor: Hoover

Geography

Associate Professor: McHugh

Health Administration and Policy

Professor: Schneller

History

Professor: Gratton

Marketing

Associate Professor: Stephens

Music

Professor: Crowe

Assistant Professor: Rio

Nursing

Professor: Gale

Associate Professors: Killeen, Komnenich, McCarthy

Nutrition (ASU East)

Professors: Manore, Vaughan

Psychology

Professors: Karoly, Okun, Reich, Sadalla, Zautra

Associate Professor: Leshowitz

Psychology in Education

Professor: Strom

Sociology

Professors: Kronenfeld, Kulis

Associate Professors: Blair, Keith, Miller-Loessi, Sullivan

Janet H. Shirreffs, Director, ASU West

Communication Studies

Associate Professor: Waldron

Education

Professor: Harris

Associate Professor: Achilles

Psychology

Professor: McGovern

Associate Professor: Náñez

Assistant Professor: Bureson

Recreation and Tourism Management

Professors: Gitelson, Knopf, Searle, Shirreffs

Social Work

Professor: Brawley

Associate Professor: Fitzpatrick

Visiting Assistant Professor: McCabe

Sociology

Assistant Professor: Carter

Senior Lecturer: Luken

An interdisciplinary, 21-semester-hour Certificate in Gerontology may be earned by graduate students who wish to study the psychological, sociological, biological, and

GRADUATE PROGRAMS AND COURSES

policy-related aspects of aging and the health, economic, and social concerns of older people. Graduate students enrolled in the certificate program simultaneously pursue a major in an academic unit offering an advanced degree, whereas nondegree graduate students, typically, are either working with or seeking to work with older people. The Certificate in Gerontology provides a broad academic foundation for students who wish to apply the knowledge and skills acquired in their major and/or work experience to a variety of aging-related pursuits. Course work is evenly divided between required and elective courses. For their electives, students choose courses from the gerontology-related offerings of several departments. For more information, call 480/965-3225. Additional information about the ASU West program is available by calling 602/543-6642.

GERONTOLOGY (GRN) ASU Main

GRN 430 Multidisciplinary Approaches to Gerontology. (3)

once a year

Examines literature that each discipline brings to the study of gerontology. Covers both theory and practice. Lecture, discussion.

GRN 431 Caregiving. (3)

once a year

Examines theory and practice of caregiving for the senior population. Lecture, discussion.

GRN 440 Aging and Wellness. (3)

fall and spring

One-on-one service/experiential learning with seniors from the community. May be repeated for credit. Lecture, lab.

GRN 450 Biology of Aging. (3)

spring

Examines normal biological aging and changes in the functional capabilities in the elderly. Lecture, lab.

GRN 460 Alzheimer's and Related Dementias. (3)

fall and spring

Familiarization with Alzheimer's disease and related dementias from a caregiver's perspective. Lecture, lab.

GRN 484 Undergraduate Internship. (3-6)

fall, spring, summer

GRN 494 ST: Undergraduate Special Topics. (3)

fall and spring

GRN 498 PS: Undergraduate Pro-Seminar. (3)

spring

GRN 499 Undergraduate Individualized Instruction. (3)

fall, spring, summer

GRN 530 Multidisciplinary Approaches to Gerontology. (3)

once a year

Examines literature that each discipline brings to the study of gerontology. Covers both theory and practice. Lecture, discussion.

GRN 531 Caregiving. (3)

once a year

Examines theory and practice of caregiving for the senior population. Lecture, discussion.

GRN 540 Aging and Wellness. (3)

fall and spring

One-on-one service/experiential learning with seniors from the community. Lecture, lab. Cross-listed as SWG 517. Credit is allowed for only GRN 540 or SWG 517.

GRN 550 Biology of Aging. (3)

spring

Examines normal biological aging and changes in the functional capabilities in the elderly. Lecture, lab.

GRN 560 Alzheimer's and Related Dementias. (3)

fall and spring

Familiarization with Alzheimer's disease and related dementias from a caregiver's perspective. Lecture, lab.

GRN 584 Graduate Internship. (3-6)

fall, spring, summer

GRN 590 Graduate Reading and Conference. (3)

fall, spring, summer

GRN 591 Graduate Seminar. (1-6)

fall and spring

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Health Services Administration

Master's Program

www.cob.asu.edu/mba/day_mhlsa/mhlsa_info.cfm

480/965-7778

BA 318

Eugene S. Schneller, Director

Professors: Forsyth, Johnson, Kirkman-Liff, Schneller

Assistant Professor: Rivers

The faculty in the School of Health Administration and Policy, College of Business, offer a graduate program leading to the Master of Health Services Administration degree. This degree is offered only in conjunction with the ASU M.B.A.

MASTER OF HEALTH SERVICES ADMINISTRATION

The ASU M.B.A./M.H.S.A. is a concurrent degree program structured to prepare students to become managers and leaders in contemporary health-related industries and systems. The curriculum is designed to equip graduates with knowledge of the broad continuum of healthcare products and services, advanced managerial knowledge and analytical skills, as well as in-depth preparation in one of the four ASU M.B.A. areas of study: financial management and markets, information management, services marketing and management, and supply chain management. Students graduate from this program prepared to assume advanced leadership roles in a wide range of settings, including biotechnology corporations, consulting firms, delivery systems, health financing, health information organizations, and pharmaceutical industry. This preparation consists of the core ASU M.B.A. curriculum, a series of eight M.H.S.A. courses, a summer internship, and one of the ASU M.B.A. areas of study.

Admission. Applications should be submitted online. For the general requirements, see "[Admission to the Graduate College](#)," page 84. Applicants are required to submit evidence of their ability to pursue a graduate degree program in



The university's first six McNair scholars were named in 2001. In addition to a three-year research or teaching assistantship provided by the academic unit, this fellowship includes a \$5,000 per year stipend enhancement for three years, resident/nonresident tuition waiver for three years, and an additional \$5,000 to be split across the first two summers.

Dennis Durband photo

health services administration successfully. All students must take the GMAT. For more information, call 609/921-9000, send e-mail to etsinfo@ets.org, or write

EDUCATIONAL TESTING SERVICE
ROSEDALE ROAD
PRINCETON NJ 08541-6108

Students must apply separately to the ASU M.B.A. and M.H.S.A. degree programs. Applicants must submit two applications for admission and two copies of all transcripts directly to the Graduate College. Two recommendations commenting on the student's motivation, commitment, achievements, work experience, and opportunity for success in the program are required. The application package includes the M.B.A. supplemental application, which contains a box that must be checked, indicating your interest in the M.H.S.A. degree program. In addition, applicants are required to submit a statement of personal objectives and professional interest statement that reflects your interest in health-related industries and systems. Students should identify their preliminary interest in one of the four M.B.A. specialization areas. Because the ASU M.B.A./M.H.S.A. program begins in early June, preference for admission and financial assistance will be given to applicants applying by the March 1. It is recommended that students visit the campus for a personal interview. In cases where this creates a hardship, a student may ask for a telephone interview with an M.H.S.A. faculty member when the application file is complete. Materials describing the Master of Health Ser-

vices Administration are available by calling 480/965-7778, accessing the Web site at www.cob.asu.edu/mba/asu_mba_day.cfm, sending e-mail to asuhap@asu.edu, or writing

SCHOOL OF HEALTH ADMINISTRATION AND
POLICY
COLLEGE OF BUSINESS
ARIZONA STATE UNIVERSITY
PO BOX 874506
TEMPE AZ 85287-4506

Program of Study. The program of study for the concurrent ASU M.B.A./M.H.S.A. consists of a minimum of 72 semester hours. The total amount of semester hours a student is required to take is dependent upon his or her choice of ASU M.B.A. specialization area.

Additional semester hours (prerequisites) may be required to strengthen preparation in a given specialty. Subject to availability, students may complete an optional residency/fellowship for a period of up to one year (following completion of the degree program).

Prerequisites. Students lacking sufficient background in business fundamentals are encouraged to take a basic financial accounting course. Those without a basic course in computer skills are required to complete CIS 200. Students must demonstrate strong quantitative ability. This may be accomplished by taking a calculus course (MAT 210).

Foreign Language Requirements. None.

GRADUATE PROGRAMS AND COURSES

Comprehensive Examinations. All students must successfully complete the integrative seminar, which meets the comprehensive requirement established by the College of Business and Graduate College for the M.H.S.A. degree.

Thesis Requirements. None.

HEALTH SERVICES ADMINISTRATION (HSA)

HSA 502 Health Care Organization. (3)

once a year

Concepts, structures, functions, and values which characterize contemporary health care systems in the United States.

HSA 505 Managerial and Population Epidemiology. (3)

once a year

Quantitative tools to make health care management decisions including biostatistics, epidemiology, and cost-effectiveness analysis. Prerequisite: HSA 561 or a course in basic statistics.

HSA 512 Health Care Economics. (3)

once a year

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)

once a year

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics. Prerequisite: HSA 502.

HSA 522 Health Care Management Systems. (3)

once a year

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)

once a year

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 540 Health Care Outcomes. (3)

once a year

Project-oriented course on application of efficiency-based methods for the evaluation of the outcomes of health care. Seminar, individual student research. Prerequisite: HSA 512 or enrollment in Ph.D. program.

HSA 542 Health Care Jurisprudence. (3)

once a year

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)

fall and spring

Introduces organizational theory and management of complex organizations within the historical and contemporary contexts of the U.S. public health.

HSA 561 Biostatistics. (3)

fall

Aspects of descriptive statistics and statistical inference most relevant to health issues, including data, rates, and confidence intervals.

HSA 562 Health Care Organization and Systems. (3)

once a year

Functional relationships among managerial elements of health care institutions with major focus on hospital governance and policy dynamics.

HSA 563 Economics for Public Health Management. (3)

fall

Introduces concepts and methods used to direct and understand production and distribution of health care services.

HSA 564 Health Care Finance. (3)

once a year

Overview of the acquisition, allocation, and management of financial resources by health care providers. Focuses on economic, financial, and accounting principles.

HSA 565 Policy Issues in Health Care. (3)

once a year

Current policy issues in health through concepts of access, cost, and quality; issues relating to disease trends and policy formulation.

HSA 566 Basic Principles of Epidemiology. (3)

spring

Basic principles of epidemiology, evaluation of etiology, natural history, intervention therapy, and disease prevention. Lecture, lab. Prerequisite: Master of Public Health major or instructor approval.

HSA 571 Managed Care. (3)

selected semesters

Trends in managed care/integrated systems, complexities of balancing objectives (e.g., financial and quality). A two-semester-long marketplace simulation. Prerequisite: HSA 502.

HSA 573 Comparative Health Systems. (3)

once a year

Comparison of health care financing and delivery in industrialized countries; covers insurance, hospital management, and physician payment. Lecture, discussion.

HSA 575 Chronic Care Administration. (3)

selected semesters

Management of long-term care services and facilities, including behavioral health and rehabilitation programs.

HSA 589 Integrative Seminar. (3)

fall, spring, summer

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. (1–12)

once a year

Topics may include the following:

- Behavioral Health. (3)
- Cost Containment and Quality Assurance. (3)
- Health Care Economic Outcomes. (3)
- Health Care Policy. (3)
- Managing Physicians. (3)
- Topics in Health Services Research. (3)

HSA 593 Applied Project. (3)

fall, spring, summer

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. (1–4)

once a year

Topics may include the following:

- Epidemiology. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Higher and Postsecondary Education

Master's and Doctoral Programs

coe.asu.edu/elps

480/727-7083

ED 138A

Gary R. Hanson, Academic Program Coordinator

Professors: Fenske, Hanson, Turner, Valverde, Webb

Associate Professors: Hartwell-Hunnicut, Rund, Wilkinson

Research Professor: de los Santos

The faculty in the Division of Educational Leadership and Policy Studies offer graduate programs leading to the Master of Education and Doctor of Education degrees in Higher and Postsecondary Education.

Candidates for the M.Ed. and Ed.D. programs may be required to take certain College of Education core courses depending upon previous experience and education. Pre-approval by an advisor is required. The M.Ed. program requires 33 semester hours of course work, including a practicum. Candidates for all degrees must pass a written comprehensive examination, and candidates for the Ed.D. must also pass a final oral examination in defense of the dissertation.

Students interested in the Ph.D. degree with a field of study encompassing higher education should refer to the major in ["Educational Leadership and Policy Studies," page 185](#). See ["Doctor of Philosophy," page 96](#), for information on the Ph.D. degree.

MASTER OF EDUCATION

Applicants for admission to the M.Ed. degree program must submit scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test; scores on the GRE are preferred.

For more information, see ["Master of Education," page 181](#).

DOCTOR OF EDUCATION

Applicants for admission to the Doctor of Education program must submit scores on the GRE.

See ["Doctor of Education," page 182](#), for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Current faculty research includes a focus on the impact of affirmative action policies on student recruitment, enrollment, and retention; equity and access for students of color within the educational system; minorities as research subjects in higher education; student financial aid policies; hiring policies and diversity; and K-16 reform policy.

HIGHER AND POSTSECONDARY EDUCATION (HED)

HED 510 Introduction to Higher Education. (3)

fall

Overview of American higher education, including philosophical, political, and social aspects.

HED 515 Student Diversity in Higher Education. (3)

spring

Introduces the demographic profile of college students and addresses diverse students' access, retention, and graduation. Lecture, collaborative learning.

HED 527 Seminar: Student Affairs Administration. (3)

fall

Organizational models, administrative competencies and skills, and emerging challenges of student affairs administration. Lecture, discussion, group projects, written assignments.

HED 533 The Community-Junior College. (3)

fall and spring

History, functions, organization, and current issues. Meets Arizona community college course requirement for certification.

HED 602 Institutional Research/Strategic Planning. (3)

fall

Provides an overview of policy research and planning in higher education at the campus system and governing/coordinating agency levels. Lecture, group discussion, research projects. Prerequisite: HED 510.

HED 603 Computer-Assisted Qualitative Data Analysis. (3)

spring

Emphasizes the applied and computing aspects of qualitative research design, data analysis, and reporting of results. Lecture, lab, demonstrations. Prerequisite: COE 503 (or its equivalent).

HED 611 Curriculum and Instruction. (3)

spring

Curriculum development, instructional organization, and improvement of instruction in higher education. Prerequisite: HED 510.

HED 644 Higher Education Finance and Budgeting. (3)

spring

Financial planning and budgeting in higher education institutions. Issues related to financing public and private colleges and universities. Prerequisite: HED 510.

HED 649 Law of Higher Education. (3)

fall

Analyzes legal issues related to higher education; examines key court decisions. Prerequisite: HED 510.

HED 679 The American College Student. (3)

spring

Overview of American college student from demographic, background characteristics, and values/attitudes/perspectives. Includes access, persistence, and degree completion. Lecture, group discussion, research projects. Cross-listed as CED 656. Credit is allowed for only CED 656 or HED 679.

HED 687 Governance, Coordination, and External Influences in Higher Education. (3)

spring in odd years

Study of governance and coordination in higher education systems and the impact of external forces on them. Lecture, discussion.

HED 688 Organizational Theory. (3)

spring

Major views of organizations and their influence on role definition and participant behaviors in educational organization. Seminar, discussion. Cross-listed as SPF 622. Credit is allowed for only HED 688 or SPF 622.

HED 689 Leadership in Higher Education. (3)

fall

Theory and practice of leadership and administration in higher education institutions.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48](#).

History

Master's and Doctoral Programs

www.asu.edu/clas/history/graduate/graduate.html

480/965-5778

SS 204

Noel J. Stowe, Chair

CORE FACULTY

Regents' Professor: Iverson

Professors: Adelson, Batalden, Burg, Davis, Fuchs, Giffin, Gratton, Green, Kleinfeld, Lavrin, Luckingham, MacKinnon, Rosales, Simpson, Stowe, Tambs, Tillman, Trennert, Warnicke

Associate Professors: Barnes, Carroll, Gray, Gullett, Hendricks, Kahn, Longley, Rush, Samuelson, Smith, Soergel, Stoner, Thornton, VanderMeer, Warren-Findley

Assistant Professors: Koopmans, Manchester, Thompson, Wilson

Senior Instructional Professional: Luey

AFFILIATED FACULTY

Biology

Professor: Pyne

Chicana and Chicano Studies

Associate Professor: Escobar

Women's Studies

Professor: Rothschild

The faculty in the Department of History offer graduate programs leading to the M.A. and Ph.D. degrees in History. M.A. candidates are offered an opportunity to develop knowledge of a specific historical field, to study comparative history, and to learn research techniques. Students with various goals benefit from this degree program, including those planning to advance to Ph.D. study, those seeking positions in the public sector, or in business, and those now holding or looking for educational posts in elementary and secondary schools and community colleges.

Students admitted to the Master of Education (M.Ed.) degree program with a major in Secondary Education may elect history as the subject matter field.

MASTER OF ARTS

See "[Master's Degrees](#)," page 93, for general requirements.

Admission. Applications for the master's program must be accompanied by the applicant's scores on the Graduate Record Examination (GRE); three letters of recommendation from faculty members or others who are qualified to

judge the applicant's potential for advanced study in history; a résumé; a writing sample; and a statement of purpose.

Forms and instructions for filling them out are available from the graduate administrative assistant, the Graduate College Web site (www.asu.edu/graduate) and the Department of History Web site (www.asu.edu/clas/history). M.Ed. applicants must submit scores from both the GRE aptitude and advanced history tests. For M.Ed. program requirements, see "[M.Ed. Degree in Secondary Education](#)," page 231.

All applications and supporting materials are reviewed by the graduate committee of the department. The committee recommends to the Graduate College that the student be granted regular or provisional admission or be denied admission.

Areas of Concentration. In consultation with the supervisory committee, the candidate may select a field of history from the following: Asian, British, European, Latin American, public history, United States, and U.S. Western. For information on the concentration in public history, see "[Public History Concentration](#)," page 231. Under the United States concentration, students may choose to specialize in a variety of areas; some examples are African-American, American Indian, Chicana/Chicano, and women.

Program of Study

M.A. Degree in History. A minimum of 30 semester hours of graduate course work are required for the M.A. in History. Upon matriculation, the student, in consultation with the graduate director, selects a faculty advisor in the student's area of concentration. The faculty advisor directs the student toward completion of required course work. The 30 semester hours must conform to the following guidelines:



ASU President Lattie Coor officially opens Graduate and Professional Student Appreciation Week on the ASU Main campus.

Dennis Durband photo

1. At least 24 semester hours of course work in history is required. With the approval of the supervisory committee, candidates may add to the 24 semester hours, six semester hours of closely related course work in another academic unit (this does not apply to students in the public history concentration).
2. Eighteen of the 24 semester hours must be in 500-level history courses. If 400-level courses are included in the program of study, documented proof must be provided that they were taken for graduate credit. Contact the graduate administrative assistant for details.
3. Six of the 18 semester hours must be in comparative courses (HST 551 to HST 555). This requirement does not apply to students with a concentration in public history.
4. At least three of the 24 semester hours must be in HST 591 Seminar (in the major field of study).
5. At least six semester hours of HST 599 Thesis are required of students writing an M.A. thesis. The thesis equivalent substitutes six semester hours of HST 592 in place of six semester hours of HST 599 and incorporates an additional three semester hours of HST 591 into the program.

Public History Concentration. Candidates admitted to the M.A. degree in History with a concentration in public history select two areas of emphasis, one of which is public history, and must complete HST 502 and at least two short courses (of one semester hour each). Beyond these requirements, each of the six emphases within public history has other specific requirements, which are listed in the department's graduate handbook. The following is a list of the differing minimum number of semester hours for a degree in each of the six emphases: business, 41 semester hours; community history, 40; historic preservation, 40; historical administration, 37; historical editing and publishing, up to 44; public sector, 39. Course work taken outside of the department for inclusion in the program of study must be approved in advance by the appropriate program director.

M.Ed. Degree in Secondary Education. Candidates for the M.Ed. degree in Secondary Education with an emphasis in history must complete 15 semester hours of history course work. Three of the 15 semester hours must be in historiographic survey (HST 512 to HST 515). Three of the 15 semester hours must be in either comparative courses (HST 551 to HST 555) or a research seminar (HST 591). Overall, 12 of the 15 semester hours must be in 500-level history courses. If 400-level courses are included in the program of study, documented proof must be provided that they were taken for graduate credit. Contact the department for specific details. All candidates for the M.Ed. must maintain at least a 3.00 G.P.A. in HST courses.

Foreign Language Requirements. The student is expected to have a reading knowledge of one foreign language, but some other research skills may be substituted for this requirement by the supervisory committee.

Thesis Requirements. A master's thesis or its equivalent is required. Students have two options: They can either write

an M.A. thesis or take the M.A. thesis equivalent. The M.A. thesis is approximately 100 pages in length and is based on original research. Students who choose this option must enroll for six semester hours of thesis work (HST 599).

The M.A. thesis equivalency is composed of two parts: (1) two three semester hour seminars (HST 591) on a broad topic and (2) two three semester hour research courses (HST 592) on a topic derived from the first research course.

Both the M.A. thesis and the M.A. thesis equivalent must be prepared according to Graduate College requirements, and defended, and approved by a thesis committee. Bound copies of both are placed in Hayden Library and the Department of History.

Final Examinations. A final oral defense of the thesis or the thesis equivalent is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in History offers candidates the opportunity to study past and contemporary civilizations and to learn research and writing techniques that may be used in scholarly careers at leading academic institutions, in historical societies and agencies, in the public sector, and in business.

Major emphasis is placed upon developing a disciplined and inquiring mind, expertise in a chosen subject area, and competence in research methodology. The program is composed of small classes that bring students into a close working relationship with faculty and other students and offers flexibility in designing degree programs.

The five areas of concentration are Asian history, British history, European history, Latin American history, and United States history. Students must select a minimum of three historical fields for examination.

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Admission. Applications for the Ph.D. degree in History must be accompanied by the applicant's scores on the Graduate Record Examination, three letters of recommendation from faculty members or others who are qualified to judge the applicant's potential for doctoral study, a writing sample, a résumé, and a statement of purpose. Applications and supporting materials are reviewed by the graduate committee of the Department of History. The committee recommends to the Graduate College that the applicant be granted regular or provisional admission or be denied admission.

Program of Study. For students admitted to the doctoral program with a master's degree or other graduate credits in hand, the requirements for the Ph.D. are an additional 54 semester hours of credit in residence, which should consist of 30 semester hours of historical study and 24 semester hours of dissertation research and writing. All 54 semester hours have to be taken after admission to the program. A minimum of 84 semester hours is required for the doctorate.

For students admitted to the doctoral program directly from a baccalaureate program, the requirements for the Ph.D. are 84 semester hours of course work, which should consist of 60 semester hours of historical study and 24 semester hours of dissertation research and writing. A minimum of 54 semester hours must be taken while the student

GRADUATE PROGRAMS AND COURSES

is in residence after admission to the doctoral program. These hours should conform to the expectations of students who enter with a master's degree or other graduate credits in hand.

Upon matriculation, the student, in consultation with the graduate director, selects a faculty advisor in the area of concentration. Together the faculty advisor and student select a Ph.D. program committee consisting of at least three faculty members. In consultation with the student, the committee draws up the program of study and helps direct the student to the completion of required course work.

The program of study (a minimum of 60 graduate semester hours of history) required of all students in the doctoral program must conform to the following guidelines:

1. At least 36 semester hours must be at the 500-level or above;
2. If 400-level courses are taken as part of the program of study, the student must have documented proof that they were taken for graduate credit, contact the graduate administrative assistant for details;
3. At least six semester hours must be in historiographic course work (HST 512 to HST 515);
4. At least three semester hours must be in a comparative course (HST 551 to HST 555);
5. At least nine semester hours must be in research seminars (HST 591); and
6. 24 semester hours of dissertation research and writing are required.

Foreign Language Requirements. Demonstration of a satisfactory reading knowledge of two foreign languages is required before the student may take the comprehensive examinations. For the second language, the student's program committee is free to approve the substitution of a demonstrated capacity in some other research skill, such as quantitative or statistical analysis, archival management, historical preservation, oral history, or educational technology.

Preliminary Reviews. During the first academic year of residence, students are required to schedule a preliminary review with their program committee. A preliminary review is an oral interview during which a student defends the program of study and his or her progress in the program to that point. Students who fail this review must withdraw from the program.

It is recommended that students make arrangements for the preliminary review by February 1 and have the preliminary review completed by March 1. It is further recommended that the student demonstrates a satisfactory reading knowledge of at least one foreign language before scheduling the review.

Comprehensive Examinations. Candidates for the doctoral degree must display a command of the historical knowledge in their chosen fields of study. This command is determined through a series of written and oral assessments known collectively as the comprehensive examinations. Comprehensive examinations are taken after the student has completed 60 semester hours of graduate course work. Students are allowed to retake the written portions of the com-

prehensive examination only once. Only upon successful completion of the written portions of the examination are students allowed to sit for the oral portion. The comprehensive examinations are conducted by the program committee.

Dissertation Committee. Upon satisfactory completion of the comprehensive examination, a supervisory committee for the dissertation is selected. In consultation with the director of Graduate Studies, the student chooses a chair of the dissertation committee. In consultation with the chair, the student then chooses two other faculty members to serve on the dissertation committee. The role of the committee is to approve the subject and title of the dissertation and to advise the candidate during the completion of the research and writing of the dissertation.

Dissertation Prospectus. Before a candidate is permitted to begin researching a dissertation topic, the candidate must prepare a prospectus of four to seven pages outlining the thesis. The prospectus presents the connection between the thesis and relevant historiography. The prospectus must be presented to the dissertation committee by the end of the semester following the comprehensive exams. The topic must be in one of the candidate's fields of study and should include the following:

1. a thesis statement;
2. a discussion of relevant literature;
3. a discussion of possible research material and availability of sources;
4. a secondary bibliography; and
5. a historiographical statement.

Consult the graduate handbook for more information on the composition of a dissertation prospectus.

Dissertation Requirements. The dissertation must be an original contribution to knowledge and demonstrate the student's proficiency in independent research.

Final Examinations. A final oral defense of the dissertation is required.

Graduate Preparation in Public History

The department offers several public history emphases preparing students to apply the skills of the historian in careers beyond the classroom. Public historians focus their historical insight, expertise, and critical abilities in the broad—that is, public—community. Six areas of emphasis are offered within public history: business, community history, scholarly publishing, historic preservation, historical administration, and the public sector. Graduate course work in public history may be included in both master's and doctoral programs of study.

The public history core combines specially designed course work and specific program requirements with traditional degree requirements. The department imposes additional admission requirements and includes periodic evaluations of public history students' progress. (The business emphasis requires prerequisites in the business field.) Enrollment is limited to provide careful preparation and advising. The curriculum integrates required course work in a public history component with courses in a geographic

area concentration. As a special feature of the program, short courses are taught each year by visiting public historians. Each emphasis requires completion of two short courses. Courses from other disciplines, such as anthropology, business, public administration, fine arts, geography, political science, and architecture (architectural history and preservation planning) may be included in a program of study when students have the necessary prerequisites and if the courses meet particular student needs or are required within the various emphases of the concentration. Students who select the scholarly publishing option must be admitted to the Scholarly Publishing Certificate program and complete all certificate requirements. (See [“Scholarly Publishing,” page 311](#), for more information.)

Course work for all areas of the program *begins each fall semester with a required* special workshop during the fall orientation week before classes start. Students are admitted for the fall semester, though some class work outside the public history field may be started earlier. With concentrated full-time study, the master’s public history component may be completed in four semesters, depending on the public history area selected for emphasis. In some instances, the mandatory internship or other program requirements must be completed during the *summer* months.

Each student in the program completes a core of courses appropriate to an area of emphasis. Basic to each core is the completion of HIS 502 Public History Methodology during the first semester of study. The work introduced in this methodology class is continued in the public history research seminar (HIS 591), required or optional, depending on the area of emphasis.

At the satisfactory completion of the training work and upon the recommendation of the appropriate director and the department, a certificate of completion is issued by the department. Assistance is provided in job placement.

Students interested in this curriculum should consult the department’s graduate handbook, which provides detail about public history work.

HISTORY (HST)

HST 405 Colonial American History to 1763. (3)

once a year

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.

HST 406 The American Revolution, 1763–1789. (3)

once a year

Causes, course, and consequences of the American Revolution culminating in the ratification of the Constitution.

HST 407 The Early U.S. Republic, 1789–1850. (3)

once a year

Political, social, economic, and cultural development of the United States from the Revolution to 1850.

HST 408 Civil War and Reconstruction. (3)

once a year

Explores the causes, conduct, and consequences of the American Civil War, concentrating on the years 1848 to 1877.

HST 409 The Emergence of the Modern United States, 1877 to 1918. (3)

once a year

Triumph of modern political, social, and economic structures and values, 1877–1918; role of region, religion, race, and ethnicity.

HST 410 The Modern United States, 1918 to 1945. (3)

once a year

1920’s boom and the crash, the Depression and the New Deal response. The Second World War at home and abroad.

HST 411 The Postwar United States, 1945 to 1973. (3)

once a year

Cold War, prosperity, reform, and immense social and political change in the U.S.

HST 412 The Contemporary United States, 1973 to the Present. (3)

once a year

End of the Cold War, political crises, and cultural transformations in the U.S.

HST 414 The Modern U.S. Economy. (3)

selected semesters

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 HST 109 (or 110).

HST 415 Unequal Sisters: Women and Political and Cultural Change. (3)

once a year

Examines race, ethnic, and class differences among women, focusing on the political and cultural experiences of women in the U.S.

HST 416 Indian History of the Southwest. (3)

once a year

Reviews historical events from prehistoric peoples, the Spanish and Mexican periods, and the U.S. period from 1846 to present.

HST 417 Topics in Mexican American History. (3)

once a year

Focuses on specific topics in Mexican American history including immigration, civil rights, the Chicano Movement, union activism, and regional and generational differences.

HST 423 The Tudor Monarchy. (3)

once a year

Political, cultural, and social foundations of 16th-century England.

HST 424 The Stuart Transformation of England. (3)

once a year

Political, social, economic, and cultural developments in 17th-century England.

HST 426 The British Empire. (3)

once a year

British imperialism and colonialism in Africa, the Americas, Asia, and the South Pacific. Prerequisite: upper-division standing or instructor approval.

HST 427 The French Revolution and the Napoleonic Era. (3)

once a year

Conditions in Pre-Revolutionary and Revolutionary France; organization of France under Napoleon and impact of French changes upon Europe.

HST 428 Modern France. (3)

selected semesters

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.

HST 429 Modern Germany. (3)

once a year

Germany since 1871.

HST 430 Hitler: Man and Legend. (3)

once a year

Biographical approach to the German Third Reich emphasizing nature of Nazi regime, sociocultural issues, World War II, and historiography.

HST 431 Eastern Europe and the Balkans Before 1914. (3)

selected semesters

Empire and nation in Eastern Europe and the Balkans before World War I, emphasizing Hapsburg and Ottoman lands.

HST 432 Eastern Europe and the Balkans in the 20th Century. (3)

selected semesters

Politics and culture in Eastern Europe and the Balkans from World War I to the present.

GRADUATE PROGRAMS AND COURSES

HST 435 The Russian Empire. (3)

fall

Development of Russian imperial institutions and civil society from the 17th to the early 20th centuries. Lecture, discussion.

HST 436 The Soviet Experiment. (3)

spring

Communist revolutionaries' rule of Russia, focusing on utopian culture, Stalinist terror, heroism in war, and the breakup of the former USSR.

HST 437 Spain Through the Golden Age. (3)

selected semesters

Cultural, economic, political, and social development of Spain from antiquity to the late 17th century.

HST 438 Modern Spain. (3)

selected semesters

Cultural, economic, political, and social development of modern Spain.

HST 441 Spanish South America. (3)

selected semesters

Political, economic, and social development of the Spanish-speaking nations of South America since independence. 19th-century developments.

HST 442 Spanish South America. (3)

once a year

Political, economic, and social development of the Spanish-speaking nations of South America. 20th-century developments.

HST 443 The United States and Latin America. (3)

once a year

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.

HST 445 20th-Century Cuba. (3)

once a year

History of Cuba from colonial era to formation of the early republic; political, economic, social development in late 20th century. Lecture, discussion.

HST 446 Colonial Mexico. (3)

once a year

Political, economic, social, and cultural developments from pre-Columbian times to 1810.

HST 447 Modern Mexico. (3)

once a year

Political, economic, social, and cultural developments from 1810 to the present.

HST 451 Chinese Cultural History. (3)

selected semesters

China's classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought.

HST 452 Chinese Cultural History. (3)

selected semesters

Evolution of Confucian thought, its synthesis with Taoism and Buddhism, and modern reactions against, and uses of, Confucian traditions.

HST 453 The People's Republic of China. (3)

selected semesters

Analyzes major political, social, economic, and intellectual trends in China since the founding of the People's Republic in 1949.

HST 455 The United States and Japan. (3)

fall

Cultural, political, and economic relations in the 19th and 20th centuries. Emphasizes post-World War II period.

HST 456 The Vietnam War. (3)

once a year

Intersection of American and Asian histories in Vietnam, viewed from as many sides as possible.

HST 460 History of Fire. (3)

fall

Global survey of the natural and cultural history of fire. Lecture, discussion.

HST 480 Methods of Teaching History: Classroom Resources. (3)

fall

Methods in instruction, organization, and presentation of the subject matter of history and closely allied fields. Prerequisites: HST 300; ITC admission.

HST 481 Methods of Teaching History: Community Resources. (3)

spring

Identify community-based resources for teaching history, work with resources, and learn how to integrate them into the secondary classroom. Lecture, lab. Prerequisites: HST 300; ITC admission.

HST 484 Internship. (1–4)

selected semesters

HST 492 Honors Directed Study. (1–6)

selected semesters

HST 493 Honors Thesis. (3)

selected semesters

HST 494 Special Topics. (1–4)

selected semesters

HST 498 PS: History Pro-Seminar. (3)

fall and spring

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. Prerequisites: HST 300; History major.

HST 499 Individualized Instruction. (1–3)

selected semesters

HST 500 Methods of Historical Investigations. (1–12)

selected semesters

HST 502 Public History Methodology. (3)

fall

Introduces historical research methodologies, techniques, and strategies used by public historians. Readings, short papers, and guest speakers. Required for students in the public history concentration.

HST 512 Western Civilization to the Enlightenment. (3)

fall

Systematically examines various interpretations of Western civilization from the ancient Middle Eastern civilizations to the European Enlightenment. Seminar.

HST 513 Western Civilization Since the French Revolution. (3)

spring

Systematically examines various interpretations of Western civilization since the French Revolution. Seminar.

HST 514 Historians of the United States. (3)

selected semesters

Study of the history of American historical writing from the early colonial days to the 20th century.

HST 515 Studies in Historiography. (3)

fall and spring

Methods and theories of writers of history. May be repeated for credit.

HST 525 Historical Resource Management. (3)

fall

Identification, documentation, and interpretation of historic period buildings, sites, and districts. Emphasis on interdisciplinary efforts among historians, architects, and anthropologists.

HST 526 Historians and Preservation. (3)

spring

Preparation of historians for public and private historic preservation programs. Prerequisite: HST 525 or instructor approval.

HST 527 Historical Administration. (3)

fall

Preparation of historians in administration of archives and historical sites, museums, societies, and offices in government agencies.

HST 532 Community History. (3)

selected semesters

Techniques and methods of community history emphasizing local resources. Required for community history option. Seminar.

HST 551 Comparative Histories of War and Revolution. (3)

once a year

Comparative field course of the themes of war and revolution.

HST 552 Comparative History of Family and Community. (3)

selected semesters

Comparative course with a focus on family, including minority and ethnic groups, in society.

HST 553 Comparative History of State and Institutions. (3)

selected semesters

Comparative course that explores the changing nature of central institutions and government.

HST 554 Comparative Historical Population Studies: Ethnicity, Economy, and Migration. (3)

selected semesters

Comparative course that explores the impact of social, cultural, or economic changes in the population.

HST 555 Comparative Historical Topics. (3)

selected semesters

Analyzes a variety of specific social, political, cultural, and intellectual topics.

HST 584 Internship. (1–12)

selected semesters

HST 590 Reading and Conference. (1–12)

selected semesters

HST 591 Seminar. (3)

selected semesters

May be repeated for credit.

HST 592 Research. (1–12)

selected semesters

HST 595 Continuing Registration. (1)

selected semesters

HST 598 Special Topics. (1–4)

selected semesters

Reading courses designed to increase familiarity with a particular topic and the important writing concerning it. May be repeated for credit. Topics may include the following:

- Asian History. (3)
- English and British History. (3)
- European History. (3)

- Latin American History. (3)
- U.S. History. (3)

HST 599 Thesis. (1–12)

selected semesters

HST 684 Internship. (1–12)

selected semesters

HST 690 Reading and Conference. (1–12)

selected semesters

HST 695 Continuing Registration. (1)

selected semesters

HST 700 Public History Research Methods. (1–12)

selected semesters

HST 790 Reading and Conference. (1–12)

selected semesters

HST 791 Seminar. (1–12)

selected semesters

HST 792 Research. (1–12)

selected semesters

HST 795 Continuing Registration. (1)

selected semesters

HST 799 Dissertation. (1–15)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

History and Theory of Art

See [“Ph.D. in History and Theory of Art,” page 118.](#)



ASU Art Professor Randall Schmidt works on a plaster cast inside his studio.

Tim Trumble photo

Humanities

Interdisciplinary Master's Program

www.asu.edu/clas/humanities

480/965-6747

LL 641

Nancy Gutierrez, Interim Director

Humanities

Professors: Kugelmass, Lehman

Associate Professors: Privateer, Wright

Assistant Professors: Baker, Duncan, Lund, Romeyn, Taylor

Languages and Literatures

Regents' Professor: Foster

The Graduate Committee on Humanities offers an interdisciplinary program leading to the M.A. degree in Humanities. One of the unique features of this interdisciplinary program is that, because it uses faculty research/teaching interests from a number of disciplines, a student may tailor a course of study to fit individual needs and goals. The committee is chaired by Humanities core faculty and may include members from several departments. At the same time, the individualized program is balanced by a required core of several courses emphasizing interdisciplinary methodology and theory. Faculty and courses are not limited, however, to the departments and schools listed, since it is understood that many fields may be approached from a humanistic perspective.

MASTER OF ARTS

Among the small number of humanities M.A. programs in the U.S., the ASU program stands out in terms of its substance and breadth. The core of the curriculum, a sequence of three required courses, provides students with an introduction to an extremely wide range of classical and contemporary cultural theory. At the same time, the large number of elective classes at their disposal permits students to fashion a specialized field for themselves, typically combining work in two or more of the traditional humanities disciplines. The thesis—the capstone of the requirements for the degree—gives students the opportunity to make an original and substantial contribution to scholarship in their chosen field. This combination—a solid grounding in cultural theory, interdisciplinary specialization, and advanced research and writing—makes this M.A. program unique among its peers.

Admission. Students who fulfill the general requirements of the Graduate College and who have a B.A. in any of the humanities disciplines listed by the National Endowment for the Humanities are invited to apply. This invitation, however, does not preclude students who have bachelor's degrees in the social and natural sciences. In addition to meeting Graduate College requirements, students must sub-

mit Graduate Record Examination scores; three letters of academic recommendation; and a brief letter of intent, outlining their academic career to date and plans for the future, at ASU and beyond. Prospective students should apply by March 1 for admission into the program the following fall. Students whose applications are complete by the March 1 deadline will be notified of their admission status by April 15. Qualified students applying after March 1 will be admitted depending on the availability of space.

Program of Study. M.A. students must complete a minimum of 30 hours of course work, including six hours of thesis preparation. In most cases, this involves a two-year program of study, focused on the following requirements:

Core Courses. Students take a sequence of three core courses, one in each of their first three semesters. Contact an advisor for details.

Area of Study. Beyond the core courses, students use their remaining electives to develop a specific area of study, whose ultimate expression is the thesis, but which is also grounded in course work. The areas of study sponsored by the faculty include, but are not limited to: American studies; art and society; classical studies; comparative literatures and cultures; film and media studies; gender and sexuality; intellectual history and philosophy; Jewish studies; performance studies; post-colonial studies; science, technology, and culture.

Foreign Language Exam. M.A. students are required to pass a foreign language reading examination during the first three semesters.

Master's Thesis. The centerpiece of the master's degree is a written thesis that makes an original and substantial contribution to scholarship in the humanities. Most students are expected to work toward a thesis proposal and the formation of a thesis committee (consisting of a chair drawn from the Humanities faculty and two other members) during their first two semesters; to finalize their committee and receive its approval of their proposal in their third semester; and to complete the thesis in the fourth semester. A final oral defense of the thesis is required.

Faculty Research Interests. Social and intellectual history; the Enlightenment; media studies; cultural studies; Latin America; queer theory; gender studies; subaltern studies; ideological approaches to literature; comparative literature; postcolonial studies; classical culture; East European and American Jews; Israel; urban studies; humor; technology and culture; intercultural perceptions; European imperialism and colonialism; American studies; science and the humanities; Southeast Asian art history; critical theory; cultural anthropology; culture and organizational theory.

HUMANITIES (HUM)

HUM 420 Interpreting Latin America. (3)

spring

Introduces protocols and methodologies for cultural interpretation of Latin America, with emphasis on four principal cities as cultural space.

HUM 440 Los Angeles and Cultural Theory. (3)

spring

Analyzes representations of Los Angeles in literary, film, and musical texts and broader implications for contemporary American society.

HUM 450 Technology and Culture. (3)*spring*

Explores sociocultural, ideological, and postmodern implications of technology and the role technology plays in social constructions as well as the spaces it creates. Seminar, discussion.

HUM 460 Postmodern Culture and Interpretation. (3)*selected semesters*

Currents and interpretations of postmodern culture; international, comparative perspective on the culture and traditions of contemporary "Europes" and "Americas." Seminar, discussion.

HUM 462 Psychoanalysis and Culture. (3)*fall*

Introduces intellectual history of psychoanalytic movement of the 20th century and its contribution to humanities disciplines.

HUM 465 Narrative in the Human Sciences. (3)*fall*

Theories of narrative and narrativity in the humanities, concentrating on the problems of specific disciplines and interdisciplinary solutions.

HUM 501 Introduction to Cultural Theory. (3)*fall*

Selective history of cultural theory. Major figures and topics include Marx, Nietzsche, Freud, phenomenology, western Marxism, structuralism, and post-structuralism. Seminar.

HUM 502 Writing Cultures. (3)*spring*

Theories and methods of representing Western and non-Western cultures in literature, history, ethnography, and pictorial media.

HUM 503 Research and Writing in the Humanities. (3)*fall*

Systematic training in humanistic research and writing with particular attention to the interdisciplinary study of culture. Seminar.

HUM 511 Structures of Knowledge. (3)*fall*

Theories and examples of structures of knowledge, including such topics as metaphor, semiotics, and knowledge of the "other."

HUM 513 Interpretation of Cultures. (3)*once a year*

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. Fee.

HUM 549 Contemporary Critical Theory. (3)*once a year*

Advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as ENG 502. Credit is allowed for only ENG 502 or HUM 549.

HUM 591 Seminar. (1–12)*once a year*

Topics may include the following:

- Cultural Productions. (3)
- Theory and Culture. (3)
- Tragedy: Meaning and Form. (3)

HUM 598 Special Topics in the Humanities. (1–4)*selected semesters*

Open to all students. Topics may include the following:

- Comparative Fine and Performing Arts. (3)
- Cultures of Ethnic Minorities. (3)
- Film and Media Studies. (3)
- Film Theory and Criticism
Fee.
- Non-Western Cultures. (3)
- Sexuality in the Media
Fee.
- Western Historical or Contemporary Cultures. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Indian Law**Certificate Program**

See ["Indian Legal Program," page 72.](#)

Industrial Engineering**Master's and Doctoral Programs**

ceaspub.eas.asu.edu/ie

480/965-3185

GWC 502

Gary L. Hogg, Chair

Professors: Cochran, Dooley, Henderson, Hogg, Hubele, Montgomery, Runger, Wolfe

Associate Professors: Anderson-Rowland, Fowler, Mackulak, Moor, Mou, Roberts, Shunk, Villalobos, Ye

Assistant Professors: Carlyle, Gel, Kulahci, Wu

Lecturer: Borrer

The faculty in the Department of Industrial Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering, and the Ph.D. degrees in Industrial Engineering.

The overall educational objective of graduate study in industrial engineering is to improve each student's ability to understand, analyze, and resolve problems within complex organizations. Industrial engineers must develop qualitative and quantitative abilities to assist management in such diverse organizations as banks, government, hospitals, military, and manufacturing operations.

It is required that all students applying for one of the master's or doctoral degree programs submit scores (verbal, quantitative, analytical) on the Graduate Record Examination, a statement of purpose, and three letters of recommendation.

Applicants may have a baccalaureate degree in a major field other than industrial engineering, although engineering, mathematics, or science is recommended. The student's qualifications are reviewed by the faculty.

MASTER OF SCIENCE

The Master of Science (M.S.) degree is a research degree requiring a thesis and an oral defense. See ["Master's Degrees," page 93,](#) for general requirements.

GRADUATE PROGRAMS AND COURSES

MASTER OF SCIENCE IN ENGINEERING

The Master of Science in Engineering (M.S.E.) degree is a non-research degree requiring additional course work and a written comprehensive examination. See [“Master of Science in Engineering,” page 196](#), for more information on the Master of Science in Engineering degree.

The faculty also participate in offering the tri-university Master of Engineering Program. For more information, see [“Master of Engineering,” page 190](#).

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Industrial Engineering is conferred upon evidence of excellence in research that culminates in a dissertation representing a significant contribution to the field of industrial engineering.

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Program of Study. The program of study should be developed early in the second semester of Ph.D. study or when the student has completed nine semester hours of courses at ASU. Specific requirements may be obtained from the department.

Early Evaluation. In the second regular semester in residence, the student’s program of study and academic accomplishment to date serve as a basis for evaluation by the supervisory committee. The results of this evaluation are used to assist the student in improving or modifying the program of study, to encourage the continuance of Ph.D. studies or, if necessary, to discourage the student from continuing in the program.

Foreign Language Requirements. None.

Comprehensive Examinations. When the Ph.D. student has essentially completed the course work in the approved program of study and submitted a research proposal to the advisory committee, the student is given a written comprehensive examination relating to the research area. The written examination is followed by an oral exam. Upon successful completion of the comprehensive examinations, the student is admitted to candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

For up-to-date information about research activity, access the Department of Industrial Engineering Web site at ceaspub.eas.asu.edu/ie.

INDUSTRIAL ENGINEERING (IEE)

IEE 500 Research Methods: Engineering Statistics. (3)

fall, spring, summer

Designing statistical studies for solutions to engineering problems. Methods include regression, design and analysis of experiments, and other statistical topics. Credit is allowed for only IEE 485 or 500. Prerequisite: ECE 380.

IEE 505 Information Systems Engineering. (3)

fall and spring

Studies information systems application engineering. Topics include information technology, data modeling, data organization, process mapping, application and database engineering, and user interface development. Prerequisites: CSE 200; graduate standing.

IEE 511 Analysis of Decision Processes. (3)

spring

Methods of making decisions in complex environments and statistical decision theory; effects of risk, uncertainty, and strategy on engineering and managerial decisions. Prerequisites: ECE 380; graduate standing.

IEE 520 Ergonomics Design. (3)

spring

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 graduate standing.

IEE 530 Enterprise Modeling. (3)

spring

Focuses on social, economic, and technical models of the enterprise with emphasis on the management of technological resources. Includes organization, econometric, financial, and large-scale mathematical models. Prerequisite: graduate standing.

IEE 531 Topics in Engineering Administration. (3)

spring in even years

Consideration given to philosophical, psychological, political, and social implications of administrative decisions. Prerequisite: graduate standing.

IEE 532 Management of Technology. (3)

fall

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.

IEE 533 Scheduling and Network Analysis Models. (3)

spring

Applies scheduling and sequencing algorithms, deterministic and stochastic network analysis, and flow algorithms. Prerequisites: ECE 380; IEE 476 (or 546).

IEE 541 Engineering Administration. (3)

fall

Introduces quantitative and qualitative approaches to management functions, engineering administration, organizational analysis, decision making, and communication. Credit is allowed for only IEE 541 or 431. Prerequisite: graduate standing.

IEE 543 Computer-Aided Manufacturing and Control. (3)

spring

Computer control in manufacturing, CIM, NC, logic controllers, group technology, process planning and robotics. Credit is allowed for only IEE 543 or 463. Prerequisite: graduate standing.

IEE 545 Simulating Stochastic Systems. (3)

fall and spring

Analyzes stochastic systems using basic queuing networks and discrete event simulation. Basic network modeling, shared resources, routing, assembly logic. Credit is allowed for only IEE 545 or 475. Prerequisites: CSE 200; IEE 476 (or 546). Pre- or corequisite: IEE 485 or 500.

IEE 546 Operations Research Techniques/Applications. (4)

fall and spring

Models and analyzes industrial systems applications with operations research techniques. Resource allocation, product mix, production, shipping, task assignment, market share, machine repair, customer service. Credit is allowed for only IEE 546 or 476. Prerequisites: ECE 380; graduate standing.

IEE 547 Human Factors Engineering. (3)

fall and spring

Study of people at work; designing for human performance effectiveness and productivity. Considerations of human physiological and psychological factors. Credit is allowed for only IEE 547 or 437. Prerequisite: graduate standing.

IEE 552 Strategic Technological Planning. (3)

spring

Studies concepts of strategy, strategy formulation process, and strategic planning methodologies with emphasis on engineering design and manufacturing strategy, complemented with case studies. Presents and uses an analytical executive planning decision support system throughout course. Prerequisite: graduate standing. Pre- or corequisites: IEE 545, 561, 572, 574.

IEE 560 Object-Oriented Information Systems. (3)

spring

Applies object-oriented technology and concepts to enterprise information systems. Topics include requirement analysis, object-oriented design and programming, rapid application development, object data management, and development of object-oriented distributed applications. Prerequisite: IEE 505.

IEE 561 Production Systems. (3)

spring

Understanding how factories operate, how performance is measured, and how operational changes impact performance metrics. Operational philosophies, increasing production efficiency through quantitative methods. Prerequisites: IEE 476, 485.

IEE 562 Computer-Aided Manufacturing (CAM) Tools. (3)

spring

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.

IEE 563 Distributed Information Systems. (3)

fall and spring

Introduces concepts and technologies that form the core of distributed enterprise information systems. Topics include client-server architectures, distributed objects and paradigms, internet, World Wide Web, distributed information sharing, network programming, and e-commerce and enterprise applications. Prerequisite: IEE 505.

IEE 564 Planning for Computer-Integrated Manufacturing. (3)

fall

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: graduate standing.

IEE 565 Computer-Integrated Manufacturing Research. (3)

spring

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 Manufacturing. (3)

spring in even years

Uses simulation in computer-integrated manufacturing with an emphasis on modeling material handling systems. Programming, declarative, and intelligence-based simulation environments. Prerequisite: IEE 475 or 545.

IEE 567 Simulation System Analysis. (3)

fall

Simulation modeling of processes involving discrete and continuous system components. Topics include random number generators, output analysis, variance reduction, and statistical issues related to simulation. Prerequisite: IEE 475 or 545.

IEE 569 Advanced Statistical Methods. (3)

fall in even years

Applies statistical modelling and inference techniques to problems in engineering and science. Topics may include multivariate methods, spatial modeling, and nonparametric methods. Prerequisite: IEE 485 or 500.

IEE 570 Advanced Quality Control. (3)

spring

Process monitoring with control charts (Shewhart, cusum, EWMA), feedback adjustment and engineering process control, process capability, autocorrelation, selected topics from current literature. Prerequisite: IEE 485 or 500.

IEE 571 Quality Management. (3)

fall

Total quality concepts, quality strategies, quality and competitive position, quality costs, vendor relations, the quality manual, and quality in the services. Prerequisite: graduate standing.

IEE 572 Design of Engineering Experiments. (3)

fall and spring

Analysis of variance and experimental design. Topics include strategy of experimentation, factorials, blocking and confounding, fractional factorials, response surfaces, nested and split-plot designs. Prerequisite: ECE 380.

IEE 573 Reliability Engineering. (3)

spring

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)

fall and spring

Develops advanced techniques in operations research for the solution of complex industrial systems problems. Goal programming, integer programming, heuristic methods, dynamic and nonlinear programming. Prerequisite: IEE 476 or 546.

IEE 575 Applied Stochastic Operations Research Models. (3)

spring

Formulate and solve industrial systems problems with stochastic components using analytical techniques. Convolution, continuous-time Markov chains, queues with batching, priorities, balking, open/closed queueing networks. Prerequisites: IEE 476 (or 546), 485 (or 500).

IEE 576 Modeling and Analysis of Semiconductor Manufacturing Operations. (3)

fall

Applies operations research and statistical methods to solve problems that involve semiconductor manufacturing operations. Prerequisites: IEE 485 (or 500), 476 (or 546).

IEE 578 Regression Analysis. (3)

fall

Regression model building oriented toward engineers and physical scientists. Topics include linear regression, diagnostics, biased and robust fitting, nonlinear regression. Prerequisite: IEE 485 or 500.

IEE 579 Time Series Analysis and Forecasting. (3)

fall in odd years

Forecasting time series by regression-based, exponential smoothing, and ARIMA model techniques; uses digital computer programs to augment the theory. Prerequisite: IEE 485 or 500.

IEE 582 Response Surfaces and Process Optimization. (3)

spring

Classical response surface analysis and designs including steepest ascent, canonical analysis, and multiple responses. Other topics include process robustness studies, robust design, and mixture experiments. Prerequisite: IEE 572.

IEE 593 Applied Project. (1–12)

selected semesters

IEE 594 Conference and Workshop. (1)

fall and spring

Orientation to the developing work in the field with an emphasis on what the IE faculty are doing.

IEE 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Topics in Deterministic Operations Research. (3)
- Advanced Topics in Scheduling. (3)
- Analysis of Massive Data Sets. (3)
- Computer and Human Vision. (3)
- DOE/SPC for Semiconductor Processes. (3)
- Enterprise Internet/Intranet. (3)
- Introduction to Rapid Prototyping. (3)
- Mechatronics. (3)

GRADUATE PROGRAMS AND COURSES

- Product Modeling. (3)
- Strategic Design of Manufacturing Systems. (3)
- Strategic Issues in Manufacturing. (3)

IEE 599 Thesis. (1–12)

selected semesters

IEE 672 Advanced Topics in Experimental Design. (3)

spring in even years

Multilevel and mixed-level factorials and fractions, design optimality, incomplete blocks, unbalanced designs, random effects and variance components, analysis of covariance. Prerequisite: IEE 572.

IEE 677 Regression and Generalized Linear Models. (3)

spring in odd years

Theory of linear models including least squares, maximum likelihood, likelihood-based inference. Generalized linear models including Poisson and logistic regression, generalized estimating equations. Prerequisite: IEE 578.

IEE 679 Time Series Analysis and Control. (3)

fall in even years

Identification, estimation, diagnostic checking techniques for ARIMA models, transfer functions, multiple time series models for feedback and feedforward control schemes. Prerequisite: IEE 579.

IEE 681 Reliability, Availability, and Serviceability. (3)

fall in even years

Organizing hardware and software, integrity and fault-tolerant design, maintenance design and strategy, Markov models, fault-free analysis, and military standards. Prerequisite: IEE 573.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Information Management

Master’s Program

www.cob.asu.edu/acct

480/965-3631

BA 223

Philip M.J. Reckers, Director

Professors: J.R. Boatsman, Boyd, Christian, Goul, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: David, Golen, Gupta, Hwang, Iyer, Keim, Kulkarni, Moeckel, O’Dell, O’Leary, Regier, Whitecotton, Yen

Assistant Professors: Bhattacharya, Chen, Chenoweth, Comprix, Dowling, Lee, O’Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

Senior Lecturers: Goldman, Maccracken, Shrednick

Lecturers: J.L. Boatsman, Geiger, Hayes

The faculty in the School of Accountancy and Information Management, College of Business, offer specialized professional programs leading to the Master of Science in Information Management, Master of Accountancy and Information Systems (see [“Accountancy and Information Systems,” page 98.](#)), and Master of Taxation (see [“Taxation,” page 328.](#)) degrees.

The faculty also participate in the programs leading to the Master of Business Administration (see [“Master of Business Administration,” page 131.](#)) and Ph.D. degree in Business Administration (see [“Doctor of Philosophy,” page 132.](#)) degrees.

For more information, visit the school’s Web site at www.cob.asu.edu/acct.

MASTER OF SCIENCE

The program leading to the M.S. degree in Information Management educates specialists to develop and apply quantitative and computer methods to support business decision making. The program prepares students for careers in professional accounting, accounting and computer information systems/management, business consulting and corporate accounting/finance.

Admission. All applicants are required to submit the supplemental application materials required from the school. Complete application instructions may be obtained from the school’s Web site at www.cob.asu.edu/acct.

Applicants must also submit scores from the Graduate Management Admission Test (GMAT). International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) and Test of Spoken English (TSE) exams. Preference in admission is given to those with degrees in accounting and business, although other exceptional candidates are considered.

Prerequisites. Applicants must complete the program prerequisites. Refer to the School of Accountancy and Information Management Web site for a current listing of required course prerequisites for the program.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. A sample program of study might include:

ACC 533	Application Solutions in the Connected Economy	3
ACC 541	Strategic Innovations in Information and Cost Management.....	3
ACC 591	S: Electronic Commerce	3
CIS 505	Object-Oriented Modeling and Programming	3
CIS 506	Business Database Systems	3
CIS 512	Intelligent Decision Systems and Knowledge Management.....	3
CIS 530	Information Systems Development.....	3
CIS 535	Distributed Information Systems	3
CIS 593	Applied Project	3

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. An applied project is required.

Final Examinations. A final written examination is required of all candidates and is integrated with the applied project.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Systems Web site at www.cob.asu.edu/acct.

COURSES

For courses, see "Accountancy (ACC)," page .99, and "Computer Information Systems (CIS)," page .99.

Interdisciplinary Studies

ASU West offers a Master of Arts degree in Interdisciplinary Studies. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Justice Studies

Master's Program

www.asu.edu/copp/justice

480/965-7682

WILSN 327

Doris Marie Provine, Director

Regents' Professor: Altheide

Professors: Cavender, Figueira-McDonough, Haynes, Hepburn, Johnson, Jurik, Lauderdale, Musheno, Provine, Romero, Schneider, Zatz

Associate Professors: Bortner, Lujan, Menjivar, Riding In

Assistant Professors: Adelman, Afflitto, Hanson, Lopez

The faculty in the School of Justice Studies offer a program leading to the M.S. degree in Justice Studies.

Information about the interdisciplinary Ph.D. degree in Justice Studies may be obtained from the graduate coordinator's office. See "[Justice Studies](#)," page 243.

MASTER OF SCIENCE

The faculty in the School of Justice Studies offer a program leading to the M.S. degree in Justice Studies. The study of justice is an interdisciplinary field of scholarship, research, and teaching, embracing those aspects of social and behavioral sciences relevant to an understanding of law, justice, crime, and social deviance. It includes a critical examination of the policies and organizational processes that have evolved for handling attendant problems. The M.S. degree has been designed to prepare students for professional positions in justice-related agencies, for teaching

in community colleges, and for further study and research in the justice field.

Admission. In addition to meeting Graduate College requirements, the applicant must submit Graduate Record Examination (GRE) scores, a one- or two-page statement outlining the applicant's educational and career goals related to Justice Studies, areas of interest, and three letters of recommendation, preferably from academic referees. Because of enrollment limits, candidates who meet minimum requirements are not automatically admitted into the program.

Selection Criteria. In selecting promising candidates, the admissions committee evaluates past academic performance, scores from the GRE, and potential for success as indicated by recommendations and personal statements.

Applications to the program may be made at any time; however, complete files must be submitted to the Graduate College by January 1 for fall admission.

International Applicants. In addition to admission material, international applicants whose native language is not English must submit scores from the Test of English as a Foreign Language. Evidence that sufficient funds are available for financing the student's academic program also must be submitted. See "[Admission to the Graduate College](#)," page 84, for more information.

Advisory Committee. Upon admission of the applicant, a temporary advisor is appointed. The temporary advisor is a faculty member who assists students in the selection of courses for the first semester until an advisory committee is formed. Typically, by the end of the first year, students form an advisory committee consisting of a chair and two members. The chair and at least one member must be faculty of the School of Justice Studies.

The committee members must be appointed by the dean of the Graduate College upon the recommendation of the director of the School of Justice Studies. The advisory committee works with the student to establish a program of study, to direct the thesis or applied project, and to administer the oral examination.

Program of Study. The M.S. degree in Justice Studies has two options: a thesis or an applied project. The thesis option requires the completion of 36 semester hours, of which six are thesis hours. The applied project option requires the completion of 42 semester hours, of which three are JUS 593 Applied Project. Each student's program is developed in concert with the advisory committee. The program of study has three major categories: foundation courses, elective courses, and thesis or applied project requirements.

Foundation Courses. The required foundation courses provide students with a fundamental understanding of the theories, methods, and analytic techniques associated with the study of justice. Foundation courses include:

JUS 500	Justice Research Methods	3
JUS 501	Justice Theory	3
JUS 509	Statistical Problems in Justice Research	3
JUS 521	Qualitative Data Analysis and Evaluation.....	3

Elective Courses. Offered by the School of Justice Studies and other academic units, elective courses develop a unique

GRADUATE PROGRAMS AND COURSES

research area in justice studies. Students may choose these courses in consultation with their advisory committees. Alternatively, students may choose one of the following areas within justice studies:

1. adolescence and justice;
2. American Indian justice;
3. comparative justice;
4. crime and justice;
5. dispute resolution;
6. gender and justice;
7. law, ecology, and society;
8. law, policy, and evaluation;
9. race, ethnicity, and justice; or
10. social and economic justice.

Thesis Requirements. To satisfy the research requirement for the Master of Science degree, candidates must write a thesis and defend it in an oral examination.

Applied Project Requirements. Candidates pursuing the applied project option must present their applied project and defend it in an oral examination conducted by the faculty member who supervises the project. The project should be an analytical report.

Concurrent M.A. Anthropology/M.S. Justice Studies. Graduate students in the School of Justice Studies and the Department of Anthropology are able to receive a concurrent Master of Science degree in Justice Studies and Master of Arts degree in Anthropology with a concentration in sociocultural anthropology. The program is designed for individuals with combined and complementary knowledge and skills. It prepares them for basic and applied research and administrative and educational activities related to justice studies and anthropology. Students must apply and be admitted separately to each program in accordance with the guidelines of the Graduate College, the Department of Anthropology, and the School of Justice Studies.

Foreign Language Requirements. None.

Financial Assistance. A limited number of assistantships are available on a competitive basis for well-qualified students at the master's level. To be eligible for an assistantship, students must be admitted to a graduate degree program with regular admission status. Application should be made directly to the School of Justice Studies.

JUSTICE STUDIES (JUS)

JUS 500 Justice Research Methods. (3)

once a year
Theories and methods of research with emphasis on development of designs most relevant to justice data and problems.

JUS 501 Justice Theory. (3)

once a year
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)

once a year
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)

once a year
Methodological problems of research design and statistical methods specific to justice studies.

JUS 515 Comparative Justice. (3)

once a year
Focuses on justice, legality, and human rights cross-culturally, examining both theoretical and methodological issues. Seminar.

JUS 521 Qualitative Data Analysis and Evaluation. (3)

once a year
Analyzes qualitative data, e.g., field notes, in-depth interview transcripts, document analysis, coding, and retrieval with a microcomputer; qualitative evaluation.

JUS 542 American Indian Justice. (3)

once a year
Provides a broad overview of American Indian and Alaskan Native issues of justice and injustice in contemporary society.

JUS 555 Migration/Immigration and Justice. (3)

selected semesters
Explores the causes and consequences of immigration to the United States and the incorporation of immigrants into the American economy and society. Seminar.

JUS 560 Women, Law, and Social Control. (3)

once a year
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)

once a year
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 575 Race, Gender, and Crime. (3)

fall and spring
Current theoretical and methodological debates and controversies regarding race, ethnicity, gender, class, crime, and the criminal justice system; policy implications. Seminar.

JUS 579 Political Deviance. (3)

once a year
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)

fall, spring, summer
Assignments in a justice agency designed to further the integration of theory and practice. Placements are arranged through consultation with students and agencies.

JUS 588 Justice and the Mass Media. (3)

once a year
Analyzes the nature and impact of mass media messages about justice concerns for social order. Lecture, discussion.

JUS 591 Seminar. (1–3)

once a year
Topics chosen from various fields of justice studies. May be repeated for credit.

JUS 593 Applied Project. (1–12)

selected semesters

JUS 610 Law and the Social Sciences. (3)

once a year
Analyzes 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)

once a year
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)

once a year
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)

once a year

Analyzes philosophical perspectives of justice; linkages between social science theory and justice constructs; application of justice to social issues.

JUS 650 Advanced Qualitative Data Analysis. (3)

spring

Advanced qualitative data collection and analysis techniques, including ethnography, in-depth interviews, field notes, coding, transcribing, content analysis, textual analysis. Seminar.

JUS 669 Political Trials and Indigenous Justice. (3)

once a year

Focuses upon research on political trials, deviance, and conceptions of indigenous and contemporary justice. Lecture, discussion.

JUS 691 Seminar. (1–3)

fall, spring, summer

Topics chosen from various fields of justice studies. May be repeated for credit.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Justice Studies

Interdisciplinary Doctoral Program

www.asu.edu/copp/justice

480/965-7083

WILSN 370

John Johnson, Director

Administration of Justice (ASU West)

Associate Professor: Haarr

Anthropology

Professor: Brandt

Chicana and Chicano Studies

Associate Professor: Escobar

Communication

Professors: Carlson, Nakayama

Associate Professor: Corey

Assistant Professor: Trethewey

Curriculum and Instruction

Professor: Edelsky

English

Professor: Sands

History

Professors: Davis, Fuchs

Humanities

Assistant Professor: Baker

Justice Studies

Regents' Professor: Altheide

Professors: Cavender, Figueira-McDonough, Haynes, Hepburn, Johnson, Jurik, Lauderdale, Musheno, Romero, Schneider, Zatz

Associate Professors: Bortner, Lujan, Menjivar, Riding In

Assistant Professors: Adelman, Afflitto, Hanson, Lopez

Languages and Literatures

Regents' Professor: Foster

Professor: Baldini

Law

Regents' Professor: Murphy

Professors: Bartels, Lowenthal, Saks, Stanton, Strouse, Tesón, Tsosie

Clinical Professor: Dauber

Philosophy

Regents' Professor: Murphy

Associate Professors: de Marneffe, McGregor

Political Science

Associate Professors: Ashley, Dantico, Doty, Simhony

Psychology

Regents' Professor: Russo

Professor: Lanyon

Psychology in Education

Associate Professor: Moore

Recreation Management and Tourism

Professor: Allison

Religious Studies

Associate Professor: Gereboff

Social Work

Professor: Ashford

Sociology

Professors: Kronenfeld, Nagasawa, Thomas

Associate Professor: Benin

Women's Studies

Associate Professor: Ferraro

Assistant Professor: Anderson

The Committee on Law and the Social Sciences (COLASS) offers an interdisciplinary graduate program leading to the Ph.D. degree in Justice Studies. Faculty are from a large number of academic units and provide the students with an opportunity to tailor their courses of study to fit individual needs and goals. COLASS committee members represent the following departments: Anthropology, Communication, Languages and Literatures, History, Management, Philosophy, Political Science, Psychology, Recreation Management and Tourism, Religious Studies, Sociology, the College of Law, and the Schools of Justice Studies and Social Work. An executive committee, appointed by the dean of the Graduate College from this larger body of faculty, has the primary responsibility for the operation of the Ph.D. program.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Justice Studies integrates philosophical, legal, historical, and social science approaches to the study of law and justice in society.

GRADUATE PROGRAMS AND COURSES

This interdisciplinary program aims to produce scholars whose research activities contribute to the knowledge and understanding of conflicts and dilemmas surrounding social change. Courses on the study of justice are a part of the curriculum of many academic disciplines, and academic books and journals increasingly stress issues of justice and injustice. In addition to the interdisciplinary programs featuring justice, students may enter academic programs that focus on business administration, class, ecology, gender, law, public administration, and race. Justice Studies graduates from the interdisciplinary Ph.D. program have a strong theoretical background, interdisciplinary training in law, humanities, and the social sciences, and possess the technical skills associated with both qualitative and quantitative research methodologies. These qualifications can provide graduates with the opportunity to successfully compete for a variety of positions in academic and justice-related fields.

Admission. Applications are reviewed on an annual basis by an admissions committee representing COLASS. Recommendations for admission are made by the director of the Executive Committee to the dean of the Graduate College. In addition to meeting minimum Graduate College admission requirements, each applicant must provide a statement of educational and career goals and the reasons for seeking the interdisciplinary Ph.D. in Justice Studies, a Graduate Record Examination test score or the Law School Admission Test score, a sample of written work, and three letters of recommendation, preferably from academic referees. Application to the program may be made at anytime. However, complete files must be submitted to the Graduate College by January 1 for the following fall semester. Because of enrollment limits, candidates who meet minimum requirements cannot automatically be admitted.

Advisory Committee. An advisory committee consisting of the committee chairperson and at least two other members, must represent a minimum of two disciplines and be from two different academic units. The dean of the Graduate College, upon the recommendation of the director of COLASS, appoints this committee. The advisory committee assists the students in developing programs of study, assumes primary responsibility for assessing the students' academic progress, and prepares and evaluates the comprehensive examination.

Core Courses. Five core courses are required of all students in the program. The core courses are taken within the first three semesters of the student's program of study. Each core course is interdisciplinary in nature.

JUS 610 Law and the Social Sciences.....	3
JUS 620 Justice Research and Methods	3
JUS 630 Data Analysis for Justice Research.....	3
JUS 640 Theoretical Perspectives on Justice.....	3
JUS 650 Advanced Qualitative Data Analysis	3
Total	15

Areas of Concentration. Students use elective courses to develop a specialization in an area relevant to justice studies from a law and social sciences perspective. The specialization is developed through consultation with the student's advisory committee. Five areas of concentration have been

established, based on the research and teaching expertise of participating faculty.

1. criminal and juvenile justice;
2. dispute resolution;
3. law, justice, and minority populations;
4. law, policy, and evaluation; and
5. women, law, and justice.

From these broad concentrations, students can develop areas of study emphasizing

1. adolescence and justice;
2. American Indian justice;
3. comparative justice;
4. crime and justice;
5. dispute resolution;
6. gender and justice;
7. law, ecology, and society;
8. law, policy, and evaluation;
9. race, ethnicity, and justice; and
10. social and economic justice.

Students may develop other areas of study in consultation with their advisory committee. Courses are not limited to those departments and schools participating in the Committee on Law and Social Sciences.

Program of Study. Students entering the program with a master's degree in the social sciences, philosophy, a relevant interdisciplinary field, or a Juris Doctorate (J.D.), must complete a minimum of 54 semester hours of study beyond the master's or J.D. degree, including 24 semester hours of dissertation and research. Applicants holding only the baccalaureate degree are required to complete a total of 84 semester hours. At least 30 hours of the approved Ph.D. program of study must be completed after admission into the program. The Graduate College also requires that two consecutive semesters, subsequent to admission to the program, must be spent in full-time residence at ASU.

Foreign Language Requirements. None.

Comprehensive Examinations. Upon completion of course work and before the start of dissertation research, the student is given a written examination. The examination evaluates the student's accumulation of interdisciplinary knowledge and ability to communicate across disciplines. The exam is developed and administered by the student's advisory committee.

Dissertation Committee. After passing the comprehensive examination, a dissertation committee is formed and approved by the dean of the Graduate College upon the recommendation of the director of the executive committee. The dissertation committee must consist of at least three faculty members, including the dissertation committee chairperson. The committee must represent an interdisciplinary faculty, with demonstrated interdisciplinary knowledge and skills to advise the student during the formulation of the research topic and during the completion of the research and dissertation. The three-membered committee must represent

at least two disciplines and two different academic units. The dissertation and advisory committees may have different memberships.

Advancement to Candidacy. Ph.D. students will achieve candidacy status in a letter from the Graduate College dean upon (1) passing the comprehensive examination, and (2) successfully defending the dissertation prospectus.

Dissertation Requirements. The dissertation consists of a fully documented written analysis demonstrating an appropriate level of interdisciplinary skills and competence associated with a justice issue. Each student must register for a minimum of 24 semester hours of dissertation and research; 12 of these semester hours must be completed in subsequent semesters following the semester the student is advanced to candidacy.

Final Examinations. The dissertation must be defended in an oral examination. A candidate must pass the final examination within five years after completing the comprehensive examination.

Concurrent Ph.D. in Justice Studies/J.D. The purpose of the concurrent Ph.D. in Justice Studies/J.D. is to provide a rigorous education for highly qualified students interested in

pursuing academic careers in law, law and the social sciences, or law and philosophy. To seek concurrent degrees, the prospective student must first gain separate admission to the College of Law and the interdisciplinary Ph.D. program in Justice Studies. The student must then obtain special approval to pursue concurrently the J.D. and Ph.D. degrees. No more than three students a year are admitted into the concurrent degree program.

COURSES

For courses, see “Justice Studies (JUS),” page 242.

Languages and Literatures

Master’s and Doctoral Programs

www.asu.edu/clas/dll

480/965-6281

LL 440

Deborah N. Losse, Chair

Regents’ Professors: Foster, Keller

Professors: Alexander, Baldini, Ballon-Aguirre, Chambers, Couch, Croft, Ekmanis, Guntermann, Honegger, Horwath, Losse, Valdivieso, Volek, Wetsel, Williams, Wixted, T. Wong

Associate Professors: Acereda, Candela, Cota-Cárdenas, Carlos Garcia-Fernandez, Carmen Garcia-Fernandez, W. Hendrickson, Hernández-G., Lafford, Ossipov, Reiman, Sanchez, Senner, Suwarno, Tompkins, Urioste-Azcorra, Vitullo

Assistant Professors: Burton, Canovas, Cashman, Choi, Colina, George, Ginsburg, Gruzinska, Haberman, Orlich, Rees, Tipton

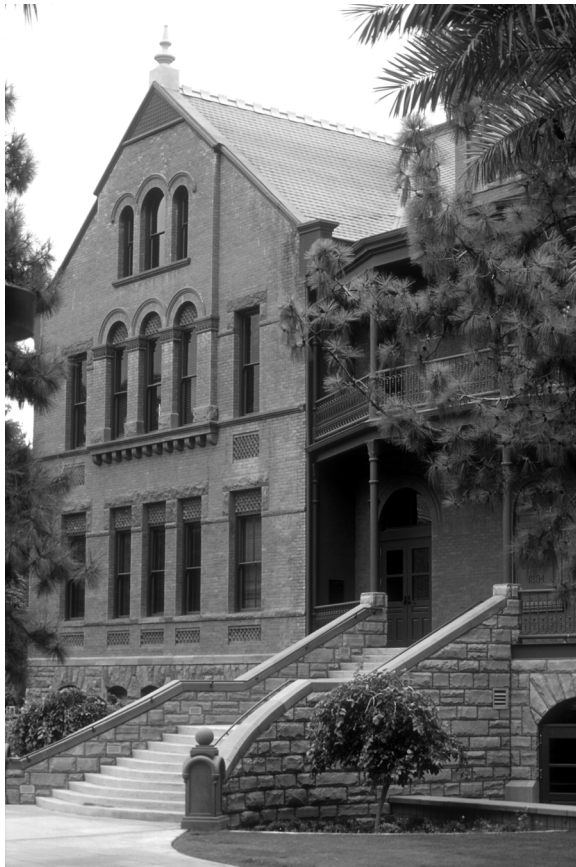
Lecturers: Foard, S. Hendrickson, Lage, Martinez, Sherman, Stiftel, Walton-Ramirez, E. Wong

Instructors: Deal, Le, Oh, Pang

Academic Associate: Glessner

The faculty in the Department of Languages and Literatures offer graduate programs leading to the M.A. degree in Asian Languages and Civilizations—Chinese/Japanese, French, German, and Spanish. For concentrations available under each major, see the “[College of Liberal Arts and Sciences Graduate Degrees and Majors](#)” table, page 75.

Students admitted to the Master of Education degree program in Secondary Education may elect foreign languages as the subject matter field. See “[Master of Education](#),” page 181, for information on the Master of Education degree.



Old Main

Tim Trumble photo

GRADUATE PROGRAMS AND COURSES

The faculty also offer a graduate program leading to the Ph.D. degree in Spanish. See “[Doctor of Philosophy](#),” page 96, for general requirements.

It is recommended, but not required, that students applying for admission to the M.A., M.Ed., or Ph.D. program submit scores on the Graduate Record Examination.

The department also offers a Certificate in Translation.

MASTER OF ARTS

Candidates for the M.A. degree should, upon entrance, present the equivalent of an undergraduate major in the language in which the degree is sought. Those who lack this background, but who show strong potential and meet Graduate College admissions requirements, may be admitted to a graduate program on a provisional basis, pending removal of specified deficiencies. These deficiencies must be completed in addition to the regular program of study for the master’s degree.

Students in all graduate programs are expected to maintain a high level of linguistic fluency acceptable to a native speaker. Before acceptance in the program, applicants may be requested to furnish evidence of their proficiency.

The program of study for the M.A. degree includes a minimum of 30 semester hours of graduate-level work, as approved by the candidate’s supervisory committee. The program must include a 500-level Bibliography and Research Methods course offered by the department. When approved by the candidate’s supervisory committee, in some programs, nine hours in another language or in closely related courses may be included in the program.

Students who are primarily interested in teaching on the secondary or community college levels may select a program of study with a concentration in language and cultures. Students seeking an M.A. degree in Asian Languages and Civilization or in Spanish, should consult with the respective director of Graduate Studies.

Comprehensive Examinations. All candidates are required to pass a comprehensive written or oral examination designed to evaluate the candidate’s knowledge in the area of specialization. A reading list is provided as a guide to preparation for this examination.

Thesis Requirements. There are two options. The thesis option is required for students intending to pursue doctoral studies. In French, there is a portfolio option thesis equivalent for students intending to teach in K–12 or the community colleges; however, such students may also choose the thesis option. See the director of graduate studies to inquire about the two options. Students seeking an M.A. degree in Spanish have a thesis option only. Consult the *Spanish Graduate Handbook* for further information.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is offered with a major in Spanish with concentrations in literature or cultural studies.

Program of Study. A student’s individual program of courses covering the various periods of Spanish and Latin

American literature and/or culture, as well as the historical and political background of both areas, is determined in consultation with the supervisory committee. Specifically required as prerequisites are SPA 500 Bibliography and Research Methods, SPA 545 Concepts of Literary Criticism (for a concentration in literature), and SPA 598 ST: Cultural Studies/Semiotics of Culture (for a concentration in cultural studies).

At least 15 graduate credits must be earned in the subfield, and the candidate’s program of study in the subfield must be approved by the subfield department. Normally the comprehensive examination on the subfield, administered by the subfield department, must be satisfied before the comprehensive examination in Spanish. Students are urged to consult the *Spanish Graduate Handbook*.

Foreign Language Requirements. Each candidate is expected to demonstrate a reading knowledge of two languages other than Spanish. The language requirements must be satisfied before the candidate is eligible to take the comprehensive examination.

Comprehensive Examinations. A written and oral comprehensive examination, designed to ascertain the candidate’s knowledge and orientation in the field of study and competency to proceed with the dissertation, is required at or near the end of course work.

Dissertation Requirements. The candidate must present an acceptable dissertation based on original investigation. The dissertation must represent a significant contribution to knowledge and demonstrate the candidate’s ability to do independent, scholarly research.

Final Examinations. A final oral examination is required. This examination covers the subject matter of the dissertation and appropriate field.

CERTIFICATE IN TRANSLATION

The Certificate in Translation program is designed to provide the advanced training required for professional translation in both the 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 semester hours of in-service practicum primarily into the receptor language of English from the source language of Spanish. The practicum 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 and are enrolled in the university. A complete brochure is available at the Department of Languages and Literatures in LL 440.

While the certificate program is not yet available in French, FRE translation courses may be available. See the *Schedule of Classes* for course offerings.

RESEARCH ACTIVITY

Faculty in the Department of Languages and Literatures conducts a wide array of research on topics relating to languages and cultures of the world. Of particular interest are contemporary and urban topics relating to the 20th-century and beyond, with special emphasis on urban studies, gender issues/sexual identities, popular culture, film, theater, and print media. Current pedagogical issues relating to language acquisition figures prominently in the department, as do technological developments. These include the teaching of languages and cultures, and the accessibility to and distribution of information regarding regions and topics of interest to faculty and students.

Spanish Research Activity. In addition to broad coverage of peninsular and Spanish-American literary and cultural topics, particular regional emphases lie within the U.S. Southwest, Mexico, Central America, the Caribbean, the Andes, and the River Plate. Specific research projects by Spanish faculty members include topics in Chicano and Latino literature, literary translation, Hispanic literary bibliography, contemporary literary theory, Spanish-American colonial literature, Argentine narrative, contemporary Mexican and Centro-American literature, contemporary Spanish and Spanish-American poetry, Spanish-American oral tradition, Hispanic women writers, Latin American popular culture, Spanish-American Jewish writers, gender and queer studies, contemporary Spanish and Spanish-American theater and film, Spanish-American postmodern culture, prose narrative of the Golden Age, Hispanic linguistics and bilingualism/sociolinguistics, and various topics in Brazilian literature.

CHINESE (CHI)

CHI 500 Bibliography and Research Methods. (3)

selected semesters

Introduces research materials on China in Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion.

CHI 514 Advanced Classical Chinese. (3)

selected semesters

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)

selected semesters

Theory and practice of teaching Chinese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

CHI 535 Advanced Readings. (3)

selected semesters

Readings in primary and secondary sources in history, art, religious studies, economics, or other fields. Lecture, discussion.

CHI 543 Chinese Language and Linguistics. (3)

fall

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)

selected semesters

Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture, discussion.

CHI 591 Seminar. (3)

selected semesters

Topics in literary, linguistic, or cultural studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

FOREIGN LANGUAGES (FLA)

FLA 515 Second Language Acquisition. (3)

spring

Discussion and application of theories of second language acquisition. Prerequisite: FLA 400 (or its equivalent).

FLA 525 Trends and Issues in Foreign Language Teaching. (3)

selected semesters

Advanced methods seminar, designed for experienced teachers.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

FRENCH (FRE)

FRE 415 French Civilization I. (3)

spring

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.

FRE 416 French Civilization II. (3)

spring

Political, intellectual, social, economic, and artistic development of France from the 18th century to present. Prerequisite: 6 hours of upper-division French.

FRE 421 Structure of French. (3)

fall

Phonology, morphology, syntax, semantics, and varieties of French. Prerequisites: both FRE 311 and 312 or only instructor approval.

FRE 422 Applied French Linguistics. (3)

spring

Applies 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)

spring

Analyzes French syntactic structure by contemporary theoretical models. Prerequisite: ASB 480 or ENG 213 or FLA 400.

FRE 424 French Phonology. (3)

selected semesters

Introduces phonological theory and its application to French. Prerequisites: both FRE 311 and 312 or only instructor approval.

FRE 441 French Literature of the 17th Century. (3)

fall

From 1600 to 1660. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

FRE 442 French Literature of the 17th Century. (3)

spring

From 1660 to 1700. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

FRE 445 French Literature of the 18th Century. (3)

selected semesters

Contributions of the philosophers and the development of the novel and drama. Prerequisites: both FRE 321 and 6 hours of 300-level French or only instructor approval.

FRE 451 French Poetry of the 19th Century. (3)

spring

From Romanticism to Parnassian poetry to Symbolism. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 452 French Novel of the 19th Century. (3)

fall

From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

GRADUATE PROGRAMS AND COURSES

FRE 453 Theater of the 19th Century. (3)

spring

From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Mirbeau. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 461 Modern Narrative. (3)

fall

Representative authors from Gide to the new Nouveau Roman. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 462 Modern Poetry. (3)

spring

Representative authors from Mallarmé to Bonnefoy. Lecture, discussion. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 471 The Literature of Francophone Africa and the Caribbean. (3)

fall

Selected prose, poetry, and drama of black authors from Africa and the Caribbean. Prerequisites: both FRE 322 and 6 hours of 300-level French or only instructor approval.

FRE 472 Franco-Canadian Civilization. (3)

spring

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.

FRE 480 Translation Theory and Practice. (3)

spring

Theoretical and practical approaches to the fundamentals of meaning-based translation. Lecture, seminar. Prerequisite: FRE 412 or instructor approval.

FRE 482 Business Translation. (3)

fall

Practical approach to meaning-based translation through exposure to a variety of business texts. Prerequisite: FRE 312 or instructor approval.

FRE 485 Literary Translation. (3)

spring

Theory and practice of literary translation with emphasis on application through individual translation project. Prerequisite: FRE 480.

FRE 500 Bibliography and Research Methods. (3)

fall

Required of all graduate students.

FRE 510 Explication de Textes. (3)

selected semesters

Detailed analysis of literary texts.

FRE 515 Intellectual Currents in France, from the Middle Ages to the 18th Century. (3)

selected semesters

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)

selected semesters

See FRE 515.

FRE 521 History of the French Language. (3)

spring

Principal phonological, morphological, and semantic developments of French from Latin to present, with emphasis on Old and Middle French. Prerequisite: some familiarity with Latin recommended.

FRE 531 Medieval French Literature. (3)

fall

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)

fall

Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pleiade.

FRE 580 Translation Theory and Practice. (3)

spring

Theoretical and practical approaches to the fundamentals of meaning-based translation. Lecture, seminar. Prerequisite: FRE 412 or instructor approval.

FRE 582 Business Translation. (3)

fall

Practical approach to meaning-based translation through exposure to a variety of business texts. Prerequisite: FRE 312 or instructor approval.

FRE 585 Literary Translation. (3)

spring

Theory and practice of literary translation with emphasis on application through individual translation project. Lecture, seminar. Prerequisite: FRE 480.

FRE 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Advanced Problems in French Literature. (3)
- Balzac. (3)
- Corneille, Molière, and Racine. (3)
- Diderot, Voltaire, and Rousseau. (3)
- Flaubert. (3)
- French Existentialist Literature. (3)
- French Literary Criticism. (3)
- Proust. (3)
- Realism and Naturalism. (3)
- Romanticism. (3)
- Stendhal and Zola. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

GERMAN (GER)

GER 421 German Literature. (3)

fall

From the beginning to Classicism. Prerequisite: 6 hours of 300-level German.

GER 422 German Literature. (3)

spring

From Romanticism to the present. Prerequisite: 6 hours of 300-level German.

GER 453 German Literary Masterpieces on Film. (3)

fall, spring, summer

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.

GER 500 Bibliography and Research Methods. (3)

selected semesters

Required of all graduate students.

GER 511 German Stylistics. (3)

selected semesters

Art of writing literary German, comparative stylistics.

GER 521 History of German Language. (3)

selected semesters

Linguistic development of German from the earliest records to the present.

GER 523 German Drama. (3)

selected semesters

Drama of the 19th and 20th centuries.

GER 525 German Novel. (3)

selected semesters

Special studies in the German novel.

GER 527 The *Novelle*. (3)

selected semesters

Special studies in the German short story.

GER 531 Middle High German Language and Literature. (3)

selected semesters

Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres.

GER 551 Romanticism. (3)

selected semesters

Treatment of early and late Romanticism.

GER 555 Modern German Literature. (3)

selected semesters

Major works from the period of Expressionism to 1945.

GER 591 Seminar. (1–12)

selected semesters

Special topics are concerned with a figure, theme, or work in German literature or Germanic studies. Topics may include the following:

- Faust. (3)
- Germanic Studies. (3)
- Goethe. (3)
- Grass and Böll. (3)
- Hesse. (3)
- Kafka. (3)
- Kleist. (3)
- Schiller. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

JAPANESE (JPN)

JPN 500 Bibliography and Research Methods. (3)

selected semesters

Introduces research materials on Japan both in Japanese and in Western languages. Overview of research methods. Lecture, discussion.

JPN 514 Advanced Premodern Japanese. (3)

selected semesters

Close readings of selected premodern texts, with focus on grammatical and stylistic features. Lecture, discussion. Prerequisite: JPN 414 (or its equivalent).

JPN 520 Teaching of Japanese as a Second Language. (3)

selected semesters

Theory and practice of teaching Japanese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

JPN 535 Advanced Readings. (3)

selected semesters

Readings in primary and secondary sources in history, art, religious studies, literature, or other fields. Lecture, discussion. Prerequisite: JPN 414 (or its equivalent).

JPN 543 Japanese Language and Linguistics. (3)

selected semesters

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)

selected semesters

Theories and practice of translation; strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 435 (or its equivalent).

JPN 591 Seminar. (3)

selected semesters

Topics in literary, linguistic, or cultural studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

RUSSIAN (RUS)

RUS 591 Seminar. (3)

selected semesters

Topics in literary, linguistic, or other cultural studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

SPANISH (SPA)

SPA 500 Bibliography and Research Methods. (3)

fall

Required of all graduate students.

SPA 536 Generation of 1898. (3)

selected semesters

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)

spring

Analyzes and discusses the development of Spanish from Vulgar Latin to the present day. Prerequisite: FLA 400 (or its equivalent).

SPA 541 Spanish Language in America. (3)

fall

Discusses and analyzes various regional and social varieties of Spanish in the Americas. Prerequisite: FLA 400 (or its equivalent).

SPA 542 Studies in the Spanish of the Southwest. (3)

spring

Examines bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 (or its equivalent).

SPA 543 Structure of Spanish. (3)

spring

Analyzes and discusses data on selected topics in Spanish morphology, semantics, and syntax. Prerequisite: FLA 400 (or its equivalent).

SPA 544 Spanish Phonology. (3)

spring

Surveys problems of Spanish phonology within the context of recent phonological theory. Prerequisite: FLA 400 (or its equivalent).

SPA 545 Concepts of Literary Criticism. (3)

spring

Aims and methods of modern literary scholarship. Discusses major theories of literary analysis.

SPA 555 Spanish American Modernism. (3)

selected semesters

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)

selected semesters

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)

selected semesters

Major figures and works of the Middle Ages in Spain.

SPA 561 Golden Age Spanish Prose Fiction. (3)

selected semesters

Major figures and works of the 16th and 17th centuries, with emphasis on the picaresque novel.

SPA 562 Golden Age Spanish Poetry. (3)

selected semesters

Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

SPA 563 Spanish Romanticism. (3)

selected semesters

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)

selected semesters

Principal figures and works of realism in the 19th-century novel, with emphasis on Galdós.

SPA 565 20th-Century Spanish Drama. (3)

selected semesters

Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

SPA 566 Generation of 1927. (3)

selected semesters

Major poets of the Generation of 1927, with emphasis on works of Lorca, Guillén, Salinas, and Aleixandre.

SPA 567 Contemporary Spanish Novel. (3)

selected semesters

Major works of post-Civil War Spanish fiction.

GRADUATE PROGRAMS AND COURSES

SPA 568 Cervantes. (3)

selected semesters

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)

selected semesters

Indigenous literary traditions, with emphasis on Nahuatl, Mayan, and Quechua literatures through readings in Spanish translations.

SPA 571 Colonial Spanish American Literature. (3)

selected semesters

Major figures and works from conquest to independence.

SPA 572 Spanish American Drama. (3)

selected semesters

Major contributions of Spanish American drama, with emphasis on contemporary dramatists.

SPA 573 Spanish American Essay. (3)

selected semesters

Major works of the essay, within the framework of intellectual history and literary movements.

SPA 574 Spanish American Vanguard Poetry. (3)

selected semesters

Examines poetic developments, 1920–1940, with emphasis on Huidobro, Vallejo, Neruda, and the international context of their works.

SPA 575 Contemporary Spanish American Novel. (3)

selected semesters

Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 576 Contemporary Spanish American Short Story. (3)

selected semesters

Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

SPA 577 Regional Spanish American Literature. (3)

selected semesters

Figures and works of major national (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated when topics vary.

SPA 578 Novel of the Mexican Revolution. (3)

selected semesters

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)

selected semesters

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)

selected semesters

Examines the role of film in contemporary Latin American culture; films viewed and analyzed as casebook examples. Seminar.

SPA 591 Seminar. (3)

selected semesters

Spanish and Spanish American literary, cultural, and linguistic topics.

SPA 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Cultural Studies/Semiotics of Culture

SPA 691 Figures and Works Seminar. (3)

selected semesters

Topics may be selected from Spanish and Spanish American literatures

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Law

Doctoral and Certificate Programs

law.asu.edu

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LAW 201

Patricia D. White, Dean

Directors

Marchant, Center for the Study of Law, Science, and Technology; O'Grady, Clinical Programs; Stinson, Legal Research and Writing and Academic Support; Tsosie, Indian Legal Program

Regents' Professors: Kaye, Murphy

Professors: Arterian, Bartels, Bender, Berch, Brennan, Calleros, Clinton, Ellman, Feller, Furnish, Gorman, Grey, Guerin, Jones, Kader, Karjala, Leshy, Lowenthal, Lynk, Matheson, O'Grady, Rose, Saks, Schatzki, Schroeder, Stanton, Strouse, Tesón, Tsosie, Tucker, Weinstein, White, Winer, Woodley

Associate Professor: Marchant

Clinical Professor: Dauber

Clinical Professional: Dallyn

For more information about the College of Law programs, see "[College of Law](#)," page 71.

LAW (LAW)

LAW 500 Holding Registration. (1–16)

fall and spring

LAW 515 Contracts I. (3)

fall

Explores common law legal method and the structure of Article 2 of the U.C.C. in the context of issues of contract formation.

LAW 516 Criminal Law. (3)

fall

Substantive law of crimes.

LAW 517 Torts I. (2–4)

spring

Legal protections of personality, property, and relational interests against physical, economic, and emotional harms.

LAW 518 Civil Procedure I. (3)

fall

Explores the structure of a lawsuit and techniques of alternative dispute resolution. Specific topics include commencement of suit, joinder of parties, discovery, pretrial motions, and subject matter jurisdiction.

LAW 519 Legal Method and Writing. (2)

fall

Examines methods used to analyze legal problems. Reviews precedent statutory construction and basic *res judicata* problems. Use of basic legal writing formats.

LAW 520 Contracts II. (2)

spring

Continuation of LAW 515 focusing on contract interpretation.

LAW 522 Constitutional Law I. (3)*spring*

Role of courts in the federal system, distribution of powers between state and federal governments, and the role of procedure in litigation of constitutional questions.

LAW 523 Property I. (2–3)*fall*

Indicia of ownership, found property, estates in land, landlord tenant.

LAW 524 Legal Research and Writing. (2)*spring*

Continuation of LAW 519.

LAW 525 Torts II. (2)*spring*

Continuation of LAW 517 with emphasis on strict and products liability.

LAW 526 Property II. (2–3)*spring*

Nonpossessory interests in property (easements, covenants, servitudes); nuisance; land use planning; and transfers of interests in property.

LAW 527 Civil Procedure II. (3)*spring*

Continuation of LAW 518; subjects in LAW 518 are addressed in greater depth as well as personal jurisdiction, res judicata, collateral estoppel, and choice of law under the *Erie* doctrine.

LAW 600 Administrative Law. (3)*once a year*

Administrative process, emphasizing nature of powers exercised by administrative agencies of government, problems of procedure, and scope of judicial review.

LAW 601 Antitrust Law. (3)*once a year*

Legislation and its implementation to prevent monopoly and business practices in restraint of trade, including restrictive agreements involving price-fixing, trade association activities, and resale price maintenance.

LAW 602 Partnership Taxation. (2–3)*selected semesters*

Federal tax consequences of forming, operating, terminating, or transferring partnerships.

LAW 603 Conflict of Laws. (3)*selected semesters*

Problems arising when the operative facts of a case are connected with more than one state or nation. Choice of law, bases of jurisdiction, effect of foreign judgments, and underlying federal and constitutional issues.

LAW 604 Criminal Procedure. (3)*fall and spring*

Nature of the criminal procedural system with special focus on constitutional protections for the accused.

LAW 605 Evidence. (3)*once a year*

Principles and practice governing the competency of witnesses and presentation of evidence, including the rules of exclusion and roles of lawyer, judge, and jury under the adversary system.

LAW 606 Federal Income Taxation. (3–4)*fall and spring*

Federal income tax in relation to concepts of income, property arrangement, business activity, and current tax problems, with focus on the process of tax legislation and administration.

LAW 607 Advanced Civil Procedure. (3)*fall and spring*

Overview of the structure and life cycle of a lawsuit from pleadings to appeal, emphasizing the Federal Rules of Civil Procedure.

LAW 608 Business Associations I. (3)*once a year*

Partnerships, limited partnerships, and small business corporations. Includes a brief introduction to accounting. Detailed analysis of the problems of forming a close corporation, state law duties of care and loyalty, management, dividends and redemptions, issuance of stock, internal dispute resolution, dissolution, and the general law of derivative actions.

LAW 609 Business Associations II. (3)*once a year*

Interrelationship of federal and state law and a brief introduction to corporate finance (1933 Act). Broad overview of large company regulations including reporting rules, proxy regulation, insider trading, sale of control, tender offers and takeovers, and going private. Prerequisite: LAW 608.

LAW 610 Advanced Criminal Procedure. (2–3)*once a year*

Topics in criminal procedure, with emphasis on legal constraints on grand jury investigations, police practices, pretrial release, preliminary hearings, prosecutorial discretion, and plea bargaining.

LAW 611 Estate Planning I. (2–3)*selected semesters*

Tax laws relating to transfer of wealth both at death and during lifetime, including federal estate tax, gift tax, and income taxation of estates and trusts.

LAW 612 Family Law. (3)*once a year*

Legal and nonlegal problems that an individual may encounter because of a situation as a family member.

LAW 613 Federal Courts. (3)*selected semesters*

Federal judicial system; relationship of federal and state law; jurisdiction of federal courts and their relation to state courts.

LAW 614 Labor Relations. (3)*selected semesters*

Collective bargaining, including the right of employees to organize and to engage in concerted activities; resolution of questions concerning the representation of employees; duty of employers and unions to bargain; administration and enforcement of collective bargaining agreements.

LAW 615 Public International Law. (3)*once a year*

Role of law in international disputes. Considers drafting and interpretation of treaties and multilateral conventions.

LAW 616 Jurisprudence. (3)*once a year*

Introduces legal philosophy, with readings on the nature of law and legal reasoning, the relationship between law and morality and equality and social justice.

LAW 618 Trusts and Estates. (3)*once a year*

Substantive concepts involved in transmitting wealth, including interstate succession, wills and will substitutes, the modern trust as a family protective device, creation of future interests in a planned estate, social restrictions of a nontax nature, and methods of devoting property to charitable purposes.

LAW 619 Commercial Law: Payment and Credit Systems. (3)*fall*

Law of credit obligations and payment devices. Focuses on Articles 3, 4, and 4A of the Uniform Commercial Code.

LAW 620 Civil Rights Legislation. (2–3)*selected semesters*

Coverage of the rights and remedies provided by federal civil rights legislation, principally, the key provisions of the Reconstruction Era Civil Rights Acts, portions of the employment discrimination legislation, and voting rights legislation.

LAW 621 Commercial Law: Sales and Leases of Goods. (3)*spring*

Advanced issues involving the formation and interpretation of sales and lease contracts. Focuses primarily on Articles 2 and 2A of the Uniform Commercial Code.

LAW 622 Commercial Law: Secured Transactions. (3)*once a year*

Secured transactions under Article 9 of the Uniform Commercial Code and other relevant sections. Overview of the creation, perfection, and priority effects of security interests. Financing of business enterprise and consumer credit.

GRADUATE PROGRAMS AND COURSES

LAW 623 Commercial Torts. (3–4)

once a year

Involves an analysis of actionable wrongs against a business entity or against proprietary rights held by that entity, covering the entire spectrum of private remedies for competitive wrongs.

LAW 624 Community Property. (1–2)

fall and spring

Property rights of husband and wife; the Arizona community property system; homestead.

LAW 625 Constitutional Law II. (3–4)

fall, spring, summer

Fundamental protection for person, property, political, and social rights.

LAW 627 Corporate Taxation. (2–3)

once a year

Problems in taxability of the corporation, corporate distributions, and corporate reorganizations.

LAW 628 Creditor-Debtor Relations. (3)

once a year

Creditors' remedies in satisfaction of claims and debtors' protection and relief under bankruptcy, other laws.

LAW 629 Employment Law. (3)

once a year

Employment law topics including testing, privacy, OSHA, FLSA, benefits, worker's compensation, rights to compensation, workplace emotional injuries, termination, and sexual harassment.

LAW 630 Employment Discrimination. (2–3)

selected semesters

Focuses primarily on Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, and the Americans with Disabilities Act.

LAW 631 Environmental Law. (3)

once a year

Litigation, administrative law, and legislation relating to problems of environmental quality. Topics covered may include air and water pollution, toxic substances, pesticides, and radiation.

LAW 632 Indian Law. (3)

once a year

Inquiry into legal problems special to American Indians and tribes.

LAW 634 Judicial Remedies. (3)

once a year

Nature and limits of injunctive, restitutionary, and compensatory remedies for the protection of personal, property, political, and civil rights.

LAW 635 Juvenile Justice System. (3)

selected semesters

Special problems in the juvenile system.

LAW 636 Land Use Regulation. (2–3)

once a year

Legal problems in the regulation and control of land development by state and local governments. Administration of zoning, subdivision, and other planning controls; issues of fairness and procedure in the utilization of such controls.

LAW 637 Lawyering Theory and Practice. (4)

fall and spring

Issues of competency and professionalism in the practice of law.

LAW 638 Professional Responsibility. (3)

fall and spring

Emphasizes the Model Rules and Model Code that govern the professional responsibility of lawyers and their interpretation and application.

LAW 639 Natural Resource Law. (3)

once a year

Examines the constitutional basis for federal land management and the different kinds of public lands management schemes (e.g., parks, forests, wildlife refuges), emphasizing acquisition of right to, and regulation of, the different uses of public lands and resources (e.g., mining, grazing, timber, wildlife habitat, recreation).

LAW 640 Securities Regulation. (2)

once a year

Selected problems arising under the major statutes concerned with regulating the securities market.

LAW 641 State and Local Government. (2–3)

selected semesters

Legal problems involved in the organization and administration of governmental units, including the city, county, town, village, school district, and special district.

LAW 642 White Collar Crime. (2–3)

once a year

Examines the ways in which "white collar" crime is prosecuted, principally in the federal system.

LAW 643 Water Law. (3)

once a year

Acquisition of water rights; water use controls; interstate conflicts.

LAW 644 Intellectual Property. (3)

once a year

Protection of intellectual property and encouragement of creativity—trade values, trade secrets, patents, copyrights, performing arts, and visual arts.

LAW 645 Patent Law. (3)

once a year

In-depth examination of substantive patent law as it applies to the commercialization and enforcement of patent rights.

LAW 646 Copyright Law. (3)

once a year

Legal rights in original forms of human expression.

LAW 647 Mass Tort Litigation. (2–3)

once a year

Examines unique procedural and substantive issues that arise in mass tort litigation.

LAW 701 Arbitration. (2–3)

once a year

Examines the Federal Arbitration Act and the Uniform Arbitration Act as it has been adopted in Arizona.

LAW 702 Alternative Dispute Resolution. (2–3)

once a year

Broad exposure to methods of settling disputes in our society such as mediation, arbitration/conciliation, and negotiation, including examination of the current litigation model.

LAW 703 Law, Science, and Technology. (2–3)

once a year

Legal mechanisms used in dealing with various issues raised by contemporary science and technology. Explores current legal responses to science and technology.

LAW 705 Media Law. (2–3)

once a year

Examines First Amendment principles and statutory and regulatory requirements with respect to the conventional print and broadcast media, as well as recent technologies such as cable.

LAW 706 Immigration Law. (2–3)

selected semesters

Explores political, economic, social, and legal issues concerning immigration. Specific topics covered include citizenship and naturalization, denaturalization, deportation, and refugee rights and asylum.

LAW 707 Elder Law. (2–3)

once a year

Looks at legal and policy questions related to aging individuals and an older society. Seminar.

LAW 708 Gender, Sexuality, and the Law. (2–3)

once a year

Examines assumptions made in the law about gender and sexuality and the impact of those assumptions on the application of the law. Seminar.

LAW 709 International Human Rights. (2–3)

selected semesters

International rules and procedures governing the protection of human rights.

LAW 710 Real Estate Tax Planning. (2–3)

once a year

Discusses topics, including but not limited to real estate investments as tax shelters, alternative acquisition finance devices, refinancing techniques, and nontaxable exchanges.

LAW 711 Real Estate Transfer. (2–3)*once a year*

Examines the legal aspects of the sale and purchase of real property encompassing three areas: the role of the lawyer and broker in the transaction, the sales contract, and issues relating to title protection.

LAW 712 Religion and the Constitution. (2–3)*once a year*

In-depth study of the “establishment” and “free exercise” clauses of the First Amendment to the U.S. Constitution.

LAW 714 Law and Social Science. (2–3)*selected semesters*

Investigates the use of social science research and methods in the legal system. Topics include psychology of eyewitness identification, social-psychological studies of decision making, statistical evidence of discrimination, econometric studies of the deterrent effects of capital punishment, and clinical predictions of violent behavior.

LAW 715 Professional Sports. (2–3)*selected semesters*

Unique legal problems relating to professional sports, including their relationship to antitrust laws, the nature of player contracts, and associated tax problems.

LAW 716 Timber and Range. (2–3)*once a year*

Explores legal aspects of environmental controversies surrounding timber cutting and livestock grazing on public lands. Seminar. Prerequisite: LAW 639.

LAW 717 Legislative Process. (2–3)*selected semesters*

Explores both the legal and the practical contexts within which the legislative process operates, with a major component being a legislative drafting project.

LAW 721 Education and the Law. (2–3)*selected semesters*

Current legal problems affecting institutions of higher education, faculty, students, and governing boards.

LAW 722 Mexican Law. (2–3)*fall*

Comparative overview of Mexican law. Poses questions regarding the proper role and function of a legal system. Seminar.

LAW 733 Negotiation, Mediation, and Counseling. (3)*once a year*

Explores alternative models of negotiated dispute resolution, as well as the roles of lawyer and client in the negotiation process. Extensive use of simulation exercises.

LAW 734 Products Liability. (2–3)*once a year*

Traces the development of products liability law; analyzes the major issues currently confronting the courts in this area. Seminar.

LAW 735 Estate Planning II. (2–3)*selected semesters*

Prepares actual estate plans and implements legal documents for a variety of typical private clients. Considers both tax and nontax elements in preparation of the plans. Prerequisite: LAW 611.

LAW 736 Planning for the Business Client. (2–3)*selected semesters*

Planning transactions involving business organizations with special emphasis on income tax and corporate considerations.

LAW 738 Trial Advocacy. (2–3)*fall and spring*

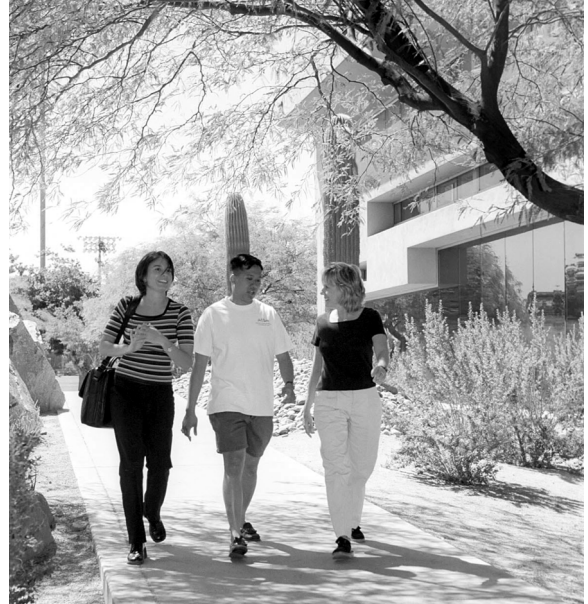
Confronts issues of trial advocacy through simulation of a variety of aspects of trial practice in a mock court setting. Prerequisite: LAW 605.

LAW 745 The Supreme Court. (2–3)*once a year*

Intensive examination of selected current decisions of the U.S. Supreme Court.

LAW 768 International Business Transactions. (2–3)*selected semesters*

Problems and policy considerations involved in international trade; tariffs, international monetary controls, and development loans.



Law students visit the John J. Ross–William C. Blakley Law Library on ASU Main campus.

Tim Trumble photo

LAW 770 Law Journal. (1–3)*fall and spring*

Academic credit for successful completion of editorial work by a member of the staff of *Arizona State Law Journal*; maximum of 5 semester hours.

LAW 771 Jurimetrics Journal. (1–3)*fall and spring*

Academic credit for successful completion of editorial work by a member of the staff of the *Jurimetrics Journal of Law, Science, and Technology*. Studio.

LAW 772 Public Defender Clinic. (1–6)*fall, spring, summer*

Placement in the Public Defender Clinic and related classroom component. Prerequisite: LAW 605.

LAW 773 Civil Practice Clinic. (1–6)*fall, spring, summer*

Placement in the Civil Practice Clinic and related classroom component. Prerequisite: LAW 605.

LAW 774 Criminal Practice Clinic. (1–6)*fall, spring, summer*

Placement with various prosecutor offices in the Phoenix area and related classroom component. Prerequisite: LAW 605.

LAW 775 Mediation Clinic. (1–4)*fall and spring*

Study of the mediation process and experience as mediators in cases pending before the justice courts and administrative agencies.

LAW 780 Moot Court. (1–3)*fall and spring*

Academic credit for successful completion of work as a member of the Moot Court Board of Directors; maximum of 3 semester hours.

LAW 781 Individual Study. (1)*fall, spring, summer*

With the approval of a faculty member, a student may research a legal subject of special interest and prepare a paper suitable for publication.

LAW 782 Individual Study. (2)*fall, spring, summer*

See LAW 781.

LAW 783 Individual Study. (3)*fall, spring, summer*

See LAW 781.

GRADUATE PROGRAMS AND COURSES

LAW 784 Moot Court Competition. (1–4)

fall and spring

Successful participation and completion of a national moot court competition.

LAW 785 Externship. (1–12)

fall, spring, summer

Supervised, practical lawyering in an external placement proposed by the student or established by a sponsoring agency and approved by the College of Law. In addition, an associated academic component is established by the student with a member of the faculty.

LAW 791 Seminar in Law. (1–12)

fall and spring

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Mass Communication

Master's Program

cronkite.pp.asu.edu/grad

480/965-5011

STAUF A231B

Joe Foote, Director

Professors: Craft, Cronkite, Doig, Foote, Godfrey, Merrill, Sylvester, Watson, Youm

Associate Professors: Allen, Barrett, Bramlett-Solomon, Galician, Lentz, Matera, Russell, Russomanno

Assistant Professors: Keith, Silcock

Clinical Professor: Leigh

Lecturers: Casavantes, Nichols

MASTER OF MASS COMMUNICATION

The faculty in the Walter Cronkite School of Journalism and Mass Communication offer a graduate program leading to the professional degree Master of Mass Communication (M.M.C.). The program is designed to help students achieve academic and professional growth, to prepare students for positions in the mass media, and to provide a background to enable persons currently in the media to advance their careers.

Admission. In addition to the general requirements for admission to the Graduate College, the M.M.C. program requires applicants to provide three letters of recommendation (including two from professors in the last unit of study from degree-granting institutions), scores on either the GRE (verbal and quantitative) or the MAT, a biographical sketch or résumé that includes all professional media experience, and a 250–500 word statement outlining career aspirations that could be enhanced by admission to the program (the statement is also used as a writing sample). The applicant's undergraduate GPA, letters of recommendation, test scores, and professional media experience are all considered in the admission process. A TOEFL score of 600 or higher is

required of all applicants whose native language is not English. Applicants wishing to enroll for fall semester must have all their application materials submitted by March 1.

Admission Classification. Applicants who have an undergraduate degree in an area of mass communication, who meet all other requirements, and who receive regular admission may begin the 36 semester hour program in the fall. A two-year program is designed for applicants who have an undergraduate degree in a discipline other than mass communication. This program consists of 45 semester hours. The first-year courses are designed to provide a foundation in journalism knowledge and skills and must be taken in prescribed sequence. Some first-semester courses are prerequisites for courses to be taken in subsequent semesters.

Registration. Registration in courses numbered 500 is limited to students who have been admitted to the M.M.C. program or have approval from the instructor of the class. Non-degree graduate students may not register for 500-level courses in the Walter Cronkite School of Journalism and Mass Communication during early registration. Undergraduate students wishing to reserve graduate course credit must follow Graduate College guidelines and obtain approval from the director of graduate studies.

Program of Study. The program consists of 36 semester hours of graduate credit for students with undergraduate degrees in the areas of mass communication. Requirements are as follows:

1. 12 hours of core course work,
2. six to 12 hours of specialization courses,
3. nine to 15 hours of a related area outside the school, and
4. three hours of supervised applied project (MCO 593).

The program consists of 45 semester hours of credit for students with undergraduate degrees in areas other than mass communication. Requirements are as follows:

1. 15 hours of core course work,
2. 12 hours of specialization courses,
3. six hours of mass communication writing skills courses,
4. nine hours of a related area outside the school, and
5. three hours of supervised applied project (MCO 593).

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. An oral examination in defense of the supervised research or creative project is required.

JOURNALISM AND MASS COMMUNICATION (JMC)

JMC 401 Advanced Public Relations. (3)

fall and spring

Advanced theory and practice of publicity, public relations, and related techniques and procedures. Prerequisite: JMC 270.

JMC 412 Editorial Interpretation. (3)

selected semesters

The press as an influence on public opinion. Role of the editorial in analyzing and interpreting current events. Prerequisites: JMC 301; professional status.

JMC 413 Advanced Editing. (3)

fall and spring

Theory and practice of newspaper editing, layout and design, picture and story selection. Prerequisites: JMC 313; professional status.

JMC 414 Electronic Publication Design. (3)

fall and spring

Theory, organization, and practice of layout, typography, and design in traditional and multimedia publishing. Prerequisites: JMC 401; professional status.

JMC 415 Writing for Public Relations. (3)

fall and spring

Development of specific writing techniques for the practitioner in public relations agencies and divisions of major organizations. Prerequisites: JMC 401; professional status.

JMC 417 Public Relations Campaigns. (3)

fall and spring

Theory, principles, and literature of public relations and how they relate to audiences, campaigns, and ethics. Prerequisites: JMC 401; professional status. Corequisite: JMC 415.

JMC 420 Reporting Public Affairs. (3)

fall and spring

Instruction and assignments in reporting the courts, schools, government, city hall, social problems, and other areas involving public issues. Prerequisites: JMC 301; professional status.

JMC 433 Broadcast Sales and Promotion. (3)

fall and spring

Basics of electronic media marketing practices, including commercial time sales techniques and radio/TV promotion fundamentals. Prerequisites: JMC 200; professional status.

JMC 437 Advanced TV Production. (3)

fall and spring

Emphasizes individual production projects of the student's own conception and design utilizing studio, field, and postproduction techniques. Prerequisites: JMC 235; professional status.

JMC 440 Magazine Writing. (3)

fall and spring

Writing and marketing magazine articles for publication. Prerequisites: JMC 301; professional status.

JMC 451 Photojournalism II. (3)

fall and spring

Theory and practice of photojournalism with emphasis on shooting, lighting, and layout for the media. Prerequisites: JMC 351; professional status.

JMC 452 Photojournalism III. (3)

fall and spring

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. Prerequisites: JMC 451; professional status.

JMC 465 Precision Journalism. (3)

fall and spring

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. Prerequisites: JMC 301; professional status.

JMC 470 Depth Reporting. (3)

fall and spring

Introduces strategies for writing in-depth newspaper or magazine articles. Lecture, lab. Prerequisites: JMC 301; professional status; instructor approval.

JMC 472 Broadcast Station Management. (3)

fall, spring, summer

Management principles and practices, including organization, procedures, policies, personnel problems, and financial aspects of station management. Prerequisites: JMC 332; professional status.

JMC 475 Television Newscast Production. (3)

fall and spring

Writing, reporting, and production of the television newscast. Capstone course of the broadcast journalism emphasis. Prerequisites: professional status; instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

MASS COMMUNICATION (MCO)

MCO 402 Mass Communication Law. (3)

fall, spring, summer

Legal aspects of the rights, privileges, and obligations of the press, radio, and television. Prerequisites: 87 hours; professional status.

MCO 418 History of Mass Communication. (3)

fall and spring

American journalism from its English and colonial origins to the present day. Development and influence of newspapers, magazines, radio, television, and news gathering agencies.

MCO 421 News Problems. (3)

fall and spring

Trends and problems of the news media, emphasizing editorial decisions in the processing of news.

MCO 430 International Mass Communication. (3)

fall and spring

Comparative study of communication and media systems. Information gathering and dissemination under different political and cultural systems.

MCO 435 Emerging Media Technologies. (3)

fall and spring

Surveys new telecommunication technologies in a convergent environment.

MCO 450 Visual Communication. (3)

fall, spring, summer

Theory and tradition of communication through the visual media with emphasis on the continuity of traditions common to modern visual media.

MCO 456 Political Communication. (3)

fall and spring

Theory and research related to political campaign communication. The persuasive process of political campaigning, the role of the media, the candidate, and image creation.

MCO 460 Race, Gender, and Media. (3)

spring and summer

Reading seminar designed to give a probing examination of the interface between AHANA Americans and the mass media in the United States. Lecture, discussion. Cross-listed as AFR 460. Credit is allowed for only AFR 460 or MCO 460.

MCO 501 Newswriting and Reporting. (3)

fall

Designed for graduate students in the M.M.C. 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 or instructor approval.

MCO 503 Press Freedom Theory. (3)

spring

Examines philosophical and legal aspects of press freedom. Emphasizes First Amendment theory evolution from 1791 to present.

MCO 510 Research Methodology in Mass Communication. (3)

fall and spring

Identifies research problems in mass communication. Overview of questionnaire construction. Attention to survey, historical, content analysis, experimental, and legal research methods. Prerequisite: acceptance into M.M.C. graduate program or instructor approval.

MCO 520 Mass Communication Theories and Process. (3)

fall

Analyzes 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)

spring

Mass media as social institutions, particularly interaction with government and public. Emphasizes criticism and normative statements.

GRADUATE PROGRAMS AND COURSES

MCO 530 Media Ethics. (3)

fall

Ethical conventions and practices of print and electronic media as they relate to the government and private sectors of the society.

MCO 531 Broadcast Journalism. (3)

spring

News and information practices of networks, stations, and industry. Practice in writing, reporting, and editing with emphasis on video. Lecture, lab. Prerequisite: MCO 501.

MCO 540 Historical/Legal Methods. (3)

spring

Introduces legal and historical methods necessary to conduct qualitative mass communication research. Prerequisite: M.M.C. graduate student.

MCO 560 Arizona Media Law. (3)

fall

Case study approach of first amendment issues, media access, libel, confidentiality, and invasion of privacy as applied to media organizations in Arizona. Lecture, seminar.

MCO 593 Applied Project. (1-12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Materials Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~cme

480/965-3313

ECG 202

Subhash Mahajan, Chair

Regents' Professor: Mayer

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux, Sieradzki

Associate Professors: Alford, Van Schilfgaarde

Assistant Professor: Chawla

The faculty in the Department of Chemical and Materials Engineering offer graduate programs leading to the Master of Science (M.S.) degree, the Master of Science in Engineering (M.S.E.) degree, and the Ph.D. degree in Engineering Science with specializations in materials science and engineering (see "[Engineering Science](#)," page 197 for program description). Areas of concentration include electronic and advanced materials processing, mechanical behavior of materials, composites, thin films, ceramics, characterization and simulation of materials, and biomaterials.

The faculty also participate in offering the interdisciplinary program leading to the Ph.D. degree with a major in Science and Engineering of Materials (see "[Science and Engineering of Materials](#)," page 312, for program description). A *Graduate Student Handbook*, detailing information on studies in the Master's and Doctoral programs, is available to admitted students. For information on graduate studies in Materials Engineering, access the Web site at

www.eas.asu.edu/~cme or call the Department of Chemical and Materials Engineering at 480/965-3313.

Graduate Record Examination. Graduate Record Examination scores are required from all students.

MASTER OF SCIENCE

For more information, including general requirements, see "[Master's Degrees](#)," page 93.

Transition Program. Students applying for the program leading to a master's degree with a major in Materials Engineering may have an undergraduate B.S. degree in a major field other than Materials Engineering or Materials Science. The qualifications of transition students are reviewed by the department graduate committee and a special program is then designed for successful applicants. In general applicants should have had, or should be prepared to take, calculus through differential equations, chemistry, and physics. Transition students are expected to complete the essential courses in their area of study from the undergraduate program in order to be prepared for the graduate courses. Other course work from the undergraduate program may be required depending upon the area of study selected by the student. Transition students should contact the graduate coordinator for an evaluation of their undergraduate transcript.

Program of Study. All candidates for the M.S.E. or M.S. degree in Materials Engineering are required to complete an approved program of study consisting of the minimum required semester hours, including research report (M.S.E.) or thesis (M.S.). Special course requirements for the different areas of study are established by the faculty and are available from the departmental graduate coordinator. In addition to the course/thesis requirements, all full-time graduate students must successfully complete a seminar course during each semester of attendance. Part-time students must enroll in a seminar course at least three times during the course of study. Candidates whose undergraduate degree was in a field other than Materials Engineering or Materials Science may be required to complete more than 30 semester hours.

Thesis Requirements. A thesis or equivalent is required for the M.S. degree.

Final Examinations. A final oral examination or equivalent is required in defense of the thesis.

MASTER OF SCIENCE IN ENGINEERING

The faculty also participate in offering the tri-university Master of Engineering degree program. See "[Master of Science in Engineering](#)," page 196, for program description.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in the area of study in materials science and engineering under the Engineering Science major, is conferred upon evidence of excellence in research resulting in a scholarly dissertation that is a contribution to existing knowledge. See "[Doctor of Philosophy](#)," page 96, for general requirements.

Doctoral Program. Upon successful completion of the qualifying examination, a research supervisory committee is formed and the doctoral student is required to submit a research proposal. Following acceptance of the research proposal, the student is given a comprehensive examination to determine initiative, originality, breadth, and level of professional commitment to the problem selected for investigation. Upon successful completion of the comprehensive examination, the student applies for admission to candidacy.

Foreign Language Requirements. Candidates in the program leading to the Ph.D. degree in the area of study in materials science and engineering, under the Engineering Science major, normally are not required to pass an examination showing reading competency of a foreign language. However, the supervisory committee may establish such a requirement in special cases depending upon the research interests of the candidate. If a foreign language is required, the student must successfully fulfill the requirement before taking the comprehensive examination.

Dissertation Requirement. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The research thrusts in Materials Engineering are:

1. growth, processing, and characterization of electronic materials;
2. electroceramics;
3. deformation behavior of materials at different length scales;
4. computational materials science; and
5. nanoscience and nanotechnology.

Some of the research projects that are currently being pursued are:

1. growth of group III nitrides by organometallic vapor phase epitaxy and molecular beam epitaxy and their fabrication into high frequency, high power, and high temperature devices;
2. fabrication of spintronic devices for very high frequency applications;
3. synthesis of high k dielectric films by organometallic vapor phase epitaxy and correlation of properties with microstructures;
4. process-induced defects in implantation and annealing of GaN;
5. creep and thermal fatigue behaviors of lead-free solder balls used in electronic packaging;
6. modeling of the evolution of thin film microstructures; and
7. synthesis and characterization of quantum dots.

MATERIALS SCIENCE AND ENGINEERING (MSE)

MSE 510 X-Ray and Electron Diffraction. (3)

spring

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)

spring in odd years

Introduces corrosion mechanisms and methods of preventing corrosion. Topics include: electrochemistry, polarization, corrosion rates, oxidation, coatings, and cathodic protection. Prerequisite: transition student with instructor approval.

MSE 512 Analysis of Material Failures. (3)

spring in even years

Identifies 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)

fall

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

MSE 514 Physical Metallurgy. (3)

spring

Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Prerequisite: transition student with instructor approval.

MSE 515 Thermodynamics of Materials. (3)

spring

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)

fall

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)

fall

Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

MSE 519 Physical Metallurgy Laboratory. (1)

spring

Analyzes microstructure of metals and alloys and includes some correlation with mechanical properties. Lab. Pre- or corequisite: MSE 514.

MSE 520 Theory of Crystalline Solids. (3)

selected semesters

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)

spring

Introduces the geometry, interaction, and equilibrium between dislocations and point defects. Discusses relations between defects and properties. Prerequisite: ECE 350 or instructor approval.

MSE 530 Materials Thermodynamics and Kinetics. (3)

spring

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)

spring in odd years

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 its equivalent).

GRADUATE PROGRAMS AND COURSES

MSE 550 Advanced Materials Characterization. (3)

fall

Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.

MSE 556 Electron Microscopy Laboratory. (3)

fall

Lab support for MSE 558. Cross-listed as SEM 556. Credit is allowed for only MSE 556 or SEM 556. Pre- or corequisite: MSE 558 or SEM 558.

MSE 557 Electron Microscopy Laboratory. (3)

spring

Lab support for MSE 559. Cross-listed as SEM 557. Credit is allowed for only MSE 557 or SEM 557. Pre- or corequisite: MSE 559 or SEM 559.

MSE 558 Electron Microscopy I. (3)

fall

Microanalysis of the structure and composition of materials using images, diffraction, x rays, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 558. Credit is allowed for only MSE 558 or SEM 558. Prerequisite: instructor approval.

MSE 559 Electron Microscopy II. (3)

spring

Microanalysis of the structure and composition of materials using images, diffraction, x rays, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as SEM 559. Credit is allowed for only MSE 559 or SEM 559. Prerequisite: instructor approval.

MSE 560 Strengthening Mechanisms. (3)

selected semesters

Deformation of crystalline materials. Properties of dislocations. Theories of strain hardening, solid solution, precipitation, and transformation strengthening. Prerequisite: ECE 350 (or its equivalent).

MSE 561 Phase Transformation in Solids. (3)

spring in even years

Heterogeneous and homogeneous precipitation reactions, shear displacive reactions, and order-disorder transformation.

MSE 562 Ion Implantation. (3)

selected semesters

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)

spring in even years

Relationships between structure and properties of synthetic polymers, including glass transition, molecular relaxations, crystalline state viscoelasticity, morphological characterization, and processing.

MSE 571 Ceramics. (3)

selected semesters

Includes ceramic processing, casting, molding, firing, sintering, crystal defects, and mechanical, electronic, and physical properties. Prerequisites: MSE 521, 561.

MSE 573 Magnetic Materials. (3)

selected semesters

Emphasizes ferromagnetic and ferrimagnetic phenomena. Domains, magnetic anisotropy, and magnetostriction. Study of commercial magnetic materials. Prerequisite: MSE 520 (or its equivalent).

MSE 598 Special Topics. (1–4)

once a year

Topics may include the following:

- Growth and Processing of Semiconductor Devices. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Materials Science

Interdisciplinary Master's Program

www.asu.edu/graduate/SEM

480/965-2460

PS A323

James B. Adams and William T. Petuskey, Codirectors

Chemical and Materials Engineering

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux
Associate Professor: Alford

Chemistry and Biochemistry

Regents' Professor: Buseck
Professor: Petuskey
Associate Professor: Kouvetakis
Assistant Professor: Matyushov

Electrical Engineering

Regents' Professor: Ferry
Professors: Goodnick, Kozicki, Schroder, Thornton, Zhang

Mechanical and Aerospace Engineering

Professor: Sieradzki

Physics and Astronomy

Regents' Professor: Smith
Professors: Bennett, Ponce, Rez, Sankey, Tsong, Venables
Associate Professors: Culbertson, Drucker, Herbots, Marzke

Solid-State Science

Professor: Carpenter
Senior Research Scientists: Crozier, McCartney, McKelvy
Associate Research Scientist: Sharma

The Science and Engineering Program of Materials Program offers an interdisciplinary master's degree in Materials Science. The members of the faculty are from several academic and research units in the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences: the Departments of Chemical and Materials Engineering, Chemistry and Biochemistry, Electrical Engineering, Mechanical and Aerospace Engineering, and Physics and Astronomy, and the Center for Solid State Science.

MATERIALS SCIENCE—M.S.

The M.S. degree in Materials Science is an interdisciplinary program of study that integrates courses offered by several academic departments and faculty representing various disciplines to provide a sound foundation for research leading to a thesis. Emphasis is placed upon application of the core fundamentals for investigation of the relationships between syntheses, microstructure, physical and chemical properties, and the performance of solids in current technological applications.

Admission. All applications for graduate study are processed by the ASU Graduate College. The Graduate College has an online application on the Web at www.asu.edu/graduate. Applicants must satisfy the general requirements for admission to the Graduate College, which include

1. application;
2. application fee of \$45;
3. official transcripts;
4. official TOEFL for international students (minimum of 600 for admission to the SEM Program); and
5. TSE for students who wish to be considered for a teaching assistantship.

Students must also satisfy the requirements of the program which are

1. GRE (verbal, quantitative and analytical);
2. resume;
3. statement of purpose; and
4. three letters of recommendation.

All application materials must be received by the program (postmarked) by February 15 for the fall semester and October 15 for the spring semester.

Program of Study. The master’s degree in Materials Science is structured around a comprehensive set of courses contained in the participating disciplines. Because of the multidisciplinary emphasis of the program, a balance is sought of courses that are taught with engineering and science objectives. The program consists of 33 semester hours beyond the bachelor’s degree. A minimum of 24 semester hours are split evenly between four core courses (12 semester hours) and four elective courses (12 semester hours). The remainder of semester hours are devoted to seminar (three semester hours), research (three semester hours), and thesis (three semester hours).

Interdisciplinary Course Hours

CHM 471 Solid-State Chemistry	3
CHM 541 Advanced Thermodynamics	3
or MSE 530 Materials Thermodynamics and Kinetics (3)	
PHY 481 Solid-State Physics.....	3
SEM 500 Introduction to Physical Materials	3
SEM 591 Graduate Seminar.....	3
Total	15

Foreign Language Requirements. None.

Thesis Requirements. The thesis, which is the final and most important product of the student’s effort in this program, must report original research in the field and demonstrate the student’s ability to conduct creative, independent research. Each candidate must register for three semester hours of research and three semester hours of thesis.

Final Examination. The final examination in defense of the thesis is conducted by the student’s thesis committee and other faculty members appointed by the dean of the Graduate College.

COURSES

For courses, see “Science and Engineering of Materials (SEM),” page 313.

Mathematics

Master’s and Doctoral Programs

math.la.asu.edu
 480/965-3951
 PS A216

Andrew Bremner, Chair

Regents’ Professor: Trotter

Professors: Armbruster, Bremner, Bustoz, Gardner, Hoppensteadt, Ihrig, Jackiewicz, Kadell, Kawski, Kierstead, Kostelich, Kuang, Kuiper, Lai, Leonard, Lohr, McDonald, Mittelman, Nicolaenko, Quigg, Renaut, Ringhofer, H.A. Smith, H.I. Smith, Thieme, Young

Associate Professors: Baer, Barcelo, Blount, Carlson, Childress, Driscoll, Farmer, Gelb, Hurlburt, D. Jones, J. Jones, Kurtz, Lopez, Mahalov, McCarter, Moore, Nikitin, Prewitt, Spielberg, Suslov, Swimmer, Taylor, Wellfert

Assistant Professors: Czygrinow, Kaliszewski, Zandieh, Zuo

The faculty in the Department of Mathematics and Statistics offer graduate programs leading to the M.A. and Ph.D. degrees in Mathematics.

The faculty also participate in the program leading to the Master of Natural Science (M.N.S.) degree when one of the concentrations is mathematics. In collaboration with the College of Education, the Department of Mathematics and Statistics offers an option for the M.N.S. degree that leads to high school certification.

In addition, the faculty participate in the interdisciplinary program leading to the M.S. degree in Statistics (see “[Statistics;](#)” page 326).

It is required that students applying to one of these programs submit scores on the Graduate Record Examination.

Students in the College of Education admitted to the Master of Education (see “[Master of Education;](#)” page 181) or Doctor of Education (see “[Doctor of Education;](#)” page 182) degree program in Secondary Education may elect mathematics as the subject matter field. These programs are offered and administered through the College of Education.

MASTER OF ARTS

This degree is designed for students who wish to extend their knowledge of mathematics or prepare for certain careers related to mathematics. In order to be admitted without deficiencies, the student’s background should include

GRADUATE PROGRAMS AND COURSES

an undergraduate mathematics major or an equivalent preparation such as may be obtained in certain undergraduate programs in engineering or the sciences. In particular, it is required that the student's preparation include courses in linear algebra and foundations of analysis. A certain degree of familiarity with computer languages may also be required for some areas of study.

Students pursuing the M.A. degree in Mathematics may choose one of the following areas: general mathematics, applied mathematics, statistics and probability, and computational mathematics. Information concerning the requirements for each area may be obtained from the Department of Mathematics and Statistics.

See "[Master's Degrees](#)," page 93, for general requirements.

Program of Study. The program of study, including courses in mathematics and related subjects, is selected with the recommendation of the student's supervisory committee. Ordinarily, a program of study consists of a minimum of 30 semester hours.

Foreign Language Requirements. None.

Comprehensive Examinations. Written examinations are required. For details, contact the Department of Mathematics and Statistics.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

MASTER OF NATURAL SCIENCE

The faculty of the Department of Mathematics and Statistics participate in programs leading to the M.N.S. degree (see "[Natural Science](#)," page 279). This degree is intended for the student who is interested in an interdisciplinary program with a major emphasis in mathematics and a minor emphasis in a related subject outside mathematics. The student's supervisory committee consists of two faculty members of the department and one faculty member of the department in the related area. The supervisory committee designs a program of study of at least 36 semester hours that is appropriate for the type of interdisciplinary work the student wishes to pursue. A special option of the M.N.S. degree leads to high school certification. The intention is to develop high school teachers with an excellent subject knowledge in mathematics. For more information, contact the Department of Mathematics and Statistics.

DOCTOR OF PHILOSOPHY

This Ph.D. is intended for the student with superior mathematical ability, emphasizing the development of creative scholarship and breadth and depth in background knowledge. Admission to the degree program is normally granted after completion of the master's degree. See "[Doctoral Degrees](#)," page 95, for general requirements.

Program of Study. The program of study is selected with the recommendation of the student's supervisory committee.

Qualifying Examinations. Qualifying examinations are required. They test a student's mastery of basic material in two of the following five areas: algebra, differential equations, mathematical statistics, numerical methods, and real analysis. Normally, students entering the graduate program with a bachelor's degree take these qualifying examinations at the beginning of the third semester, and those entering with a master's degree at the beginning of the second semester. These examinations are given once each semester.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A dissertation reporting significant, original research suitable for publication in a professional research journal is required. (See "[Doctoral Dissertations](#)," page 95.)

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

With 59 faculty members in the department, research interests cover most aspects of mathematics. In particular, the department has strengths in algebra, analysis, computational mathematics, control and system science, differential equations, discrete mathematics, dynamical systems and chaos, mathematical biology, mathematics education, number theory, and statistics.

MATHEMATICS (MAT)

MAT 410 Introduction to General Topology. (3)

once a year
Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.

MAT 415 Introduction to Combinatorics. (3)

fall
Topics include proof techniques, permutations, combinations; counting techniques including recurrence relations, generating functions, inclusion-exclusion; Ramsey theory and combinatorial designs. Prerequisites: both MAT 300 (or 243) and 342 (or 242) or only instructor approval.

MAT 416 Introduction to Graph Theory. (3)

spring
Topics include trees, cycles, matchings, planarity, connectivity, Hamiltonicity, colorings, graph algorithms, and other advanced topics. Prerequisites: both MAT 300 (or 243) and 342 (or 242) or only instructor approval.

MAT 419 Introduction to Linear Programming. (3)

spring
Simplex method, duality, and network flows. Applications to game theory, geometry, combinatorics, graph theory, and posets. Prerequisites: a combination of CSE 100 (or 200 or 210) and MAT 300 (or 243) and 342 (or 242) or only instructor approval.

MAT 420 Scientific Computing. (3)

fall
Surveys and applies programming languages, libraries, and scientific visualization tools. Programming assignments emphasize software development skills. Lecture, lab. Fee. Prerequisites: a combination of CSE 200 and MAT 274 and 342 (or their equivalents) or only instructor approval.

MAT 421 Applied Computational Methods. (3)

fall and spring
Numerical methods for quadrature, differential equations, roots of nonlinear equations, interpolation, approximation, linear equations, float-

ing-point arithmetic, and roundoff error. Prerequisites: both MAT 271 (or its equivalent) and fluency in computer programming (preferably FORTRAN) or only instructor approval.

MAT 423 Numerical Analysis I. (3)

fall

Analysis and algorithms for numerical solutions linear/nonlinear equations, direct solvers, iterative procedures, optimization. Determination of eigenvalues. Elementary computer arithmetic. Prerequisites: both MAT 342 and fluency in computer programming or only instructor approval.

MAT 425 Numerical Analysis II. (3)

spring

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: both MAT 274 and fluency in computer programming or only instructor approval. MAT 371 recommended.

MAT 427 Computer Arithmetic. (3)

selected semesters

Number systems, hardware/software arithmetic, overflow, significance, rounding, multiple precision, and automatic error control; impact on languages, architectures, robust programming, and software development. Prerequisite: only CSE 100 (or 200) or both MAT 421 and 423 (or 425) or only instructor approval.

MAT 442 Advanced Linear Algebra. (3)

fall

Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 443 Introduction to Abstract Algebra. (3)

fall

Introduces concepts of abstract algebra. Not open to students with credit for MAT 444. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 444 Intermediate Abstract Algebra. (3)

spring

Basic theory of groups, rings, and fields, including an introduction to Galois theory. Appropriate as preparation for MAT 543. Prerequisite: MAT 443 or graduate standing or instructor approval.

MAT 445 Theory of Numbers. (3)

spring

Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive roots, and quadratic reciprocity theorem. Prerequisites: both MAT 300 and 342 or only instructor approval.

MAT 447 Cryptography. (3)

fall and spring

Block ciphers, stream ciphers, congruence arithmetic, information theory, public key cryptosystems, key exchange, electronic signatures. Prerequisites: MAT 242 (or 342), 300.

MAT 451 Mathematical Modeling. (3)

spring

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: both MAT 242 (or 342) and 274 or only instructor approval.

MAT 452 Introduction to Chaos and Nonlinear Dynamics. (3)

fall

Properties of nonlinear dynamical systems; dependence on initial conditions; strange attractors; period doubling; bifurcations; symbolic dynamics; Smale-Birkhoff theorem; and applications. Prerequisites: MAT 274, 342 (or 242); MAT 371 is recommended.

MAT 455 Introduction to Fractals and Applications. (3)

spring

Fractals; self-similar structures, fractals with iterated function systems of maps, computing fractals, fractal dimensions, chaotic dynamics on fractals, applications. Prerequisites: MAT 274, 342 (or 242); MAT 371 recommended.

MAT 460 Vector Calculus. (3)

spring

Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit for MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

MAT 461 Applied Complex Analysis. (3)

fall and summer

Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 (or its equivalent).

MAT 462 Applied Partial Differential Equations. (3)

spring

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 I. (3)

fall

Introduces analysis in metric spaces with emphasis on the real line. Appropriate as preparation for MAT 570. Prerequisites: MAT 300, 342.

MAT 473 Intermediate Real Analysis II. (3)

spring

Analysis in \mathbb{R}^n : implicit function theorem, introduction to manifolds, Lebesgue integration, change of variables formula, convergence theorems for integrals. Prerequisite: MAT 472 or instructor approval.

MAT 475 Differential Equations. (3)

fall

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)

spring

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 484 Internship. (1–12)

selected semesters

MAT 485 History of Mathematics. (3)

selected semesters

Topics from the history of the origin and development of mathematical ideas. Prerequisite: MAT 272 (or its equivalent).

MAT 502 Neural Modeling. (3)

fall and spring

Mathematical modeling electrochemical processes in nerve. Cable theory, neuronal branching, spines, bifurcation analysis of excitable membrane models. Prerequisite: MAT 274.

MAT 503 Mathematical Cell Physiology. (3)

fall and spring

Mathematical modeling of dynamical aspects of cell physiology. Diffusion, membrane transport, intracellular calcium channel kinetics, calcium oscillations and waves. Lecture, computing lab.

MAT 504 Mathematical Aspects of Biotechnology. (3)

fall and spring

Bacterial growth, bacterial genetics, gene expression, stoichiometry of metabolic pathways, random walks, diffusion processes, biofilms. Prerequisite: instructor approval.

MAT 505 Perturbation Methods. (3)

selected semesters

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKBJ method. Cross-listed as MAE 505. Credit is allowed for only MAE 505 or MAT 505.

MAT 514 Enumerative Combinatorics I. (3)

fall

First semester of a systematic development of enumerative combinatorics, including elementary counting techniques, sieve methods, and partially ordered sets. Prerequisite: graduate standing or instructor approval.

MAT 515 Enumerative Combinatorics II. (3)

spring

Second semester of a systematic development of enumerative combinatorics, including lattices, exponential structures, symmetric functions, and selected special topics. Prerequisite: MAT 514 or instructor approval.

GRADUATE PROGRAMS AND COURSES

MAT 516 Graph Theory I. (3)

fall

First semester of a systematic development of graph theory, including matchings, connectivity, arboricity, planarity, coloring, network flows. Prerequisite: graduate standing or instructor approval.

MAT 517 Graph Theory II. (3)

spring

Second semester of a systematic development of graph theory, including dense and sparse graphs, Ramsey theory, hamiltonicity, random graphs, minors. Prerequisite: MAT 516 or instructor approval.

MAT 518 Combinatorial Optimization I. (3)

fall

First semester of a systematic development of combinatorial optimization, including linear programming, duality, primal-dual algorithms, network flow algorithms, weighted matchings. Prerequisite: graduate standing or instructor approval.

MAT 519 Combinatorial Optimization II. (3)

spring

Second semester of a systematic development of combinatorial optimization, including matroid algorithms, theory of NP-completeness, polynomial time approximation, dynamic programming. Prerequisite: MAT 518 or instructor approval.

MAT 520 Numerical Linear Algebra. (3)

fall

Direct solution of linear systems, iterative methods, eigenvalues and eigenvectors, singular value decomposition, the QR algorithm, error propagation, arithmetic, and stability. Prerequisites: both MAT 342 and 423 (or 421) or only instructor approval.

MAT 521 Iterative Methods. (3)

spring

Numerical methods for solving linear/nonlinear systems of equations (symmetric, nonsymmetric). Iterative methods for linear systems, conjugate gradients, multigrid methods, preconditioning, Krylov methods. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 523 Numerical Optimization. (3)

selected semesters

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 its equivalent) or instructor approval.

MAT 524 Parallel Numerical Algorithms. (3)

selected semesters

Algorithms for massively parallel, hypercube architectures; "parallel" FORTRAN; solution of linear, nonlinear systems; partial differential equations; iterative methods; multigrid; domain decomposition. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 530 Numerical Solution of Ordinary Differential Equations. (3)

fall

One-step, linear multistep methods; consistency, order, stability, convergence; discretization, roundoff errors, error estimation, adaptive strategy; implementation, software for nonstiff equations. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 531 Numerical Solution of Stiff Differential Systems. (3)

spring

Runge-Kutta methods, order conditions, construction of highly stable methods, order stars, error estimation, stepsize selection, contractivity properties, linear multistep methods. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 533 Computational Elliptic and Parabolic Partial Differential Equations. (3)

fall

Parabolic and elliptic equations, finite difference, finite element methods, stability, consistency, convergence, practical aspects, applications, software. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 534 Computational Hyperbolic Partial Differential Equations. (3)

spring

Numerical solutions of hyperbolic PDEs, finite difference methods, well-posedness, stability, consistency, convergence, adaptive grids;

Maxwell's equations, elastic wave propagation; Navier-Stokes. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 535 Spectral Methods for Partial Differential Equations. (3)

selected semesters

Spectral, pseudospectral theory; Galerkin, collocation methods; Tau-methods, global approximation properties, stability; convergence; solutions for linear, nonlinear systems. Prerequisites: both MAT 371 and 423 (or 421) or only instructor approval.

MAT 543 Abstract Algebra. (3)

fall

Groups, modules, rings and fields, Galois theory, homological algebra, and the representation theory. Prerequisite: MAT 444 or instructor approval.

MAT 544 Abstract Algebra. (3)

spring

Continuation of MAT 543. Prerequisite: MAT 543 or instructor approval.

MAT 551 Linear Operators and Integral Equations. (3)

spring

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 their equivalents).

MAT 555 Fractal Geometry. (3)

selected semesters

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 recommended.

MAT 560 Dynamical Systems Methods in Fluid Dynamics. (3)

fall

Applies modern dynamical systems methods to fluid mechanics: bifurcations, normal forms, nonlinear dynamics, pattern formation, mixing, and Lagrangian chaos. Prerequisite: graduate standing or instructor approval.

MAT 562 Nonlinear Analysis of PDEs in Fluids. (3)

spring

Sobolev spaces; incompressible Euler and Navier-Stokes equations; weak and strong solutions; attractors and the connection with turbulence; geophysical applications. Prerequisite: graduate standing or instructor approval.

MAT 570 Real Analysis. (3)

spring

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)

fall

Continuation of MAT 570. Prerequisite: MAT 570 or instructor approval.

MAT 572 Complex Analysis. (3)

fall

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)

spring

Continuation of MAT 572. Prerequisite: MAT 572 or instructor approval.

MAT 574 Theory of Ordinary Differential Equations. (3)

selected semesters

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)

selected semesters

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: both MAT 452 and 475 or only MAT 574 or only instructor approval.

MAT 576 Theory of Partial Differential Equations. (3)

selected semesters

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)

selected semesters

Continuation of MAT 576. Prerequisite: MAT 576 or instructor approval.

MAT 578 Functional Analysis. (3)

selected semesters

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)

selected semesters

Continuation of MAT 578. Prerequisite: MAT 578 or instructor approval.

MAT 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Algebra. (1–3)
- Analysis. (1–3)
- Applied Mathematics. (1–3)
- Combinatorial Mathematics. (1–3)
- Mathematical Logic. (1–3)
- Numerical Analysis. (1–3)
- Topology. (1–3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

MATHEMATICS EDUCATION (MTE)

MTE 482 Methods of Teaching Mathematics in Secondary School. (3)

fall

Examines secondary school curricular material and analyzes instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Fee. Prerequisite: instructor approval.

MTE 483 Mathematics in the Secondary School. (3)

spring

Topics in geometry, number theory, algebra, and analysis. Emphasizes unifying principles. Prerequisite: MAT 310 or instructor approval.

MTE 585 Modern Geometry for Teachers. (3)

once a year

Euclidean, projective, and non-Euclidean geometries. Fee. Prerequisite: instructor approval.

MTE 587 Analysis for Teachers. (3)

selected semesters

Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

STATISTICS AND PROBABILITY (STP)

STP 420 Introductory Applied Statistics. (3)

fall, spring, summer

Introductory probability, descriptive statistics, sampling distributions, parameter estimation, tests of hypotheses, chi-square tests, regression analysis, analysis of variance, and nonparametric tests. Prerequisite: MAT 117 (or its equivalent).

STP 421 Probability. (3)

fall

Laws of probability, combinatorial analysis, random variables, probability distributions, expectations, moment-generating functions, transformations of random variables, and central limit theorem. Prerequisites: MAT 272 and 300 and STP 420 (or their equivalents).

STP 425 Stochastic Processes. (3)

spring

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)

spring

Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisites: STP 420, 421.

STP 429 Experimental Statistics. (3)

spring

Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 (or its equivalent).

STP 525 Advanced Probability. (3)

selected semesters

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: both MAT 571 and STP 421 or only instructor approval.

STP 526 Theory of Statistical Linear Models. (3)

fall

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)

fall

Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 (or its equivalent).

STP 531 Applied Analysis of Variance. (3)

spring

Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance, and multiple comparisons. Prerequisite: STP 420 (or its equivalent).

STP 532 Applied Nonparametric Statistics. (3)

fall

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 its equivalent).

STP 533 Applied Multivariate Analysis. (3)

spring

Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 (or its equivalent).

STP 534 Applied Discrete Data Analysis. (3)

selected semesters

Models for discrete and count data, measures of association, and log-linear and regression models for contingency tables. Prerequisite: STP 420 (or its equivalent).

STP 535 Applied Sampling Methodology. (3)

spring

Simple random, stratified, cluster sampling; variance estimation in complex surveys; nonparametric superpopulation approaches; nonresponse models; computational methods. Prerequisite: STP 420 (or its equivalent).

STP 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Probability. (1–3)
- Statistics. (1–3)

STP 593 Applied Project. (1–12)

selected semesters

STP 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Mechanical Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~mac

480/965-3291

ECG 346

Robert E. Peck, Chair

Professors: Boyer, Davidson, Evans, Fernando, Jankowski, Krajcinovic, Peck, Roy, Shah, Sieradzki, Tseng, Yao

Associate Professors: Chen, Kuo, Phelan, Squires

Assistant Professors: Calhoun, Chapsky, McNeill, Peralta, Sugar

The faculty in the Department of Mechanical and Aerospace Engineering offer graduate programs leading to the degrees of M.S., M.S.E., and Ph.D. in Mechanical Engineering. A number of areas of study may be pursued, including design and manufacturing, dynamics and control, energy systems, engineering mechanics, and thermosciences.



Many areas on campus accommodate wireless computer connections.

Tim Trumble photo

The faculty also offer graduate degree programs in Aerospace Engineering.

All of the department's graduate programs stress a sound foundation in fundamentals leading to a specialized area of study.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination; the subject test in engineering is highly recommended but not required.

MASTER OF SCIENCE

See "[Master's Degrees](#)," page 93, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "[Master of Science in Engineering](#)," page 196, for information on the Master of Science in Engineering degree.

MASTER OF ENGINEERING

The faculty also participate in offering the tri-university Master of Engineering program. See "[Master of Engineering](#)," page 190.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is conferred upon evidence of excellence in research leading to a scholarly dissertation that is an original contribution to knowledge in the field of mechanical engineering.

See "[Doctoral Dissertations](#)," page 95, for general requirements.

Program of Study. The program of study must be established no later than the first semester after successfully completing the qualifying examination.

Qualifying Examinations. The purposes of the qualifying criteria are to assess if the student is qualified to continue in the doctoral program and to detect deficiencies in the student's background that can be corrected by appropriate course work and individual study. Within the first year of graduate studies at ASU, a graduate student pursuing a Ph.D. program of study in Mechanical Engineering must complete three 500-level core courses, preferably in the major area of interest, and one 500-level mathematics course, both with an average GPA of 3.25 or higher. Specific qualifying course requirements for each major area are available from the department.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required. The examinations are administered by the program committee.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The Department of Mechanical and Aerospace Engineering is organized informally into four disciplinary research groups. The Design Automation Lab of the Design and Manufacturing Group engages in research and education related to the planning and manufacture of mechanical and aerospace engineering products. Research projects include CAD/CAM; geometric modeling; process planning; knowledge-based systems; design theory; engineering data management; creativity techniques; machine intelligence; computational techniques; and engineering analysis. This group is also involved in the development of models for geometric tolerances and dimensioning, a collaboration with the Department of Psychology to develop models for human pursuit strategies, and the design and development of systems of robots.

The Fluid Dynamics and Aerodynamics Group conducts numerical analyses on the modeling of particle-laden turbulent flows; development and assessment of methods for predicting high Reynolds number separated flows; simulation and modeling of the flow and thermal fields in gas-turbine vane-endwall passages; large-eddy simulations; wall-layer modeling of complex boundary layers; boundary-layer transition and flow control; hypersonics; micro-propulsion; and low-chord-Reynolds-number aerodynamics. Theoretical work is carried out on multi-phase and multi-component flows, hydrodynamic stability, polymeric materials processing and fluid behavior in micro-machined systems. Numerical and laboratory modeling and theoretical approaches are used to apply the basic principles of fluid dynamics to geophysical and environmental flows, such as air pollution dispersion, turbulence in the oceans and atmosphere, and topography effects on atmospheric and oceanic currents. Detailed experimental research is conducted on transition and flow control of 2-D and 3-D boundary layers, flow fields measurements and drag reduction on micro-aerial vehicles, and vortex generation in time dependent internal flows. The department faculty are also closely involved in low-cost space experimentation and satellite design.

Members of the Thermodynamics and Heat Transfer Group are investigating cryogenic heat transfer, including thermal contact resistance and mesoscale cryo-cooler development; energy systems engineering, including energy efficiency of manufacturing facilities and commercial buildings, refrigeration, and indoor air quality; nanoscale and microscale transport processes, using biomolecular motors; FT-IR spectroscopy for gas and other material characterization; turbulent combustion; remote monitoring of pollutants; gas-turbine/spray combustion; fuel systems safety; combustion in porous media; emission control; thermal systems design/optimization; experiments and modeling of multi-phase flow and thermal fields; experiments and simulation of flow and heat transfer in gas turbine components; and thermodynamic analysis of combined-cycle power plants.

Research in the Dynamics and Solid Mechanics Group includes the determination of the forced response of turbomachinery blades, including defects (mistuning), as well as the optimization of the blade properties; vibration testing for sensor optimization; the determination of the random response and fatigue life of thermally buckled panels sub-

jected to a transverse acoustic excitation; the assessment/optimization of a flutter exciter, the nonlinear dynamic response of structural systems (e.g., aircraft) stabilized by internal friction; the vibration monitoring of power plant components; the integrated orbit, attitude, and structural control design for large spacecraft; rapid multi-target pointing control of agile spacecraft using control moment gyros and singularity analysis for redundant single-gimbal control moment gyros. This group also has a strong research effort on the modeling, analysis and design synthesis of composite structures, smart materials and integrated systems; application areas include vibration, noise and shape control, and structural health monitoring. Research in mechanics of materials includes the understanding of brittle behavior in ductile metals; the stress-corrosion cracking problem using the molecular dynamic technique; corrosion and passivation in alloys; fracture of solids with random porosity; elastic properties of superlattices; and thin-film growth to demonstrate that local surface defect interactions control global film morphology. Studies are also conducted in kinematics of fatigue crack propagation, indentation mechanics of monocrystalline substrates, and deformation and fracture of alloyed molybdenum silicides.

Computer Resources and Facilities

Mechanical Engineering graduate education and research is supported by an extensive array of college- and university-supported computer hardware and software, in addition to laboratory workstations.

CEAS Engineering Technical Services (ETS) provides a significant amount of computer equipment, hardware engineering staff, and system staff dedicated to supporting research activities within the college. The central computers, PCs, and distributed workstations in offices and laboratories in the Engineering Research Center (ERC), Barry Goldwater Center (GWC), and many adjoining engineering buildings all link together to form the Engineering Network Support System (ENSS). ENSS utilizes the standard TCP/IP protocol on an ethernet local area network. Faculty and labs connect their PCs directly to ENSS via ethernet. Ethernet is offered in two speeds: 10 mbs and 100 mbs. Central computers accessible via ENSS include these distributed systems:

1. 300 to 400 Unix workstations (Sun, Silicon Graphics, DEC, HP, IBM, Intel);
2. 2500 to 3000 PCs running mostly Windows NT;
3. 13 to 15 Novell PC LANs ultimately being converted to Windows NT LANs or re-centralized; and
4. 8 to 10 Windows NT LANs, many of which are being re-centralized.

MECHANICAL AND AEROSPACE ENGINEERING (MAE)

MAE 402 Introduction to Continuum Mechanics. (3)

once a year

Applies 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).

GRADUATE PROGRAMS AND COURSES

MAE 404 Finite Elements in Engineering. (3)

once a year

Introduces 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)

once a year

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: ECE 384; MAE 422, 441 (or 444).

MAE 415 Vibration Analysis. (4)

fall

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 212; MAE 319, 422 (or 425); MAT 242 (or 342).

MAE 417 Control System Design. (3)

once a year

Tools and methods of control system design and compensation, including simulation, response optimization, frequency domain techniques, state variable feedback, and sensitivity analysis. Introduces nonlinear and discrete time systems. Prerequisite: MAE 317.

MAE 433 Air Conditioning and Refrigeration. (3)

once a year

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)

once a year

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)

once a year

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)

once a year

Thermochemical and reaction rate processes; combustion of gaseous and condensed-phase fuels. Applications to propulsion and heating systems. Pollutant formation. Prerequisite: MAE 388.

MAE 442 Mechanical Systems Design. (4)

spring

Applies design principles and techniques to the synthesis, modeling, and optimization of mechanical, electromechanical, and hydraulic systems. Prerequisites: MAE 317, 441 (or 444).

MAE 446 Thermal Systems Design. (3)

once a year

Applies engineering principles and techniques to the modeling and analysis of thermal systems and components. Presents and demonstrates optimization techniques and their use. Prerequisite: ECE 300; MAE 388.

MAE 447 Robotics and Its Influence on Design. (3)

once a year

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)

fall

Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems. Cross-listed as MSE 470. Credit is allowed for only MAE 455 or MSE 470. Prerequisites: ECE 313, 350.

MAE 460 Gas Dynamics. (3)

spring

Compressible flow at subsonic and supersonic speeds; duct flow; normal and oblique shocks, perturbation theory, and wind tunnel design. Prerequisites: ECE 384; MAE 361 (or 371).

MAE 462 Space Vehicle Dynamics and Control. (3)

fall

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)

fall

Fundamentals of gas-turbine engines and design of components. Principles and design of rocket propulsion and alternative devices. Lecture, design projects. Prerequisites: ECE 384; MAE 382 (or 460).

MAE 465 Rocket Propulsion. (3)

once a year

Rocket flight performance; nozzle design; combustion of liquid and solid propellants; component design; advanced propulsion systems; interplanetary missions; testing. Prerequisite: MAE 382 or 460.

MAE 466 Rotary Wing Aerodynamics and Performance. (3)

once a year

Introduces helicopter and propeller analysis techniques. Momentum, blade-element, and vortex methods. Hover and forward flight. Ground effect, autorotation, and compressibility effects. Prerequisites: both ECE 384 and MAE 361 or only instructor approval.

MAE 467 Aircraft Performance. (3)

once a year

Integrates 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 444.

MAE 469 Projects in Astronautics or Aeronautics. (3)

fall and spring

Various multidisciplinary team projects available each semester. Projects include design of high-speed rotocraft autonomous vehicles, liquid-fueled rockets, microaerial vehicles, satellites. Prerequisite: instructor approval.

MAE 471 Computational Fluid Dynamics. (3)

once a year

Numerical solutions for selected problems in fluid mechanics. Prerequisites: ECE 384; MAE 361 (or 371).

MAE 504 Laser Diagnostics. (3)

spring

Fundamentals of optics and the interaction of light with matter. Laser sources, laser spectroscopy, velocimetry, particle sizing, and surface characterization.

MAE 505 Perturbation Methods. (3)

selected semesters

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKBJ method. Cross-listed as MAT 505. Credit is allowed for only MAE 505 or MAT 505.

MAE 506 Advanced System Modeling, Dynamics, and Control. (3)

spring

Lumped-parameter modeling of physical systems with examples. State variable representations and dynamic response. Introduces modern control. Prerequisite: ASE 582 or MAT 442.

MAE 507 Optimal Control. (3)

fall

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as EEE 587. Credit is allowed for only EEE 587 or MAE 507. Prerequisite: EEE 482 or MAE 506.

MAE 509 Robust Multivariable Control. (3)

spring

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)

fall

Lagrange's and Hamilton's equations, rigid body dynamics, gyroscopic motion, and small oscillation theory.

MAE 511 Acoustics. (3)

fall

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)*spring*

Reviews 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)*spring*

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 518 Dynamics of Rotor-Bearing Systems. (3)*spring*

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)*fall*

Introduces tensors: kinematics, kinetics, and constitutive assumptions leading to elastic, plastic, and viscoelastic behavior. Applications.

MAE 521 Structural Optimization. (3)*selected semesters*

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. Credit is allowed for only CEE 533 or MAE 521. Prerequisite: instructor approval.

MAE 523 Theory of Plates and Shells. (3)*fall*

Linear and nonlinear theories of plates. Membrane and bending theories of shells. Shells of revolution. Prerequisite: MAE 520.

MAE 524 Theory of Elasticity. (3)*spring*

Elastic behavior in two and three dimensions. Airy stress functions and displacement potentials. Elements of fracture. Prerequisite: MAE 520.

MAE 527 Finite Element Methods in Engineering Science. (3)*fall*

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)*selected semesters*

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)*fall*

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)*fall*

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 544 Mechanical Design and Failure Prevention. (3)*fall*

Modes of mechanical failure; applies principles of elasticity and plasticity in multiaxial state of stress to design synthesis; failure theories; fatigue; creep; impact. Prerequisite: MAE 443.

MAE 546 CAD/CAM Applications in MAE. (4)*once a year*

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. Prerequisites: ECE 384; MAE 422, 441 (or 444).

MAE 547 Mechanical Design and Control of Robots. (3)*selected semesters*

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)*spring*

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)*spring*

Analyzes composite materials and applications. Micromechanical and macromechanical behavior. Classical lamination theory developed with investigation of bending-extension coupling.

MAE 560 Propulsion Systems. (3)*selected semesters*

Design of air-breathing gas turbine engines for aircraft propulsion; mission analysis; cycle analysis; engine sizing; component design.

MAE 561 Computational Fluid Dynamics. (3)*spring*

Finite-difference and finite-volume techniques for solving the subsonic, transonic, and supersonic flow equations. Method of characteristics. Numerical grid-generation techniques. Prerequisite: MAE 571 or instructor approval.

MAE 563 Unsteady Aerodynamics. (3)*spring*

Unsteady incompressible and compressible flow. Wings and bodies in oscillatory and transient motions. Kernel function approach and panel methods. Aeroelastic applications. Prerequisite: MAE 460 or 461.

MAE 564 Advanced Aerodynamics. (3)*fall*

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)*fall*

Introduces 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)*fall*

Basic kinematic, dynamic, and thermodynamic equations of the fluid continuum and their application to basic fluid models.

MAE 572 Inviscid Fluid Flow. (3)*spring*

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)*fall*

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)*fall*

Homogeneous, isotropic, and wall turbulence. Experimental results. Introduces turbulent-flow calculations. Prerequisite: MAE 571.

MAE 577 Turbulent Flow Modeling. (3)*spring*

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)*fall*

Basic concepts and laws of classical equilibrium thermodynamics; applications to engineering systems. Introduces statistical thermodynamics.

GRADUATE PROGRAMS AND COURSES

MAE 582 Statistical Thermodynamics. (3)

once a year

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)

fall

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 384; MAE 388.

MAE 586 Convection Heat Transfer. (3)

spring

Basic concepts and governing equations. Analyzes laminar and turbulent heat transfer for internal and external flows. Natural and mixed convection. Prerequisite: MAE 388.

MAE 587 Radiation Heat Transfer. (3)

fall

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)

spring

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)

fall

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)

fall and spring

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. (1-4)

fall and spring

Special topics courses, including the following, which are regularly offered, are open to qualified students. Topics may include the following:

- Advanced Spacecraft Control. (1-3)
- Aeroelasticity. (1-3)
- Aerospace Vehicle Guidance and Control. (1-3)
- Boundary Layer Stability. (1-3)
- Hydrodynamic Stability. (1-3)
- Plasticity. (1-3)
- Polymers and Composites. (1-3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Medieval and Renaissance Studies

Interdisciplinary Certificate Programs

www.asu.edu/clas/acmrs/cert.html

480/965-5900

SS 224

Robert E. Bjork, Director

American Studies (ASU West)

Associate Professor: Moulton

Architecture

Professor: Meunier

Assistant Professor: Caicco

Art

Associate Professors: Schleif, Wolfthal

Barrett Honors College

Senior Lecturer: Facinelli

English

Professors: Bjork, Brink, Gutierrez

Associate Professors: Corse, Mahoney, Perry, Voaden

Assistant Professor: Fox

History

Professors: Batalden, Burg, Green, Tillman, Warnicke

Associate Professors: Barnes, Soergel, Thornton

Assistant Professor: Koopmans

Languages and Literatures

Professors: Alexander, Losse, Wixted

Associate Professors: Candela, Hendrickson, Sanchez, Senner, Vitullo

Assistant Professor: George

Law

Professors: Brennan, Rose

Music

Professor: Metz

Associate Professor: Haefer

Philosophy

Professor: White

Religious Studies

Professor: Coudert

Associate Professor: Clay

Theatre

Professor: Knapp

Graduate students admitted to a degree program in any field may earn one of two M.A.- or Ph.D.-level certificates:

the Certificate in Medieval Studies or the Certificate in Renaissance Studies. Since medieval and Renaissance studies are by nature interdisciplinary, students in the certificate program receive interdisciplinary training. Besides the course work and examinations required in their major field, students take six to nine semester hours outside their discipline and receive training in a medieval vernacular language or a modern European language.

The core of the program has two components: (1) Latin, the international language for both the Middle Ages and Renaissance, and (2) paleography, the study of the physical medium through which Latin and other languages were transmitted.

The certificate program prepares students for advanced study or for academic positions by augmenting their skills and knowledge, thereby making them more equipped to handle the demands of their fields. For more information, contact the Arizona Center for Medieval and Renaissance Studies.

COURSES

For course information, contact the Arizona Center for Medieval and Renaissance Studies.

Microbiology

Master's and Doctoral Programs

ls.la.asu.edu/microbiology/text/grad.htm

480/965-1457

LSE 210

Edward A. Birge, Chair

Professors: Burke, Jacobs, Misra, Mossman, Schmidt

Associate Professors: Birge, Hoffman, Hogue, Stout

Assistant Professors: Chang, Garcia-Pichel

The faculty in the Department of Microbiology offer programs leading to the M.S. and the Ph.D. degrees in Microbiology.

The faculty also participate in the program leading to the Master of Natural Science degree when one of the concentrations is microbiology (see "[Natural Science](#)," page 279).

The Graduate Record Examination (GRE) is required for all applicants. Three letters of recommendation and a statement of personal goals must be submitted for admission to the graduate programs. Applicants are expected to have completed the requirements for an undergraduate major in Biology, Chemistry, or Microbiology or have an adequate background in related courses in biology, chemistry, mathematics, physics, and plant biology. Applicants without this background may be asked to take the GRE subject test. Applications are accepted throughout the year. To be considered for assistantships and fellowships, completed appli-

cations must be received by February 15 for the fall semester and by October 15 for the spring semester.

The graduate programs are designed to prepare students for careers in teaching and in research on various aspects of microbiology in educational institutions, industry, or government agencies. To ensure proper course selection, new students must have the department's approval for all course registrations.

MASTER OF SCIENCE

See "[Master's Degrees](#)," page 93, for general requirements.

Program of Study. A minimum of 30 semester hours of graduate credit are required, of which at least six hours must be thesis and research credit. The program is planned by the student in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Students are expected to achieve, through course work, a fundamental understanding of the following subdisciplines: bacterial genetics, immunology, molecular biology, physiology and metabolism, and virology. Alternatively, the student may demonstrate this fundamental understanding by a comprehensive examination prepared by the student's supervisory committee.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination covering the thesis and related subject matter is required.

DOCTOR OF PHILOSOPHY

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Program of Study. At least 60 semester hours of graduate credit, in addition to 24 hours of dissertation and research, are required; a minimum of 24 hours of this total is in formal course work. The program is planned in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A dissertation based on original work of high quality, demonstrating proficiency in the student's area of interest, is required. (See "[Doctoral Dissertations](#)," page 95.)

Final Examinations. A final oral examination in defense of the dissertation is required.

MICROBIOLOGY (MIC)

MIC 420 Immunology: Molecular and Cellular Foundations. (3)

fall

Molecular and cellular foundations of immunology. Antibody/antigen interactions, cellular response, cytokines, immunogenetics, immunoregulation, autoimmunity, psychoneuroimmunology research/medical perspectives. Prerequisites: both CHM 231 (or 331) and MIC 205 (or 220) or only instructor approval.

GRADUATE PROGRAMS AND COURSES

MIC 421 Experimental Immunology. (2)

fall and spring

Introduces the basic techniques, methods, and assays used in immunology. 6 hours lab. Fee. Prerequisites: a combination of CHM 231 and 331 and MIC 302 or only instructor approval.

MIC 425 Advanced Immunology. (3)

selected semesters

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)

spring

Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: both BIO 340 and MIC 205 (or 220) or only instructor approval.

MIC 442 Bacterial Genetics Laboratory. (1)

spring

Techniques of mutagenesis, mapping, and strain and genetic library construction. 4 hours lab. Prerequisites: MIC 206, 302. Pre- or corequisite: MIC 441.

MIC 445 Techniques in Molecular Biology/Genetics. (2)

fall and spring

Molecular genetic principles: plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MBB 445. Credit is allowed for only MBB 445 or MIC 445. Prerequisites: both BIO 340 and MIC 302 or only instructor approval.

MIC 446 Techniques in Molecular Biology/Genetics Lab. (2)

fall and spring

Molecular genetic techniques; plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MBB 446. Credit is allowed for only MBB 446 or MIC 446. Pre- or corequisite: MBB 445 or MIC 445.

MIC 461 Geomicrobiology. (3)

spring

Past and present interactions among microbial life, geological materials, and biogeochemical cycles involving carbon, sulfur, phosphate, nitrogen, and metals. Cross-listed as GLG 461. Credit is allowed for only GLG 461 or MIC 461. Prerequisites: introductory courses in chemistry and microbiology (or geological sciences); instructor approval.

MIC 470 Bacterial Diversity and Systematics. (4)

fall

Biology, classification, and enrichment culture of the nonpathogenic bacteria. 2 hours lecture, 6 hours lab. Fee. Prerequisite: MIC 302.

MIC 485 General Virology. (3)

fall

Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: both BIO 340 and CHM 331 or only instructor approval.

MIC 486 General Virology Laboratory. (2)

selected semesters

Fundamentals of virus detection, isolation and assay; propagation of virus in mammalian cell culture; recombinant virus and vector construction. 6 hours lab. Prerequisite: MIC 302. Pre- or corequisite: MIC 485.

MIC 527 Neuroimmunology. (3)

selected semesters

Studies 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 581 Molecular Mechanism of Pathogenesis. (3)

selected semesters

Pathogenic mechanisms and host responses in viral and/or bacterial diseases. Prerequisites: both MIC 381 and 420 or only instructor approval.

MIC 585 Molecular Virology. (3)

fall

Selected topics concerning molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

MIC 591 Seminar. (1-12)

fall and spring

Topics may include the following:

- Bacterial Ecology. (1-3)
- Current Research in Microbiology. (1-3)
- Enzymology. (1-3)
- Genetic Engineering. (1-3)
- Genetics. (1-3)
- Immunology. (1-3)
- Molecular Virology. (1-3)
- Neuroimmunology. (1-3)
- Pathogenic Bacteriology. (1-3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Molecular and Cellular Biology

Interdisciplinary Master's and Doctoral Programs

www.asu.edu/mcb

480/965-0743

LSE 411

Robert W. McGaughey, Director

Bioengineering

Associate Professor: Massia

Assistant Professor: Panitch

Biology

Professors: Capco, Chandler, Hazel, McGaughey, Satterlie

Associate Professors: Goldstein, Orchinik

Assistant Professors: Kumar, Lorson, Newfeld, Wilson-Rawls

Chemical and Materials Engineering

Assistant Professor: Razatos

Chemistry and Biochemistry

Professors: Allen, Blankenship, Lohr, Rose, Woodbury

Research Professor: Bieber

Assistant Professor: Francisco

Microbiology

Professors: Jacobs, Misra, Schmidt

Associate Professors: Hoffman, Stout

Assistant Professor: Chang

Plant Biology

Professors: Backhaus, Frasch, Hooper, Trelease, Vermaas, Webber

Associate Professors: Roberson, Stutz

Assistant Professor: Rhoads

The interdisciplinary M.S. and Ph.D. degrees 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 Departments of Biology, Chemistry and Biochemistry, Microbiology, and Plant Biology), with additional faculty from the Departments of Anthropology, Bioengineering, Chemical and Materials Engineering, Exercise Science, Physics and Astronomy, and Psychology. One striking aspect of studies in this broad area of biological science is the interdisciplinary nature of the field. Similar approaches and techniques are used for studies of biological systems whether they are viral, bacterial, plant, or animal.

The graduate degrees offered by the faculty through this program prepare students for careers that span traditional disciplinary boundaries. The broad-based training provides the necessary skills for professional careers in academic institutions, governmental institutions, and industry, particularly those related to health and chemical sciences.

Graduate Record Examination. All applicants are required to take the Graduate Record Examination (GRE). Submission of scores on the verbal, quantitative, and analytical sections of the GRE is required for admission to the M.S. and Ph.D. degree programs. The subject test in the sciences is highly recommended.

TOEFL and SPEAK Test. Students whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL). A TOEFL score of 630 (paper) or 267 (computer) is required for admission to the MCB program. Students whose native language is not English must pass the Speaking Proficiency English Assessment Kit (SPEAK) test with a score of at least 55 if they wish to be considered for teaching assistantship support.

MASTER OF SCIENCE

See [“Master’s Degrees,” page 93](#), for general requirements.

Program of Study. Thirty semester hours are required. A minimum of 10 designated semester hours of MCB courses and six hours of Research and Thesis are required. The remaining courses are selected by the student in consultation with the supervisory committee.

Thesis Requirements. A written thesis based on original research is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Program of Study. Eighty-four semester hours are required. A minimum of 12 designated semester hours of MCB courses, six semester hours of elective course work, and 24 semester hours of Research and Dissertation are required. The remaining courses are selected by the student in consultation with the supervisory committee.

Comprehensive Examinations. Written and oral comprehensive examinations are required.

Dissertation Requirements. A written dissertation based on original research of high quality that demonstrates proficiency in the area of specialization is required.

Final Examinations. The final oral examination in defense of the dissertation is required. Evidence must be presented that the research contribution is publishable in the primary literature.

RESEARCH ACTIVITY

The Interdisciplinary Program in Molecular and Cellular Biology offers research experiences and laboratory training at the forefront of biology. Recent completion of a new wing to the Life Science Center and the opening of the Goldwater Science and Technology Center have made state of the art resources available to students in the program. The faculty strive to provide an environment that builds a base for the pursuit of intellectual development throughout a student’s lifetime.

MOLECULAR AND CELLULAR BIOLOGY (MCB)

MCB 500 Research Methods in Molecular and Cellular Biology. (2)

fall and spring

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

MCB 501 Seminar: Molecular and Cellular Biology Colloquium. (1)

fall and spring

Presentation of current research by noted researchers in the field. May be repeated for credit.

MCB 555 Advanced Molecular and Cellular Biology I. (3)

fall

Study of structural and functional organization of biomolecules and cells, based on current literature. May be repeated once for credit. 3 hours lecture, discussion. Pre- or corequisites: BCH 461; BIO 543 (or its equivalent).

MCB 556 Advanced Molecular and Cellular Biology II. (3)

spring

Continuation of MCB 555. May be repeated once for credit. 3 hours lecture, discussion. Pre- or corequisites: BCH 462; BIO 543 (or its equivalent).

MCB 576 Functional Genomics. (2)

spring

Functional relevance of genomic sequences; DNA arrays, proteomics, analysis of genomic information for metabolic physiology of organisms. Cross-listed as PLB 576. Credit is allowed for only MCB 576 or PLB 576. Prerequisite: MAT 351.

MCB 591 Seminar: Current Literature in Molecular and Cellular Biology. (1)

fall and spring

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

MCB 598 Special Topics. (1–4)

selected semesters

MCB 555 and 556 may be taken as one-semester-hour sections listed by the instructor.

MCB 700 Research Methods in Molecular and Cellular Biology. (2)

fall and spring

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

MCB 701 Seminar: Molecular and Cellular Biology Colloquium. (1)

fall and spring

Presentation of current research by noted researchers in the field. May be repeated for credit.

GRADUATE PROGRAMS AND COURSES

MCB 791 Seminar: Current Literature in Molecular and Cellular Biology. (1)

fall and spring

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Multimedia Writing and Technical Communication

Certificate Program

ASU East offers a postbaccalaureate certificate in Multimedia Writing and Technical Communication. For more information, call 480/727-1515, or access www.east.asu.edu/ecollege/multimedia on the Web.

MULTIMEDIA WRITING AND TECHNICAL COMMUNICATION (TWC)

TWC 401 Principles of Technical Communication. (3)

fall and spring

Basic information design principles to produce effective written, oral, and electronic technical communication. Understanding of rhetorical and audience analysis. Pre- or corequisite: TWC 301.

TWC 403 Writing for Professional Publication. (3)

selected semesters

Analyzes the market and examines the publication process, including the roles of the author, editor, and reviewer. Pre- or corequisite: TWC 401.

TWC 411 Principles of Visual Communication. (3)

fall and spring

Basic principles of visual communication in print and electronic media. Understanding graphic and document design, including typography and color. Pre- or corequisite: TWC 401.

TWC 421 Principles of Writing with Technology. (3)

fall and spring

Understanding historical and social impact of technology on writing, with emphasis on multimedia design, computer-mediated communication, and hypertext. Pre- or corequisite: TWC 401.

TWC 431 Principles of Technical Editing. (3)

fall and spring

Basic principles of technical editing (for print and electronic media) including copyediting, reviews, standards, style, and project management. Pre- or corequisite: TWC 401.

TWC 443 Proposal Writing. (3)

once a year

Develops persuasive strategies and themes for researching and writing professional proposals. Pre- or corequisite: TWC 401.

TWC 444 Manual and Instructional Writing. (3)

once a year

Design and development of a user manual, writing instructions, improving graphics and page design, and usability testing. Pre- or corequisite: TWC 401.

TWC 445 Computer Documentation. (3)

once a year

Introduces writing documentation for the computer industry. Pre- or corequisite: TWC 401.

TWC 446 Technical and Scientific Reports. (3)

once a year

Introduces strategies, formats, and techniques of presenting information to technical and scientific audiences. Pre- or corequisite: TWC 401.

TWC 447 Business Reports. (3)

once a year

Introduces strategies, formats, and techniques of presenting information to business and other workplace audiences. Pre- or corequisite: TWC 401.

TWC 484 Internship. (3)

fall and spring

Applies classroom work in a supervised workplace environment. Pre- or corequisite: TWC 411 or 421 or 431.

TWC 490 Capstone. (3)

fall and spring

Development of a professional portfolio, creation of a "culminating document," and synthesis of undergraduate experience. Prerequisite: instructor approval.

TWC 501 Principles of Technical Communication. (3)

fall and spring

Basic information design principles to produce effective written, oral, and electronic technical communication. Understanding of rhetorical and audience analysis. Pre- or corequisite: graduate standing.

TWC 503 Writing for Professional Publication. (3)

selected semesters

Analyzes the market and examines the publication process, including the roles of the author, editor, and reviewer. Pre- or corequisite: TWC 501.

TWC 511 Principles of Visual Communication. (3)

fall and spring

Basic principles of visual communication in print and electronic media. Understanding graphic and document design, including typography and color. Pre- or corequisite: TWC 501.

TWC 521 Principles of Writing with Technology. (3)

fall and spring

Understanding historical and social impact of technology on writing, with emphasis on multimedia design, computer-mediated communication, and hypertext. Pre- or corequisite: TWC 501.

TWC 531 Principles of Technical Editing. (3)

fall and spring

Basic principles of technical editing for print and electronic media, including copyediting, reviews, standards, style, and project management. Pre- or corequisite: TWC 501.

TWC 543 Proposal Writing. (3)

once a year

Develops persuasive strategies and themes for researching and writing professional proposals. Pre- or corequisite: TWC 501.

TWC 544 Manual and Instructional Writing. (3)

once a year

Design and development of a user manual, writing instructions, improving graphics and page design, and usability testing. Pre- or corequisite: TWC 501.

TWC 545 Computer Documentation. (3)

once a year

Introduces writing documentation for the computer industry. Pre- or corequisite: TWC 501.

TWC 546 Technical and Scientific Reports. (3)

once a year

Introduces strategies, formats, and techniques of presenting information to technical and scientific audiences. Pre- or corequisite: TWC 501.

TWC 547 Business Reports. (3)

once a year

Introduces strategies, formats, and techniques of presenting information to business and other workplace audiences. Pre- or corequisite: TWC 501.

TWC 584 Internship. (3)

fall and spring

Applies classroom work in a supervised workplace environment. Pre- or corequisites: TWC 511, 521, 531.

TWC 598 Special Topics. (1–4)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Museum Studies

See “Certificate in Museum Studies,” page [105](#).

Music

Master’s, Doctoral, and Certificate Programs

herbergercollege.asu.edu/music

480/965-3371

MUSIC E185

Wayne A. Bailey, Director

Amy Holbrook, Graduate Program Coordinator

Regents’ Professors: Hickman, Pagano

Professors: Bailey, Britton, Cosand, Crowe, DeMars, Doan, Dreyfoos, Hackbarth, Hamilton, Hill, Hoffer, Humphreys, Kliewer-Britton, Koonce, Lockwood, Marohnic, Metz, Oldani, Pilafian, Reber, Rogers, Russell, Sellheim, Shinn, Spring, Stauffer, Sunkett, Swaim, Thompson, Umberson, Williamson, Wytko

Associate Professors: Bush, Carpenter, Haefer, Holbrook, Kopta, Lyman, Marshall, May, Peterson, Rockmaker, Rodland, Smith, Solis, Wilson

Assistant Professors: Bryan, Ericson, Landschoot, Lingas, McLin, Meir, Rio, Schmidt, Schuring, Sullivan, Swartz

Senior Lecturers: Norton, Shellans

Lecturer: Tongret

Academic Professional: Campbell

The School of Music in the Katherine K. Herberger College of Fine Arts at ASU is an accredited institutional member of the National Association of Schools of Music. The requirements for entrance and graduation set forth in this catalog are in accordance with the published regulations of the association.

The School of Music is committed to the growth and development of both faculty and students in order that music may be created, performed, studied, and taught with excellence.

The faculty in the School of Music offer graduate programs leading to the M.A. degree in Music with concentrations in ethnomusicology, music history and literature, and music theory.

The faculty also offer a graduate program leading to the professional Master of Music degree in Composition, Music Education, and Performance and the professional Doctor of

Musical Arts degree in Music with concentrations in choral conducting, music composition, music education, and solo performance.

Graduate Diagnostic Examinations. All students admitted to graduate degree programs must satisfactorily complete these examinations before any comprehensive examinations may be scheduled. In music theory, the areas are as follows:

1. aural skills;
2. form;
3. analytical skills: 19th-century music; and
4. analytical skills: contemporary music.

In music history, the areas are (1) medieval, renaissance, and baroque and (2) classical, romantic, and contemporary.

Undergraduate Deficiencies. Deficiencies are determined by the school. Removal of all deficiencies is the responsibility of the student and is considered additional to the minimum hours for graduation.

Graduate Assistantships. The deadline is February 15 for teaching assistantship applications.

MASTER OF ARTS

See “[Master’s Degrees](#),” page [93](#), for general requirements.

Prerequisites. Applicants are expected to have a B.A. degree in Music or its equivalent from an accredited institution.

Admission. Application must be accompanied by evidence of scholarly achievement or potential (e.g., a term paper), letters of recommendation from two persons qualified in the field, and a one- to- two-page personal statement of the applicant’s professional goals.

Program of Study

Ethnomusicology. A minimum of 30 semester hours of graduate credit is required, of which at least 20 semester hours must be in the field of ethnomusicology or related fields, including six semester hours of thesis, and at least six semester hours in music theory.

Music History and Literature. A minimum of 30 semester hours of graduate credit is required, of which at least two-thirds must be in the field of music history and literature and at least six semester hours in music theory.

Music Theory. A minimum of 32 semester hours of graduate credit is required, of which at least 18 must be in the field of music theory and at least 10 must be selected from the fields of music theory, music composition, and music history.

Course Requirements

Ethnomusicology. MUP 587 (two semesters), MHL 568, 591, 592, 599 (Thesis), and six semester hours of music theory.

GRADUATE PROGRAMS AND COURSES

Music History and Literature. MUP 582 (two semesters), MHL 532, 591 (two semesters), 599 (Thesis), and six hours of music theory.

Music Theory. MTC 520, 525, 527, 528, 599 (Thesis); six semester hours of music history.

Foreign Language Requirements. A passing grade on the foreign language reading examination in French or German is required.

Final Examinations. A final examination (written, oral, or both) is required. An oral examination in defense of the thesis is also required.

MASTER OF MUSIC

The faculty in the School of Music offer a graduate program leading to the professional degree Master of Music (M.M.). Three majors are available: Composition, Music Education, and Performance. For the Music Education major, concentrations are available in

1. choral music,
2. general music,
3. instrumental music, and
4. jazz studies.

Performance majors may focus their education in the following areas of concentration:

1. music theatre/opera musical direction,
2. music theatre/opera performance,
3. performance,
4. performance pedagogy, and
5. piano accompanying.

Prerequisites. A Bachelor of Music degree or its equivalent from an accredited institution is required for admission to the M.M. program.

Admission. Admission to all concentrations under the major in Performance is dependent on a successful audition, either in person or by taped performance. For admission to the major in Composition, the applicant must submit three original works showing technical facility in composition, letters of recommendation from two qualified persons in the field, and a one- to two-page personal statement of the applicant's professional goals. For admission to the M.M. in Music Education degrees, the applicant must have completed all requirements for music teacher certification. Post-baccalaureate certification is available and may be completed concurrently with master's degree work.

Letters of recommendation from three qualified persons in the field are also required. For the jazz studies concentration, a video or audio tape of a recent jazz performance (solo or ensemble) by the applicant must be submitted, and a video or audio tape of a jazz ensemble directed by the applicant should also be submitted if available.

Students majoring in Performance with a concentration in solo performance (voice) and performance pedagogy (voice) are required to take a diction examination in French, German, and Italian during registration week of their first

semester. Students who do not pass this examination are required to take the appropriate semester(s) of MUP 250.

For admission to the concentration in performance pedagogy (piano), a minimum of one semester of prior piano pedagogy study including significant intern teaching experience is required. In addition, the student must demonstrate evidence of teaching ability, either in person or by videotape.

Program of Study. The student must complete a minimum of 32 semester hours of graduate courses, of which at least one-third must be in the area of concentration.

Foreign Language Requirements. Solo performance (voice only) and performance pedagogy (voice only) require a total of 16 semester hours of college-level credit in more than one language chosen from French, German, or Italian. The concentration in piano accompanying requires two semesters of college-level study in French, German, or Italian and two semesters of diction (or the equivalent) in the remaining languages in that group. These requirements may be fulfilled in whole or in part through language instruction in secondary and/or undergraduate school or by other means (for more information, see the *General Catalog*). These language requirements are not part of the 32-hour program of study. However, hours toward the requirements may be taken concurrently with the program of study if a deficiency exists.

Final Examination. A final examination (written, oral, or both) is required. An oral examination in defense of the thesis is required for the major in composition.

COURSE REQUIREMENTS

Composition

Composition. MTC 523 (six semester hours), 525, 599; six hours of music history, three hours of music theory.

Music Education

Choral Music. MUE 548, 549, 550 (or 579), 568, 570; two semester hours of ensemble; six semester hours of music history (including MHL 575); five hours of music theory. One MHL or MTC course must be in contemporary music.

General Music. MUE 548, 549, 550 (or 579), 551, 552; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music, and one MHL course or one ensemble must be in ethnomusicology.

Instrumental Music. MUE 548, 549, 550 (or 579), 564, 566; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music.

Jazz Studies. MUE 548, 549, 550 (or 579), 560, 562 (two semesters); MUP 509, 510, 517, 518, three semester hours of jazz ensemble; six semester hours of music history; five hours of music theory. One MHL or MTC course must be in contemporary music.

Performance

Solo Performance (Voice). MUP 527 (eight semester hours), 541, 551, 596, 597; performing ensembles (two hours); six hours of music history; five hours of music theory.

Solo Performance (Keyboard). MUP 527 (eight semester hours), 551 (or 581), 596, 597; performing ensembles (two hours); six hours of music history and literature; five hours of music theory.

Solo Performance (Instrumental). MUP 527 (eight semester hours), 551, 581, 596, 597; performing ensembles (two hours); six hours of music history; five hours of music theory.

Piano Accompanying. MUP 527 Studio Instruction (eight semester hours), 511 (or 521 Studio Instruction [four hours]), 588 (four hours), 596, 597; six hours of music history; five hours in music theory.

Performance Pedagogy. MUP 527 (eight semester hours), 541 (voice only), 551 and/or 581, 596, 597; performing ensembles (two hours), (piano only: MUP 440 [or proficiency], 507, 508, 581 [four hours]); six hours in music history; five hours of music theory.

(Music Theatre/Opera) Musical Direction. MUP 511 Studio Instruction: Piano (four semester hours), 551, 571 (two semester hours), 573, 574 (two semester hours), 591 (six semester hours), 596, 597; performance on stage in one production; musical direction of two productions; six hours of music history; five hours of music theory.

(Music Theatre/Opera) Performance. MUP 511 Studio Instruction (eight semester hours), 551, 570 (two semester hours), 571 (three semester hours), 596, 597; a three-hour graduate THP course designed for actors (as approved by supervisory committee); leading roles in two musical theatre productions; six hours of music history; five hours of music theory.

DOCTOR OF MUSICAL ARTS

The Doctor of Musical Arts (D.M.A.) is a professional degree program designed for students desiring high levels of performance, academic proficiency, and preparation for teaching positions at the university level. The major is Music with four concentrations: choral conducting, music composition, music education, and solo performance (instrumental, keyboard, piano accompanying, piano pedagogy, voice).

Admission. Students seeking admission normally hold the Master of Music degree. Applicants with other degrees are considered if they have received graduate training similar to that normally expected in a Master of Music degree program. The application for admission must be accompanied by an applicant's statement relating to goals, preparation, and educational background. The applicant must submit scores for the GRE (quantitative, verbal, and analytical) or the MAT. Three letters of recommendation are required. Applicants must perform a satisfactory audition or submit a tape recording of performances or compositions as appropriate to the concentration. The deadline is February 15 for teaching assistantship applications.

Supervisory Committee. When the program of study is filed, the supervisory committee is appointed by the dean of the Graduate College upon recommendation of the director and the graduate committee of the School of Music. The committee consists of five members; at least three should be from the major field.

Program of Study. A total of 90 semester hours beyond the bachelor's degree is required. Only 36 hours from a master's degree or other postgraduate work will be counted toward the 90 hour requirement. For more information, call the School of Music, 480/965-3371.

Continuous Enrollment. Once admitted to a D.M.A. degree program, the student is expected to be enrolled continuously, excluding summer sessions, until all requirements for the degree have been fulfilled. This requirement applies to students admitted fall 1994 and thereafter. Continuous enrollment promotes steady progress toward the completion of the degree and an ongoing relationship between the student and faculty offering the program. If a program of study must be interrupted for one or more semesters, the student may apply for leave status, not to exceed one calendar year. A student on leave is not required to pay fees, but is not permitted to place any demands on university faculty or use any university facilities. A student who interrupts a program without obtaining leave status may be removed automatically from the Graduate College, under the assumption that the student has decided to discontinue the program. A student removed from the Graduate College for this reason may reapply for admission; the application is considered along with all other new applications to the degree program.

An application for leave status, endorsed by the members of the student's supervisory committee and the head of the academic unit, must be approved by the dean of the Graduate College. This request must be filed and approved no later than the last day of registration in the semester of anticipated absence.

Residency. In general, the D.M.A. degree student should expect to spend at least the equivalent of three academic years beyond the bachelor's degree in the program. At least two semesters following the first year (30–32 semester hours) of graduate study must be spent in continuous full-time residence at ASU. After the first year (30–32 semester hours), at least 54 hours must be completed in residence at ASU.

Foreign Language Requirements. Competency in at least one foreign language is required for solo performance and music composition concentrations. Some areas of study within solo performance require two foreign languages.

Comprehensive Examinations. Near the completion of course work, the student must request permission to take the comprehensive examinations through the supervisory committee and the school director. These written and oral examinations are designed to assess the student's competency in the major and supportive fields. Failure in the comprehensive examinations is considered final unless the supervisory committee recommends, and the dean of the Graduate College approves, a reexamination. A reexamination may be administered no sooner than three months and no later than

GRADUATE PROGRAMS AND COURSES

one year from the date of the original examination. Only one reexamination is permitted.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, *except the dissertation*. These requirements include passing the comprehensive examinations and foreign language examination, if applicable, and meeting other requirements specified by the academic unit.

Dissertation, Research Papers, and Recitals. The music composition and music education concentrations require a dissertation of an original and creative nature. The choral conducting concentration requires a conducting recital plus either a dissertation or a series of projects and a research paper. The solo performance concentration requires at least three recitals following admission to the program and a research paper. All candidates must enroll for a total of 24 semester hours of credit in research (MUP 792), recital (MUP 796), and dissertation (MUP 799) as appropriate to the concentration.

Final Examinations. The final oral examination in defense of the dissertation or research paper is scheduled by the Graduate College. The exam is conducted by the supervisory committee and others appointed by the dean of the Graduate College. All final oral examinations must be conducted at least one week before the degree conferral date and held on the ASU Main campus.

Graduation. The student is eligible for graduation when the final oral examination has been passed, Graduate College scholarship requirements have been met, and the dissertation/research paper has been approved by the supervisory committee, the director of the school, and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

Maximum Time Limit. D.M.A. candidates must complete all requirements within five years after the comprehensive exams have been passed.

POST-BACHELOR'S ARTIST DIPLOMA

The Post-Bachelor's Artist Diploma graduate certificate program is intended for a very limited number of the most gifted performers who demonstrate strong potential for successful careers in musical performance.

Admission. Students seeking admission must hold at least a bachelor's degree in music or an equivalent conservatory credential at the time of entrance. All applicants whose native language is not English must submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL). For preliminary screening, every applicant must submit a letter of application, official transcripts, four letters of recommendation, and an audio recording containing works representing a variety of musical styles and composers. Those applicants recommended for a full audition must perform an audition recital and be interviewed on the ASU campus.

Program of Study. The Post-Bachelor's Artist Diploma program is a two-year course of study requiring at least two consecutive semesters of residence. A total of 32 semester hours, including four public recitals, is required. Three of the recitals must be presented on the ASU campus, and one at a venue outside of the metropolitan Phoenix area.

Course Requirements. MUP 527 (sixteen semester hours), 551 (four semester hours), and 581; performing ensembles (two semester hours) and four recitals (eight semester hours).

Related Requirements. The School of Music graduate diagnostic examinations in music theory and music history must be taken during the first semester of study, and all must be passed before the awarding of the Post-Bachelor's Artist Diploma. Students in voice must pass the graduate-level foreign language diction examination before completing the program. Concurrent enrollment in other degree programs during the course of study is not permitted. Transfer credits from other institutions and/or other degree programs within the ASU School of Music do not count toward the 32 required semester hours.

MUSIC HISTORY/LITERATURE (MHL)

MHL 532 Music Bibliography. (3)

fall

Major historical and analytical writings; systematic and historical collections of music. Prerequisite: reading knowledge of a foreign language recommended.

MHL 535 Medieval Music. (3)

spring in odd years

Music of Europe in the Middle Ages, Gregorian chant, religious and secular monophony and polyphony to 1400.

MHL 536 Music of the Renaissance. (3)

spring in even years

Music in Europe, with emphasis on stylistic concepts and changes, ca. 1400–1580.

MHL 544 World Music I. (3)

fall in odd years

Music of traditional and folk cultures of Africa, Europe, and the Americas.

MHL 545 World Music II. (3)

fall in even years

Traditional, folk, and art music of the Pacific, Near East, and Asia.

MHL 547 Topics in American Music. (3)

selected semesters

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)

spring in even years

Examines 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 564 History of Music Instruments. (3)

fall in even years

Survey of the history and development of music instruments in traditional, folk, and art cultures.

MHL 566 Area Studies in Ethnomusicology. (3)

spring

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)

fall in odd years

Introduces the theory and methodology of the discipline, including bibliography, fieldwork, transcription, analysis, and organology.

MHL 575 History of Choral Music. (3)*fall*

Major choral works.

MHL 591 Seminar. (1–12)*fall and spring***MHL 592 Research. (1–12)***fall and spring***MHL 599 Thesis. (1–12)***fall and spring***MHL 644 Notation of Polyphonic Music. (3)***spring in even years*

Music notation from the 15th through 17th centuries, including problems of transcription into modern notation.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)**MUSIC THEORY AND COMPOSITION (MTC)****MTC 516 Baroque Music. (3)***spring in even years*

Detailed analysis of selected examples of music from the Baroque period.

MTC 517 Classic Music. (3)*spring in odd years*

Detailed analysis of selected examples of music from the Classic period.

MTC 518 Romantic Music. (3)*fall in even years*

Detailed analysis of selected examples of music from the Romantic period.

MTC 519 Late 19th-/Early 20th-Century Music. (3)*fall in odd years*

Detailed analysis of selected examples of music from the late 19th and early 20th centuries.

MTC 520 Analytical Techniques. (3)*spring and summer*

Analytical techniques systematically applied to music. Concentration on structural and compositional procedures.

MTC 523 Advanced Composition. (2–3)*fall and spring*

Advanced music composition, including complex techniques and larger structure. May be repeated for credit. Prerequisite: instructor approval.

MTC 525 Pedagogy of Theory. (3)*fall in even years*

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)*selected semesters*

Theory from Pythagoras to the 16th century. Need not be taken in sequence with MTC 528.

MTC 528 History of Music Theory. (3)*selected semesters*

Theory from the 17th century to the present. Need not be taken in sequence with MTC 527.

MTC 555 Computer Music Notation. (2)*selected semesters*

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 591 Seminar. (1–12)*fall and spring***MTC 592 Research. (1–12)***fall and spring***MTC 599 Thesis. (1–12)***fall and spring***MTC 647 Directions in New Music. (3)***selected semesters*

Studies in contemporary idioms and aesthetics drawn from recent works of visiting composers; involves analytical discourse, critical writ-

ing, and applied concepts in composition. Lecture, discussion, exercise. Prerequisite: instructor approval.

MTC 723 Advanced Composition. (3)*fall and spring*

Special problems in writing in complex forms and textures. May be repeated for credit. Studio.

MTC 755 Music Composition Technology. (3)*selected semesters*

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 their equivalents).

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)**MUSIC EDUCATION (MUE)****MUE 548 Introduction to Research in Music Education. (3)***fall and summer*

Introduces historical, quantitative, and qualitative research methods and sources as they apply to research in music education.

MUE 549 Foundations of Music Education. (3)*once a year*

Historical/sociological survey of formal and informal music teaching and learning practices from the ancient Greeks to the present, including the evolution of philosophies and learning theories.

MUE 550 Studies in Music Curricula. (3)*once a year*

Scope and sequence of musical experiences. Development of criteria for the evaluation of music curricula.

MUE 551 Advanced Studies in Elementary School Music. (3)*once a year*

For experienced teachers; organization and content of K–6 general music classes. Emphasizes teaching music reading and ear training to young children.

MUE 552 Advanced Studies in Secondary General Music. (3)*once a year*

Organization and content of school music classes that are not performance oriented.

MUE 553 Contemporary Elementary Music. (3)*selected semesters*

Identification and development of materials and techniques for teaching special units of music study to elementary (K–8) children.

MUE 560 Jazz Pedagogy. (3)*spring in odd years*

Study of pedagogy, repertoire, and technique of instruction in jazz styles, ensemble techniques, and performance practice for school ensembles. Lecture, lab, discussion, observation. Prerequisite: M.M., Music Education major.

MUE 562 Jazz Ensemble Rehearsal Techniques. (1)*fall and spring*

Conducting and rehearsal techniques for school jazz ensembles. Lab. Prerequisite: M.M., Music Education major.

MUE 564 Instrumental Music, Advanced Rehearsal Techniques. (3)*once a year*

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)*once a year*

Comprehensive study and analysis of all types of instrumental music.

MUE 568 Choral Music, Advanced Rehearsal Techniques. (3)*once a year*

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)*once a year*

Comprehensive study and analysis of choral music for the high school with special emphasis on octavo literature.

GRADUATE PROGRAMS AND COURSES

MUE 579 Psychology of Music. (3)

once a year

Nature of musicality and its evaluation. Review of recent research.

MUE 585 Vocal Acoustics and Production. (3)

once a year

In-depth approach to the psychological/physiological workings of the vocal mechanism.

MUE 733 Contemporary Issues and Research in Music Education. (3)

once a year

Emphasizes 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)

once a year

Philosophical and psychological principles of college/university teaching. Patterns of music teacher education and a projection of course outlines.

MUE 755 Historical Research in Music Education. (3)

summer

Knowledge and insights related to conducting historical research in music education. Includes development of a mini-proposal for a dissertation on the history of music education.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

MUSIC PERFORMANCE (MUP)

MUP 507 Group Piano Practicum. (2)

fall

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)

fall and spring

Weekly observation of studio teaching by various piano faculty. Paper as final requirement. Prerequisite: M.M. piano student in Performance major (performance pedagogy or solo performance concentration).

MUP 509 Jazz Keyboard Harmony. (1)

fall

Emphasizes jazz chords and chord progressions, harmonization, voicing, and analysis of transcriptions. Lab. Prerequisite: M.M., Music Education student.

MUP 510 Jazz Keyboard Harmony. (1)

spring

Continuation of MUP 509. Lab. Prerequisite: MUP 509.

MUP 511 Studio Instruction. (2)

fall and spring

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. Fee. Prerequisites: graduate music major; placement examination; audition.

MUP 517 Advanced Improvisation. (1)

fall

Improvisation techniques within the context of advanced jazz literature. Must be taken in sequence with MUP 518. Lab. Prerequisites: placement examination; audition.

MUP 518 Advanced Improvisation. (1)

spring

Continuation of MUP 517. Lab. Prerequisite: MUP 517.

MUP 521 Studio Instruction. (1)

fall, spring, summer

Secondary or minor instrument instruction. 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. Fee. Prerequisites: graduate music major; instructor approval.

MUP 527 Studio Instruction. (2 or 4)

fall and spring

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. Fee. Prerequisites: M.M., Performance major; placement examination; audition.

MUP 540 Advanced Conducting. (3)

fall

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)

selected semesters

Seminar on solo song from its beginning to the present day.

MUP 544 Chamber Orchestra. (1)

fall and spring

Important masterpieces from all periods of music are performed throughout the year. May be repeated for credit. Prerequisite: instructor approval.

MUP 545 Symphony Orchestra. (1)

fall and spring

Masterpieces of symphony orchestra literature. 3 times per week. May be repeated for credit. Prerequisite: audition with director.

MUP 546 Sinfonietta. (1)

fall and spring

Symphonic orchestra that presents approximately six concerts annually, performing masterpieces of the classical repertoire. 3 times per week. May be repeated for credit. Prerequisite: audition with director.

MUP 550 Choral Union. (1)

fall and spring

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. Prerequisite: audition with director.

MUP 551 Repertoire. (2)

fall and spring

Literature available for performance in all performing media. May be repeated for credit.

MUP 552 Concert Choir. (1)

fall and spring

Important masterpieces from all periods of music are performed. May be repeated for credit. Prerequisite: instructor approval.

MUP 553 University Choir. (1)

fall and spring

4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 555 Men's Chorus. (1)

fall and spring

Rehearsal and performance of music for male voices. 3 hours per week. May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 557 Women's Chorus. (1)

fall and spring

2 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 561 Marching and Concert Bands. (1)

fall and spring

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. Prerequisite: audition with director.

MUP 562 Wind Ensemble. (1)

fall and spring

Rehearsal and performance of literature for wind ensemble. 2 hours per week in fall, 4 hours in spring. May be repeated for credit. Performing ensemble. Prerequisite: instructor approval.

MUP 563 Chamber Winds. (1)

fall and spring

Rehearsal and performance of advanced literature for chamber winds. 2 hours per week. May be repeated for credit. Performing ensemble. Prerequisite: instructor approval.

MUP 570 Music Theatre: Techniques. (1)*fall and spring*

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)*fall and spring*

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)*fall and spring*

Participation in Lyric Opera Theatre productions. Section 1 (Orchestra); Section 2 (Chamber Orchestra); Section 3 (Chamber Ensemble). May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 573 Music Theatre: Performance. (1)*fall and spring*

Participation in Lyric Opera Theatre productions. Section 1 (Principal Roles); Section 2 (Chorus). May be repeated for credit. Prerequisites: audition with director; instructor approval.

MUP 574 Music Theatre: Production. (1)*fall and spring*

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 573, Section 2. May be repeated for credit.

MUP 576 New Music Ensemble. (1)*fall and spring*

Rehearsal and performance of music written in the last 20 years. May be repeated for credit. Prerequisite: instructor approval.

MUP 579 Chamber Music Ensembles. (1)*fall and spring*

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)*fall and spring*

Principles and methods of performance techniques for each performance field. May be repeated for credit.

MUP 582 Collegium Musicum. (1)*selected semesters*

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 585 Percussion Ensemble. (1)*fall and spring*

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 Jazz Band. (1)*fall and spring*

Rehearsal and performance of new, traditional, and Latin literature for jazz bands. 4 hours per week. May be repeated for credit. Prerequisite: instructor approval.

MUP 587 Ethnomusicology Ensembles. (1)*fall and spring*

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)*fall and spring*

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. Prerequisite: Performance major with a concentration in piano accompanying or instructor approval.

MUP 591 Seminar. (1–12)*selected semesters***MUP 595 Continuing Registration. (1)***fall and spring***MUP 596 Solo Performance. (1)***fall*

May be full recital, major operatic role, solo performance with orchestra, ensemble, or lecture recital. Prerequisite: M.M. candidate in applied music.

MUP 597 Solo Performance. (1)*fall*

See MUP 596.

MUP 671 Choral Repertoire. (3)*selected semesters*

Examines large choral/orchestral works to determine their musical and textual characteristics from a conductor's point of view.

MUP 727 Studio Instruction. (2 or 4)*fall and spring*

Minimum contact of 1 hour per week. May be repeated for credit. Fee. Prerequisite: D.M.A. candidate.

MUP 751 Seminar in Piano Literature. (2)*fall in odd years*

In-depth study of selected topics related to the standard piano literature. Requires research paper, bibliography, class presentation. Seminar.

MUP 792 Research. (1–12)*fall, spring, summer***MUP 796 Solo Performance. (1–15)***fall and spring*

May be repeated for credit. Prerequisite: D.M.A. candidate.

MUP 799 Dissertation. (1–15)*fall and spring*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Music Education

See "[Music](#)," page 273.

Natural Science

Master's Program

The Master of Natural Science (M.N.S.) degree offers the opportunity for interdisciplinary graduate training in the natural sciences (biological sciences, mathematics, and physical sciences) and cognate areas. The degree program is especially suited for individuals who desire professional training rather than research training. Because of designed flexibility, the degree also offers the opportunity for individualized professional graduate programs depending upon the backgrounds and goals of the students. The major is Natural Science; students are expected to emphasize course work in two or more areas of concentration. The program must be interdisciplinary.

GRADUATE PROGRAMS AND COURSES

More information can be found under the various majors in the natural sciences and by contacting faculty offering these concentrations:

1. biology,
2. chemistry,
3. geological sciences,
4. mathematics,
5. microbiology,
6. physics, and
7. plant biology.

Admission. See [“Admission to the Graduate College,” page 84](#). A prerequisite for admission is the availability of resources for the proposed program and having a faculty member in one of the departments serve as a graduate advisor. The submission of scores on the GRE (verbal, quantitative, and analytical) is required of all applicants.

Supervisory Committee. The supervisory committee, consisting of three faculty members, is appointed by the dean of the Graduate College upon the recommendation of the chair of the academic unit in which the graduate advisor serves as a faculty member. The supervisory committee is formed soon after the student has been admitted to the degree program. The graduate advisor and student suggest names of persons to serve on the supervisory committee. The composition of the supervisory committee must reflect the interdisciplinary nature of the program.

Program of Study. A program of study is recommended by the supervisory committee after conferring with the student. The minimum number of semester hours required for the degree is 30. More may be required by the supervisory committee depending upon the background of the student and the nature of the proposed program. In some cases undergraduate courses may be required to remove deficiencies.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is optional.

Final Examinations. A final written or oral examination, or both, is required. Each examination is administered by the supervisory committee.

COURSES

For course information, refer to the catalog sections of the majors corresponding to the M.N.S.

Nonprofit Leadership and Management

Certificate Program

Robert F. Ashcraft, Director, Center for Nonprofit Leadership and Management

The certificate in Nonprofit Leadership and Management, offered through the College of Public Programs, is a graduate program that provides students with an understanding of the nonprofit sector's role in society and with the skills necessary for effective leadership and management of these organizations. The program is administered through an interdisciplinary faculty committee representing the Department of Recreation Management and Tourism, the School of Public Affairs, and other departments. The objective of this program is to provide students with professional skills needed by leaders in the nonprofit sector, including the understanding of the historical and philosophical context for nonprofit organizations in society, the management of human resources (paid and volunteer), the theory and practice of philanthropy, financial management practices, and other topical content areas.

The certificate program requires a minimum of 15 semester hours of course work. To qualify for the certificate, the student must complete three core classes and two classes from a selected list. A practicum experience is also required of students lacking direct experience in nonprofit sector work. The program is available to students who are pursuing their graduate degree in a chosen field of study and who have expressed interest in pursuing careers in the nonprofit sector. In addition, the program is well suited for working professionals who may or may not be pursuing a graduate degree but who wish to strengthen their skills and connections to the nonprofit community. All applicants must have two years of demonstrable nonprofit experience to obtain the certificate.

For more information, see [“Center for Nonprofit Leadership and Management,” page 38](#), or call 480/965-0607.

NONPROFIT LEADERSHIP AND MANAGEMENT (NLM)

NLM 510 Historical and Philosophical Foundations of Nonprofits in America. (3)

fall

Explores the history and role of the nonprofit sector in American society; contemporary issues and delivery systems. Lecture, case study.

NLM 520 Financial Management in Nonprofit Organizations. (3)

spring

Reviews funding structures utilized by nonprofit organizations; financial tools used by managers; fund raising practices and tools. Lecture, case study.

NLM 540 Volunteer and Human Resources in Nonprofit Organization. (3)*fall*

Managing the volunteer and paid staff human resources in nonprofit organizations; practices and theories. Lecture, case study.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Nursing

Master's and Certificate Programs

nursing.asu.edu

480/965-3948

NUR 448

**Pamela Kidd, Associate Dean
for Graduate Programs and Research**

Professors: Durand, Kidd, Mattson, Perry, Thurber

Associate Professors: Adams, Alpers, Brillhart, Cesarotti, Dirksen, Ismeurt, Killeen, Komnenich, McCarthy, Ruiz

Assistant Professors: Link, Long, McGrath, Pickens, Sehested, Shearer, Sousa, Tann, Zunkel

Clinical Professor: Bell

Clinical Associate Professors: Beck, Fargotstein, Hagler, Jasper, Kastenbaum, Link, Morris, Stillwell, White

Clinical Assistant Professors: P. Johnson, W. Johnson, Nunez, Sayles, Wotring

Instructor: Rosdahl

The faculty in the College of Nursing offer a graduate program leading to the M.S. degree in Nursing. Concentrations are available in one of the following areas:

1. adult health nursing with options in primary care of chronically ill adults or acute care,
2. community health nursing,
3. community mental health/psychiatric nursing,
4. family health nursing,
5. parent-child nursing with options in childbearing family, nursing of children, and neonatal nursing, and
6. women's health nursing.

The purpose of the graduate program is to provide an academic environment that fosters scholarship, critical thinking, creativity, and prepares nurses for leadership as nurse specialists. The graduate program offers advanced level courses that can be used as a base for doctoral study and for functional role development in teaching.

The master's program is designed to prepare graduates to

1. synthesize advanced knowledge using concepts, theories, principles, and research from nursing, humanities, and sciences to develop advanced nursing practice knowledge which emphasizes the holistic approach;
2. demonstrate leadership, management, and teaching abilities in advanced nursing practice;
3. assume leadership, responsibility, and accountability for holistic therapeutic interventions within or across levels of care for diverse clients including individuals, families, groups, or communities;
4. participate in professional nursing organizations and political arenas;
5. participate in research and utilize research findings;
6. communicate scholarly ideas and professional knowledge to colleagues, other disciplines, and the public;
7. provide leadership in collaboration with clients and other health care professionals in the planning and delivery of holistic health care that is responsive to changing needs and societal trends;
8. examine critically the health of populations and related health care issues; and
9. demonstrate lifelong personal and professional learning.

Functional Areas. The curriculum also provides clinical nurse practitioner roles — including adult, pediatrics, women's health, psychiatric, and family as well as clinical nurse specialist in parent-child, adult, community, and community/mental health — for preparation for teaching nursing.

MASTER OF SCIENCE

See ["Master's Degrees," page 93,](#) for general requirements.

Admission. See ["Admission to the Graduate College," page 84.](#)

Admission to graduate status in the College of Nursing is based upon meeting the following requirements:

1. undergraduate junior or senior GPA equal to 3.00, or a cumulative GPA equal to 3.00 (4.00=A) or higher for any baccalaureate or graduate degree attained;
2. a baccalaureate degree in nursing (or another field) accredited by a nationally recognized accrediting agency;
3. current Arizona license to practice as a registered nurse and/or to enroll in some nursing practicum courses;
4. satisfactory completion of the Graduate Record Examination;
5. one year of work experience in a relevant area of professional nursing (additional years may be required for nurse practitioner roles) before enrolling in specialty concentration clinical courses (not required for community health nursing);

GRADUATE PROGRAMS AND COURSES

6. a descriptive statistics course in a college or university with a grade of "C" or higher, and an inferential statistics course with a grade of "B" or higher;
7. three professional recommendations from individuals knowledgeable about the applicant's academic and nursing leadership potential;
8. an interview with a representative of the specialty area;
9. eligibility for admission to the Graduate College;
10. completion of the TOEFL with a score of 550 or higher and of all requirements for the Commission on Foreign Graduate Nursing Schools (CFGNS) if considered an international student; and
11. completion of a baccalaureate level health assessment course within the preceding three years may be required for some nurse practitioner concentrations.

Applicants who reside and work, or plan to reside and work, in rural or medically underserved areas are encouraged to apply for admission. Applications to the program are due February 1.

Admission to the RN-B.S.N.-M.S. program is competitive and occurs once a year in January. To be considered for admission to the RN-B.S.N.-M.S. program, an application to the undergraduate professional Nursing major must be submitted. A separate application for admission is required to the graduate program and to the undergraduate professional Nursing major. Admission to the undergraduate program is required before admission to the graduate program. Applications to the RN-B.S.N.-M.S. program are due September 1.

Supervisory Committee. The dean of the Graduate College, upon recommendation of the College of Nursing associate dean for Graduate Programs and Research, appoints the supervisory committee. The supervisory committee recommends the program of study, administers any special qualifying examinations, administers the final oral examination, and approves the thesis or the nonthesis option project.

Program of Study. The program of study for the M.S. degree consists of a minimum of 40 semester hours for community health areas and from 47 to 53 hours for the nurse practitioner role specialty areas.

The RN-B.S.N.-M.S. program of study consists of at least 30 semester hours; the exact number depends upon specialty concentration and role.

The program of study for the M.S. degree in Nursing requires the completion of a strong research component. This requirement can be accomplished by either of two pathways: (1) completion of the required research course and six hours of thesis or (2) completion of the nonthesis option that includes the required research course (three hours), the research utilization course (three hours), the applied project course (one hour), and a presentation of the completed requirements. The completed project and presentation are evaluated by the student's supervisory committee.

Required core courses: NUR 500, NUR 551, NUR 552, NUR 589/593 or NUR 599.

Flexible core courses: NUR 510, NUR 521, NUR 524, NUR 528, NUR 553, NUR 554, NUR 526 or NUR 558 or

NUR 559, NUR 561, NUR 527 or NUR 564, NUR 525 or NUR 565 or NUR 582 and NUR 586, NUR 584, CHP 500, CHP 501, CHP 502, and HSA 566.

Foreign Language Requirements. None.

Degree Requirements. The student must successfully complete the following as defined by the supervisory committee and as approved by the dean of the Graduate College:

1. the program of study,
2. a comprehensive written examination as required,
3. a thesis and final oral examination in defense of the thesis *or* nonthesis option project.

POST-MASTER'S CERTIFICATE

The College of Nursing offers a post-master's certificate program in all specialty concentrations and in both the Clinical Nurse Specialist and Nurse Practitioner roles on a space available basis.

RESEARCH ACTIVITY

Research within the College of Nursing focuses on understanding and addressing risk behaviors in vulnerable populations for the purpose of promoting health. Research interests of the College of Nursing faculty may be accessed by visiting nursing.asu.edu/facultystaff on the Web.

COMMUNITY HEALTH PRACTICE (CHP)

CHP 500 Foundations for Community Health Practice. (3)

fall

Presents the organization, core functions, and essential services of public health. Presentation, discussion, cooperative learning strategies, student presentations. Prerequisite: admission to graduate Nursing program, or admission to the Master of Public Health degree with a concentration in community health practice, or instructor approval.

CHP 501 Community Health Assessment and Analysis. (3)

spring

Provides theory and practice in community assessment and analysis applicable to community health practice. Presentation, discussion, cooperative learning strategies, group projects. Prerequisite: CHP 500 or instructor approval.

CHP 502 Community Health Program Planning and Evaluation. (3)

fall

Utilizes planning and evaluation theory in planning programs to meet identified health needs of communities. Presentation, discussion, cooperative learning strategies, group projects. Prerequisites: both CHP 500 and 501 or only instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

NURSING (NUR)

NUR 500 Research Methods. (3)

fall and spring

Research methods including research conceptualization and design in nursing. Prerequisites: admission to graduate Nursing program; a graduate-level course in inferential statistics prior to enrolling in specialty concentration clinical courses. Corequisite: NUR 551.

NUR 501 Advanced Adult Health Assessment/Promotion:

Advanced Theory. (4)

fall

Expands adult health assessment/promotion skills through knowledge/strategies essential for developing and interpreting data. Lecture, demonstration. Prerequisites: all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum I: Adult Health Nursing.

NUR 502 Management and Maintenance of Adults with Chronic Health Alterations: Advanced Theory. (4)*spring*

Includes theory/research that guides the management/maintenance of adults with chronic health alterations. Emphasizes psychophysiological interrelationships of illnesses. Lecture, seminar. Prerequisites: NUR 501; all core and flexible core courses except thesis/project. Pre- or corequisite: NUR 580 Advanced Nursing Practicum II: Adult Health Nursing.

NUR 503 Management and Maintenance of Adults with Acute Health Alterations: Advanced Theory. (3)*spring of even years*

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 Advanced Nursing Practicum II: Adult Health Nursing.

NUR 510 Community/Public Health Nursing Theory and Role. (3)*spring*

Analyzes and synthesizes the theoretical and conceptual basis of community/public health nursing applicable to current and future nursing roles. Lecture, discussion, learner-centered strategies. Prerequisites: CHP 500; NUR 551, 552.

NUR 521 Community Mental Health/Psychiatric Nursing: Advanced Mental Health Assessment. (3)*fall*

Theories related to holistic health assessment for the promotion of physical/psychological health; develops skill in mental health assessments. Lecture, seminar, lab. Prerequisites: all core and flexible core courses except thesis/project.

NUR 522 Community Mental Health/Psychiatric Nursing: Advanced Theory I. (3)*fall*

Analyzes issues, theories, and research in restoration and promotion of mental health. Emphasizes developing conceptual framework for psychiatric nursing. Prerequisites: NUR 521; all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum I: Community Mental Health/Psychiatric Nursing.

NUR 523 Community Mental Health/Psychiatric Nursing: Advanced Theory II. (3)*spring*

Focuses on development of theoretical basis for intervention and a knowledge base for collaboration and consultation in the mental health area. Prerequisites: NUR 522; all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum II: Community Mental Health/Psychiatric Nursing.

NUR 524 Psychoneuroimmunology Approaches to Practice. (3)*summer*

Overview of theories, concepts, and research in psychoneuroimmunology including physiological aspects and application to a holistic nursing model. Seminar. Prerequisite: admission to graduate Nursing program.

NUR 525 Neonatal/Pediatric Physiology and Embryology. (3)*fall*

Prepares advanced practice nurses to use embryology, genetics, and physiology concepts within the nursing process in the care of pediatric and neonatal patients. Lecture, discussion, participative dialogues, case studies. Prerequisites: a course in undergraduate anatomy and a course in undergraduate physiology.

NUR 526 Advanced Neonatal Physical Assessment. (4)*fall*

Develops assessment skills related to neonate/infant, including history-taking, physical, developmental, behavioral, cultural, and genetics assessment to provide comprehensive advanced practice neonatal nursing care. Lecture, seminar, discussion, case studies. Fee. Prerequisite: instructor approval. Corequisite: NUR 525.

NUR 527 Neonatal and Pediatric Pharmacology in Nursing Practice. (3)*spring*

Examines and discusses the rationale, action, and therapeutic effect for using each class of medications employed in neonatal and pediatric health care. Lecture, seminar, discussion, case studies, clinical. Pre- or corequisites: both NUR 525 and 526 (or 558) or only instructor approval.

NUR 528 Advanced Developmental and Family-Centered Nursing Care. (4)*spring*

Provides the foundation for providing advanced nursing care of children that is developmentally supportive, family centered, and culturally competent. Lecture, seminar, discussion, skills laboratory, clinical. Fee. Pre- or corequisites: both NUR 525 and 526 (or 558) or only instructor approval.

NUR 531 Nursing of Children: Advanced Theory I. (3)*fall*

Focuses on current practices, research, and issues related to health promotion and disease prevention for children and adolescents. Lecture, seminar. Prerequisites: all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum I: Parent-Child Nursing with Options in Childbearing Family, Nursing of Children, and Neonatal Nursing.

NUR 532 Nursing of Children: Advanced Theory II. (3)*spring*

Focuses on concepts, theories, and research as a basis for strategies related to management of illness and health maintenance for children. Lecture, seminar. Prerequisites: NUR 531; all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum II: Parent-Child Nursing with Options in Childbearing Family, Nursing of Children, and Neonatal Nursing.

NUR 533 Nursing of Children with Special Needs: Advanced Theory. (3)*spring*

Focuses on concepts, theories, and research related to acute and chronic health deviations of children. Lecture, seminar. Prerequisites: NUR 531 (or instructor approval); all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum II: Parent-Child Nursing with Options in Childbearing Family, Nursing of Children, and Neonatal Nursing.

NUR 534 Women's Health: Advanced Theory I. (4)*fall*

Focuses on theories, principles, and research related to managing the health of normal perinatal women and families. Cooperative learning strategies. Prerequisites: all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum I: Women's Health Nursing.

NUR 535 Women's Health: Advanced Theory II. (4)*spring*

Focuses on management of nursing care for high-risk perinatal women and women with common health problems. Cooperative learning strategies. Prerequisites: NUR 534; all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum II: Women's Health Nursing.

NUR 551 Theoretical Foundations of Advanced Practice Nursing. (3)*fall and spring*

Facilitates exploration and examination of the foundations of advanced nursing practice. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

NUR 552 Health Care Issues and Systems. (3)*fall and spring*

Analyzes organization, financing, service delivery, and outcomes of the health system. Emphasizes policy issues, roles, and challenges for nurses. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

NUR 553 Life Span Development. (3)*spring*

Critical examination of concepts, theories, issues, and research related to developmental periods throughout the life span. Analyzes biological and health, cognitive, psychological, and sociocultural influences. Lecture, discussion. Prerequisite: admission to graduate Nursing program.

NUR 554 Population-Based Health Care. (3)*fall and spring*

Identification and assessment of specific community health needs and health care patterns of target populations. Addresses promotion, protection, and improvement of health when planning health care services. Lecture, seminar. Prerequisite: admission to graduate Nursing program.

GRADUATE PROGRAMS AND COURSES

NUR 558 Advanced Pediatric Health Assessment. (3)

spring

Expansion of basic health assessment skills and development of clinical problem-solving skills for advanced practice nurses. Includes assessments of infants, children, and adolescents. Lecture, lab. Prerequisites: admission to graduate Nursing program; undergraduate health assessment within the last five years.

NUR 559 Advanced Health Assessment. (3)

spring

Expansion of basic health assessment skills and development of clinical problem-solving skills for advanced practice nurses. Includes assessments of infants, children, adolescents, and adults. Lecture, lab. Fee. Prerequisites: admission to graduate Nursing program; undergraduate health assessment within the last five years.

NUR 561 Advanced Practice Nursing Role. (2)

summer

Focuses on the examination and implementation of the role of the advanced practice nurse, emphasizing major components and sub-components of the role. Lecture, seminar. Prerequisite: admission to graduate Nursing program or instructor approval.

NUR 562 Family Nurse Practitioner Advanced Theory I: Health Promotion, Management, and Maintenance. (4)

fall

First didactic role specialty course. Focuses on concepts and strategies to promote, manage, and maintain health of child, adult, and family. Prerequisites: all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum I: Family Health Nursing.

NUR 563 Family Nurse Practitioner Advanced Theory II: Health Promotion, Management, and Maintenance. (4)

spring

Second didactic role specialty course utilizing knowledge from previous courses to formulate therapeutic promotion, management, and maintenance for individuals across the life span. Prerequisites: NUR 562; all core and flexible core courses except thesis/project. Corequisite: NUR 580 Advanced Nursing Practicum II: Family Health Nursing.

NUR 564 Applied Pharmacotherapeutics for Advanced Practice. (3)

spring

Life span course for advanced nurse practitioners to expand knowledge of pharmacotherapeutic concepts and principles. Lecture, discussion, case studies. Prerequisite: admission to graduate Nursing program.

NUR 565 Applied Physiology/Pathophysiology in Advanced Practice. (3)

spring

Advanced nurse practitioner course designed to expand previously acquired anatomy and physiology knowledge and discern pathological alterations across the life span. Lecture, seminar, case studies. Prerequisites: admission to graduate Nursing program; undergraduate anatomy and physiology.

NUR 566 Pediatric Physiology/Pathophysiology. (3)

spring

Analyzes the patterns of heredity, cellular differentiation, and the development of systems in the infant to adolescent. Prerequisite: admission to graduate Nursing program.

NUR 571 Teaching in Nursing Programs. (3)

selected semesters

Analyzes theories, issues, and research related to teaching in nursing. Focuses on the process of teaching/learning. Seminar, cooperative learning. Prerequisite: graduate standing.

NUR 578 Gestalt Therapy I. (3)

fall

Introduces theory and methodology of Gestalt therapy and its uses for mental health promotion and restoration.

NUR 579 Gestalt Therapy II. (3)

spring

Focuses on further development of Gestalt therapy and its application in working with various client populations. Prerequisite: NUR 578.

NUR 580 Practicum. (1–12)

selected semesters

Topics may include the following:

- **Advanced Nursing Practicum I: Adult Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 501 or 502 or 503.
- **Advanced Nursing Practicum II: Adult Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 501 or 502 or 503.
- **Advanced Nursing Practicum: Community Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 510.
- **Advanced Nursing Practicum I: Community Mental Health/Psychiatric Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 522 or 523.
- **Advanced Nursing Practicum II: Community Mental Health/Psychiatric Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 522 or 523.
- **Advanced Nursing Practicum I: Family Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 562 or 563.
- **Advanced Nursing Practicum II: Family Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 562 or 563.
- **Advanced Nursing Practicum I: Parent-Child Nursing with Options in Childbearing Family, Nursing of Children, and Neonatal Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 531 or 532.
- **Advanced Nursing Practicum II: Parent-Child Nursing with Options in Childbearing Family, Nursing of Children, and Neonatal Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 531 or 532.
- **Advanced Nursing Practicum I: Women's Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 534 or 535.
- **Advanced Nursing Practicum II: Women's Health Nursing. (2–6)**
fall and spring
Clinical application of theories, concepts, and principles in areas of concentration. Conferences. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 534 or 535.
- **Practicum (Electives). (1–4)**
selected semesters
Clinical application of theories, concepts, and principles such as health promotion, health management, health maintenance, teaching, management, and special clinical studies. Fee.
- **Practicum for Teaching. (2–6)**
selected semesters
Prerequisites: NUR 571, 591.

NUR 582 Advanced Human Physiology. (3)*fall*

Analyzes major theories and concepts of human physiology. Explores interrelationship of physiology and health. Prerequisite: admission to graduate Nursing program.

NUR 584 Community Health Nursing Internship. (3)*spring*

Students operationalize community health nursing/public health content in leadership roles in a variety of community agencies. Clinical internship. Prerequisites: NUR 510 and 580 Advanced Nursing Practicum: Community Health Nursing.

NUR 585 Stress Reduction. (3)*selected semesters*

Theory, application, and evaluation of mind/body relaxation methods, including physiological effects. Emphasizes research findings. Daily student practice. Prerequisite: graduate standing or instructor approval.

NUR 586 Advanced Pathophysiology. (3)*spring*

Manifestation of altered human physiology and disease. Uses systems theory to analyze the relationships of disease and physiology. Prerequisites: NUR 582; admission to graduate Nursing program.

NUR 589 Research Utilization. (3)*fall and spring*

Emphasizes the synthesis and application of research to an identified clinical nursing problem. Prerequisites: all core and flexible core courses except thesis/project. Corequisite: NUR 593.

NUR 590 Reading and Conference. (1–12)*selected semesters*

Independent study in which a student meets regularly with a faculty member to discuss assignments such as intensive reading in a specialized area, writing synthesis of literature on a specific topic, or writing literature review of a topic. Prerequisite: instructor approval.

NUR 591 Seminar. (2–4)*selected semesters*

Advanced topics, including curriculum development and health promotion. Prerequisite: instructor approval in selected courses.

NUR 593 Applied Project. (1)*fall and spring*

Preparation of a supervised applied project that is a graduation requirement in some professional majors. Prerequisites: all core and flexible core courses. Corequisite: NUR 589.

NUR 598 Special Topics. (1–4)*selected semesters*

Special study, including issues in health care and organizations, management in nursing, ethical issues, and clinical nurse specialist role.

Topics may include the following:

- Advanced Neonatal Theory I. (4)

fall

- Advanced Neonatal Theory II. (3)

spring

- Nursing of Children with Development Disabilities. (3)
- School Nursing Practice. (3)

NUR 599 Thesis. (1–6)*fall, spring, summer*

Research proposal development, data collection and analysis, thesis writing, and thesis oral defense. Requires six hours. Prerequisites: all core and flexible core courses.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Nutrition

Master’s Program

www.east.asu.edu/ecollege/nutrition

480/727-1728

HSC 1386

Linda A. Vaughan, Chair

Professors: Johnston, Vaughan**Assistant Professors:** Hampl, Hutchins**Senior Lecturer:** Martin**Lecturer:** Dixon

The faculty in the Department of Nutrition, at ASU East, offer a graduate program leading to a M.S. degree in Nutrition. The department also offers a Dietetic Internship program, which is currently granted accreditation by the

COMMISSION ON ACCREDITATION FOR
DIETETICS EDUCATION OF THE AMERICAN
DIETETIC ASSOCIATION
216 W JACKSON BLVD
CHICAGO IL 60606-6995

The commission can be reached by phone at 312/899-0040, ext. 5400.

Admission. Applications for admission and graduate assistantships are accepted until February 1 preceding the fall semester to which the applicant is seeking admission. In addition to meeting Graduate College requirements, students must submit an official record of their scores on the Graduate Record Examination (verbal, quantitative, and analytical), three letters of recommendation, a résumé of employment and academic experiences, and the completed departmental Supplementary Information Form. Students wishing to be considered for graduate assistantships must also complete the Graduate College and departmental forms. The prerequisites for graduate work in Nutrition are as follows: anatomy and physiology with laboratory, biochemistry with laboratory, general chemistry with laboratory, general nutrition, introductory statistics, microbiology with laboratory, and organic chemistry with laboratory. Admission procedures for the Dietetic Internship are explained below.

Program of Study. The program of study consists of a minimum of 31 semester hours. Required courses are NTR 500 Research Methods in Nutrition (or an equivalent course, with advisor approval), three to six semester hours of 500-level statistics courses approved by an advisor, six semester hours of thesis/research credit, a one-semester-hour departmental seminar (NTR 591 S: Recent Developments in Food and Nutrition), and six semester hours of nutrition seminars

GRADUATE PROGRAMS AND COURSES

selected from NTR 531, 532, and/or 598. Students completing the Dietetic Internship must also complete six semester hours of NTR 580 Dietetics Practicum; only three semester hours of NTR 580 may be applied toward the M.S. degree. Additional courses may be selected upon consultation with an advisor.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examination. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

The faculty in the Department of Nutrition are engaged in a broad range of research activities. Undergraduate students are encouraged to collaborate with faculty and graduate students in the research process. Department faculty are well recognized for their research in the areas of Vitamin C metabolism, nutrition and exercise, the nutrient intakes of children and young adults, and the nutritional status of free-living and homebound elderly. Nutrition faculty conduct controlled metabolic feeding studies, investigate food product stability, analyze national food and nutrient data sets, and assess the nutritional status of children and adults. Interdisciplinary research is conducted in conjunction with agribusiness, anthropology, exercise and wellness, immunology, nursing, and other faculty. For more information, access the Department of Nutrition Web site at www.east.asu.edu/college/nutrition.

Dietetic Internship. Admission to the Dietetic Internship is limited to students with regular or unconditional admission to the Department of Nutrition's graduate program and submission of an official Verification Statement documenting successful completion of a Didactic Program in Dietetics (DPD). If DPD requirements have not been met at the time application to the Dietetic Internship is made, students must submit an Intent to Complete form and all DPD courses must be completed before entering the internship. Students must provide documentation that a minimum of 150 hours of clinical experience has been completed within the past five years. The Dietetic Internship is limited to students enrolled in the ASU East Master's Program in Nutrition, and therefore does not participate in computer matching. Students must complete both the M.S. degree requirements and the Internship practicum requirements to satisfy the Dietetic Internship requirements and establish eligibility to sit for the Registration Examination for Dietitians.

NUTRITION (NTR)

NTR 440 Advanced Human Nutrition I. (3)

fall
Metabolic reactions and interrelationships of vitamins, minerals, and water. Prerequisites: BIO 202 and CHM 231 and NTR 241 (or their equivalents).

NTR 441 Advanced Human Nutrition II. (3)

spring
Metabolic reactions and interrelationships of carbohydrate, lipid, and protein. Prerequisites: BCH 361 and BIO 202 and NTR 241 (or their equivalents).

NTR 442 Experimental Foods. (3)

fall and spring
Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Fee. Prerequisites: CHM 231; NTR 142.

NTR 444 Medical Nutrition Therapy. (3)

spring and summer
Principles of medical nutrition therapy for prevention and treatment of disease and promotion of health. Prerequisites: BIO 201 and 202 and NTR 241 (or their equivalents).

NTR 445 Quantity Food Production. (3)

fall and spring
Standardized methods of quantity food preparation, operation of institutional equipment, institutional menu planning, quantity food experiences. Lecture, lab, possible field trips. Fee. Prerequisites: NTR 100 (or 241) and 344 (or their equivalents).

NTR 446 Human Nutrition Assessment Lecture/Laboratory. (3)

fall and spring
Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: BCH 361, 367; NTR 440 (or 441).

NTR 448 Community Nutrition. (3)

fall and spring
Food-related behaviors; organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutrition assessment of populations. Prerequisite: NTR 241 (or its equivalent).

NTR 450 Nutrition in the Life Cycle I. (3)

fall
Emphasizes nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: NTR 100 or 241 (or its equivalent).

NTR 451 Nutrition in the Life Cycle II. (3)

spring
Nutritional requirements and nutrition-related disorders of adolescence, middle adulthood, and later life. Prerequisite: NTR 100 or 241 (or its equivalent).

NTR 500 Research Methods in Nutrition. (3)

fall
Experimental design; methods of data collection, laboratory analyses, and statistical analyses; development of thesis proposal. Lecture, lab. Fee. Prerequisites: a course each in advanced nutrition, biochemistry, and statistics.

NTR 531 Recent Developments in Nutrition. (1)

fall and spring
Selected topics addressing current issues in nutrition research. Prerequisites: a course each in advanced nutrition and biochemistry.

NTR 532 Current Research in Nutrition. (3)

spring
Vitamins and minerals. Prerequisites: a course each in advanced nutrition and biochemistry.

NTR 540 Advanced Micronutrient Metabolism. (3)

fall
Metabolism of vitamins and minerals, primarily as applied to humans, with research literature emphasized. Prerequisites: a course each in basic nutrition and biochemistry.

NTR 541 Advanced Macronutrient Metabolism. (3)

spring
Metabolism of protein, fat, and carbohydrate, primarily as applied to humans, with research literature emphasized. Prerequisites: a course each in basic nutrition and biochemistry.

NTR 542 Advanced Food Product Development. (3)

fall and spring
Food product development techniques, food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 3 hours lab. Fee. Prerequisites: CHM 231 and NTR 142 (or their equivalents).

NTR 544 Therapeutic Nutrition. (3)

spring and summer
Current theories of the nutritional prevention or treatment of various diseases. Prerequisites: a course each in basic nutrition, introduction to diet therapy, and physiology.

NTR 545 Recent Developments in Institutional Feeding. (3)*fall and spring*

Current practices in institutional feeding, including supervised practicum with local quantity food operation. 1 hour lecture, 6 hours lab. Fee. Prerequisites: NTR 142 and 344 (or their equivalents).

NTR 546 Assessment Techniques in Nutrition. (3)*fall and spring*

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: a course each in advanced nutrition, biochemistry, and physiology.

NTR 548 Nutrition Program Development. (3)*fall and spring*

Planning, development, implementation, and evaluation of community nutrition programs, including the process of grant applications. Prerequisites: a course each in basic nutrition and sociology.

NTR 550 Advanced Maternal and Child Nutrition. (3)*fall*

In-depth review of metabolic characteristics and nutritional needs of the pregnant woman, lactating woman, infant, and child. Prerequisites: a course each in basic nutrition, biochemistry, and physiology.

NTR 551 Advanced Geriatric Nutrition. (3)*spring*

In-depth review of metabolic characteristics and nutritional requirements of the elderly. Prerequisites: a course each in basic nutrition, biochemistry, and physiology.

NTR 580 Dietetics Practicum. (3–9)*fall, spring, summer*

Structured practical experience in the Dietetic Internship, supervised by practitioners with whom the student works closely. Practicum. Prerequisite: acceptance into the Dietetic Internship.

NTR 591 Seminar. (1–12)*selected semesters*

Topics may include the following:

- Recent Developments in Food and Nutrition. (1)

NTR 592 Research. (1–12)*selected semesters***NTR 593 Applied Project. (1–12)***selected semesters***NTR 594 Conference and Workshop. (1–12)***selected semesters***NTR 598 Special Topics. (3)***fall and spring*

In-depth review of recent research in areas including nutrition and exercise, nutrition and immunology, energy balance, vegetarianism, nutritional pathophysiology. Fee. Prerequisites: a course each in advanced nutrition, biochemistry, and physiology.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

Performance

See [“Music,” page 273](#).

Philosophy

Master’s and Doctoral Programwww.asu.edu/philosophy

480/965-3394

PS A524

Brad Armendt, Chair**Regents’ Professors:** Maienschein, Murphy**Professors:** Cohen, Creath, Fitch, French, Humphrey, White**Associate Professors:** Armendt, Blackson, de Marneffe, Guleserian, Kobes, McGregor, Reynolds**Assistant Professor:** Devlin**Lecturer:** Bolton

The faculty in the Department of Philosophy offer a graduate program leading to the M.A. or Ph.D. degree in Philosophy. For the specific requirements of the Ph.D., contact the department.

MASTER OF ARTS

See [“Master’s Degrees,” page 93](#), for general requirements.

Prerequisites. At least 15 semester hours of upper-division course work in philosophy, including history of ancient and modern philosophy, epistemology, metaphysics, and the equivalent of PHI 333 Introduction to Symbolic Logic are required. No course credits in which a grade of less than “B” has been earned may count toward meeting this 15-semester-hour requirement. Persons otherwise qualified for admission but lacking the above prerequisites may make up this deficiency by enrolling as a nondegree graduate student and taking those philosophy courses necessary to complete the prerequisite. If some or most of the prerequisites have already been met, the student may be admitted into the program under “provisional status” or under “regular status with deficiencies.” All applicants for admission to the program must submit scores for the general section of the Graduate Record Examination.

Admission. All applications for admission to the M.A. degree program in Philosophy must be accompanied by complete transcripts, the applicant’s score in the GRE aptitude exam, three letters of recommendation from persons qualified to judge the applicant’s potential for graduate work in philosophy, a sample of philosophical writing, and a statement of purpose.

Program of Study. The M.A. degree program in Philosophy is designed to prepare students either to teach philosophy at the community college level, to enter doctoral programs in philosophy at other institutions, or to be employed

GRADUATE PROGRAMS AND COURSES

in any areas that require critical, analytical thinking (such as medicine, law, government, or publishing). The program seeks to maintain a balance between a breadth of course offerings in the traditional areas of philosophy—metaphysics, ethics, epistemology, logic, and history of philosophy—and opportunities for study in current philosophical developments, such as the philosophy of science, philosophy of language, and philosophical psychology. The program of study includes at least 30 semester hours of approved graduate-level courses, not including PHI 599 Thesis. An additional six hours of PHI 599 Thesis is required. The details of each student's program are worked out with the director of graduate studies.

Course Requirements. Each student is required to take an approved graduate-level course of three semester hours or more in each of the following areas and to obtain at least a “B” in each course: metaphysics/epistemology, value theory and logic; and any two of the following: history of early philosophy, history of modern philosophy, and history of contemporary philosophy.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required. This written work must demonstrate the ability to carry out independent research in philosophy.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See “[Doctoral Degrees](#),” page 95, for general requirements.

Prerequisites. At least 15 semester hours of upper-division course work in philosophy, including history of ancient and modern philosophy, epistemology, metaphysics, and the equivalent of PHI 333 Introduction to Symbolic Logic are required. No course credits in which a grade of less than “B” has been earned may count toward meeting this 15-semester-hour requirement. If some or most of the prerequisites have already been met, the student may be admitted into the program under “provisional status” or under “regular status with deficiencies.”

Admission. All applications for admission to the Ph.D. degree program in Philosophy must be accompanied by complete transcripts, the applicant's score in the GRE aptitude exam, three letters of recommendation from persons qualified to judge the applicant's potential for graduate work in philosophy, a sample of philosophical writing, and a statement of purpose.

Program of Study. The Ph.D. degree program in Philosophy is designed to prepare students for careers as philosophers and teachers of philosophy, and in areas that may benefit from advanced training in philosophy, such as law, civil service, and publishing. The program of study includes 60 semester hours (30 beyond the M.A.) of graduate credit plus 24 semester hours of research and dissertation. The student's program of study is selected by the student in consul-

tation with the graduate director and the supervisory committee and is approved by the supervisory committee.

Course Requirements. To ensure breadth in the traditional areas of philosophy, students are required to pass these courses with a grade of “B” or higher:

1. two graduate courses in history of philosophy in two different areas chosen from ancient, modern, and contemporary;
2. two graduate courses in value theory;
3. four graduate courses in metaphysics and epistemology (including areas such as philosophy of language, philosophy of science, and philosophy of mind); and
4. one advanced course in symbolic logic (at the 400 or 500 level) (students may satisfy the logic requirement by examination).

Foreign Language Requirement. None.

Comprehensive Examination. Students will be examined in their area of specialization and competence. The written and oral examinations are based on a bibliography compiled by the student and approved by the student's advisory committee. Normally these examinations are taken after the student has completed at least 60 hours of graduate course work.

Dissertation Prospectus. Each doctoral candidate will prepare a prospectus of four to seven pages for the dissertation. The format and design of the prospectus will be determined by the candidate and committee chair. The prospectus should include a

1. thesis statement,
2. discussion of relevant literature,
3. discussion of the approach to the project, and
4. bibliography.

Dissertation. A dissertation based on original research is required. Research for the dissertation is supervised by a committee of at least three faculty members, appointed by the graduate director in consultation with the student. Students must enroll for a minimum of 12 semester hours of Research or Dissertation credit after admission to candidacy.

Final Examination. An oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The department offers a solid program in traditional and contemporary philosophy. General areas of research include ethics, political philosophy, metaphysics, epistemology, philosophy of law, philosophy of science, philosophy of language, philosophy of religion, and the history of philosophy. The topics treated in recent and current faculty research include moral psychology and moral emotions, environmental ethics, feminist analysis of law, liberty and paternalism, causation, rational choice theory, contextualism in epistemology, perceptual knowledge, the nature of consciousness,

the role of the *a priori* in science and philosophy, truth, reference, externalist theories of mental content, and free will.

PHILOSOPHY (PHI)

PHI 401 Rationalism. (3)

selected semesters

Examines classical philosophical rationalism, as in Descartes, Spinoza, Malebranche, or Leibniz. Contemporary rationalist thought may also be examined. Prerequisites: PHI 302 and 305 (or 309 or 312 or 316 or 317).

PHI 402 Empiricism. (3)

selected semesters

Examines 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).

PHI 403 Contemporary Analytic Philosophy. (3)

once a year

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 and 312 (or 314 or 315 or 316 or 317 or 401 or 402).

PHI 413 Advanced Symbolic Logic. (3)

selected semesters

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)

once a year

Course descriptions on file in department. May be repeated for credit.

Topics may include the following:

- History of Philosophy
- Metaphysics/Epistemology
- Philosophy of Language/Logic
- Philosophy of Science
- Value Theory

Prerequisite: a relevant upper-division PHI course or instructor approval.

PHI 590 Reading and Conference. (1–12)

selected semesters

PHI 591 Seminar. (1–12)

once a year

Topics may include the following:

- Aesthetics. (1–3)
- Epistemology. (1–3)
- Ethics. (1–3)
- History of Philosophy. (1–3)
- Logic. (1–3)
- Metaphysics. (1–3)
- Philosophy of Language. (1–3)
- Philosophy of Law. (1–3)
- Philosophy of Science. (1–3)
- Social and Political Philosophy. (1–3)

Prerequisite: Philosophy graduate student or instructor approval.

PHI 592 Research. (1–15)

selected semesters

PHI 599 Thesis. (1–12)

fall and spring

PHI 790 Reading and Conference. (1–12)

selected semesters

PHI 792 Research. (1–15)

selected semesters

PHI 799 Dissertation. (1–15)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Physical Education

See [“Master of Physical Education,” page 213.](#)

Physics

Master’s and Doctoral Programs

phy.asu.edu

480/965-0355

PS F470

Barry G. Ritchie, Chair

Regents’ Professors: Smith, Spence, Starrfield

Professors: Alarcon, Bennett, Burstein, Chamberlin, Comfort, Cowley, Doak, Dow, Hester, Kaufmann, Lindsay, Menéndez, Page, Ponce, Rez, Ritchie, Sankey, Scheinfein, Schmidt, Tillery, Tsen, Tsong, Venables, Windhorst, Wyckoff

Associate Professors: Aannestad, Culbertson, Drucker, Herbots, Marzke

Assistant Professors: Lebed, Shumway

The faculty in the Department of Physics and Astronomy offer graduate programs leading to the M.S. and Ph.D. degrees in Physics. In the M.S. program, options are available in physics, physics with an emphasis in astronomy, interdisciplinary physics, technical physics, or physics teaching. In the Ph.D. program, options are available in physics, physics with an emphasis in astronomy, or applied physics. Within the physics program, students may pursue a wide range of studies, including an emphasis in biophysics, condensed matter and materials physics, physics education, or subatomic physics.

The faculty in the Department of Physics and Astronomy also participate in the program leading to the Master of Natural Science degree (see [“Natural Science,” page 279](#)) when one of the concentrations is physics, and in the interdisciplinary program leading to the Ph.D. degree in the Science and Engineering of Materials (see [“Science and Engineering of Materials,” page 312](#)).

Students admitted to the Master of Education degree program with a major in Secondary Education may elect physics or science education as the subject matter field. A Doctor of Education degree program option is also available. The M.Ed. (see [“Master of Education,” page 181](#)) and Ed.D. (see [“Doctor of Education,” page 182](#)) are offered and administered through the College of Education.

The master’s and doctoral programs are designed to prepare students for professional research careers in

GRADUATE PROGRAMS AND COURSES

governmental, industrial, or academic institutions and for teaching at the university, college, or secondary school levels.

An evaluation of the progress of all graduate students is made during the spring semester by the Graduate Program Committee. Students whose progress is considered to be unsatisfactory are placed on probation. Failure to maintain a GPA of 3.00 in courses taken while enrolled as a graduate student, exclusive of research, thesis, and dissertation, is an indication of unsatisfactory progress and may result in dismissal from the program.

Courses can include up to six semester hours of 400-level courses (see [“Graduate Credit Courses,” page 89](#)). Timely attempts at examination are also required.

Teaching experience in undergraduate physics and astronomy laboratories and recitations is valuable training for graduate students and is considered part of the graduate program.

Departmental colloquia are an integral part of the graduate program. Regular attendance at colloquia is expected of all graduate students intending to earn graduate degrees.

MASTER OF SCIENCE

See [“Master’s Degrees,” page 93](#), for general requirements.

Admission. To be admitted without deficiencies, entering graduate students should have adequate undergraduate preparation equivalent to an undergraduate major of 30 semester hours in physics and 20 semester hours in mathematics. Courses in analytic mechanics, electromagnetism, and modern physics, including quantum mechanics, are particularly important. Students applying for admission must submit scores for the verbal, quantitative, and analytical sections of the Graduate Record Examination (GRE).

Applicants for financial support must submit a score on the physics advanced examination of the GRE. Subsequent financial support in the form of teaching or research assistantships is contingent upon satisfactory performance in course work, timely completion of the final examination for the M.S. degree as described below, and need and availability of such support. Students on probation are offered financial support only under exceptional circumstances.

Program of Study. The faculty in the Department of Physics and Astronomy offer the M.S. degree, emphasizing either physics solely or in combination with one of the following fields:

1. astronomy and astrophysics,
2. interdisciplinary physics (e.g., with chemistry),
3. technical physics, or
4. physics teaching.

A supervisory committee is formed for each student, usually during the first year of study. In each case an appropriate program of study is selected with the approval of the supervisory committee. A research project resulting in a thesis is required of all students enrolled in the M.S. program.

Physics. An individual program of study, including courses in physics, astronomy, mathematics, or related subjects, is selected with the approval of the supervisory committee to

make up a coherent program of graduate study. The courses and research project are to be conducted primarily within the Department of Physics and Astronomy.

Astronomy and Astrophysics. The AST graduate courses are taken in addition to the required graduate physics courses for the M.S. program. The research project must be in the area of astronomy and astrophysics, conducted under the supervision of one or more faculty members of the Department of Physics and Astronomy who specialize in this subject.

Interdisciplinary Physics. The courses taken are approximately half in physics and half in some other subject area. The research project must be in an interdisciplinary area and conducted under the joint supervision of one faculty member from the Department of Physics and Astronomy and one faculty member from another department.

Technical Physics. The research project involves active collaboration with an industrial or government laboratory under the supervision of a faculty member from the Department of Physics and Astronomy and may be conducted either in the Department of Physics and Astronomy or in the outside laboratory. At least half the courses taken must be in physics.

Physics Teaching. The course of study and research are designed to prepare students for a career in physics teaching, with appropriate modifications for teaching at the high school or community college level. At least half the courses taken must be in physics. Students participate in directed, evaluated teaching experiences.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required of all students obtaining the M.S. degree. Every student must complete at least six semester hours of PHY 592 or PHY 599. However, no more than nine semester hours in these courses can be counted toward the 30 semester hours required for the M.S. degree.

Final Examinations. The final examination for the M.S. degree is an oral examination on the subject of the student’s thesis and on graduate course work taken.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Admission. This program is designed for students with a high-level of ability who show promise for independent research. An applicant holding a baccalaureate degree should have the same undergraduate preparation as for admission to the master’s program. An applicant presenting acceptable graduate credit, earned at this or another institution must demonstrate mastery of this material, see [“Written Comprehensive Examination”](#) and [“Oral Comprehensive Examination,” page 291](#).

Students applying for admission must submit scores for the verbal, quantitative, and analytical sections of the GRE.

Applicants for financial support must submit a score on the physics advanced examination of the GRE. Subsequent financial support in the form of teaching or research

assistantships is contingent upon satisfactory performance in course work, timely completion of examinations, including the written and oral Ph.D. comprehensive examinations, and need and availability of such support. Students on probation are offered support only under exceptional circumstances. The period for which a Ph.D. candidate may receive financial support through the Department of Physics and Astronomy does not normally exceed six years.

Program of Study. In order to accommodate the needs for training in preparation for the wide variety of occupations of professional physicists and astrophysicists, in areas ranging from academic faculty to industrial research to administrative positions, doctoral degree programs are offered in physics or applied physics. Within the physics program a wide range of options are offered, as stated below. The goal is to provide, through course work and independent study, competence at advanced levels in fundamental, applied and interdisciplinary branches of physics and astronomy, and demonstrated ability in independent research.

Students enrolled in the Ph.D. program may obtain an "M.S. degree in passing" by satisfactorily filing and completing an M.S. Program of Study, obtaining a GPA of at least 3.00 in a set of core courses which total 24 semester hours, and passing a written comprehensive examination. The core courses shall be those designated as appropriate for the particular emphasis chosen for the student's doctoral program. Graduate core courses satisfactorily completed at other institutions may be waived upon petition by the Graduate Program Committee. Up to nine semester hours of classroom-based courses may be substituted for core courses that are waived by the Graduate Program Committee.

Each student's progress is overseen by a supervisory committee appointed for the student usually during the first year of study. This committee also approves the student's program of study.

The student's individual program includes courses selected, with the approval of the supervisory committee, to make up a coherent program for the achievement of these goals. Students may pursue a wide range of options, including emphasis on one of the following: astronomy and astrophysics, biophysics, condensed matter and materials physics, physics education, or subatomic physics. The program may be directed toward either theoretical or experimental aspects, and frequently includes courses in cognate fields, particularly mathematics, depending on the student's selected field.

Applied Physics. With advising from the supervisory committee, a program of study is selected with a major portion in physics and a minor portion (nine semester hours or more to be passed with at least a "B" average) in another area. The supervisory committee should include appropriate representation from the minor area.

Astronomy and Astrophysics. The following six AST 598 graduate courses are required for all students enrolled in the emphasis in astronomy and astrophysics.

- AST 598 ST: Astronomical Data Taking and Data Reduction
- AST 598 ST: Cosmology and High-Energy Astrophysics
- AST 598 ST: Extragalactic Astronomy
- AST 598 ST: Galactic Structure
- AST 598 ST: Interstellar Medium and Gaseous Astrophysics
- AST 598 ST: Stellar Interiors and Stellar Evolution

Course Requirements. The following basic core of courses or their equivalents is required of all students:

PHY 521 Classical Mechanics.....	3
PHY 531 Advanced Electricity and Magnetism.....	3
PHY 532 Electrodynamics.....	3
PHY 541 Statistical Physics.....	3
PHY 571 Quantum Physics	3
PHY 576 Quantum Theory	3
or PHY 577 Quantum Theory (3)	
Total	18

Additional course work is selected according to emphasis, with the advice and approval of the supervisory committee. Students should ensure that they have sufficient mathematical experience, and if in any doubt, should take PHY 501 Methods of Theoretical Physics.

Foreign Language Requirements. None.

Comprehensive Examinations. The following examinations are required of all students intending to earn the Ph.D. degree.

Master of Science Degree in Passing. Students enrolled in the Ph.D. degree may be awarded an M.S. degree in passing.

Written Comprehensive Examination

The subject matter of this examination is classical and quantum mechanics, statistical mechanics, and electricity and magnetism, as represented by the courses PHY 521, 531, 532, 541 and 571 or 576. The examination is given in two four-hour sessions on separate days, but there is no division of subject matter for the separate sessions.

The written comprehensive examination is normally given twice yearly, approximately during registration weeks of the fall and spring semesters. Ph.D. candidates must attempt the examination before the beginning of their third semester as full-time students in the physics graduate program and must pass the examination before the beginning of the fourth semester.

Additional written examinations may be set to examine areas of emphasis. Any further written examinations will be given at least once yearly and must be passed by the beginning of the sixth semester.

Oral Comprehensive Examination

Ph.D. candidates are required to pass the oral comprehensive examination by the end of their sixth semester as full-time students in the physics graduate program. The examination is administered and graded by the student's supervisory committee. It tests the student's general knowledge of one of the following four broad areas of current activity in physics:

1. astronomy and astrophysics,
2. atomic and molecular physics,

GRADUATE PROGRAMS AND COURSES

3. nuclear and particle physics, and
4. condensed matter and materials physics.

The area tested is to be chosen by the student at the time of scheduling of the examination. The student may request to be examined on specific subjects in addition to one of the areas. A proposal for the dissertation topic may be included in the material covered by the examination, subject to prior agreement between the student and the supervisory committee.

Dissertation Requirements. A dissertation representing an original contribution to the field, as a result of independent work suitable for publication in a refereed physics or astronomy journal, is required.

Final Examinations. A final oral examination that covers, but is not necessarily limited to, the subject of the dissertation is required.

RESEARCH ACTIVITY

Faculty in the Department of Physics and Astronomy perform frontier research that spans the largest and smallest scales—from the galaxies of the cosmos to the substructure of subatomic particles. Topics include investigations in areas such as astrophysics, biophysics, condensed matter physics, surface physics and materials science, and subatomic physics. Faculty and students regularly conduct experiments using state-of-the-art instruments such as electron microscopes, lasers, computers, space-borne and ground-based observatories, and detector facilities at international accelerator laboratories. This experimental work is completed by theoretical investigations associated with the phenomena explored by these experiments as well as other cutting-edge topics. A major effort in physics education research is influential both locally and nationally. For more details, visit the department's Web site at phy.asu.edu.

ASTRONOMY (AST)

AST 421 Astrophysics I. (3)

fall

Selected astrophysical topics, including: stellar evolution, star formation, interstellar medium, galactic structure, extragalactic astronomy, high-energy astrophysics, and cosmology. Prerequisites: AST 321, 322; PHY 311, 314.

AST 422 Astrophysics II. (3)

spring

Same range of astrophysical topics as for AST 421 but different specific topics are emphasized in a given year. Prerequisites: AST 321, 322; PHY 311, 314.

AST 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Astronomical Data Taking and Data Reduction
- Cosmology and High-Energy Astrophysics
- Extragalactic Astronomy
- Galactic Structure
- Interstellar Medium and Gaseous Astrophysics
- Stellar Interiors and Stellar Evolution

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" [page 48](#).

PHYSICAL SCIENCES (PHS)

PHS 505 Energy and the Environment. (3)

summer

Current problems in energy resources, production, consumption, and conservation. Studio. Prerequisite: instructor approval.

PHS 510 Inquiry Physical Science I. (3)

summer

Inquiry approach to physical science, standards-based, intended for elementary school teachers. Topics selected: kinematics, dynamics, electricity, magnetism, light, astronomy. Studio. Prerequisite: instructor approval.

PHS 520 Inquiry Physical Science II. (3)

summer

Inquiry approach to physics and astronomy, standards-based, intended for middle school teachers. Emphasizes technology and modeling. Studio. Prerequisite: instructor approval.

PHS 530 Methods of Physics Teaching I. (3)

summer

Inquiry approach to high school physics teaching. Studio. Prerequisite: instructor approval.

PHS 531 Methods of Physics Teaching II. (3)

summer

Extension of modeling techniques introduced in PHY 580. Studio. Prerequisite: PHS 530 or instructor approval.

PHS 534 Methods of Teaching Physical Science I, II, III. (3)

summer

Design of curriculum and conduct of instruction for physical science courses. Studio. Prerequisite: instructor approval.

PHS 540 Integrated Physics and Chemistry. (3)

summer

Collaborative inquiry methods for teaching and coordinating physics and chemistry. Studio. Prerequisite: CHM 480 or PHS 530 or PHY 480 or instructor approval.

PHS 542 Integrated Mathematics and Physics. (3)

summer

Mathematical models and modeling as an integrating theme for secondary mathematics and physics. Studio. Prerequisite: instructor approval.

PHS 550 Physics and Astronomy. (3)

summer

Astronomy curricula and projects for secondary school, with emphasis on the role of physics in astronomy. Studio. Prerequisite: instructor approval.

PHS 556 Astrophysics. (3)

summer

Structure and evolution of stars, galaxies, and the universe. For secondary school teachers. Studio. Prerequisite: instructor approval.

PHS 560 Matter and Light. (3)

summer

Interactions of light with matter. Lasers and spectroscopy. Studio. Prerequisite: instructor approval.

PHS 564 Light and Electron Optics. (3)

summer

Principles and practice of electron-optical instruments. Studio. Prerequisite: instructor approval.

PHS 570 Spacetime Physics. (3)

summer

Special and general theories of relativity with implications for space and time travel. Studio. Prerequisite: instructor approval.

PHS 581 Structure of Matter and Its Properties. (3)

summer

Models of matter and its properties. Studio. Prerequisite: instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses;](#)" [page 48](#).

PHYSICS (PHY)

PHY 412 Classical Particles, Fields, and Matter III. (3)*fall*

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)*fall*

Introduces 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)*fall and spring*

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.

PHY 441 Statistical and Thermal Physics I. (3)*fall*

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)*spring*

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)*fall*

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 Subatomic Physics. (3)*spring*

Nuclear properties, models, decays and reactions; fundamental forces, field theories, symmetry principles; hadrons, quarks, and leptons; the Standard Model. Prerequisites: PHY 311, 315.

PHY 465 Advanced Laboratory II. (2)*fall and spring*

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)*fall and spring*

Continuation of PHY 465. Prerequisite: PHY 465.

PHY 480 Methods of Teaching Physics. (3)*spring*

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)*spring*

Structure, elastic properties, and dynamics of crystals; electron motions in crystals under applied fields. Prerequisites: PHY 311, 315.

PHY 501 Methods of Theoretical Physics. (3)*fall and spring*

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)*fall and spring*

Continuation of PHY 501. Prerequisite: PHY 501.

PHY 521 Classical Mechanics. (3)*fall*

Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory.



Leslie Landrum, an academic professional in the Department of Plant Biology, shows plant specimens to boosters of graduate education at the ASU herbarium.

Dennis Durband photo

PHY 523 Relativity. (3)*selected semesters*

Special and general theories of relativity. Prerequisite: PHY 532 or instructor approval.

PHY 531 Advanced Electricity and Magnetism. (3)*fall*

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)*spring*

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: both PHY 412 and 531 or only instructor approval.

PHY 541 Statistical Physics. (3)*fall*

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)*spring*

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)*fall and spring*

Properties of nuclei, conservation laws, internucleon forces, nuclear structure models, reactions and decays, quark model with applications to nuclei. Prerequisite: PHY 576 or instructor approval.

PHY 562 Nuclear Physics. (3)*fall and spring*

Continuation of PHY 561. Prerequisite: PHY 561 or instructor approval.

GRADUATE PROGRAMS AND COURSES

PHY 567 Relativistic Quantum Mechanics and Field Theory. (3)

spring

Relativistic quantum mechanics and introduction to the quantum field theory of scalar, spinor, and electromagnetic fields. QED through renormalization theory. Prerequisite: PHY 577.

PHY 568 Particle Physics Phenomenology. (3)

spring

Hadron physics, internal symmetry groups, weak interactions, lepton and quark phenomenology. Prerequisite: PHY 577.

PHY 569 The Standard Model and Beyond. (3)

fall

Introduces and applies the standard model of strong and electroweak interactions. Special topics include recent developments. Prerequisites: PHY 567, 568.

PHY 571 Quantum Physics. (3)

spring

Reviews modern physics, chemistry, math. Differential equation, operator, matrix formulations. Free particle, bound-state problems. Examples across physics and astronomy. Prerequisites: a combination of modern physics and linear and complex algebra and differential equations or only instructor approval.

PHY 576 Quantum Theory. (3)

fall and spring

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)

fall and spring

Continuation of PHY 576. Prerequisite: PHY 576.

PHY 580 Practicum. (1–12)

selected semesters

PHY 581 Solid-State Physics. (3)

fall

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)

spring

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)

fall and spring

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)

fall and spring

Continuation of PHY 587. Prerequisite: PHY 587.

PHY 592 Research. (1–12)

selected semesters

PHY 598 Special Topics. (1–4)

fall and spring

Topics may include the following:

- Quantum Mechanics. (3)
spring
- Quantum Physics. (3)
spring

PHY 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Plant Biology

Master's and Doctoral Programs

lifesciences.asu.edu/plantbiology

480/965-3414

LSE 218

J. Kenneth Hooper, Chair

Professors: Arntzen, Backhaus, Frasch, Hooper, Klopatek, Nash, Sommerfeld, Trelease, Vermaas, Webber

Associate Professors: Briggs, Clark, Day, Martin, Pigg, Ramakrishna, Roberson, Stromberg, Stutz, Szarek, Towill, Wu

Assistant Professors: Rhoads, Wojciechowski

Academic Professionals: Bingham, Landrum, Lobrutto, Sharp

Research Assistant Professors: Gries, Hu, Joshi, Mor, Walmsley

The faculty in the Department of Plant Biology offer programs leading to the M.S. and Ph.D. degrees in Plant Biology. Among seven different research activity areas, two academic concentrations are available: ecology and photosynthesis.

Select faculty collaborate in the interdisciplinary program for the M.S. and Ph.D. degrees in Molecular and Cellular Biology (see [“Molecular and Cellular Biology,” page 270.](#))

The faculty participate in the programs leading to the Master of Natural Science degree (see [“Natural Science,” page 279.](#)) when the primary or secondary area of concentration is in plant biology. Students interested in pursuing the M.N.S. degree through an interdisciplinary program emphasizing any of these areas should contact the Department of Plant Biology for additional information.

Applicants for these degree programs must submit scores on the Graduate Record Examination (GRE) (aptitude). GRE scores in the advanced subject area are recommended.

The graduate programs are designed to prepare students for careers in research, teaching, industry, or governmental agencies.

MASTER OF SCIENCE

Prerequisites. Completion of the requirements for an undergraduate major in the plant sciences, biology, or related discipline, and an adequate background in related courses in chemistry, mathematical, and physical sciences.

Program of Study. A minimum of 30 semester hours of graduate credit is required. The program must include at least three semester hours of research, three semester hours of thesis, one semester of the core course PLB 502 Perspectives in Plant Biology and one hour of participatory seminar

(PLB 591). The program is planned by the student in consultation with the supervisory committee.

Foreign Language Requirements. None.

Comprehensive Examinations. Not required.

Thesis Requirements. A thesis is required.

Final Examinations. A final research seminar and an oral examination covering the thesis and related subject matter are required.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Program of Study. A minimum of 84 semester hours of graduate credit is required. The program must include at least 24 hours of research and dissertation credit and at least 30 hours of formal graduate course work. One semester of the core course PLB 502 Perspectives in Plant Biology and two hours of participatory seminar (PLB 591) are included in the required course work. Courses numbered 590 or 790 (Reading and Conference) are not considered formal courses. The program is planned by the student in consultation with a program committee that also administers and evaluates the comprehensive examinations.

Foreign Language Requirements. Completion at the undergraduate level of a one-year course with a grade of “C” or higher is required.

The supervisory committee may require the student to complete additional study.

Comprehensive Examinations. Written and oral comprehensive examinations administered and evaluated by the student’s program committee are required.

Dissertation Requirements. A dissertation based on original work of high quality, demonstrating proficiency in the student’s area of interest, is required. (See [“Doctoral Degrees,” page 95](#).)

Final Examinations. A final oral examination in defense of the dissertation is required. It is administered by a dissertation committee consisting of four to five members who previously served on the student’s program committee.

MOLECULAR BIOSCIENCES/BIO TECHNOLOGY (MBB)

MBB 445 Techniques in Molecular Biology/Genetics. (2)

fall and spring

Molecular genetic principles: plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation, immunologic detection, and electrophoresis. Cross-listed as MIC 445. Credit is allowed for only MBB 445 or MIC 445. Prerequisites: both BIO 340 and MIC 302 or only instructor approval.

MBB 446 Techniques in Molecular Biology/Genetics Lab. (2)

fall and spring

Molecular genetic techniques; plasmid construction, purification, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MIC 446. Credit is allowed for only MBB 446 or MIC 446. Pre- or corequisite: MBB 445 or MIC 445.

MBB 484 Internship. (3)

selected semesters

MBB 490 Capstone: Issues in Biotechnology. (2)

fall and spring

Integrates science and humanities within problem-solving exercises dealing with intellectual property, ethics, regulatory issues, business practices, and commercialization. Prerequisite: Molecular Biosciences/Biotechnology major or instructor approval.

MBB 499 Individualized Instruction. (3)

selected semesters

PLANT BIOLOGY (PLB)

PLB 400 Lichenology. (3)

spring in odd years

Chemistry, ecology, physiology, and taxonomy of lichens. 2 hours lecture, 3 hours lab. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent).

PLB 402 Mycology. (3)

spring

Fungal morphology and systematics with an introduction to fungal cell biology, ecology, economic significance, and growth and development. 2 hours lecture, 3 hours lab. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent) or only MIC 206.

PLB 404 Phycology. (4)

spring

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. Fee. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent).

PLB 407 Plant Fossils and Evolution. (4)

spring in odd years

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. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent).

PLB 410 Angiosperm Taxonomy. (3)

spring

Principles underlying angiosperm phylogeny. 2 hours lecture, 3 hours lab. Prerequisite: PLB 310 or instructor approval.

PLB 411 Trees and Shrubs of Arizona. (3)

fall

Identification of woody plants from desert, chaparral, and forest habitats in Arizona. 1 hour lecture, 3 hours lab, field trips. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent) or only instructor approval.

PLB 414 Plant Pathology. (3)

spring

Identification and control of biotic and abiotic factors that cause common disease problems to plants. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 (or its equivalent) or only instructor approval.

PLB 502 Perspectives in Plant Biology. (3)

fall

Introduces major areas of research within the department with the goal of broadening knowledge to enable multidisciplinary research and communication. Prerequisite: instructor approval.

PLB 583 OTS: Fieldwork in Tropical Biology. (6–8)

spring and summer

Intensive field-orientated classes with Organization for Tropical Studies (OTS) in Costa Rica with emphasis on research in ecology and systematics. Lecture, lab, fieldwork. Cross-listed as BIO 583. Credit is allowed for only BIO 583 or PLB 583. Prerequisites: graduate standing; a course in basic ecology.

PLB 591 Seminar. (1)

fall and spring

Environmental Science and Ecology

PLB 420 Plant Ecology: Organisms and Populations. (3)

spring in odd years

Factors and controls on the physiological ecology and organization of plants and plant populations using empirical and theoretical approaches. 2 hours lecture, 3 hours lab. Fee. Prerequisite: BIO 320 or PLB 322 (or its equivalent).

GRADUATE PROGRAMS AND COURSES

PLB 421 Plant Ecology: Communities and Ecosystems. (3)

spring in even years

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. Fee. Prerequisite: BIO 320 or PLB 322 (or its equivalent).

PLB 422 Plant Geography. (3)

selected semesters

Plant communities of the world and their interpretation, emphasizing North American plant associations. Cross-listed as GPH 422. Credit is allowed for only GPH 422 or PLB 422. Prerequisites: preferably both PLB 200 and 201 or only BIO 187 or only GPH 111.

PLB 430 Statistical Analyses in Environmental Science. (3)

spring

ANOVAS, 1-way classification of factorial and partially hierarchic designs; introductory multivariate statistics. Prerequisite: MAT 210 (or its equivalent).

PLB 432 Computer Applications in Biology. (3)

fall

Computer analysis techniques in biology emphasizing data entry, management and analysis, and graphic portrayal. Employs mainframe and microcomputers. 2 hours lecture, 3 hours lab. Cross-listed as BIO 406. Credit is allowed for only BIO 406 or PLB 432. Prerequisites: both BIO 187 and MAT 117 (or 210) or only instructor approval.

PLB 434 Landscape Ecological Analysis and Modeling. (3)

spring in odd years

Technical methods of landscape ecological analyses. Includes mathematical and statistical examination and modeling of landscape ecological patterns and processes. Prerequisites: both BIO 320 and 406 or only PLB 432 (or its equivalent).

PLB 520 Plant Structural Adaptation. (1–3)

selected semesters

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 its equivalent).

PLB 522 Plant Photosynthetic Adaptation. (1–3)

selected semesters

Evolution and ecology of C₄ 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)

spring in odd years

Techniques to measure and quantify microclimate and mass transfer. Supporting principles. 2 hours lecture, 3 hours lab. Prerequisite: BIO 320 or PLB 308.

Plant Biochemistry and Molecular Biology

PLB 440 Photobiology. (3)

selected semesters

Principles underlying the effects of light on growth, development, and behavior of plants, animals, and microorganisms. Cross-listed as BIO 464. Credit is allowed for only BIO 464 or PLB 440. Prerequisites: CHM 231 (or 331); 12 hours in life sciences.

PLB 444 Plant Growth and Development. (3)

spring

Molecular basis of development, role of signal transduction pathways/gene regulation in control of organ formation, pollination, germination, and growth. Prerequisite: BIO 353.

PLB 530 Introduction to Structural and Molecular Biology. (4)

spring

Structure and function of cells, proteins, membranes, and the genome; gene expression and biogenesis of structures; application of computer imaging. Cross-listed as CBS 530. Credit is allowed for only CBS 530 or PLB 530. Prerequisites: one year of biology; one semester of organic chemistry.

PLB 540 Plant Biochemistry. (3)

selected semesters

Structure/function relationships of molecules, emphasizing processes unique to plants: carbon fixation, synthesis of storage products, pigments, and secondary metabolites. Prerequisites: both BCH 361 and PLB 308 or only instructor approval.

PLB 550 Plant Molecular Biology. (2)

spring in odd years

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)

spring

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)

spring

Plant transformation, utilization of transgenic plants, transient gene expression assays, and applications of plant genetic engineering. 6 hours lab. Prerequisite: instructor approval.

PLB 554 Plant Biotechnology. (3)

selected semesters

Aseptic, clonal propagation of plants and in vitro culture of cells, organs, and tissues. 2 hours lecture, 3 hours lab. Prerequisite: PLB 308 or 370.

PLB 558 Molecular Mechanisms of Photosynthesis. (3)

spring

Structure and function of photosynthetic complexes; mechanism of energy conversion in plants, bacteria, and model systems. Cross-listed as BCH 568. Credit is allowed for only BCH 568 or PLB 558. Prerequisite: instructor approval.

PLB 576 Functional Genomics. (2)

spring

Functional relevance of genomic sequences; DNA arrays, proteomics, analysis of genomic information for metabolic physiology of organisms. Cross-listed as MCB 576. Credit is allowed for only MCB 576 or PLB 576. Prerequisite: MAT 351.

Urban Horticulture

PLB 472 Greenhouse/Nursery Management. (3)

spring in even years

Greenhouse structures, environment, and nursery operation. Includes irrigation, nutrition, and other principles relative to container-grown species. Fee. Prerequisites: ERS 130 (or 225 or 226); PLB 260.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Political Science

Master's and Doctoral Programs

www.asu.edu/clas/polisci

480/965-7667

SS 412

Robert L. Youngblood, Chair

Professors: Ball, Berman, Chaudhuri, Dagger, Jones, Kahn, Kenney, McDonough, McGowan, Simon, Walker, Youngblood

Associate Professors: Ashley, Crittenden, Dantico, Doty, Herrera, Keating, Mitchell, Simhony, Spruyt, Warner

Assistant Professors: Chin, C. Elman, M. Elman, Goren, Krutz

The faculty in the Department of Political Science offer graduate programs leading to the M.A. and Ph.D. degrees in Political Science. Concentrations are available in American

politics, comparative politics, international relations, and political theory.

Students admitted to the Master of Education degree with a major in Secondary Education may also elect political science as the subject matter field.

MASTER OF ARTS

See [“Master’s Degrees,” page 93](#), for general requirements.

Admission. The M.A. degree provides advanced education for those students preparing for teaching, research, or applied careers in political science. It may be taken as a terminal program or as a step toward eventual fulfillment of the requirements for the Ph.D. Students may apply directly to the doctoral program or master’s program.

In addition to the materials sent to the Graduate College, the following items should be submitted to the director of graduate studies of the Department of Political Science by April 15 in order to ensure recommendations for admission to the M.A. program beginning the following fall:

1. scores from the verbal, quantitative, and analytical sections of the Graduate Record Examination (GRE);
2. three letters of recommendation from persons who can evaluate the applicant’s academic performance and potential;
3. a career overview statement which describes the applicant’s educational objectives; and
4. a writing sample that best represents the applicant’s thinking and writing skills.

Applicants for financial aid should submit these items and complete the application form for graduate assistantships by February 15. The department also has an early admission deadline in late November. Candidates who have submitted a complete application by that date will be notified of their status by the end of the calendar year.

Undergraduate course work in political science is not a prerequisite for admission.

It is assumed, however, that M.A. students have a basic understanding of elementary statistics and the undergraduate content of the political science fields of concentration that they wish to study. Students without such a background should allow sufficient time to acquire it.

Program of Study. A minimum of 30 semester hours is required for the Master of Arts degree. All candidates must take POS 503 and the core course in the student’s major and minor fields. Additional hours must be taken in graduate-level courses and seminars. Each student is expected to take seminars each semester in his/her major field, minor field, and an elective until course work is completed. If the thesis option is followed, the program must include a combination of at least six semester hours of research (POS 592) and thesis (POS 599) credit. A maximum of six semester hours in approved courses taken outside the department or six hours of reading and conference (POS 590) courses may count towards the 30-hour requirement.

Foreign Language Requirement. None.

Thesis Option Requirements. M.A. students seeking admission to the Ph.D. program are expected to complete the thesis early in their fourth semester. A copy of the *Format Manual* is available in the Graduate College. A careful review of this document well in advance of preparation for the final copy of the thesis is recommended. An oral examination in defense of the thesis is required.

Non-Thesis Option Requirements. The program of study must include 27-hours of approved course work and at least one three-hour reading and conference course (POS 590) in the fourth semester to enhance the student’s research capabilities. A research paper must be defended by the end of the third semester before a faculty committee appointed by the director of Graduate Studies.

DOCTOR OF PHILOSOPHY

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Admission. In addition to meeting Graduate College requirements, an applicant for the Ph.D. program must take the verbal, quantitative, and analytical sections of the GRE; supply a career overview statement that describes the applicant’s educational objectives; submit three letters of recommendation from persons who can evaluate the applicant’s undergraduate and graduate work; and provide a sample of writing. These items should be submitted to the director of graduate studies of the Department of Political Science by February 15. Applicants for financial aid should also complete and submit the application form for graduate assistantships by February 15. The department also has an early admission deadline in late November. Candidates who have submitted a complete application by that date will be notified of their status by the end of the calendar year.

It is assumed that Ph.D. students have a basic understanding of elementary statistics and the content of the areas of concentration that they wish to study. Students without such a background should allow sufficient time to acquire it.

Program of Study. A minimum of 60 semester hours of graduate courses beyond the baccalaureate degree and approved by the student’s supervisory committee shall constitute the formal course preparation, followed by a minimum of 24 semester hours of research and dissertation work. The supervisory committee has three members, including the committee chair from the student’s major field, and two members from a minor field. As part of the 60 semester hours, the student must take POS 503 and 603. A maximum of 12 semester hours of approved course work outside the department and 12 semester hours of approved reading and conference courses (POS 590 and 790) may count toward the 60 semester hours. Grades of “A,” “B,” or “Y,” must be obtained in all course work counted for the Ph.D. degree.

Master’s in Passing. For students without an M.A. who are admitted directly into the Ph.D. program, the department offers a Master’s in Passing. Students opting for the Master’s in Passing must, in the third semester of residence, pass an oral examination of their work. The examination is conducted by a committee composed of members of the

GRADUATE PROGRAMS AND COURSES

Graduate Committee who represent each student's primary and secondary subfields. Students who pass the oral examination and have completed 30 semester hours of course work toward the Ph.D. are then awarded the M.A.

Research Skills/Foreign Language Requirements. All Ph.D. students must show proficiency in research and methodological skills. This requirement may be met by showing proficiency in one or more of the following areas: foreign language, quantitative, or qualitative methods. Supervisory committees determine which among those research tools are appropriate for students in their fields of study.

Comprehensive Examination. The student is required to take three examinations from the fields and subfields of American politics, international relations, comparative politics, and political theory. In the major field, the student takes a written general examination. Additionally, the student takes a written field or subfield examination in one of the remaining fields of political science. An oral examination over the dissertation proposal follows the written examinations.

Dissertation Requirements. The dissertation must be an original contribution to knowledge and demonstrate the student's proficiency as an independent investigator. The dissertation proposal is approved by the chair of the department upon the recommendation of the student's dissertation committee. The department chair also approves the dissertation committee. This committee must have a minimum of three members from the department of political science, including a chair from the student's major field.

Final Examinations. A final oral examination is required. This examination is the occasion for the student to defend the dissertation, both as to methods and conclusions, and to demonstrate general competence in the area of concentration.

RESEARCH ACTIVITY

Political science faculty and the department's curriculum are organized into four areas of concentration. The faculty offer courses and conduct research from a variety of methodological orientations, all with a common thread of theoretically oriented scholarship.

American Politics. Faculty emphasize political behavior and use survey research, experimental designs, and content analysis to collect data and conduct statistical analyses of mass voting patterns, campaign strategies, party politics, the role of the media in political communication, agenda setting and policy development in Congress, and elite-mass linkages. Other faculty emphasize public law and policy with a focus primarily at the state and local levels of government.

International Relations. One group focuses on foreign policy theory and international security, using event chronologies, institutional differences, archival materials, and public records to guide comparative analyses of foreign policy decision-making by different types of regimes, case studies of leaders and their decision-making strategies, state and nation building, nationalism, and policy analyses of issues in the Asia-Pacific region. Another cluster of faculty emphasize critical theory and the international political economy,

employing archival sources, statistical data, and texts of legal norms and state practices to conduct analyses of global inequalities in wealth and income, the evolution of statecraft, and the impact of hierarchically-ordered gender and race categories in North-South relations.

Political Theory. Faculty research interests in the area of political theory cover a range of topics in the history of political thought and contemporary political theory. Historical topics include Rousseau, conceptual history, and positive liberalism of the 19th and 20th centuries. Research in contemporary political theory focuses on such themes as autonomy and freedom, rights and obligations, civic virtues, and the idea of the common good; various issues in democratic theory (with particular attention to education), aspects of political and legal theory regarding corporate personality, conceptions of self in various cultures, analysis of myths in aboriginal societies and politics, social ecology, and peace and nonviolence.

Comparative Politics. Faculty in the area of comparative politics investigate a variety of topics in several regions of the globe. Research interests include the political economy of uneven development in Africa, democratization processes within formerly authoritarian regimes in Europe, Latin America, and East Asia, church and state relations in the Philippines, ethnic minority problems in Brazil, problems of federalism in India, and party leadership in France and Italy.

POLITICAL SCIENCE (POS)

POS 501 Methods of Political Science. (3)

selected semesters

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)

once a year

Problems of knowledge and method in political science, with attention to both empirical and evaluative analysis.

POS 503 Empirical Political Inquiry. (3)

once a year

Research methods and techniques of the discipline, emphasizing empirical foundations and analytic methods employed in subfields. Prerequisites: POS 401 (or its equivalent); instructor approval.

POS 530 American Politics. (3)

once a year

Examines major debates in the study of American political processes and institutions. Covers parties, media, elections, public opinion, interest groups, and the three branches of government. Seminar.

POS 545 Themes in Political Thought. (3)

selected semesters

Examines a particular theme or problem in political thought from both a historical and contemporary perspective. May be repeated with approval of the director of graduate studies. Seminar. Prerequisite: instructor approval.

POS 550 Comparative Politics. (3)

once a year

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)

once a year

Surveys major theoretical approaches and debates in international relations. Seminar.

POS 563 Comparative Asian Security Policies. (3)

selected semesters

Analyzes domestic and international constraints, belief systems, and economic components in security decisions by major powers and Asian nations. Seminar. Prerequisite: instructor approval.

POS 590 Reading and Conference. (1–12)

selected semesters

POS 591 Seminar. (1–12)

once a year

Topics may include the following:

- American Politics. (3)
- Comparative Politics. (3)
- Global Politics. (3)
- Political Theory. (3)

POS 592 Research. (1–12)

selected semesters

POS 598 Special Topics. (1–4)

once a year

Topics may include the following:

- American Politics. (3)
- Comparative Politics. (3)
- Global Politics. (3)
- Political Theory. (3)

POS 599 Thesis. (1–12)

selected semesters

POS 601 Advanced Experimental Research. (3)

selected semesters

Introduces experimental and quasi-experimental research designs in political research, including laboratory techniques and topics in the analysis of variance. Prerequisite: POS 503 (or its equivalent).

POS 602 Advanced Survey Research. (3)

selected semesters

Presents design and conduct of political surveys, including sampling, instrument design, scaling, and statistical and graphical analysis of survey data. Prerequisite: POS 503 (or its equivalent).

POS 603 Polimetrics I. (3)

once a year

Introduces theory and practice of linear regression analysis. Provides skills to read, understand, and evaluate professional literature using regression analysis. Prerequisites: both POS 401 and 503 or only instructor approval.

POS 604 Polimetrics II. (3)

once a year

Applies quantitative techniques to research topics producing publishable papers through exposure to time-series, logit and probit, and simultaneous equations. Prerequisites: a combination of POS 401 and 503 and 603 or only instructor approval.

POS 606 Qualitative and Textual Analysis. (3)

spring in odd years

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)

selected semesters

Introduces comparative state policy emphasizing policy or performance differences among the states and the reasons for these differences. Seminar. Prerequisites: both POS 530 and 603 or only instructor approval.

POS 636 Electoral Behavior. (3)

selected semesters

Introduces fundamental concepts of electoral behavior. Emphasizes presidential elections and examines why people vote and how their votes are determined. Seminar. Prerequisites: both POS 530 and 603 or only instructor approval.

POS 638 Law and Politics. (3)

selected semesters

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)

selected semesters

Examines contending approaches to national, social, and political change. Seminar. Prerequisite: instructor approval.

POS 660 The Modern World System. (3)

selected semesters

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)

selected semesters

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)

selected semesters

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)

selected semesters

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)

selected semesters

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 691 Seminar. (1–12)

selected semesters

POS 790 Reading and Conference. (1–12)

selected semesters

POS 792 Research. (3)

fall and spring

Projects in various areas of political science. Prerequisite: doctoral student.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Post-Bachelor's Artist Diploma

See ["Post-Bachelor's Artist Diploma," page 276.](#)

Post-Master's Nurse Practitioner Certificate

For information, see ["Nursing," page 281,](#) or call the College of Nursing Student Services Office at 480/965-2987.

Professional Accountancy Certificate Program

ASU West offers a postbaccalaureate certificate in Professional Accountancy. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Psychology

Doctoral Program

psych.la.asu.edu

480/965-3326

PSY 237C

Darwyn E. Linder, Chair

Regents' Professors: Cialdini, Eisenberg, Russo

Professors: Aiken, Barrera, Braun, Braver, Castro, Chassin, Homa, Karoly, Kenrick, Killeen, Knight, Lanyon, Linder, Mackinnon, Millsap, Neisewander, Neuberg, Okun, Parkinson, Presson, Reich, Sadalla, Sandler, Somerville, Van Orden, West, Wolchik, Zautra

Associate Professors: Castaneda, Davis, Fabricius, Goldinger, Gonzales, Leshowitz, McBeath, Nagoshi, Nemeroff, Saenz, Stone

Assistant Professors: E. Amazeen, P. Amazeen, Khoo

Senior Lecturers: Barton, Weigand, Wosinski

Lecturer: Palmer

The faculty in the Department of Psychology offer graduate programs leading to the Ph.D. degree in Psychology. Concentrations are available in clinical, developmental, and social psychology, as well as in cognitive/behavioral systems, behavioral neuroscience, and quantitative research methods. (Applications to the concentration in environmental psychology are not being accepted at this time.)

Although there is no terminal master's program as such, doctoral students are required to complete a nonterminal master's degree as part of their training.

All applicants are required to submit scores on the Graduate Record Examination (verbal, quantitative, and analytical sections; advanced section is required for clinical psychology), transcripts, three letters of reference, and a statement of purpose.

Program of Study. A minimum of 30 semester hours is required for the nonterminal master's degree.

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

Final Examinations. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See "[Doctor of Philosophy](#)," page 96, for general requirements.



Palo Verde beach area between Palo Verde East and West Dorms

Tim Trumble photo

Application Deadline. Completed applications for admission in the fall semester, including all letters and supporting documents, should be received by December 1. (However, for the concentrations in cognitive/behavioral systems and quantitative research methods, applications are accepted until January 1.)

The Department of Psychology requires all applicants to provide scores from the aptitude sections of the GRE for clinical psychology. A score from the advanced test in psychology is required. These scores are not used exclusively to determine admission but are viewed in the context of other supporting materials, such as GPAs and letters of recommendation.

Program of Study. At present the Department of Psychology offers the Ph.D. degree in the following research areas: clinical, developmental, cognitive/behavioral systems, behavioral neuroscience, quantitative, and social psychology. A minimum of 60 semester hours beyond the bachelor's degree is required, plus 24 semester hours in research and dissertation.

In addition to a core curriculum, students take courses related to their area of interest as determined in consultation with their supervisory committees.

First-Year Evaluation. At the end of the first year of study, each student receives a comprehensive evaluation by the faculty based upon performance in courses and in professional or laboratory assignments and upon the evidence of professional responsibility and ethical behavior.

Foreign Language Requirements. None.

Comprehensive Examinations. Written and oral examinations are required near the end or upon completion of all course work. After passing the comprehensive examinations and meeting other requirements (e.g., dissertation prospectus), the student is eligible to apply for candidacy.

Dissertation Requirements. The dissertation must be an original contribution to knowledge, demonstrating the stu-

dent's proficiency as an independent investigator. (See ["Doctoral Degrees," page 95.](#))

Final Examinations. A final oral examination in defense of the dissertation is required.

PSYCHOLOGY (SOCIAL AND BEHAVIORAL) (PGS)

PGS 414 History of Psychology. (3)

fall and spring

Historical development of psychology from its philosophical beginnings to the present. Prerequisites: PGS 101; PSY 230, 290.

PGS 461 Interpersonal Influence. (3)

selected semesters

Principles and procedures that affect the process of social influence; consideration of attitudinal, compliance-inducing, and perceptual influences. Prerequisite: PGS 350.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

PSYCHOLOGY (SCIENCE AND MATHEMATICS) (PSY)

PSY 420 Analysis of Behavior. (3)

selected semesters

Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 290.

PSY 424 Genetic Psychology. (3)

spring

Introduces the concepts, methodologies, and findings of behavioral genetics for Psychology majors. Prerequisites: PGS 101; PSY 230, 290.

PSY 425 Biological Bases of Behavior. (3)

selected semesters

Critical study of physiological psychology; brain mechanisms underlying motivation and learning. Prerequisite: PSY 325.

PSY 426 Neuroanatomy. (4)

selected semesters

Structure and function of mammalian brain, including sheep brain dissection. 3 hours lecture, 3 hours lab. Prerequisite: PSY 325 (or its equivalent).

PSY 434 Cognitive Psychology. (3)

spring

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.

PSY 437 Human Factors. (3)

fall

Emphasizes human factors in high-technology systems. Specific topics include systems development, systems analysis techniques, displays, and controls. Prerequisites: both PSY 290 and upper-division standing or only instructor approval.

PSY 470 Psychopharmacology. (3)

fall and spring

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)

fall

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)

fall

Major topics and paradigms in the study of person-environment relationships. Prerequisite: instructor approval.

PSY 512 Advanced Learning. (3)

selected semesters

Principles and theories of learning, emphasizing research literature. Prerequisite: instructor approval.

PSY 524 Advanced Physiological Psychology. (3)

selected semesters

Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite: instructor approval.

PSY 528 Sensation and Perception. (3)

selected semesters

Principles of sensory and perceptual processes, emphasizing research literature. Prerequisite: instructor approval.

PSY 530 Analysis of Variance in Psychological Research. (3)

fall

One-way and factorial designs, contrasts, post-hoc tests, probing of interactions, mixed designs, power, computer applications. Prerequisite: undergraduate statistics or instructor approval.

PSY 531 Multiple Regression in Psychological Research. (3)

spring

Multiple regression and correlation, hierarchical regression, interactions, curvilinear relationships, categorical predictors, ANOVA in regression, regression diagnostics, regression graphics. Prerequisite: PSY 530 or instructor approval.

PSY 532 Analysis of Multivariate Data. (3)

fall

Matrix algebra for multivariate procedures, component and factor analysis, canonical and discriminant analysis, classification, MANOVA, logistic regression, hierarchical linear model. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 533 Structural Equation Modeling. (3)

spring

Path analysis; exploratory and confirmatory factor analysis; recursive and nonrecursive latent variable models; mean and covariance structures; latent growth models. Prerequisite: PSY 532 or instructor approval.

PSY 534 Psychometric Methods. (3)

fall and spring

Theory and practice of psychological measurement using classical and modern test theories. Reliability assessment, test validation, test construction, test usage. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 535 Cognitive Processes. (3)

selected semesters

Theoretical/empirical treatment of the human organism as a processor of information, including abstraction, memory structure, problem solving, and thinking. Prerequisite: instructor approval.

PSY 536 Statistical Methods in Prevention Research. (3)

fall and spring

Statistical methods used in prevention research including epidemiological methods, logistic regression, program effect estimation, estimation, and mediation analysis. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 537 Longitudinal Growth Modeling. (3)

selected semesters

Growth modeling methodology to describe individual variation in development over time. Employs multilevel and structural equation modeling frameworks. Prerequisite: PSY 533 or instructor approval.

PSY 538 Advanced Structural Equation Modeling. (3)

selected semesters

Mean and covariance structure analysis. Includes multiple-group modeling, two-level hierarchical modeling, longitudinal growth modeling, analysis with categorical outcomes. Prerequisite: PSY 533 or instructor approval.

PSY 539 Meta-Analysis I. (1)

fall

Meta-analysis; searching the literature, coding study characteristics, computing effect sizes. Must be followed by PSY 540. Seminar. Prerequisites: both PSY 530 and 531 or only instructor approval.

PSY 540 Meta-Analysis II. (2)

spring

Continuation of PSY 539. Meta-analysis; computing effect sizes, and analyzing the heterogeneity of effect sizes. Seminar. Prerequisite: PSY 539.

PSY 541 Research in Cognitive Development. (3)

selected semesters

Theoretical and empirical issues in the study of children's knowledge and cognitive processes. Comparison of research in Piagetian and

GRADUATE PROGRAMS AND COURSES

other traditions. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

PSY 542 Social Development. (3)

selected semesters

Reviews and critiques major issues in the area of social development. Covers theory, research, and content. Prerequisite: instructor approval.

PSY 550 Advanced Social Psychology. (3)

fall and spring

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)

fall and spring

Continuation of PSY 550. Prerequisite: PSY 550 or instructor approval.

PSY 553 Social Influence. (3)

selected semesters

Researches literature relevant to attitude formation and change, conformity, obedience, power, compliance, altruism, and others. Prerequisite: PSY 551 or instructor approval.

PSY 555 Experimental and Quasi-Experimental Designs for Research. (3)

selected semesters

Reviews research techniques. Analyzes laboratory and field research; applications to specific topics. Prerequisite: instructor approval.

PSY 569 Advanced Study of Personality. (3)

selected semesters

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)

fall

Theory and research on assessment of personality, psychopathology, and intelligence; construction of psychological assessment instruments. Prerequisite: admission to clinical Ph.D. program or instructor approval.

PSY 573 Psychopathology. (3)

fall

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)

spring

Detailed survey of the theoretical and empirical literature relating to verbal psychotherapy. Prerequisite: admission to the clinical Ph.D. program or instructor approval.

PSY 578 Developmental Psychopathology. (3)

selected semesters

Covers major theories and research related to the development of psychological disorders of childhood and adolescence.

PSY 582 Community Psychology. (3)

summer

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)

selected semesters

Several theories and strategies of organizational consultation. Develops consultative skills through simulation and practical experience. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

PSY 624 Clinical Neuroscience. (3)

spring

Examines 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.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Public Administration

Master's Program

spa.asu.edu/Acadprog/mpa.htm

480/965-3926

WILSN 208

Jeffrey Chapman

Director, School of Public Affairs

Heather Campbell

Director, Master's Program

Professors: Alozie, Cayer, Chapman, Coor, J. Denhardt, R. Denhardt, Hall, Mankin, Perry

Associate Professors: Brown, Campbell, DeGraw, Lan

Assistant Professors: DeLorenzo, McCabe, Peck

The mission of the School of Public Affairs is to advance excellence in governance by creating, sharing, and applying knowledge of public administration.

The School of Public Affairs offers a 42-semester-hour professional Master of Public Administration (M.P.A.) degree and participates in an interdisciplinary degree leading to the Ph.D. degree in Public Administration.

MASTER OF PUBLIC ADMINISTRATION

The M.P.A. is an interdisciplinary, professional degree designed to prepare students for public service, public management, and policy analysis at the local, state, and national levels of government. The M.P.A. degree is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Admission. Applicants to the M.P.A. program are considered for admission irrespective of undergraduate major, although students may be required to complete additional courses and/or workshops to prepare themselves for the core courses.

The applicant's undergraduate GPA, GRE scores (verbal, quantitative, and analytical), letters of recommendation, statement of educational and career goals, and professional experience are all considered in the admissions process. In addition, TOEFL scores (550 or higher) are required for international students. Admission may be limited by space availability.

Applications for admission can be sent at any time. Students requesting graduate assistantships and tuition scholarships should have their application files completed by March 1.

All applicants must submit the following materials to the Graduate College:

1. an official application;
2. official transcripts of all undergraduate and graduate work;
3. scores on the GRE (verbal, quantitative, and analytical; special subject tests not required); and
4. TOEFL scores for international students.

All applicants must submit the following materials to the School of Public Affairs:

1. three letters of recommendation, at least two of which should be written by faculty who can evaluate the applicant's academic performance;
2. a written statement of applicant's educational and career goals, which also is used as a sample of the applicant's writing abilities; and
3. résumé or additional documents as the applicant sees fit.

Program of Study. The M.P.A. program consists of 42 hours of graduate credit. Students take 27 of these hours in nine core classes in the School of Public Affairs, and 15 additional hours in elective courses.

No more than nine semester hours of ASU graduate courses taken before admission to the school and approved by the M.P.A. Committee can be included in the Program of Study.

Students enrolling in core courses must demonstrate minimum competency in statistics, American government, and computer applications. Courses taken to fulfill the competency do not count toward the 42-hour degree program. Competency in statistics or American government is met with a grade of "B" or higher in approved courses, passing a diagnostic test approved by the M.P.A. Committee, or earning a grade of "B" or higher in such approved courses as PAF 401, POS 401, PSY 230, QBA 221, and SOC 390 for statistics and POS 310 for American government. Competency in computer applications is met by enrollment in university short courses and training seminars.

Internship. A public service internship is recommended for M.P.A. students without previous administrative experience in government. The purpose of the internship is to provide students with practical and professional experience in a specific career area. Students work in and for public organizations applying the knowledge, skills, and abilities acquired in their program of study. During the internship experience, students can develop a professional network that will aid them in their pursuit of a career in government or non-profit organizations. Students can apply three hours of internship credit to the degree program. To receive course credit for an internship, students are required to attend class sessions and submit a paper to the internship coordinator.

Foreign Language Requirements. None.

Comprehensive Examination. None.

Thesis Requirements. None.

Capstone Requirement. The M.P.A. degree requires students to demonstrate competency for public service by synthesizing and applying core course knowledge, skills, and abilities to public service problems. Students demonstrate their public service competency by earning an "A" or a "B" in the M.P.A. capstone course, PAF 509 Public Service.

Morrison Institute for Public Policy

As an integral part of the School of Public Affairs, the Morrison Institute is an applied public policy research center that conducts research on public policy, informs policymakers and citizens about issues, and advises leaders on choices and actions. In partnership with government officials, university faculty, and the private sector, the Morrison Institute conducts research, policy forums, program evaluations, and strategic planning for public, private, and non-profit clients. The Institute produces publications on a wide range of topics, including urban growth, education, natural resources, governmental systems and relations, health care, social services, quality of life, and economic development.

Advanced Public Executive Program (APEP)

APEP is a continuing education program designed to provide public-sector executives with analytical approaches and skills in leadership, policy analysis, total quality management, media relations, organizational development, team-building, and communication. Located at the ASU Downtown Center, APEP sponsors the Certified Manager Program, the Institute for Public Executives, Total Quality Management in the Public Sector, the County Elected Officials' Certification Program, and presents custom-tailored professional development programs for public-sector managers.

PUBLIC AFFAIRS (PAF)

PAF 401 Statistics. (3)

fall and spring

Surveys 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 I. (3)

fall and spring

Philosophy, scope, and methods; public service research design, values, and ethics. Prerequisite: an approved course in statistics.

PAF 502 Public Service Research II. (3)

fall and spring

Quantitative techniques including multivariate analysis, data analysis, decision making, and computer applications in public affairs. Prerequisite: PAF 501.

PAF 503 Public Affairs. (3)

fall and spring

Development and context of American public administration and policy, role of administration in governance, and values and ethics in administration.

PAF 504 Public Affairs Economics. (3)

fall and spring

Basics of public sector economics, microeconomic and macroeconomic concepts applied to public sector decisions and policies.

PAF 505 Public Policy Analysis. (3)

fall and spring

Institutional and formal analysis of policy processes, decision making, and problem solving; values, ethics, and the uses of policy analysis. Prerequisites: PAF 504; satisfaction of the statistics requirement.

GRADUATE PROGRAMS AND COURSES

PAF 506 Public Budgeting and Finance. (3)

fall and spring

Legal, social, economic, political, institutional, and ethical foundations of governmental finance, budgets, and budgeting. Prerequisites: PAF 502, 504.

PAF 507 Public Human Resource Management. (3)

fall and spring

Personnel systems, behavior and management of people in public organizations, collective behavior, unionism, conflict management, motivation, productivity, and ethics.

PAF 508 Organization Behavior. (3)

fall and spring

Theory and application in the management of organizational behavior with emphasis on leadership and the public service.

PAF 509 Public Service. (3)

fall and spring

Capstone application of core course knowledge, skills, and abilities required for public service. Prerequisites: PAF 501, 502, 503, 504, 505, 506, 507, 508.

PAF 511 Governmental Finance. (3)

selected semesters

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)

selected semesters

Management process in government and public agencies, with emphasis on the executive leadership within the public sector.

PAF 521 Organization Theory. (3)

selected semesters

Organization theory and current research emphasis with application to public administrative organizations.

PAF 522 Public Labor Relations. (3)

selected semesters

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)

once a year

Manager's role and resources in the differing forms of administrative, legislative, and community sectors.

PAF 526 Public Sector Human Resource Development. (3)

selected semesters

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)

selected semesters

Explores 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)

selected semesters

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)

selected semesters

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)

selected semesters

Historical and present-day uses of urban planning and procedures for its implementation. Basic principles and practices.

PAF 533 Urban Growth Administration. (3)

selected semesters

Examines the process of urban growth and change. Emphasizes partnership roles played by public and private sectors in management.

PAF 535 Urban Housing Policy. (3)

selected semesters

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)

selected semesters

Analyzes the opportunities and costs of influencing public policy and the roles of officials and bureaucracies in decision making.

PAF 540 Advanced Policy Analysis. (3)

once a year

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)

selected semesters

Various methodologies available for the evaluation of public policies and programs. Prerequisite: PAF 501 or instructor approval.

PAF 546 Environmental Policy and Management. (3)

selected semesters

Analyzes 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)

selected semesters

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)

selected semesters

Explores how political philosophy, politics, and public policy affect and are affected by women.

PAF 549 Diversity Issues and Public Policy. (3)

selected semesters

Examines 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)

selected semesters

Concepts and theory of information and information technology in public sector organizations.

PAF 551 Computers in Administration. (3)

selected semesters

Experience in use of computer technology for public administration problem solving.

PAF 552 Public Information Systems. (3)

selected semesters

Systems analysis concepts and theory as applied to administration. Alternative modes of information organization and their impact on public decision making.

PAF 556 Database Management Systems. (3)

selected semesters

Concept and use of modern database management systems in an administrative organization. Advantages and disadvantages of this approach.

PAF 561 Comparative Administration. (3)

selected semesters

Literature on comparative public administration theory. Bureaucracies and their impact on the political development process. Studies selected nations.

PAF 562 Intergovernmental Relations. (3)

once a year

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)

selected semesters

Intensive practice in written and oral presentation of reports to conferences with problems in public administration. Visual aid techniques.

PAF 564 Political Economy. (3)*once a year*

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)*fall and spring*

Topics may include the following:

- Business and Government
- Emergency Management
- General Public Administration
- Geographic Information Systems
- Information Management
- Law and Public Administration
- Public Finance Administration
- Public Management
- Public Policy Analysis
- Transportation Systems Pro-Seminar
- Urban Affairs and Urban Planning

PAF 600 Research Design and Methods. (3)*once a year*

Advanced methods of research design and data collection. Prerequisites: formal graduate-level course work in statistics and in research methods.

PAF 601 Seminar: Policy Analysis and Evaluation. (3)*once a year*

Normative and conceptual issues of policy formulation, implementation, and evaluation; methods of policy analysis and evaluation.

PAF 602 Seminar: Foundations of Public Administration. (3)*once a year*

Ethical, social, legal, and philosophical foundations of public administration.

PAF 603 Seminar: Organization and Behavior in the Public Sector. (3)*once a year*

Structure, organization, conduct, and performance of public sector institutions in the administration of public policy. Prerequisite: PAF 602.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Public Administration

Interdisciplinary Doctoral Program**spa.asu.edu****480/965-3926****WILSN 208**

Jeffrey Chapman
Director, School of Public Affairs

Robert Denhardt
Director, Doctoral Program

Agribusiness

Professors: Edwards, Thor

Economics

Professor: Hogan

Geography

Professor: Burns

Health Administration and Policy

Professor: Johnson

Journalism and Mass Communication

Professor: Merrill

Justice Studies

Regents' Professors: Altheide, Palumbo

Professors: Hepburn, Musheno, Schneider

Management

Professor: Bohlander

Planning and Landscape Architecture

Professors: Mushkatel, Pijawka

Political Science

Professor: Berman

Psychology

Associate Professor: Castro

Public Affairs

Professors: Alozie, Cayer, Chapman, J. Denhardt,

R. Denhardt, Hall, Mankin, Perry

Associate Professors: Brown, Campbell, Lan

Assistant Professors: DeLorenzo, McCabe, Peck

Recreation Management and Tourism

Associate Professor: Virden

Social Work

Professors: Kettner, MacEachron

Sociology

Professor: Nagasawa

Associate Professor: Benin

The School of Public Affairs offers an interdisciplinary graduate program leading to the Ph.D. degree in Public Administration.

The purpose of the degree program is to foster the next generation of public administration scholars in research and university teaching and to prepare skilled professional public administrators for high-level positions in the public sector. The program is designed to emphasize both normative and conceptual content pertaining to value assessments, theoretical assumptions, ethics, and modes of decision making, as well as practitioner problem-solving skills in budgeting, public personnel management, public finance, planning, program evaluation, and policy analysis.

The degree program is interdisciplinary in nature and is offered by faculty from various colleges. One of the unique features of this interdisciplinary program is that, because it utilizes faculty research and teaching interests from a number of academic units, a student may tailor a course of study to fit individual needs and goals.

Admission. Applications are reviewed by an admissions committee appointed by the director of the program. Recommendations for admission are made by the director to the dean of the Graduate College. Minimum Graduate College admission requirements must be met. See ["Admission to the Graduate College," page 84,](#) for requirements. Additionally, each applicant must provide a letter of career goals and

GRADUATE PROGRAMS AND COURSES

statement of reasons for seeking the degree, a GRE test score, a professional résumé, and six letters of recommendation (three from faculty and three from professional public administrators). International students must submit both TOEFL and TSE scores. Admissions recommendations are made only once each year, with admitted students beginning their studies in the fall semester. To assure consideration for the ensuing fall semester, submit applications for admission, graduate assistantship, and tuition waiver by January 15. Only applicants already holding a master's degree are considered. If deficiencies exist in public administration course work at the master's level, appropriate classes are prescribed.

Program of Study. When the program of study is filed, a supervisory committee consisting of at least three persons is appointed by the dean of the Graduate College upon the recommendation of the director of the program. The chair of the supervisory committee serves as the student's graduate advisor. The supervisory committee advises the student in developing a program of study and assumes primary responsibility in assessing the student's progress in the program. The program consists of a minimum of 66 semester hours of graduate work beyond the master's degree. Of the 66 semester hours, at least 24 must be dissertation and research credit. A minimum of 30 semester hours of approved course work, exclusive of dissertation and research, must be taken at ASU after admission to the program. A sequence of four core courses is required of all students, followed by a screening examination. In addition to the four core courses, an approved program of study must have a course listed in each of the following areas: quantitative research methods, qualitative research methods, political economy, and democratic theory and governance.

Residency. See the graduate director with regard to the residency requirements for this program.

Comprehensive Examinations. Upon completion of course work, and before dissertation research, the student is given a written examination in each of the areas of specialization. The written examinations are followed by a single oral examination. If the student should fail one or more components of the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval for this reexamination must be obtained from the supervisory committee, the director of the program, and the dean of the Graduate College. A second failure is considered final and dismissal from the program is recommended to the Graduate College.

Candidacy. Doctoral students should apply for admission to candidacy immediately after they have met all requirements for the degree, *except the dissertation*. These requirements include passing the comprehensive examinations and other requirements specified by the program.

Dissertation Requirements. A dissertation is required of each student. The dissertation must consist of a fully documented written analysis demonstrating a high level of skill and competence. Each student must register for a minimum of 24 hours of dissertation and research. The dissertation is

supervised by a committee of at least three faculty members appointed by the dean of the Graduate College.

Final Examinations. The final oral examination in defense of the dissertation is scheduled by the dean of the Graduate College and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination. Any exception must be approved by the dissertation committee, the director, and the dean of the Graduate College.

Graduation. The student is eligible for graduation when the Graduate College scholarship requirements have been met, the final oral examination has been passed, and the dissertation has been approved by the supervisory committee and accepted by the director and the dean of the Graduate College.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

COURSES

For courses, see "Public Affairs (PAF)," page 303.

Public Health

Master's Program

www.cob.asu.edu/hap

480/965-6633

BA 318

Christine R. Larsen, ASU Coordinator

The College of Nursing and the School of Health Administration and Policy in the College of Business, at ASU, in conjunction with the University of Arizona and Northern Arizona University, offer courses leading to the Master of Public Health degree. Two concentrations are offered at ASU, community health practice and health administration and policy.

MASTER OF PUBLIC HEALTH

The ASU curriculum of the Master's of Public Health degree prepares graduates to assume leadership roles in the health care industry. Graduates become public health architects with skills and knowledge vital to the planning, implementation, and evaluation of programs and policies essential for promotion of health and the alleviation of illness and disease.

The community health practice concentration is designed to provide graduates with a broad-based foundation in public health practice. Particular attention is focused on the health needs of groups and communities, especially border, rural, minority, and vulnerable populations. Completion of the community health practice curriculum prepares community-based health practitioners to successfully lead the pub-

lic health community in managing population-based health care issues.

The specialized curriculum of the health administration and policy concentration emphasizes skills necessary for assuming administrative and leadership responsibilities in local, state, and national health departments, policy formulating and public health advocacy organizations, foundations, and organizations engaged in the delivery of health services to both the public and private sectors. Health sector leaders throughout the state contribute to the program creating an integrated interdisciplinary statewide academic endeavor.

Materials describing the two Master of Public Health concentrations offered at ASU are available by calling 480/965-6633, accessing the Web site at www.cob.asu.edu/hap, sending e-mail to asuhap@asu.edu, or writing

TRI-UNIVERSITY MASTER OF PUBLIC HEALTH
ARIZONA STATE UNIVERSITY
PO BOX 874506
TEMPE AZ 85287-4506

Other concentrations are available at the University of Arizona and Northern Arizona University.

Admission. Applicants must hold a bachelor's degree or equivalent from an accredited college or university. Three letters of recommendation that comment on the student's motivation, commitment, achievements, work experience, and opportunity for success in the program are required. The application packet includes essay questions that should be answered in detail, and a current résumé must be attached. Prospective students must also submit an official Graduate Record Examination (GRE) or Medical College Admissions Test (MCAT) score, or the GMAT if the applicant is applying to the health administration and policy concentration only. For applicants with a U.S. doctoral degree, test scores are recommended but not required.

Applicants whose native language is not English are required to submit a score on the Test of English as a Foreign Language (TOEFL). Students should submit their applications to the University of Arizona by February 1 for fall admission. Applications are accepted only for fall admission.

Application materials can be obtained by calling the Master of Public Health program office toll-free (within the US) at 1-800-841-5984, accessing the Web site at www.ahsc.arizona.edu/pub-hlth, sending e-mail to mphadmit@u.arizona.edu, or writing

MASTER OF PUBLIC HEALTH
THE UNIVERSITY OF ARIZONA
HEALTH SCIENCES CENTER, ROOM 1115A
1501 N. CAMPBELL AVE.
PO BOX 24-5033
TUCSON AZ 85724-5033

Program of Study. The program of study for both concentrations requires 39 semester hours: 15 semester hours of core courses, 12 semester hours of concentration courses, and six hours of electives. Both concentrations require the student to successfully complete a six-hour internship.



Krista Obermeyer (left) and Sami Langley apply clinical nursing techniques learned in class.

Tim Trumble photo

**Tri-university Master of Public Health:
Core Courses**

HSA 560 Health Services Administration and Policy	3
HSA 561 Biostatistics	3
HSA 566 Principles of Epidemiology.....	3
PHL 575 Environmental and Occupational Health*	3
PHL 577 Social and Behavioral Aspects of Public Health*.....	3
Total	15

* These courses, offered at ASU, are not ASU courses per se and are not found in this catalog.

Prerequisites. Students lacking sufficient background in mathematics are encouraged to take a college algebra class before starting the program.

Foreign Language Requirements. None.

Comprehensive Examinations. Each student is required to produce a comprehensive, analytical, problem-solving report integrating the in-class learning with the internship experience. The student is also required to make an oral presentation before a student and faculty colloquium, reporting on activities during the internship and relating those activities to broader public health issues.

Thesis Requirement. None.

GRADUATE PROGRAMS AND COURSES

CONCURRENT DEGREE PROGRAMS

M.P.H./M.S. (Nursing). Beginning fall 2002, The College of Nursing at ASU will be offering a concurrent Master's of Public Health/Master's of Science degree. This program is designed to prepare advanced practice public health nurses for leadership positions by synthesizing the strengths of both the profession of nursing and the discipline of public health. Students interested in this program should contact the ASU coordinator at 480/965-6633 for program information and application instructions.

COURSES

For courses, see "Health Services Administration (HSA)," page 228.

Recreation

Master's Program

www.asu.edu/copp/recreation

480/965-7291

MOEUR 134

Randy J. Virden, Chair, Department of Recreation Management and Tourism

Dallen J. Timothy, Director, Master's Program

Professors: Allison, Haley, Yoshioka

Associate Professors: Ashcraft, Sonmez, Teye, Virden

Assistant Professors: Brown, Leclerc, Pritchard, Timothy

MASTER OF SCIENCE

The faculty in the Department of Recreation Management and Tourism offer a program leading to the M.S. degree in Recreation.

The M.S. degree program prepares students to analyze and understand critical topics and issues pertinent to the field of leisure and recreation.

Students choose between two academic options: the thesis or the professional option.

Admission. Students applying to the M.S. program must have achieved a GPA of 3.00 or the equivalent in the last two years of work leading to the bachelor's degree. Applicants should submit their application, application fee, and all undergraduate transcripts to the Graduate College before February 15. To be considered for fall admission, candidates must have their Graduate Record Examination (or Miller's Analogy Test) scores, a statement of professional and academic goals, and three letters of recommendation sent to the Department of Recreation Management and Tourism by February 15. Only complete application files are reviewed or considered for admission. Students without undergraduate academic work in the recreation/tourism disciplines are

required to take six semester hours of deficiency course work in addition to the M.S. degree requirements. Deficiency course work may be taken in conjunction with M.S. degree classes.

Program of Study. Completion of the M.S. degree in Recreation on the average requires approximately two years of study. Students may select a thesis or professional option. The thesis option is a research-oriented degree and is recommended for students planning to continue graduate studies beyond the master's degree. The professional option is intended for students seeking additional knowledge and expertise relevant to professional career development. Advising and direction in both options are under the direct supervision of an assigned faculty member.

Program Requirements: Thesis Option. The thesis option consists of a minimum of 30 semester hours. The 30 semester hours include six hours of thesis (REC 599), which must be defended in an oral examination before a supervisory committee of at least three faculty members, one of which resides in another department.

REC 500 Research Methods.....	3
REC 552 Foundation of the Recreation and Tourism Professions.....	3
REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior.....	3
Advanced inquiry skills	3
Electives	9
Introductory statistics (500-level)	3
Thesis	6
Minimum total	30

Program Requirements: Professional Option. The professional option consists of 30 semester hours including six hours of practicum (REC 580). The purpose of the Practicum is to provide graduate students with in-depth agency-based professional experiences. The student committee will consist of one department faculty member and one community/agency professional. At the end of the Practicum, the student is required to submit a written description and analysis of the project as well as present the results to the committee.

REC 501 Program Evaluation and Information Management.....	3
REC 530 Recreation and Tourism Service Management	3
REC 552 Foundation of the Recreation and Tourism Professions.....	3
REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior.....	3
REC 580 Practicum	6
Electives	9
Introductory statistics (500-level)	3
Minimum total	30

Foreign Language Requirements. None.

Thesis Requirements. A thesis is an option.

Final Examinations. A final oral examination in defense of the thesis or a practicum is required.

RESEARCH ACTIVITY

The study of leisure, recreation, and tourism is a multidisciplinary field of research, scholarship, and program development. Recent scholarly activity of departmental faculty and students reflect this approach. Major research areas include the following: international travel and tourism; philosophy of leisure; recreation resource planning; social and psychological analyses of leisure behavior; leisure and youth development; travel and tourism policy and planning; urban recreation administration; outdoor recreation and wilderness management; cross-cultural analysis of play and leisure; gender differences in leisure behavior patterns; non-profit agency leadership/management.

RECREATION MANAGEMENT AND TOURISM (REC)

REC 500 Research Methods. (3)

once a year

Introduces 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 Program Evaluation and Information Management. (3)

selected semesters

Develops skills in several professional areas, including evaluation, needs assessment, information and data collection, data management/analysis, computer applications, and report writing.

REC 530 Recreation and Tourism Service Management. (3)

spring in even years

Examines and applies organizational behavior, leadership, human resources, and development, planning and risk management to profession.

REC 552 Foundation of the Recreation and Tourism Professions. (3)

once a year

Examines the philosophical and conceptual foundations of play, leisure, recreation and tourism; history of the profession; professional and research issues.

REC 555 Social and Psychological Aspects of Recreation and Tourism Behavior. (3)

once a year

Theoretical review and empirical analysis of social, cultural, and psychological foundations of leisure behavior with practical implications.

REC 569 Current Issues in Tourism. (3)

once a year

General survey of tourism literature with emphasis on relevant theories, concepts, and current research.

REC 570 Social Aspects of Outdoor Recreation Management. (3)

once a year

Analyzes the social aspects of natural resource recreation management and planning. Prerequisite: REC 370 (or its equivalent).

REC 580 Practicum. (1-12)

selected semesters

REC 593 Applied Project. (1-12)

selected semesters

REC 598 Special Topics. (1-12)

selected semesters

REC 599 Thesis. (1-12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Religious Studies

Master's Program

www.asu.edu/clas/religious_studies

480/965-7145

ECA 377

Joel D. Gereboff, Chair

Professors: Cady, Coudert, Feldhaus, Foard, Samuelson

Associate Professors: Clay, Fessenden, Gereboff, Moore, Morrison, Schober, Swanson, Woodward

Assistant Professors: Benn, Damrel, Leon, Umar

The faculty of the Department of Religious Studies offer a graduate program leading to the M.A. degree in Religious Studies. This program is designed to serve three main purposes. It offers intensive training in research methods and in select special fields for students who seek to qualify for doctoral programs at leading universities. It serves as specialized training for those who plan to teach religious studies subject matter in colleges and high schools or who wish to bring cultural and cross-cultural analytical tools to professions such as business, social work, government, and journalism. It allows qualified persons in nonacademic occupations the opportunity to acquire competence in the study of religions, broadly defined, and in areas of special interest.

Course offerings and faculty appointments reflect the commitment of the department to a balance of Western and Asian, historical and conceptual, methodological, and subject-oriented areas of study. This programmatic diversity is maintained in a context of scholarly collegiality involving both faculty and graduate students.

MASTER OF ARTS

See ["Master's Degrees," page 93,](#) for general requirements.

The graduate program leading to the M.A. degree provides two options: (1) a thesis option and (2) a portfolio option. While admission requirements and procedures are identical for both options, requirements for degree completion vary as indicated.

Admission. In order to be eligible for admission to the graduate program in Religious Studies, an applicant must meet Graduate College requirements. See ["Admission to the Graduate College," page 84,](#) and provide the following:

1. The student must submit test scores from the Graduate Record Exam (older returning students may petition the department to have this requirement waived).
2. The student must have completed the equivalent of 15 hours of undergraduate work in the study of religions, including advanced courses in both Western

GRADUATE PROGRAMS AND COURSES

and Asian or other non-Western religions. Students without the necessary background in religious studies may remove deficiencies by taking additional specified courses (which may or may not count toward the fulfillment of degree requirements) at the beginning of their program of study.

3. The student must request three academic letters of reference to be sent to the graduate coordinator of the department.
4. The student must submit an essay of approximately 1,000 words outlining the academic background, career goals, and specific area of interest in religious studies in relation to fields offered by the faculty.

Complete applications are due by February 1. Students will receive notification from the department by April 1. Graduate assistantship awards are also announced on or about April 1. Late applications and applications for spring semester are reviewed on an individual basis.

For more information, send e-mail to relstudy@asu.edu.

GRADUATE PROGRAM REQUIREMENTS

Thesis Option. This option is recommended for students intending to seek admission to a doctoral program upon completion of the M.A. degree or planning to teach in the discipline at community colleges. For the thesis option the student must satisfy the following requirements:

1. reading knowledge of French, German, or another language relevant to the proposed thesis topic is normally required. At the discretion of the student's supervisory committee, the requirement may be waived for students who either are not planning to enter a doctoral program or are planning to pursue doctoral work that does not require proficiency in foreign languages;
2. 24 hours of course work, including six hours in methods and theory (REL 501, 502); six hours of graduate seminar (REL 591), offered each semester on varying topics within the academic study of religion; and three hours of research (REL 592) in the field of the thesis topic;
3. a thesis that earns six semester hours of 599 Thesis credit; and
4. an oral defense of the thesis.

Portfolio Option. This option is recommended for students intending to augment their primary area of expertise and professional training in fields such as journalism, law, teaching K-12, counseling, social work, the ministry, and others. For the portfolio option, the student must satisfy the following requirements:

1. reading knowledge of a foreign language relevant to the proposed area of concentration. At the discretion of the student's supervisory committee, the requirement may be waived;
2. 30 hours of course work, including six hours in methods and theory (REL 501, 502); six hours of graduate seminar (REL 591); four courses in a major

area of concentration; and two courses in a minor area;

3. a portfolio consisting of three papers: one on theory and method, one on the student's minor area of study, and one on the major area of study. Although portfolio papers may germinate from ideas generated in graduate seminars, they will be of publishable quality and make substantive contributions to the scholarship of the field. Credit towards completing the portfolio may be earned as part of the required credit hours outlined in (2); and
4. an oral defense of the portfolio.

RESEARCH ACTIVITY

For information on current research activity, access the Department of Religious Studies Web site at www.asu.edu/clas/religious_studies.

RELIGIOUS STUDIES (REL)

REL 410 Judaism in Modern Times. (3)

selected semesters

Variety of expressions of Judaism and Jewishness in the modern period. Topics may include American Judaism or religious responses to the Holocaust.

REL 415 The Jewish Mystical Tradition. (3)

selected semesters

Examines some of the esoteric lore of Judaism. Studies movements and literature such as Hasidism and Kabbalah.

REL 420 Religion in American Life and Thought. (3)

selected semesters

Influence of religion on American society, culture, and ideas; the distinctive character of religion in America. Prerequisite: REL 320 or 321 (or its equivalent).

REL 426 American Preachers and Preaching: The Sermon in America. (3)

selected semesters

Life and work of notable American preachers. Emergence of the preacher as representative of American religion. Prerequisite: REL 320 or 321 (or its equivalent).

REL 427 American Religious Thought. (3)

selected semesters

Thought of representative American religious thinkers, i.e., Jonathan Edwards, William Ellery Channing, Horace Bushnell, and Reinhold Niebuhr. Prerequisite: REL 320 or 321 (or its equivalent).

REL 444 Religion in Japan. (3)

once a year

Religion in Japanese history, especially the development of Japanese Buddhism, and religion in the modern transformation of Japan. Prerequisite: instructor approval.

REL 460 Studies in Islamic Religion. (3)

selected semesters

Issues in the interpretation and understanding of Islamic texts, history, society, culture, and rituals. Prerequisites: both REL 365 and Religious Studies major or only instructor approval.

REL 470 Religion in the Middle Ages. (3)

selected semesters

Religious aspects of medieval life and thought; variety of forms of dissent, heresy, and reform movements from the 4th to 13th centuries.

REL 471 Reformation and Modern Christianity. (3)

selected semesters

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.

REL 483 Religion and Science. (3)*spring*

Investigates the correlation between science and religion as an interdisciplinary study from a historical perspective. Readings, film, lecture, discussion. Prerequisite: junior standing or instructor approval.

REL 494 Special Topics in Religious Studies. (3)*fall and spring*

Open to all students. Topics may be selected from various areas. Prerequisite for freshmen: instructor approval.

REL 498 PS: Pro-Seminar in Religious Studies. (3)*selected semesters*

For students with a major or minor emphasis in Religious Studies.

REL 501 Research Methods in Religious Studies. (3)*fall*

Explores 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)*spring*

Explores the major themes and methods in the study of religion, with primary focus on contemporary texts. Lecture, discussion.

REL 591 Seminar. (3)*fall and spring*

Topics on methodological issues in the study of religion. Prerequisite: Religious Studies graduate student or instructor approval.

REL 592 Research. (1–12)*fall and spring*

May be repeated for credit. Topics may include the following:

- Christianity. (3)
- Islam. (3)
- Judaism. (3)
- Native American Religion. (3)
- Problems in Religious Studies. (3)
- Religion in America. (3)
- Religion in East Asia. (3)
- Religion in South and Southeast Asia. (3)
- Study of Religion, Comparative Religion. (3)
- Western Religious Thought, Ethics. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

Renaissance Studies

See [“Medieval and Renaissance Studies,” page 268](#).



A graduate student quintet performs for community members at the School of Music.

Dennis Durband photo

Scholarly Publishing

Certificate Program

www.asu.edu/clas/history/graduate/scholarlypub.html

480/965-5775

SS 225H

Beth Luey, Director

Senior Instructional Professional: Luey

Graduate students in any discipline may pursue a Certificate in Scholarly Publishing in conjunction with their degree programs. The program is also open to students who already hold graduate degrees. Students gain an understanding of the structure of scholarly publishing (scholarly books, journals, reference books, college textbooks, and scholarly electronic media), its role and responsibility in society, the legal and ethical issues that impinge upon it, and its economics. They also learn to perform the responsibilities of editors, designers, or producers of scholarly publications. Course work includes a required core, required courses in editing or design, and electives from a variety of disciplines. The certificate requires 28 hours of course work, including six internship hours. Some courses may be applied to both the certificate and the student's degree program. Applicants are strongly urged to submit Graduate Record Examination aptitude scores; a writing sample is required. Application deadline is February 1. For more information, contact the director, Scholarly Publishing Program, SS 225H, 480/965-5775.

SCHOLARLY PUBLISHING (PUB)**PUB 501 Introduction to Scholarly Publishing. (3)***spring*

Introduces the purpose, organization, and operation of scholarly publishing, including its history, societal role, and current issues. Lecture, discussion. Prerequisite: graduate standing.

PUB 502 Scholarly Editing. (3)*spring*

Publishing procedures, proofreading, and manuscript editing of scholarly books, textbooks and scholarly journals. Lecture, discussion. Prerequisite: admission to scholarly publishing certificate program. Pre- or corequisite: PUB 501.

PUB 503 Advanced Scholarly Editing. (3)*fall*

Advanced manuscript editing, acquisitions, developmental editing, and indexing of scholarly books, textbooks, and scholarly journals. Lecture, discussion. Prerequisites: PUB 501, 502.

PUB 510 Research in Scholarly Publishing. (3)*spring*

Individual or group research projects on issues in scholarly publishing, including legal, economic, design, technological, and related topics. Directed research, discussion. Prerequisites: PUB 501; admission to scholarly publishing certificate program.

PUB 584 Scholarly Publishing Internship. (1–6)*once a year*

Structured, supervised, practical experience with a scholarly publisher or other appropriate publishing enterprise. Internship. Prerequisites: PUB 501; 9 hours in scholarly publishing core; instructor approval.

GRADUATE PROGRAMS AND COURSES

PUB 598 Special Topics in Scholarly Publishing. (1)

spring

One-week short courses covering special topics in scholarly publishing, to be taught by visiting publishing professionals. Lecture, discussion. Prerequisites: PUB 501; admission to scholarly publishing certificate program.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses.](#)" page 48.

Science and Engineering of Materials

Interdisciplinary Ph.D. Program

www.asu.edu/graduate/SEM

480/965-2460

PS A323

James B. Adams and William T. Petuskey, Codirectors

Solid State Science

Regents' Professor: Smith

Professor: Carpenter

Senior Research Scientists: Crozier, McCartney, McKelvy

Associate Research Scientist: Sharma

Chemical and Materials Engineering

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux

Associate Professor: Alford

Chemistry and Biochemistry

Regents' Professor: Buseck

Professor: Petuskey

Associate Professor: Kouvetakis

Assistant Professor: Matyushov

Electrical Engineering

Regents' Professor: Ferry

Professors: Goodnick, Kozicki, Schroder, Thornton, Zhang

Mechanical and Aerospace Engineering

Professor: Sieradzki

Physics and Astronomy

Regents' Professor: Smith

Professors: Bennett, Ponce, Rez, Sankey, Tsong, Venables

Associate Professors: Culbertson, Drucker, Herbots, Marzke

The Committee on the Science and Engineering of Materials offers an interdisciplinary graduate program leading to the Ph.D. degree in Science and Engineering of Materials, with concentrations in high-resolution nanostructure analysis and solid-state device materials design. The members of the faculty comprising the program are from several academic research units in the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences: the Center for Solid State Science; the Departments of Chemical, and Materials Engineering; Chemistry and Bio-

chemistry; Electrical Engineering; Mechanical and Aerospace Engineering; Physics and Astronomy.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in the Science and Engineering of Materials is an interdisciplinary program of study that integrates courses offered by faculty representing various disciplines, along with courses in mathematics, to provide a sound foundation for research leading to a dissertation. Emphasis is placed upon applications of the core fundamentals for investigation of the relationships between microstructure and properties and performance of solids, and the dependence of microstructure on processing.

Admission. Admission to the SEM Program is a two-step process. First, all prospective students must satisfy the general admission requirements of the Graduate College. International students must submit a Test of English as a Foreign Language (TOEFL) score. The minimum TOEFL score required by the SEM Program is 600. Second, students must satisfy the requirements of the SEM Program. These requirements are: a GRE (verbal, quantitative, analytical), a professional résumé, a statement of purpose, and three letters of recommendation. International students who wish to be considered for teaching assistantships must provide the program with a Test of Spoken English (TSE) score. Application materials must be received by the SEM Program Office by the following established deadlines: for fall, documents must be received (postmarked) by February 1; for spring, by October 1.

Program of Study. The program consists of a minimum 84 semester hours beyond the bachelor's degree, at least 24 of which are research and dissertation credit. Programs of study for individual students are defined during discussions between the student and the faculty supervisory committee. At least 30 semester hours of the approved program of study, including the core, exclusive of research and dissertation, must be completed after admission to the Ph.D. at ASU.

A minimum of 10 graduate-level courses beyond the bachelor's degree is required.

The curriculum includes core courses that define the essential course work for all students, involving 21 semester hours of selected courses in materials, chemistry, and physics. Students who previously have taken courses fulfilling some of the core requirements may select electives.

Interdisciplinary Core Courses

CHM 471 Solid-State Chemistry	3
or CHM 453 Inorganic Chemistry (3)	
CHM 541 Advanced Thermodynamics	3
CHM 545 Quantum Chemistry I.....	3
or EEE 434 Quantum Mechanics for Engineers (3)	
or PHY 571 ST: Quantum Physics (3)	
PHY 498 PS: Materials Physics II.....	3
or PHY 598 ST: Materials Physics II (3)	
SEM 500 RM: Introduction to Physical Materials.....	3
SEM 591 Seminar	3

Students may choose one of the following concentrations in their program of study: (1) high-resolution nanostructure analysis and (2) solid-state device materials design, or may

tailor a program of study in the science and engineering of materials to meet their professional and academic needs. Students achieve the desired concentration by completing three or more of the courses in the appropriate concentration group of courses. The courses in these concentrations are a part of the elective portion of the degree course requirements.

High-Resolution Nanostructure Analysis. The courses comprising the high-resolution nanostructure analysis concentration are the most comprehensive education in the theory and application of transmission electron microscopy in the U.S. This group of courses is highly interdisciplinary. Because of the strict and important correspondence between the properties of materials and their nanostructure, transmission electron microscopy plays a central role in modern materials science, far beyond its role in other fields of natural science and engineering. Nanostructure analysis is fully one-third the field of materials research and is often the critical knowledge necessary to understand the behavior of materials. The development and applications of high-resolution nanostructure analysis methods is one of ASU's strongest materials research and education specialties and is an important part of the SEM program. Required courses are as follows:

SEM 556 Electron Microscopy Laboratory	3
SEM 557 Electron Microscopy Laboratory	3
SEM 558 Electron Microscopy I.....	3
SEM 559 Electron Microscopy II	3
Total	12

Solid-State Device Materials Design. The courses specified for the solid-state device materials design concentration are materials applications and characterization courses that introduce SEM students to the culture of device engineering. Students apply their knowledge of basic materials science to contemporary problems of the solid-state electronics industry. Required courses are as follows:

EEE 435 Microelectronics	3
EEE 436 Fundamentals of Solid-State Devices	3
EEE 536 Semiconductor Characterization.....	3
IEE 572 Design of Engineering Experiments	3
MSE 598 ST: Growth and Processing of Semiconductor Devices.....	3
Total	15

Foreign Language Requirements. None.

Comprehensive Examinations. Near completion of course work and no later than three years after admission to the program, the student is given a comprehensive examination with oral and written components. The written component is a test that examines the student's knowledge in the core course subjects.

The examination is administered by the Curriculum and Examination Committee. The oral component requires the presentation of a research proposition to the student's faculty supervisory committee. The student must define a research problem of current relevance to the materials sci-

ence field. The problem may be experimental, theoretical, or a combination of both. The presentation should be based on the study of literature and discussions with members of the supervisory committee and materials researchers. The student will define the problem, describe its significance in the field, propose a method of investigation leading to a solution of the problem, and defend the problem and proposed solution before the faculty supervisory committee. The proposed problem may be from any area of materials research but it may not be part of the student's dissertation topic. The student must prepare and deliver to the members of the supervisory committee the written proposal describing the research proposition not less than seven business days before the scheduled examination date. The comprehensive exams may be taken no more than twice upon formal application to, and under conditions specified by, the student's faculty committee, the director of the supervisory program, and the dean of the Graduate College. Upon successful completion of this examination, the student is advanced to candidacy for the degree by the Graduate College.

Dissertation Requirements. The dissertation, which is the final and most important product of the student's effort in this program, must report original research in the field and demonstrate the student's ability to conduct creative, independent research. Each candidate must register for 24 semester hours of research and dissertation as part of the degree requirements; specifically 12 semester hours of SEM 792 Research and 12 semester hours of SEM 799 Dissertation. Dissertation credits should be taken in the semester(s) following the student's advancement to candidacy.

After the student passes the comprehensive examinations, and every semester up to the time the student defends the dissertation, the student must submit a one-page report on the dissertation proposal to his or her dissertation committee at the end of the semester.

Final Examinations. The final oral examination in defense of the dissertation is conducted by the student's dissertation committee and others appointed by the dean of the Graduate College.

SCIENCE AND ENGINEERING OF MATERIALS (SEM)

SEM 500 Research Methods. (1-12)

selected semesters

SEM 556 Electron Microscopy Laboratory. (3)

fall

Lab support for SEM 558. Cross-listed as MSE 556. Credit is allowed for only MSE 556 or SEM 556. Pre- or corequisite: MSE 558 or SEM 558.

SEM 557 Electron Microscopy Laboratory. (3)

spring

Lab support for SEM 559. Cross-listed as MSE 557. Credit is allowed for only MSE 557 or SEM 557. Pre- or corequisite: MSE 559 or SEM 559.

SEM 558 Electron Microscopy I. (3)

fall

Microanalysis of the structure and composition of materials using images, diffraction, x rays, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as MSE 558. Credit is allowed for only MSE 558 or SEM 558. Prerequisite: instructor approval.

GRADUATE PROGRAMS AND COURSES

SEM 559 Electron Microscopy II. (3)

spring

Microanalysis of the structure and composition of materials using images, diffraction, x rays, and energy loss spectroscopy. Requires knowledge of elementary crystallography, reciprocal lattice, stereographic projections, and complex variables. Cross-listed as MSE 559. Credit is allowed for only MSE 559 or SEM 559. Prerequisite: instructor approval.

SEM 591 Seminar. (1)

fall and spring

Emphasizes discussion, student presentations, and written research papers.

SEM 592 Research. (1–12)

fall, spring, summer

SEM 594 Vacuum System Science and Engineering. (3)

spring

Vacuum concepts, equipment, and systems are studied to give an operational knowledge of modern vacuum technology. Equal emphasis is placed on theoretical and practical instruction. Class time is equally distributed between lecture and laboratory sessions. Lab sessions consist of exercises and tours to provide hands-on experience with and a working perspective of the vacuum techniques and systems principally used in industry, academia, and government laboratories. Undergraduates take two written exams; graduate students take two written exams and complete a vacuum system design project. Prerequisite: college algebra.

SEM 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Phase Transformations in Solids. (3)

SEM 599 Thesis. (1–12)

fall, spring, summer

SEM 700 Research Methods. (1–6)

selected semesters

SEM 790 Reading and Conference. (1–6)

selected semesters

Independent study in which a student meets regularly with a faculty member to discuss assignments (such as intensive reading in a specialized area, writing synthesis of literature on a specified topic, writing literature review of a topic).

SEM 791 Seminar. (1)

selected semesters

SEM 792 Research. (1–12)

fall, spring, summer

SEM 799 Dissertation. (1–12)

fall, spring, summer

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Secondary Education

Master's Program

ASU West offers a Master of Education degree in Secondary Education. For information, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Social and Philosophical Foundations of Education

Master's Program

coe.asu.edu/elps

480/965-0131

ED 120M

Eric Margolis, Academic Program Coordinator

Regents' Professor: Berliner

Professors: Appleton, Barone, Glass, Smith, Webb, Wiley

Associate Professors: Hunicutt, Margolis

Assistant Professor: Moses

MASTER OF ARTS

The faculty in the Division of Educational Leadership and Policy Studies offer a graduate program leading to the M.A. degree in Social and Philosophical Foundations of Education. Students may also select policy analysis as an area of study. The program offers students a thorough grounding in historical, social, and philosophical literature. The program is geared toward students seeking relevant and advanced preparation for doctoral-level study in one of the fields of education. The program is also appropriate for educational practitioners seeking terminal master's degrees and advanced intellectual development that will make them more thoughtful teachers and better informed decision makers. Students study both classic and leading contemporary thought taken from educational, social, and philosophical literature. The program draws on intellectual sources and scholarly disciplines, including anthropology, curriculum theory, history, law, philosophy, sociology, and comparative international and multicultural perspectives.

Applicants for admission to the M.A. degree program must submit scores on the Graduate Record Examination. Candidates for the M.A. degree must pass a written comprehensive examination, in addition to writing a thesis or equivalent. An oral examination in defense of the thesis or equivalent is required.

RESEARCH ACTIVITY

Faculty are currently conducting research on hidden curricula in higher education, visual sociology and sociology of education, and the experience of Chicanos in higher education.

SOCIAL AND PHILOSOPHICAL FOUNDATIONS (SPF)

SPF 501 Culture and Schooling. (3)

fall and spring

Introduces social science concepts of culture and the cultural milieu in which schooling takes place in the United States. Lecture, recitation.

SPF 510 Introduction to Organization and Administration of American Public Schools. (3)*fall and spring*

Explores organizational structure and administration of public education through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as EDA 510. Credit is allowed for only EDA 510 or SPF 510.

SPF 511 School and Society. (3)*fall, spring, summer*

Interrelationship of school and society and the role of education in social change.

SPF 515 Gender and Education. (3)*spring*

Analyzes relationships of gender and education emphasizing analyses and critiques of traditional conception of knowledge, identity, and feminist theory. Seminar.

SPF 520 Cultural Diversity in Education. (3)*spring*

Philosophic and sociological investigation of cultural diversity in the United States and how it relates to education.

SPF 530 Sociology of Education. (3)*fall*

Current issues in the sociology of education: stratification, social mobility.

SPF 533 Comparative Education in the Western World. (3)*selected semesters*

Educational practices and traditions in the leading nations of Europe and the Soviet Union.

SPF 534 Foundations of Educational Inquiry. (3)*fall*

Overview of the nature of inquiry examining the philosophy of science and social science, approaches to knowing in the humanities. Seminar.

SPF 544 Philosophical Foundations of Education. (3)*fall*

Theories of education in ancient, medieval, and modern classical and contemporary philosophies.

SPF 566 History of Education. (3)*spring*

Development of educational institutions and ideas in the Western world, from ancient times to the 20th century.

SPF 603 Visual Ethnography in Education. (3)*fall*

Advanced qualitative methods class combining ethnography with the use of video and still photography in data gathering and presentation. Seminar. Corequisite: COE 503.

SPF 612 Evaluation Theory. (3)*fall*

Explores the major theories of evaluation (inquiry leading to value judgments) in educational policy through examination of cases.

SPF 622 Organizational Theory. (3)*spring*

Major views of organizations and their influence on role definition and participant behaviors in educational organization. Seminar, discussion. Cross-listed as HED 688. Credit is allowed for only HED 688 or SPF 622.

SPF 634 Foundations of Educational Inquiry. (3)*fall*

Overview of the nature of inquiry examining the philosophy of science and social science, approaches to knowing in the humanities. Seminar.

SPF 677 Foundations of Educational Reform Movements. (3)*fall*

Historical and contemporary survey of curricular reform movements in the United States with emphasis on equity and social justice issues. Cross-listed as EDA 677. Credit is allowed for only EDA 677 or SPF 677. Prerequisite: admission to doctoral program or instructor approval.

SPF 685 Global Education. (3-6)*spring*

Global perspectives on education in contemporary society with emphasis on social, political and economic factors that affect access and equity. Lecture, travel. Cross-listed as EDA 680. Credit is allowed

for only EDA 680 or SPF 680. Prerequisite: admission to doctoral program or instructor approval.

SPF 711 Social and Historical Foundations of Education. (3)*spring*

Explores the history of sociological thought, especially theories of the relations between educational systems and the social/cultural world.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Social Work

Master's and Doctoral Programs

ssw.asu.edu

480/965-3304

WHALL 135

Leslie Leighninger, Director, School of Social Work

Professors: Ashford, Coudroglou, Daley, Figueira-McDonough, Kettner, LeCroy, Leighninger, MacEachron, Moroney, Segal

Associate Professors: Brzuzy, Gerdes, Gustavsson, Marsiglia, Montero, Nichols, Paz, Risley-Curtiss, Steiner, Waller, Yellow Bird

Assistant Professors: Holley, Holschuh, Hurdle, Larson, Napoli, Okamoto, Stromwall

Academic Professionals: Rountree-Antar, Gonzalez-Santin, Knutson-Woods, Yeppez

The faculty in the School of Social Work offer programs leading to the Master of Social Work degree and the Ph.D. degree in Social Work.

MASTER OF SOCIAL WORK

The professional program leading to the Master of Social Work degree prepares social workers for advanced direct practice or planning, administration, and community practice. The program is designed to prepare social workers capable of responding effectively to the needs of special populations in the Southwest. The Master of Social Work degree program is accredited by the Council on Social Work Education.

Application Procedures. Students applying to the graduate program in Social Work must follow the procedures for admission to the Graduate College (see "[Admission to the Graduate College](#)," page 84). In addition the applicant must submit the following to

ACADEMIC SERVICES
SCHOOL OF SOCIAL WORK
ARIZONA STATE UNIVERSITY
PO BOX 871802
TEMPE AZ 85287-1802

GRADUATE PROGRAMS AND COURSES

1. application to the graduate Social Work program;
2. statement of educational and career goals in sufficient detail to indicate compatibility with the educational objectives and capabilities of the School of Social Work;
3. three letters of reference using the reference letter forms provided by the School of Social Work;
4. test scores from either the GRE or the MAT; and
5. professional résumé that includes volunteer and paid work experience.

Admission

Applications to the M.S.W. program are accepted from November 1 to March 1 preceding the fall semester to which the applicant is seeking admission, with priority given to completed applications received on or before February 1. Applicants who are admitted to the M.S.W. program begin classes in the fall.

Regular Admission. The school also requires one of the following:

1. a liberal arts undergraduate degree;
2. a B.S.W. from a Council on Social Work Education accredited school of social work; or
3. another undergraduate degree, with 30 semester hours in liberal arts courses at the undergraduate or graduate level.

The 30 semester hours described in item three above must include course work from the social/behavioral sciences, natural sciences, and humanities. The distribution should approximate the current curriculum for the B.S.W. program: 18 hours in social and behavioral sciences, six hours in natural sciences with at least one course in human biology, and six hours in humanities.

All students are required to successfully complete a course in human biology before enrollment in the graduate program. Additionally, all students must have successfully completed a course in statistics before admission. If the statistics requirement has not been met, then an equivalent course must either be successfully completed by December 31 or before registering for SWG 519.

Provisional Admission. Applicants with lower test scores or grades below minimum levels may be considered for provisional admission if there is counterbalancing evidence suggesting the potential of outstanding performance in the M.S.W. program. Normally, final determination of removal of provisional status is made by the time the student has completed 12 hours of approved graduate study. The provisional student does not begin field work until this status has been changed. However, the student carries the same academic load as a regularly admitted student and is expected to meet the same standards for continuation in the program.

Program of Study. The standard program consists of 60 hours including both classroom instruction and field practicum. It is divided into a foundation year (core curriculum) and a concentration year. During both years, students spend two days a week in a practicum setting. The foundation curriculum is the same for all students and must be completed

before entering the concentration year. The following are the required foundation courses:

SWG 501 Human Behavior in the Social Environment I.....	3
SWG 502 Human Behavior in the Social Environment II.....	3
SWG 510 Foundation Practice I.....	3
SWG 511 Foundation Practice II.....	3
SWG 519 Research Methods in Social Work.....	3
SWG 531 Social Policy and Services I.....	3
SWG 533 Diversity and Oppression in Social Work Context.....	3
SWG 541 Field Practicum I.....	3
SWG 542 Field Practicum II.....	3
SWG 580 Community and Organizational Change.....	3

In the second year, students pursue a concentration in either (1) advanced direct practice or (2) planning, administration, and community practice. Six to twelve hours of electives are required for students either to take additional course work in their concentration or to increase knowledge and skill in such areas as health and mental health, family and child welfare, or aging.

The following are required concentration courses:

Advanced Direct Practice (ADP)

SWG 606 Assessment of Mental Disorders.....	3
SWG 611 Social Work with Families.....	3
SWG 619 Practice-Oriented Research.....	3
SWG 621 Integrative Seminar.....	3
SWG 632 Social Policy and Services II.....	3
SWG 641 Advanced Practicum: Direct Practice I.....	3
SWG 642 Advanced Practicum: Direct Practice II.....	3
One of the following five approved advanced courses.....	3
SWG 613 Social Work with Individuals (3)	
SWG 614 Social Work with Families in Transition (3)	
SWG 616 Social Work with Chemically Dependent Families (3)	
SWG 617 Social Work Practice with Children and Adolescents (3)	
SWG 618 Domestic Violence (3)	
Electives.....	6
Total.....	30

Planning, Administration, and Community Practice (PAC)

SWG 623 Agency and Community-Based Research in Social Work.....	3
SWG 632 Social Policy and Services II.....	3
SWG 643 Advanced Practicum: Planning, Social Work Administration, and Community Practice I.....	3
SWG 644 Advanced Practicum: Planning, Social Work Administration, and Community Practice II.....	3
SWG 680 Program Planning in Social Services.....	3
One of the following advanced courses.....	3
SWG 681 Social Work Administration (3)	
SWG 682 Community Participation Strategies (3)	
Electives.....	12
Total.....	30

Electives may be selected from offerings at the School of Social Work or courses offered through other departments with the approval of the M.S.W. program coordinator. The total semester hours for each concentration equals 30.

Transfer Credit. Upon recommendation of the admissions committee, the first year of graduate study (up to 30 graduate semester hours) earned at another CSWE accredited school of social work may be transferred and applied toward

the M.S.W. degree at ASU. Under these circumstances, the student must complete the second full year of graduate study (at least 30 semester hours of graduate work) at ASU, resulting in a 60-hour program composed of the work from both schools. A full report from the school at which the intended transfer credit was obtained is required.

In other cases, with the approval of the M.S.W. program coordinator, up to six semester hours of graduate work completed at another university may be transferred as elective credit.

Consideration for acceptance of prior graduate credits must be applied for at the time of admission. The grades of all transfer credit must be a “B” or higher.

Nondegree Course Work. A maximum of nine graduate semester hours earned as a nondegree student in the ASU School of Social Work or six semester hours earned at another graduate degree program at ASU may be applied toward the program of study. A combination of credit earned as a nondegree student—at ASU or transferred from another university—may not exceed nine hours and of those nine hours, no more than six hours may be electives.

Course work toward a master’s degree must be completed within six consecutive years. The six-year period begins with the first course included on the student’s approved program of study.

Consideration for acceptance of nondegree work must be applied for at the time of admission.

Exemptions and Waiver Examinations. The number of hours required to complete the M.S.W. degree ranges from 36 to 60 semester hours, with 60 hours representing the standard program. In addition to transferring credit (see policy on transfer credit), admitted students may meet requirements of up to 24 hours of credit towards the degree by (1) exempting up to fifteen hours of foundation course work without examination or (2) successfully completing examinations in any of the foundation courses except field practicum.

Exemptions. Only students from B.S.W. programs accredited by the Council on Social Work Education can be considered for exemptions. In order to be eligible for an exemption from any course, students must have received their B.S.W. degree no more than five years prior to the date of admission or must demonstrate current continuing education credits. Admitted B.S.W. students from ASU are exempted from the courses listed below without examination if they meet the stated GPA requirements. B.S.W. students from other accredited programs may also be exempted from the same courses, but must submit their course content material (course description, syllabus, and outline) for review by the M.S.W. program coordinator for an equivalency review to determine exemption. B.S.W. students may be exempted from the following courses:

1. SWG 501, if the student has an “A” in SWU 301 or an equivalent social work course;
2. SWG 502, if the student has an “A” in SWU 340 or an equivalent social work course;
3. SWG 519, if the student has an “A” in SWU 320 or an equivalent social work course;

4. SWG 531, if the student has an “A” in SWU 271 and 432 or equivalent social work courses;
5. SWG 533, if the student has an “A” in SWU 374 or an equivalent social work course.

Waiver Examinations. Students who believe they have successfully completed equivalent undergraduate courses or have related work experience covering content taught in these courses can take a written waiver examination for the following courses:

SWG 501 Human Behavior in the Social Environment I.....	3
SWG 502 Human Behavior in the Social Environment II.....	3
SWG 510 Foundation Practice I.....	3
SWG 511 Foundation Practice II*.....	3
SWG 519 Research Methods in Social Work.....	3
SWG 531 Social Policy and Services I.....	3
SWG 533 Diversity and Oppression in a Social Work Context.....	3
SWG 580 Community and Organizational Change.....	3

* Only students who successfully pass the waiver exam for SWG 510 Foundation Practice I are allowed to take the waiver exam for SWG 511 Foundation Practice II.

Comprehensive Examinations. ASU requires a comprehensive examination or thesis for graduation in all professional master’s programs. All Social Work students must pass a comprehensive examination, administered by the school, or complete a thesis before graduation.

Academic Standing and Curriculum Sequencing. In order to remain in good academic standing, the student must maintain an overall GPA of 3.00 at the end of each semester. Most courses in the program are sequential; successful completion of the prior course in the sequence is required to enroll in the following course. Students may not enroll in any second-year required courses until all foundation courses, including the foundation field (SWG 541 and 542), have been successfully completed.

Tucson Component. The School of Social Work offers the full foundation year (30 semester hours of credit) and some concentration-year course work in Tucson. Students may be required to commute to Tempe during both semesters of their concentration year. Courses are scheduled, however, so that a minimum of travel time is required of students. For information about or application to the Tucson component, call 520/884-5507.

Part-Time Program. A limited number of students are admitted each year to a planned part-time program. Students interested in this option must specifically apply to the part-time program.

Financial Assistance. Recent federal reductions in support of human services and educational programs have severely limited the resources available for stipends. Therefore, it is important that applicants have a sound financial plan to cover expenses for the duration of the degree program.

Financial assistance information is available from Student Financial Assistance Office, Student Services Building, second floor, 480/965-3355.

GRADUATE PROGRAMS AND COURSES

DOCTOR OF PHILOSOPHY

The program seeks to prepare future social work scholars who are involved in the development and application of theories in social work practice, and who plan to enhance social work knowledge through the classroom and field settings.

The program introduces students to the range of roles and responsibilities of faculty leadership, to the challenging expectations of critical thinking and creativity in research and teaching, and to the multiple ways of integrating research, teaching, and service in the social work profession.

The Social Work faculty advocate for and support the human potential in the distinct experiences and perspectives of the Southwest region. The cultural and economic diversity of the Southwest makes it possible for faculty and students to engage in many issues in their community-based research and practice.

Admission. Applicants must hold an M.S.W. degree from an accredited school of social work, preferably have a minimum of two years of post-M.S.W. professional social work paid employment, and apply to both the ASU Graduate College and the School of Social Work.

Admission to the Ph.D. program requires completion of all admission requirements and procedures set forth by the Graduate College and test scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical). Applications are accepted up to March 1 preceding the fall semester to which the applicant is seeking admission, with priority given to completed applications received on or before February 1.

Application Procedure. The following items should be submitted to

ADMISSIONS OFFICE
GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
PO BOX 871003
TEMPE AZ 85287-1003

1. the application for admission to the Graduate College;
2. one official transcript from each institution the applicant has attended previously; and
3. test scores from the GRE.

The following items should be submitted to

ACADEMIC SERVICES
SCHOOL OF SOCIAL WORK
ARIZONA STATE UNIVERSITY
PO BOX 871802
TEMPE AZ 85287-1802

1. application to the Ph.D. program in Social Work;
2. writing sample—Social Problem Essay;
3. examples of written work (students may submit samples of their professional and/or academic writing);

4. three letters of reference that must use the reference letter form provided by the School of Social Work; and
5. curriculum vitae or résumé.

Program of Study. Students must demonstrate scholarly competencies in several broad areas identified during the mentoring and advising process. These areas must include: micro/macro theories and perspectives on critical issues in social work and social welfare (24 semester hours), quantitative/qualitative research methodologies (12 semester hours), and professoriate training and mentoring in research, teaching, and service. The program requires a minimum of 36 semester hours of course work beyond the M.S.W. degree and 84 semester hours beyond the baccalaureate degree. Because students must achieve competency requirements, they may need to take additional course work to achieve these competencies.

The program emphasizes enhancement of scholarship through:

1. applied social work research in diverse community settings and populations of the Southwest;
2. teaching, from syllabus development to classroom teaching across the professional continuum;
3. participation in collegial decision making; and
4. participation in field education and community services.

Students are expected to participate fully in research, teaching, and field liaison activities during their course of studies.

Advisement. The individualized plan for becoming a social work scholar and for learning associated faculty roles is developed by students and their faculty advisors over time.

Residency. The minimum residency requirement for the Ph.D. program is 18 semester hours in courses relating to the program of study, exclusive of dissertation. The residency must be completed in two consecutive semesters, not including summer sessions.

Foreign Language Requirements. None.

Qualifying Examination. Students are given a qualifying examination in the semester following the completion of the first 18 semester hours of approved Ph.D. course work. Students who fail the examination may retake it the following semester. Students failing the qualifying examination twice will be dropped from the program.

Comprehensive Examinations. Upon completion of course work and the qualifying examination, but before beginning dissertation research, students are given a written examination covering research, theory, and methods in their substantive area. If students should fail one or more components of the examination, a reexamination may be administered no sooner than three months and no later than one year from the date of the original examination. Approval of the reexamination must be obtained from the supervisory committee and the dean of the Graduate College.

Dissertation Requirements. Each candidate must register for a minimum of 24 semester hours of credit for research and dissertation. The final copy of the dissertation must be received by the supervisory committee and the dean of the Graduate College at least three weeks before the degree conferral date.

Final Examinations. The final oral examination in defense of the dissertation is scheduled and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination.

RESEARCH ACTIVITY

Drug Resistance Strategies (DRS) Project

This is a school-based substance abuse program funded by the National Institute on Drug Abuse (NIDA). Dr. Flavio Marsiglia is the principal investigator for the project. The program is uniquely designed to reflect students' cultural norms and values. Presented to 7th grade classes throughout the City of Phoenix, DRS is impacting 50 schools and 5,500 students. Latino, non-Latino, and mixed versions of the drug prevention curriculum have been developed. This innovation enables students to recognize themselves in the prevention message and provides solutions that are sensitive to their unique cultural environment. The objective of DRS is to prevent and reduce substance abuse by teaching valuable communication and life skills.

Understanding the Cultural Context: Working with American Indian Children and their Families

The School's Office of American Indian Projects is working to develop a competency-based training curriculum. The curriculum is intended to assist both state and tribal child welfare staff in developing the necessary cultural competence to work with American Indian families. This grant is a collaborative effort with the Inter Tribal Council of Arizona and Diné College, the only American Indian College in Arizona.

FACULTY SCHOLARSHIP

Faculty of the School of Social Work are actively engaged in a variety of research areas, with an emphasis on populations of the Southwest. The following are some recent faculty publications.

- Ashford, J.B., Sales, B.D., and Reid, W.H. (2001). *Political, Legal and Professional Challenges to Treating Offenders with Special Needs*.
- Ashford, J.B., Sales, B.D., and LeCroy, C.W. (2001). *Aftercare and Recidivism Prevention*.
- Ashford, J.B., Lecroy, C.W., and Lortie, K.L. (2001). *Human Behavior in the Social Environment: A Multidimensional Perspective* (second edition).
- Brzuzy, S., Stromwall, L., Sharp, P., Wilson, R., and Segal, E. A. (2000). *The Vulnerability of American Indian Women in the New Welfare State*.
- Daley, J.M. and Marsiglia, F.F. (2000). *Community Partnerships: Old Wine in New Bottles?*
- Gustavsson, N.S., and MacEachron, A.E. (2000). *Death and the Foster Child*.
- Gustavsson, N.S., and MacEachron, A.E. (2001). *Death and the Child Welfare Worker*.
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- Marsiglia, F.F., Kulus, S. and Hecht, M.L. (2001). *Ethnic Labels and Ethnic Identity as Predictors of Drug Use and Drug Exposure among Middle School Students in the Southwest*.
- Marsiglia, F.F., Holleran, L. and Jackson, K.M. (2000). *Assessing the Impact of Internal and External Resources on School-Based Substance Abuse Prevention*.
- Murphy, S., Risley-Curtiss, C., and Gerdes, K.E. (2002). *American Indian Women and Domestic Violence: The Lived Experience*.
- Patterson, S. and Marsiglia, F.F. (2000). *Mi Casa es Su Casa: A Beginning Exploration of Mexican-Americans' Natural Helping*.
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- Steiner, S., Brzuzy, S., Gerdes, K.E., and Hurdle, D. (2001). *Using Structured Controversy to Teach Diversity Content and Cultural Competence*.
- Vidal de Haymes, M., Kilty, K.M., and Segal, E.A. (Eds) (2000). *Inequalities, Challenges, and Barriers: Latino Communities in the New Century*.
- Waller, M. (2000). *Addressing Student Writing Problems: Applying Composition Theory to Social Work Education*.

GRADUATE PROGRAMS AND COURSES

SOCIAL WORK (GRADUATE PROGRAM) (SWG)

SWG 501 Human Behavior in the Social Environment I. (3)

fall

Analyzes theories of personality and life span development from methodological, ecological, and systems perspectives up to adolescence.

SWG 502 Human Behavior in the Social Environment II. (3)

spring

Life span development from middle childhood to maturity. Prerequisite: SWG 501.

SWG 510 Foundation Practice I. (3)

fall

Basic social work methods with emphasis on the problem-solving process as it pertains to individuals, families, and small groups. Prerequisite: Social Work major.

SWG 511 Foundation Practice II. (3)

spring

Theory and methods of direct practice with groups and selected practice models. Lecture, lab. Prerequisite: SWG 510.

SWG 517 Aging and Wellness. (3)

fall and spring

One-on-one service/experiential learning with seniors from the community. Lecture, lab. Cross-listed as GRN 540. Credit is allowed for only GRN 540 or SWG 517.

SWG 519 Research Methods in Social Work. (3)

spring

Conceptual foundations and methods of nomothetic research in social work. Includes problem identification, hypothesis formulation, measurement, sampling, and experimental design. Prerequisites: Social Work major; an approved course in statistics.

SWG 531 Social Policy and Services I. (3)

fall

Conceptual, analytical, and historical perspectives on the social welfare institution. Emphasizes poverty and inequality. Principles of policy analysis.

SWG 533 Diversity and Oppression in a Social Work Context. (3)

fall and spring

Explores issues of social inequality related to disability, ethnicity, gender, race, and sexual orientation. Emphasizes populations of the Southwest.

SWG 541 Field Practicum I. (3)

fall and spring

With SWG 542, two consecutive semesters (480 hours) of supervised social work practice in an approved placement. Pre- or corequisite: SWG 510.

SWG 542 Field Practicum II. (3)

fall and spring

See SWG 541. Pre- or corequisite: SWG 511.

SWG 580 Community and Organizational Change. (3)

fall and spring

Examines communities and human service organizations as social systems. Introduces strategies for initiating planned change.

SWG 605 Substance Abuse. (3)

selected semesters

Psychological and sociocultural determinants of substance abuse. Overview of social policies and treatment approaches.

SWG 606 Assessment of Mental Disorders. (3)

fall

Theories and concepts of mental health and illness. Attention to classification systems and nomenclature used in assessing mental disorders. Prerequisite: SWG 502.

SWG 611 Social Work with Families. (3)

fall

Theory, concepts, and skills for working with diverse family populations. Emphasizes a systems and integrative approach. Prerequisites: SWG 511, 542.

SWG 612 Social Work with Groups. (3)

selected semesters

Practices applications of knowledge and skill to social work with groups.

SWG 613 Social Work with Individuals. (3)

spring

Treatment of prevalent disorders encountered by social workers, selected from the following: anxiety disorders, personality disorders, depression, and schizophrenia. Lecture, seminar. Prerequisite: SWG 611.

SWG 614 Social Work with Families in Transition. (3)

spring

Analyzes the psychosocial dynamics of families disrupted by divorce, separation, or death of a parent. Offers differential social work interventions. Prerequisite: SWG 611.

SWG 616 Social Work with Chemically Dependent Families. (3)

spring

Examines dynamics of the chemically dependent family and presents clinical approaches for intervening in the family system and subsystems. Prerequisite: SWG 611.

SWG 617 Social Work Practice with Children and Adolescents. (3)

spring

Theory, research, and intervention that focus on children and adolescents. Prerequisite: SWG 611.

SWG 618 Domestic Violence. (3)

spring

Theory, research, intervention, and prevention strategies relevant to child maltreatment, partner abuse, and elder abuse. Prerequisite: SWG 611.

SWG 619 Practice-Oriented Research. (3)

fall

Accelerated course in application of scholarly and scientific principles to field practice, problem formulation, interventional procedures, and impact assessment. Prerequisite: SWG 519.

SWG 621 Integrative Seminar. (3)

spring

Explores the fit between theoretical frameworks and practice with clients. Requires presentation of empirical studies with clients. Prerequisite: SWG 611. Pre- or corequisite: SWG 641.

SWG 623 Agency and Community-Based Research in Social Work. (3)

spring

Research design techniques and data collection in human service agencies and communities. Analysis for program evaluation and needs assessment. Prerequisites: SWG 519, 541, 542. Corequisite: SWG 680.

SWG 632 Social Policy and Services II. (3)

spring

Develops advanced knowledge and skills in social welfare policy analysis, policy formulation, and advocacy and intervention for policy change. Prerequisite: SWG 531.

SWG 633 Child Welfare Services. (3)

fall

Examines, using ecological and system theories, services which supplement, support, and substitute for parental care of children. Prerequisite: SWG 542.

SWG 641 Advanced Practicum: Direct Practice I. (3)

fall and spring

With SWG 642, two consecutive semesters (480 hours) of supervised social work practice in an approved placement related to the student's career goal. Prerequisites: SWG 541, 542. Pre- or corequisite: SWG 611.

SWG 642 Advanced Practicum: Direct Practice II. (3)

fall and spring

See SWG 641. Prerequisites: SWG 541, 542, 611. Pre- or corequisite: SWG 613 or 614 or 616 or 617 or 618.

SWG 643 Advanced Practicum: Planning, Social Work Administration, and Community Practice I. (3)

fall and spring

With SWG 644, two consecutive semesters (480 hours) in social work practice in an approved placement related to the student's career goal. Prerequisites: SWG 541, 542. Pre- or corequisite: SWG 681 or 682.

SWG 644 Advanced Practicum: Planning, Social Work Administration, and Community Practice II. (3)

fall and spring

See SWG 643. Prerequisites: SWG 681 (or 682), 643. Pre- or corequisite: SWG 680.

SWG 680 Program Planning in Social Services. (3)

spring

Social services planning process; includes needs assessment, goals and objectives, program design, budgeting, management information systems, and program evaluation. Prerequisite: SWG 681 or 682. Corequisite: SWG 623.

SWG 681 Social Work Administration. (3)

fall

Administrative skill building and theory application within human service nonprofit social work settings. Prerequisites: SWG 542, 580.

SWG 682 Community Participation Strategies. (3)

fall

Reviews strategies to involve citizens and the consumers of social and human services in community decision-making systems. Participation is viewed as means to facilitate the empowerment of oppressed peoples. Prerequisites: SWG 542, 580.

SWG 683 Developing Grants and Fund Raising. (3)

selected semesters

Identification of potential funding sources, technical and interpersonal/political aspects of proposal development and fund raising.

SWG 720 Philosophy of Science Issues in Social Work. (3)

fall

Critical examination of social science, social work practice and policy in terms of philosophical assumptions and varying frames of reference.

SWG 721 Empirical Social Work Practice. (3)

spring

Applies scientific principles to problem formulation, assessment, and intervention procedures with emphasis on the direct use of scientific tools in the conduct and evaluation of practice at all levels.

SWG 730 Families Across the Life Span. (3)

fall

Policy and practice analysis of issues which affect families with a focus on the development of interventive strategies.

SWG 731 Social Welfare Policy Analysis and Development. (3)

fall

Methods of policy analysis, critique of social welfare policies against proposed models, and case studies of policy development emphasizing southwestern populations. Prerequisite: SWG 730.

SWG 732 Social Work Administration in a Systems Context. (3)

fall

Case studies of social work administration from initial conceptualization of policy through implementation at national, state, and local levels.

SWG 740 Community Research in Social Work. (3)

fall

Substantive, value, and methodological issues in community-based research as applied to social work topics.

SWG 741 Integrative Research Seminar. (3)

fall

Integrates theory, research methods, and statistics in community social work topics of specific interest to students.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Social Work

Master's Degree

ASU West also offers a Master of Social Work (M.S.W.) degree. For more information about the ASU West program,

see the *ASU West Catalog*, call 602/543-4679, or access www.west.asu.edu/chs/msw on the Web.

Sociology

Master's and Doctoral Programs

www.asu.edu/clas/sociology/graduate

480/965-3735

SS 321F

Verna M. Keith, Chair

Professors: Bolin, Cobas, Gordon, Hackett, Kronenfeld, Kulis, Laner, Nagasawa, Thomas, Weitz

Associate Professors: Benin, Blair, Harlan, Jacobson, Keith, Miller-Loessi, Sullivan

Assistant Professors: Agadjanian, Glick, Padilla

Senior Lecturer: Fine

Academic Professional: Wolf

The faculty in the Department of Sociology offer graduate programs leading to the M.A. and Ph.D. degrees in Sociology.

MASTER OF ARTS

This degree program provides advanced training for those preparing for teaching, research, or applied careers in sociology, and may be taken either as a terminal program or as a step toward eventual fulfillment of requirements for the Ph.D. A detailed description of the graduate program (including opportunities in teaching and research assistantships) may be obtained from the department chair.

Admission. Admission to the program is determined by the following criteria: Graduate Record Examination (GRE) scores (verbal, quantitative, and analytical), three letters of appraisal from persons familiar with the applicant's academic background, valid transcripts of the student's academic record, and a biographical narrative provided by the applicant. Application deadline is February 15.

Program of Study. A master's degree in Sociology requires the successful completion of a minimum of 30 semester hours, including a 12-hour core curriculum, six hours of theory (SOC 585 and 586), and six hours of research methods (SOC 500 and 505), two hours of Sociology as a Profession (SOC 503 and 504), with the balance to be drawn from substantive courses and six hours earned through the M.A. thesis (SOC 599).

Foreign Language Requirements. None.

Thesis Requirements. A thesis is required.

GRADUATE PROGRAMS AND COURSES

Final Examinations. A final oral examination in defense of the thesis is required. This oral examination also tests the student's comprehension of the area of sociology exemplified by the thesis.

DOCTOR OF PHILOSOPHY

This degree provides advanced training in theory, research methodology, and substantive fields to prepare sociologists for teaching and research with special emphasis on urbanism, urbanization, and related issues. A detailed description of this program (including opportunities in teaching and research assistantships) may be obtained from the department chair.

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Admission. Admission to the program is determined by the following criteria: GRE scores (verbal, quantitative, and analytical), three letters of appraisal from persons familiar with the applicant's academic background, valid transcripts of the student's academic record, and a biographical narrative provided by each applicant. Applicants should have an M.A. or its equivalent in Sociology or a related field. Application deadline is February 15.

Program of Study. The Ph.D. requires 54 semester hours beyond the master's degree. Three hours each of theory, methods, and statistics are required, and 24 hours are earned through dissertation and research. The remaining 21 hours are in substantive courses reflecting the student's specialization. First-year Ph.D. students are required to take Sociology as a Profession (503 and 504). A minimum of 30 semester hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

Foreign Language Requirements. None.

Comprehensive Examinations. Written comprehensive examinations focusing on two areas chosen by the student, and an oral defense of the dissertation proposal are required. After passing the comprehensive examinations and obtaining a formal approval of the dissertation proposal, the student is eligible to apply for candidacy.

Dissertation Requirements. A dissertation based on original work demonstrating creativity in research and scholarly proficiency in the subject area is required.

Final Examinations. A final oral examination in defense of the dissertation is required.

Research Facilities. Research facilities in the department consist of a survey research laboratory, small groups research laboratory, computer terminals and linkages to mainframe and the supercomputer, computational laboratory, and Gould Memorial Research Archive. The survey research laboratory conducts campus and community surveys. Among the topics studied are transportation, citizen attitudes, recreation, judicial evaluation, occupational destinies of graduate students, academic advisement, student, staff and faculty attitudes, student living arrangements,

changing sex roles, and student activism and political involvement.

SOCIOLOGY (SOC)

SOC 500 Research Methods. (1–12)

spring

SOC 501 Practicum in Survey Research. (3)

fall

Research practicum in survey field work, analysis, and reporting in the Phoenix Area Study. Prerequisite: SOC 391 (or its equivalent).

SOC 502 Practicum in Survey Research. (3)

spring

Continuation of SOC 501. Prerequisite: SOC 501.

SOC 503 Sociology as a Profession I. (1)

fall

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)

spring

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 Applied Regression Analysis. (3)

fall and spring

Multiple linear regression topics relevant to sociological data analysis. Computer applications. Prerequisites: SOC 390 (or its equivalent); proficiency examination.

SOC 507 Social Statistics IIA: Categorical Data Analysis. (3)

fall or spring

Logistic regression and related topics relevant to categorical data analysis in sociology. Computer applications. Prerequisite: SOC 505 or instructor approval.

SOC 508 Social Statistics IIB: Structural Equation Analysis. (3)

fall or spring

Structural equation models 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 IIC: Event History Analysis. (3)

fall or spring

Proportional hazards models and other methods for analyzing longitudinal data and establishing hazard rates of events for exploratory variables. Prerequisite: SOC 505 (or its equivalent).

SOC 515 Studies of the Family. (3)

spring

Current developments in the study of marriage and the family. Prerequisite: instructor approval.

SOC 585 Development of Sociology. (3)

fall

Major sociological theorists, including Durkheim, Weber, Marx, Parsons, Merton, Dahrendorf, Homans, and Mead. Prerequisite: instructor approval.

SOC 586 Contemporary Sociological Theory. (3)

spring

Analyzes major theories, including structural-functional, conflict, social exchange, symbolic interaction, and role theory. Prerequisite: instructor approval.

SOC 587 Contemporary Issues in Sociology. (3)

selected semesters

Philosophy of social science. Contemporary issues in sociological theory and methods. Prerequisite: instructor approval.

SOC 588 Methodological Issues in Sociology. (3)

fall

Basic methodological issues in the study of human social life. Emphasizes a limited number of key issues and approaches to research.

SOC 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Spanish

See [“Languages and Literatures,” page 245.](#)

Special Education

Master’s Programs

hal.asu.edu/cni

480/965-4602

ED 434

Professors: Rutherford, Swadener, Zucker

Associate Professors: Cohn, Di Gangi, McCoy, Nelson

Assistant Professor: Lamorey

The faculty in the Division of Curriculum and Instruction Special Education Program offer graduate programs leading to the M.A. and Master of Education degrees. M.Ed. degree concentrations are available in the education of gifted, mildly disabled, the multicultural exceptional, and severely/multiply disabled.

At the Ph.D. level, a concentration in special education is offered through the interdisciplinary Ph.D. degree program in Curriculum and Instruction. See [“Curriculum and Instruction,” page 171](#), for more information on the interdisciplinary Ph.D. in Curriculum and Instruction.

To be considered for admission, applicants must meet all Graduate College requirements. The applicant for master’s degree program admission is required to provide the following:

1. Graduate Record Examination test scores or Miller Analogies Test scores, or a 3.00 or higher junior/senior GPA;
2. three letters of recommendation;
3. a summary of professional experiences; and
4. evidence of certification in special education for applicants to the M.Ed. program. (The M.Ed. Initial Teacher Certification sequence must be pursued concurrently with the M.Ed. degree by applicants who do not meet this requirement.)

MASTER OF ARTS

The M.A. program in Special Education requires at least 36 hours of course work. A thesis is required for the M.A. degree. Candidates are required to take an oral examination in defense of the thesis. For students in the M.Ed. or M.A. program lacking prerequisite courses, additional course work is required.

MASTER OF EDUCATION

The M.Ed. degree in Special Education requires a minimum of 36 semester hours of course work and a written comprehensive examination paper. The program structure includes a 12-hour methods core, a 12-hour knowledge core, and a 12-hour elective block which includes four content/theme areas: learning and instruction, diversity, foundations and values, and research and technology.

M.Ed. initial teacher certification sequences leading to standard certificates by the State of Arizona in mental retardation; and learning and emotional disabilities, as well as an endorsement in gifted education, are available.

Concurrent admission to the M.Ed. initial certification sequence and the M.Ed. degree is required. Students seeking initial certification by the State of Arizona in special education who have already completed a master’s degree in another area may enroll for the M.Ed. initial certification sequence without enrolling in a second master’s degree program. Contact the Office of Student Services (480/965-5555) for more information about specific admission requirements for the initial certification option. Further information is available in the Curriculum and Instruction Graduate Advising/Referral Office (480/965-4602).

RESEARCH ACTIVITY

Current faculty research activities include family-centered early identification of children with learning disabilities and behavior disorders; partnerships in the medical home; bilingual/English as a second language/special education; Arizona behavior initiative creating school environments that support high academic standards for all students; a crossover model of leadership preparation in special education; six interdisciplinary options; and education, disability, and juvenile justice.

SPECIAL EDUCATION (SPE)

SPE 411 Parent Involvement and Regulatory Issues. (3)

fall and spring

Emphasizes parent and school relations through effective communication and state and federal regulations impacting services for the handicapped. Prerequisite: ITC admission.

SPE 455 Early Childhood and the Handicapped. (3)

fall

Early childhood education as it applies to the handicapped child.

SPE 510 Inclusionary Curriculum for Special Education Teachers. (3)

fall and summer

Curricular practices used in inclusion classrooms.

SPE 511 The Exceptional Child. (3)

fall, spring, summer

Educational needs of exceptional children and adults. Not recommended for students who have completed SPE 311.

SPE 512 Individuals with Mental Retardation. (3)

fall, spring, summer

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)

fall, spring, summer

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

GRADUATE PROGRAMS AND COURSES

SPE 515 Methods for the Remediation of Learning Problems of Exceptional Children. (3)

spring

Methods and materials for remediating the basic academic problems of exceptional children. Prerequisites: SPE 511; a methods course in teaching reading and mathematics.

SPE 522 Academic Assessment of Exceptional Children. (3)

fall

Normative and criterion-referenced assessment of learning problems in exceptional children. Includes formative evaluation. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511); elementary methods courses; program approval.

SPE 523 Prescriptive Teaching with Exceptional Children. (3)

fall

Language, reading, and arithmetic methods, techniques, and materials used in individualized instruction. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511); elementary methods courses; program approval. Pre- or corequisite: SPE 522.

SPE 524 Effective Classroom Behavior Management. (3)

spring

Organization and delivery of instruction including formative evaluation and techniques of academic behavior management for exceptional children. Requires practicum. Lecture, practicum. Prerequisites: SPE 311 (or 511), 522, 523; program approval.

SPE 525 Social Behavior Interventions. (3)

spring

Analysis and intervention into social behavior problems of exceptional students. Focuses on strategies to change maladaptive social behavior. Requires practicum. Prerequisites: SPE 311 (or 511 or 522 or 523); program approval.

SPE 531 Behavior Management Approaches with Exceptional Children. (3)

fall and summer

Behavior management approaches for classroom behavior of exceptional children. Prerequisite: SPE 511 (or its equivalent).

SPE 536 Characteristics of Children with Behavioral Disorders. (3)

fall, spring, summer

Variables contributing to behavior patterns of behaviorally disordered children.

SPE 551 Teaching Young Children with Special Needs. (3)

spring

Methods, materials, and curriculum for preschool and primary-aged children with special needs. Prerequisites: SPE 455 and 511 (or their equivalents).

SPE 552 Management of Individuals with Severe Handicaps. (3)

spring

Instruction and management of school-aged and adult individuals with severe, physical, or multiple handicaps. Prerequisites: SPE 511 (or its equivalent); instructor approval.

SPE 553 Developmental/Functional Assessment. (3)

fall

Teacher-focused developmental/functional assessment of preschool and severely, physically, and multiply handicapped individuals. Requires field experience. Prerequisites: SPE 511 and 512 and 574 (or their equivalents).

SPE 554 The Parent/School Partnership. (3)

spring

Includes knowledge and procedures for involvement and training of parents and caregivers of preschool and severely handicapped individuals. Requires field experience. Prerequisites: SPE 455 and 511 (or their equivalents).

SPE 561 Characteristics/Diagnosis of Learning Disabilities. (3)

fall, spring, summer

Theories related to learning disabilities, including identification and characteristics.

SPE 562 Methods of Teaching Students with Learning Disabilities. (3)

selected semesters

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)

fall

Design and statistical considerations of normative and criterion-referenced tests. Collection, recording, and analysis of data from formative evaluation. Prerequisites: SPE 511 (or its equivalent); a methods course in teaching reading and mathematics.

SPE 575 Current Issues in the Education of Exceptional Children. (3)

fall

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)

spring

Addresses successful mainstreaming methods, practical problem-solving sessions related to teacher's classroom needs, and individual contracts focusing on mainstreaming issues. General educators encouraged.

SPE 578 Student Teaching in Special Education. (3–15)

fall and spring

"Y" grade only. Fee. Prerequisites: completion of specified courses; approval by the special education program coordinator.

SPE 582 Classroom Research with Exceptional Children. (3)

summer

Introduces interpreting research. Specific research techniques with primary emphasis on classroom research, including applied behavior analysis.

SPE 585 Creativity: Research and Development. (3)

spring

Explores nature of creativity 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)

once a year

Focuses 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)

fall

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)

fall and summer

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)

spring and summer

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)

fall

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)

spring

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)

spring

Issues and problems in conducting research and/or evaluation programs involving exceptional children.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Special Education

Master's Degree

ASU West also offers a Master of Education (M.Ed.) degree in Special Education. For more information about the ASU West program, see the *ASU West Catalog*, call 602/543-4567, or access www.west.asu.edu on the Web.

Speech and Hearing Science

Interdisciplinary Doctoral Program

www.asu.edu/clas/shs

480/727-6153

CSB 183

Don Sinex, Director, Executive Committee

English

Professor: Adams

Associate Professor: Bates

Family and Human Development

Professor: Roosa

Psychology

Professors: Killeen, Somerville

Associate Professor: Goldinger

Assistant Professor: McBeath

Speech and Hearing Science

Professors: Bacon, Dorman, Ingram, Sinex, Wilcox

Associate Professor: Liss

Assistant Professors: Azuma, Gray

The committee on Speech and Hearing Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Speech and Hearing Science.

The program is designed to prepare scholars for careers of basic and applied research in educational, industrial, or health care delivery environments. The student pursues a program with the unifying theme of the influence of the neurologic system on human communication and its disorders. After a core curriculum, which may include aspects of neuroscience, methodology, or speech and hearing science, the student completes a program of study under the guidance of the program committee. As part of the interdisciplinary doctoral program, a programmatic research experience prepares the student for basic or applied research leading to the dissertation.

DOCTOR OF PHILOSOPHY

See "[Doctor of Philosophy](#)," page 96, for general requirements.

Admission Requirements. Admission to the program is competitive; therefore, applications are considered only for fall admission. Applicants typically have completed a master's degree or equivalent in speech and hearing sciences, psychology, linguistics, or a related discipline. Applicants with a bachelor's degree and a strong research background are also considered.

Applicants must submit the following materials for admission review:

1. application for admission to the Graduate College and official transcripts of undergraduate and graduate study;
2. verbal, quantitative, and analytical scores of the Graduate Record Examination (GRE);
3. professional résumé;
4. a statement describing academic and professional goals, specifying the focus of study desired in the Ph.D. program; and
5. three letters of recommendation.

All applicants whose native language is not English must submit a score from the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE). Expected minimum scores are 600 on the TOEFL and 230 on the TSE.

Application materials are reviewed beginning February 1. Applications are reviewed by a three-member interdisciplinary admissions committee. Recommendations for admission or denial are forwarded to the dean of the Graduate College. Criteria for admission include the following:

1. evidence of high scholarship and research potential from GRE scores and previous academic records;
2. professional goals compatible with the degree program; and
3. scholarly interests compatible with one or more of the faculty active in the interdisciplinary degree program.

Areas of Concentration. Eighteen semester hours are taken in an area of concentration that focuses on some aspect of human communication. The student's program committee guides selection of these courses.

Program Committee. The purpose of the program committee is to guide the student through the completion of the program of study, the initiation of programmatic research, and the comprehensive examination. The program committee consists of a chair and at least two other members appointed by the dean of the Graduate College upon recommendation of the director of the Committee on Speech and Hearing Science. The committee must consist of members from more than one academic discipline. Upon completion of the comprehensive examination, the student may initiate forming a dissertation committee.

Dissertation Committee. Upon completion of the comprehensive examination and based on the recommendation of

GRADUATE PROGRAMS AND COURSES

the director of the Committee on Speech and Hearing Science, the dean of the Graduate College appoints the student's dissertation committee consisting of a chair and at least two other members. The dissertation committee must consist of members from more than one academic discipline. This committee approves the design and implementation of the dissertation. Members of the program committee also may serve as members of the dissertation committee.

Preliminary Examination. The preliminary examination is composed minimally of the first-year research project. This project, to be completed by the end of the second semester of the first year, consists of an oral presentation and defense of the research, as well as a written manuscript. The program committee decides whether an optional written examination is necessary. The format of that examination is determined by the program committee and depends, in part, upon the background of the student. Results of the preliminary examination are used to determine shortcomings that should be offset by course electives, the level at which the student is capable of pursuing various topic areas, and whether deficiencies are of sufficient magnitude to preclude recommendation for continued doctoral study.

Research Methods and Statistics. The student is required to demonstrate proficiency in research methods (research design, statistics, computer languages). Evidence of required proficiency may be demonstrated by examination or by successful completion of a sequence of courses designated by the program committee.

Program of Study. The program consists of a minimum of 54 semester hours of graduate work beyond the master's degree or 84 semester hours of graduate work beyond the bachelor's degree. Of the required semester hours, at least 24 must be research (SHS 792) and dissertation (SHS 799) credit completed at ASU. A minimum of 30 hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

Comprehensive Examinations. Near the completion of course work and before commencing dissertation research, the student is given a written examination covering the field of study. The written examination, when passed, may be followed by an oral examination.

Programmatic Research. Twelve semester hours of programmatic research (SHS 792) are required before the dissertation prospectus meeting. The student must conduct several studies, each representing a facet of a research problem or a step toward a progressive solution. Each component study must be reviewed by the program committee and conducted in collaboration with a faculty member of the interdisciplinary degree program. This research program allows the doctoral student to use different methodologies in various component studies, to exercise progressively tighter experimental controls as determined by serial investigations, or to pursue significant or unexpected outcomes of a study.

This systematic or serial research program engages the student and faculty in an ongoing research activity, the components of which allow increasing discretion and independence of the student investigator. The program is

designed to prepare students for careers in basic or applied research and enhance the quality of the dissertation research.

Research and Dissertation Proposals. (1) Before conducting the programmatic research, the student is advised by the program committee on the appropriateness of the planned research. (2) Before conducting the research for the dissertation, each student must submit a dissertation proposal that is defended orally and approved by the dissertation committee.

Dissertation Requirements. The dissertation must consist of a fully documented written product of mature and original scholarship. It must be a significant contribution to knowledge that reflects the student's creativity and competence in independent research.

Final Examinations. A final oral examination in defense of the dissertation, conducted by the dissertation committee, is required.

COURSES

For courses, see "Speech and Hearing Science (SHS)," page 152.

Statistics

Interdisciplinary Master's and Certificate Programs

www.asu.edu/graduate/statistics

480/965-5439

BAC 565

Richard K. Burdick, Director, Executive Committee

Accountancy and Information Management

Professor: St. Louis

Economics

Professors: Burdick, Mayer

Associate Professors: Reiser, Wilson

Industrial Engineering

Professors: Hubele, Montgomery, Runger

Mathematics and Statistics

Professors: Lohr, Young

Associate Professors: Driscoll, Prewitt

Assistant Professor: Zuo

Supply Chain Management

Associate Professor: Brooks

The Committee on Statistics offers a program leading to a graduate Certificate in Statistics and the M.S. degree in Statistics. The program is interdisciplinary in the sense that it draws upon faculty research and teaching interests from a

number of academic units so that programs of study can be tailored to reflect individual needs and goals. The committee, which sets program requirements and supervises programs of study, is composed of faculty from several departments in the College of Business, the College of Engineering and Applied Sciences, and the College of Liberal Arts and Sciences.

Certificate in Statistics. This certificate provides statistical training to graduate students at ASU and professionals in the metro-Phoenix area. The certificate requires 15 semester hours of course work selected from approved courses offered in graduate programs at ASU.

To enroll in the certificate program, the applicant must have a bachelor's degree, an introductory applied statistics course, and one semester of calculus. The applicant is also required to have some computer literacy with knowledge of either a programming language, a spreadsheet program, or a statistical software program.

For more information, access the Web site at www.asu.edu/graduate/statistics.

MASTER OF SCIENCE

The program for the M.S. degree in Statistics provides preparation for either a research-oriented or a practice-oriented career. Requirements specific to this program (see [“Master’s Degrees,” page 93](#), for general requirements) ensure balanced attention to the theoretical and applied aspects of the discipline of statistics. Flexibility in the program reflects the fact that statistical analysis is one of the most widely used tools of modern scientific reasoning.

Admission. Applicants must satisfy the general requirements for admission to the Graduate College (see [“Admission to the Graduate College,” page 84](#)) and must, in addition, have three letters of academic recommendation submitted to the admissions subcommittee of the Committee on Statistics. Although most applicants earn the bachelor's degree in a quantitative area (such as statistics, quantitative business analysis, mathematics, engineering, or computer science), this is not required for admission to the program.

Applicants should have completed the following courses (equivalents at ASU are given in parentheses): calculus (MAT 270, 271, and 272), advanced calculus (MAT 371), linear algebra (MAT 342), computer programming (CSE 100), and introductory applied statistics (QBA 221 or STP 420). Applicants who lack more than two of these seven prerequisite courses should expect to be admitted with deficiencies or provisionally. The submission of the Graduate Management Admission Test or Graduate Record Examination test scores is strongly recommended, but not necessary.

Supervisory Committee. Upon entering the program, the student should contact the program director for assistance in selecting a three-member supervisory committee. (Typically, the student progress subcommittee of the Committee on Statistics serves as the student's initial supervisory committee.) The faculty member who directs the student's work on the thesis or applied project must be a member of the Committee on Statistics and serves as the chair of the student's final supervisory committee.

Program of Study. The student's program of study must contain at least 30 semester hours of credit, none of which may be from the prerequisites and at least 18 of which must be at or above the 500 level. The program must include the nine semester hours from three required theory courses: probability (STP 421), mathematical statistics (STP 427), and theory of statistical linear models (STP 526). The program must also include either three semester hours of applied project (IEE 593, QBA 593, or STP 593) or six semester hours of thesis (IEE 599, QBA 599, or STP 599).

The remaining 15 or 18 semester hours may come from elective courses chosen by the student with the approval of supervising faculty. A maximum of six semester hours may be chosen from a related field on which statistics relies (such as computer science) or in which statistics is an essential tool (e.g., biostatistics, quality control).

The required theory courses are fundamental to the education of statisticians and are necessary for more advanced graduate study. The elective courses allow the student to emphasize a particular area of statistical inference, culminating in an applied project report or a thesis on a topic in that area. The student has considerable flexibility in selecting an area of specialty. Possible areas of specialty include, among others, mathematical statistics, biostatistics, applied data analysis, design of experiments, statistical modeling, time series analysis, statistical process control, variance components analysis, statistical computing, and survey research. Sample programs of study for such areas of specialty may be obtained from the director of the program.

Foreign Language Requirements. None.

Comprehensive Examinations. None.

Thesis Requirements. Either an applied project or a thesis is required.

Final Examinations. An oral examination in defense of the applied project or thesis is required. The content of the applied project report or thesis must, in its final form, be suitable for submission to an academic journal or conference proceedings. The thesis must conform to Graduate College format requirements.

RESEARCH ACTIVITY

Research interests of current members of the Committee on Statistics include the following: nonparametric regression, variance components, generalized linear models; multivariate analysis, latent structure models, categorical data analysis; biostatistics, biomedical research; time series analysis and forecasting, econometrics, statistical process control, statistical decision support systems; statistical computing, statistical graphics; panel data analysis, complex sampling designs; decision-theoretic methods, risk assessment, robust statistical methods; design of experiments; process optimization; and response surface methodology. Students and faculty have access to excellent computing facilities, including servers, work stations, and personal computers running a broad selection of statistical software.

GRADUATE PROGRAMS AND COURSES

COURSES

For courses, see "Industrial Engineering (IEE)," page 238, "Quantitative Business Analysis (QBA)," page 138, and "Statistics and Probability (STP)," page 263.

Taxation

Master's Program

www.cob.asu.edu/acct

480/965-3631

BA 223

Philip M.J. Reckers, Director

Professors: J.R. Boatsman, Boyd, Christian, Goul, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: David, Golen, Gupta, Hwang, Iyer, Keim, Kulkarni, Moeckel, O'Dell, O'Leary, Regier, Whitecotton, Yen

Assistant Professors: Bhattacharya, Chen, Chenoweth, Comprix, Dowling, Lee, O'Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

Senior Lecturers: Goldman, Maccracken, Shrednick

Lecturers: J.L. Boatsman, Geiger, Hayes

MASTER OF TAXATION

The faculty in the School of Accountancy and Information Management offer specialized professional programs leading to the Master of Taxation, Master of Accountancy and Information Systems (see "[Accountancy and Information Systems](#)," page 98), and Master of Science in Information Management, (see "[Information Management](#)," page 240) degrees. The M.Tax. degree is a specialized program providing students with skills required to succeed in careers in public accounting (consulting), as well as corporate accounting.

The faculty also participate in offering the program leading to the Master of Business Administration degree (see "[Master of Business Administration](#)," page 131) and Ph.D. degree in Business Administration (see "[Doctor of Philosophy](#)," page 132).

For more information on faculty, programs, and courses, visit the school's Web site www.cob.asu.edu/acct.

Admission. All applicants are required to submit the supplemental application materials required from the school. Complete application packets and instructions may be obtained from the school's Web site.

Students applying to this program must submit scores from the Graduate Management Admission Test (GMAT). International applicants whose native language is not English must submit scores from the Test of English as a

Foreign language (TOEFL) and the Test of Spoken English (TSE) exams. Preference in admission is given to those with degrees in accounting and business, although other exceptional candidates are considered.

Prerequisites. Visit the School of Accountancy and Information Management's Web site for a current list of the program prerequisites.

Program of Study. The program of study consists of a minimum of 30 semester hours and is continually updated. The program of study must include a minimum of 15 semester hours of credit in graduate-level accounting courses and a minimum of 24 semester hours of resident credit in courses open exclusively to graduate students. A maximum of six hours may be taken outside the College of Business. Visit the school's Web site for a current program of study.

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examinations. A final comprehensive written examination is required of all candidates.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Management Web site at www.cob.asu.edu/acct.

COURSES

For courses, see "Accountancy (ACC)," page 99.

Teaching English as a Second Language

Master's Program

www.asu.edu/clas/english/linguistics

480/965-3188

LL 313

Roy C. Major, Director

Professors: Adams, Major, Nilsen

Associate Professors: Bates, van Gelderen

Assistant Professor: Johnson

The faculty in the Department of English offer a professional program leading to the Master of Teaching English as a Second Language degree (M.TESL). The M.TESL degree is a specialized program providing students with the knowl-

edge and the skills necessary to teach English as a second language.

Admission Requirements. All applicants must meet the general requirements for admission to the Graduate College (see [“Admission to the Graduate College,” page 84](#)). International students must submit a TOEFL score of at least 600.

Program of Study. The program requires a minimum of 30 hours of approved graduate course work and must include LIN 500 Research Methods, LIN 510 English Linguistics, LIN 572 Theories Underlying the Acquisition of English as a Second Language, LIN 574 The Teaching of English as a Second Language, and a three-hour applied project (LIN 593) overseen by the supervisory committee.

Foreign Language Requirements. A foreign language is required. International students whose native language is not English may fulfill the foreign language requirement by (1) providing evidence that English is not the medium of instruction at their native-language universities and (2) satisfactory completion of the TSE.

Applied Project. A three-hour applied project (LIN 593) which is overseen by the director, chosen from the English department linguistics/TESL faculty, is required. Two additional faculty members serve with the director to form a committee for the final oral examination on the project.

Final Examinations. An oral examination on the applied project is required.

COURSES

For courses, see *“Linguistics (LIN),” page 202*.



The ASU Art Museum in the Nelson Fine Arts Center

Tim Trumble photo

Technology

Master's Programs

Department of Aeronautical Management Technology

eastair.east.asu.edu

480/727-1998

SIM 205

Department of Electronics and Computer Engineering Technology

480/727-1137

TECH 101

Department of Information and Management Technology

480/727-1781

TECH 102

Department of Manufacturing and Aeronautical Engineering Technology

www.east.asu.edu/ctas/maet

480/727-1185

SIM 425

William K. McCurry, Chair,

Department of Aeronautical Management Technology

Professor: Gesell

Associate Professors: Jackson, Karp, McCurry, Turney

Assistant Professor: Pearson

Lecturer: O'Brien

Timothy E. Lindquist, Chair,

Department of Electronics and Computer Engineering Technology

Professors: Lindquist, McHenry, Munukutla

Associate Professors: Macia, Sundararajan, Zeng

Assistant Professor: Peterson

Thomas Schildgen, Chair,

Department of Information and Management Technology

Professors: Duff, Hild, Sadowski, Schildgen

Associate Professors: Grossman, Hirata, Humble, Matson, Olson

Senior Lecturer: Wilson

Lecturer: Dolin

Scott G. Danielson, Chair,

Department of Manufacturing and Aeronautical Engineering Technology

Professor: Collins

Associate Professors: Danielson, Palmgren, Rajadas

Rogers, Schmidt

GRADUATE PROGRAMS AND COURSES

The Master of Science in Technology (M.S.Tech.) degree program is offered by the faculty in four departments of the College of Technology and Applied Sciences: Aeronautical Management Technology, Electronics and Computer Engineering Technology, Information and Management Technology, and Manufacturing and Aeronautical Engineering Technology. Courses are offered at ASU East. Both a thesis and applied project option are available.

The professional programs leading to the M.S.Tech. degree are intended as preparation for a career in a selected branch of technology or as the foundation for further advanced study. Graduates of this program are provided with technical and professional skills for use in leadership positions in industry and education.

Faculty members administering the program have been selected because of relevant backgrounds in industry and business along with their academic training and teaching experience.

Admission. Admission to the degree program requires the completion of all general admission requirements and procedures set forth by the Graduate College. The College of Technology and Applied Sciences also requires an appropriate baccalaureate degree from an accredited college or university, with a minimum of 30 semester hours in technology or equivalent and 16 hours of physical science and mathematics appropriate to the program pursued. The specific requirements vary within each department.

Graduate work presupposes an adequate technical preparation in a selected technology at the undergraduate level. Deficiencies for admission to the graduate program, if any, are specified at the time of admission. The applicant's past work and professional experience is also evaluated and taken into consideration when determining admission classification.

To be considered for regular admission, a 3.00 GPA is required.

Program of Study. The program of study is designed to promote greater depth of understanding and preparation in technology as it can be applied to industry and education. The program of study is planned in consultation with an appointed supervisory committee. It is designed for flexibility, permitting the student to select a combination of courses in a technological area and a supporting area to meet individual career goals.

A minimum of 33 semester hours is required for the degree program. Of these, a minimum of 15 semester hours must be 500-level courses and part of the approved program. Specific credit requirements vary within each department. The minimum requirements are as follows:

Thesis Option

Technical area of emphasis	18
Supporting area	6
Research course	3
Research	6
Total	33

Applied Project Option

Technical area of emphasis	18
Supporting area	9
Research course	3

Research	3
Total	33

A maximum of nine semester hours of appropriate course work completed before admission may be included in the program of study for the degree program.

A master's degree candidate forms a supervisory committee, the chair of which is from one of the four technology departments within the College of Technology and Applied Sciences. The chair and the committee members assist the student in selecting appropriate courses to meet the degree requirements and the student's goals. Specific program patterns are approved by the committee.

The Department of Aeronautical Management Technology provides students the opportunity to select courses, to be included in the technical area of their program of study, in aviation management technology and aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology, and instrumentation and measurement technology.

The Department of Information and Management Technology provides students the opportunity to study environmental technology management, fire service administration, information technology, and management of technology.

The Department of Manufacturing and Aeronautical Engineering Technology offers concentrations in aeronautical engineering technology, manufacturing engineering technology, and mechanical engineering technology.

The College of Technology and Applied Sciences offers two concentrations: global technology and development (GTD) and security engineering technology (SET). The GTD concentration gives students a comprehensive understanding of technological systems, how they interface with society, and their role in global development and change. The GTD concentration integrates the study of economic, social, and political development with technology course work to explore issues critical to 21st-century globalization and the role and impact of technological innovations on societies around the world. Students completing the GTD concentration will gain the knowledge and skills to become "technology interpreters" for careers in technology-related public policy, government service, international development, and international management.

The GTD concentration consists of two seminars: global technology and development and technology and the international political system. It also includes one core course in each of the four GTD technology content areas: telecommunications, transportation, commerce, and sustainable development. Students may select elective courses from a wide range of topics in social science and/or technology to create their own individualized specialization. An emphasis is placed on the acquisition of solid research skills with a required sequence in applied research methodologies and tools. A minimum of 33 semester hours is required (24 of which must be at the 500 level or above), including an applied project or thesis. The exact program of study, including elective courses leading to an area of specializa-

tion, and the applied project or thesis, is planned in consultation with a faculty advisor from the GTD faculty committee.

Final Examination. A final oral examination in defense of the applied project or thesis is required.

GLOBAL TECHNOLOGY AND DEVELOPMENT (GTD)

GTD 501 Global Technology and Development I. (1)

fall and spring

Major theories of economic, political, and social development, with particular emphasis on the impact of current technologies and globalization. Seminar. Prerequisite: admission to M.S. in Technology degree with a concentration in global technology and development or instructor approval.

GTD 502 Global Technology and Development II. (1)

fall and spring

Continued study of theories of development, emphasizing role of technology in historical perspective. Seminar. Prerequisite: GTD 501.

GTD 503 Technology and the International Political System I. (1)

fall and spring

Historical development of international political system, with emphasis on role of technology. Seminar. Prerequisite: GTD 502 or instructor approval.

GTD 504 Technology and the International Political System II. (1)

fall and spring

Continuing themes of GTD 503, exploring current impact of technology on international system and future trends. Seminar. Prerequisite: GTD 503.

GTD 505 Quantitative Methods in Technology and Development. (2)

fall and spring

Emphasizes techniques of primary data collection, effective uses of secondary sources, for qualitative and quantitative applications. Prerequisite: admission to M.S. in Technology degree with a concentration in global technology and development or instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

SECURITY ENGINEERING TECHNOLOGY (SET)

SET 540 Explosives Surety. (3)

fall

Physical and chemical nature of explosives; detonation models; initiating systems; commercial, military, and improvised explosives; investigations; and counter measures. Lecture, lab. Prerequisite: graduate standing.

SET 560 Physical Security I. (3)

spring

Systems engineering principles and concepts to guide the design, analysis, and implementation of protection systems. Lecture, lab. Prerequisite: graduate standing.

SET 561 Physical Security II. (3)

fall

Scientific theory behind analysis of physical protection systems. Includes probability and statistics, data collection techniques, algorithm processing. Lecture, lab. Prerequisite: SET 560.

SET 570 Security System Instrumentation. (3)

fall

Operating principles, limitations, and test procedures of security instrumentation and sensors. Lecture, lab. Prerequisite: SET 560.

SET 592 Research. (1–12)

selected semesters

SET 598 Special Topics. (1–4)

selected semesters

SET 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

Department of Aeronautical Management Technology

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants having deficiencies or not meeting the prerequisites may be required to complete them before being admitted to the M.S.Tech. degree program.

Program of Study. All candidates for the degree program are required to complete a minimum of 33 semester hours of approved courses. Additional courses may be assigned by the supervisory committee depending on the background of the candidate.

An applied project or thesis is required. Upon completion of the approved course of study or during the last semester, an oral defense of the applied project or thesis is required.

The program is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

Students may take courses in two areas of interest: aviation management and aviation human factors. Students will work with a faculty advisor to define specific courses that satisfy degree requirements.

Final Examinations. A final oral examination in defense of the applied or research project is required.

RESEARCH ACTIVITY

The Department of Aeronautical Management Technology has established a broad research agenda including both technical and management disciplines. Current research initiatives include: aviation education and training; human factors in aviation; aviation physiology; hypobarics; hyperbarics; retention of women in aviation; air traffic control enhancement; runway incursion analyses; human factors in aviation maintenance; and the development of broad-based industrial partnerships through teaming arrangements, internships, and capstone course participation.

AERONAUTICAL MANAGEMENT TECHNOLOGY (AMT)

AMT Note 1. Flight instruction costs are not included in university tuition and fees.

AMT 400 Flight Safety IV. (1)

fall, spring, summer

Multiengine and crew training and safety briefings. Requires continuous enrollment until completion of rating and multicrew training. Lecture, lab. Fee. See AMT Note 1. Prerequisite: AMT 300. Pre- or corequisite: AMT 387.

AMT 408 National Aviation Policy. (3)

fall

Examines aviation and airspace policies and policy process, including agencies involved in formulation, implementation, and evaluation of aviation policy. Prerequisite: junior standing.

GRADUATE PROGRAMS AND COURSES

AMT 409 Nondestructive Testing and Quality Assurance. (1)

selected semesters

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. Credit is allowed for only AET 409 or AMT 409. See AMT Note 1. Prerequisite: AMT 280 or MET 230.

AMT 410 Aviation Safety and Human Factors. (3)

fall

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 General Studies L requirement.

AMT 442 Aviation Law/Regulations. (3)

fall

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)

spring

Orientation to administration and management of modern public airports, including overview of planning, funding, and development of airport facilities. Prerequisite: junior standing.

AMT 482 Airline Instrument Procedures. (3)

fall

Advanced instrument flight using airline instrument procedures and airline crew and cockpit resource management. Lecture, lab. Prerequisites: a combination of AMT 200 and 322 and 382 or only instructor approval.

AMT 484 Aeronautical Internship. (1–12)

fall, spring, summer

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)

spring

Administrative organizations, economics of airline administration, operational structure, and relationship with federal government agencies. Prerequisite: junior standing.

AMT 491 Aviation Management Capstone. (3)

spring

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)

spring

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)

selected semesters

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 its equivalent).

AMT 523 Aviation Systems Management. (3)

selected semesters

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 its equivalent).

AMT 525 Airport Planning and Design. (3)

selected semesters

Completion of various phases of airport master planning process. Provides guidance for logical and timely development of airports. Project work groups assigned. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 527 Airline Management Strategies. (3)

selected semesters

Since deregulation, airlines have undergone profound changes through mergers, consolidation, and acquisition. In-depth look at air-

line management strategies for the 21st century. Prerequisite: AMT 444 or 489 (or its equivalent).

AMT 528 International Aviation. (3)

selected semesters

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 its equivalent).

AMT 529 Fixed-Base Operations Management. (3)

selected semesters

Examines 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 its equivalent).

AMT 541 Aviation Physiology. (3)

selected semesters

Surveys human physiology and human performance principles related to modern aircraft and aircraft systems operating in multiple environments. Prerequisite: AMT 410 (or its equivalent).

AMT 543 Ergonomics in High-Technology Environments. (3)

selected semesters

Examines ergonomic design principles regarding man-machine interface requirements of high-technology workstations. Emphasizes computer workstation design issues. Prerequisite: AMT 410 (or its equivalent).

AMT 545 Human Factors in Aviation. (3)

selected semesters

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 its equivalent).

AMT 546 Crew Resource Management/Line-Oriented Flight Training. (3)

selected semesters

Evaluates in-depth, multicrew coordination issues for commercial aviation pilots. Stresses importance of critical thinking, decision making, integrated resource utilization. Prerequisite: AMT 410 (or its equivalent).

AMT 547 Modern Human Factors Design Issues. (3)

selected semesters

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 its equivalent).

AMT 549 Human Factors Research. (3)

selected semesters

Aviation human factors research principles applied and tested in operational settings. Group projects assigned in conjunction with industry partners. Prerequisite: AMT 410 (or its equivalent).

AMT 580 Practicum. (1–12)

selected semesters

AMT 584 Internship. (1–12)

selected semesters

AMT 590 Reading and Conference. (1–12)

selected semesters

AMT 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Transportation Systems Pro-Seminar

AMT 592 Research. (1–12)

selected semesters

AMT 593 Applied Project. (1–12)

selected semesters

AMT 595 Continuing Registration. (1)

selected semesters

AMT 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Airport Systems

AMT 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Department of Electronics and Computer Engineering Technology

The faculty in the Department of Electronics and Computer Engineering Technology offer a graduate program leading to the M.S.Tech. Four concentrations are available: computer systems engineering technology, electronics systems engineering technology, instrumentation and measurement technology, and microelectronics engineering technology. The instrumentation and measurement technology concentration is offered in conjunction with the Department of Manufacturing and Aeronautical Engineering Technology.

Admission and Proficiency Requirements. For general admission requirements, see [“Admission to the Graduate College,” page 84](#), and [“Technology,” page 329](#). Admission and proficiency requirements and course work may be obtained from the department or from the department Web site at www.east.asu.edu/ctas/ecet.

Program of Study. The minimum requirements for the M.S.Tech. degree offered by the Department of Electronics and Computer Engineering Technology are as follows:

Thesis Option	
Concentration.....	15–17
Supporting area.....	7–9
Research Methods Courses	
EET 500 Research/Writing.....	2
EET 591 Graduate Seminar.....	1
EET 592 Research.....	3
EET 599 Thesis.....	3
Total minimum semester hours.....	33

A minimum of 20 semester hours must be 500-level courses. At least nine hours of 500-level course work must be included in the concentration. Students may take up to 12 semester hours of 400-level course work to broaden their technical knowledge within the technical concentration or the supporting area. Students are required to complete EET 592 (three semester hours) and EET 599 (three semester hours), write a thesis, and present an oral defense.

Applied Project Option	
Concentration.....	15–18
Supporting area.....	9–12
Research Methods Courses	
EET 500 Research/Writing.....	2
EET 591 Graduate Seminar.....	1
EET 593 Applied Project.....	3
Total minimum semester hours.....	33

A minimum of 20 semester hours must be 500-level courses. At least nine hours of 500-level course work must be included in the technical concentration. A maximum of three semester hours of applied project (EET 593) may be applied toward the 20 semester hour 500-level minimum. The applied project requires a supporting report; the project and report are defended in a final oral examination. All course work applied toward the minimum 33 semester hour total must be at the 400 level or higher.

All course work outside the Department of Electronics and Computer Engineering Technology must be preapproved. Completion of deficiencies or prerequisites may be required before admission to the M.S.Tech. degree program.

For more information concerning the M.S.Tech. degree, see [“Technology,” page 329](#).

RESEARCH ACTIVITY

Research activities in the Department of Electronics and Computer Engineering Technology include systems, circuit applications, and hardware design. Teaching and research are conducted in microelectronics fabrication, utilizing the clean-room facilities of the College of Technology and Applied Sciences Teaching Factory. Various aspects of computer systems are under investigation within the department, such as networking, internet activities, distributed Web-based software applications, and embedded systems. Electronic systems and telecommunications are also topics of research by department faculty and graduate students. M.S.Tech. degree candidates will find a broad range of research that can lead to an applied project or thesis. For more information on research areas and laboratories, access the department’s Web site at www.east.asu.edu/ctas/ecet.

Faculty research interests are concentrated in, but not limited to, the following general areas and topics.

Computers and Digital Systems. Digital systems design and applications; digital switching circuits; microcomputer hardware, programming, interfacing, and software systems analysis, design, development and application; computer process control hardware, techniques, and applications; computer networks; digital testing; distributed applications and software frameworks to support them; databases; embedded systems; wireless systems and their software; computer process control hardware, techniques, and applications; client-server models and reconfigurable computers.

Engineering Technology Education. Studies emphasizing curriculum and laboratory design and development in electronics, computers, telecommunications, and microelectronics engineering technology at the bachelor’s and master’s levels; studies involving faculty, student, administrative, and graduate characteristics; industry unitization and manpower needs; program curriculum and math-science articulation requirements and characteristics; characteristics of excellence in engineering technology education; computerized educational design.

Microelectronics. Solid-state device fabrication, testing, and design; monolithic bipolar and MOS device fabrication and manufacturing techniques; vacuum vapor deposition and sputtering techniques and applications; new photolithography processes; device and system packaging.

Systems Control and Instrumentation. Electrical power equipment and systems, insulator testing, control and distribution; direct solar energy conversion; analog and digital process control components, instrumentation, systems, and process applications; electronic measurements and instrumentation circuits, systems, and applications; automatic test

GRADUATE PROGRAMS AND COURSES

systems, test programming, and failure tolerant design; computer-aided design; analog and digital simulation.

COMPUTER ENGINEERING TECHNOLOGY (CET)

CET 400 Software Engineering Technology. (3)

spring

Software life-cycle models; project management; team development environments; software specification, design, implementation techniques and tools, validation, and maintenance; user documentation. Prerequisite: CET 326.

CET 401 Digital Signal Processing for Multimedia. (3)

fall

Applies DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as EET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

CET 420 Foundations of Distributed Web-Based Applications in Java. (3)

fall and spring

Principles underlying design and implementation of distributed software components; sockets, protocols, threads, XML, serialization, reflection, security, and events. Lecture, lab. Prerequisites: CET 230, 386.

CET 425 Server Software Programming. (3)

once a year

Design and implementation of software servers, threaded socket servers, servers for distributed Web-based applications; security for the Web. Prerequisite: CET 420 or instructor approval.

CET 427 Distributed Objects with Java and CORBA. (3)

spring

Managing network objects with RMI and CORBA; frameworks for naming, discovering, and invocation, such as JNDI, JINI, and Jav-aSpaces. Prerequisite: CET 420 or instructor approval.

CET 428 Web-Client User Interface Programming. (3)

fall

Client-server model for window interfaces. Java Swing, Applets, markup and scripting languages; Web tools and related technologies. Prerequisite: CET 420 or instructor approval.

CET 433 Database Technology. (3)

fall

Introduces database technologies and DBMS, data models, and languages. Prerequisites: CET 230, 326.

CET 452 Digital Logic Applications. (4)

spring

Design of sequential machines using system design techniques and complex MSI/LSI devices with lab. Prerequisite: CET 350.

CET 456 Assembly Language Applications. (3)

fall

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)

spring

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)

once a year

Network technology, topologies, protocols, control techniques, reliability, and security. Prerequisite: CET 354.

CET 473 Digital/Data Communications. (4)

fall

Signals, distortion, noise, and error detection/correction. Transmission and systems design. Interface techniques and standards. Lecture, lab. Prerequisites: CET 354; EET 372.

CET 486 Hardware Description Languages: VHDL. (3)

spring

Introduces hardware description languages using VHDL. Techniques for modeling and simulating small digital systems using a VHDL simulator. Prerequisites: CET 350, 383.

CET 488 Systems Administration of UNIX. (3)

fall

Administration of UNIX, its processes, system calls, kernel, file structure, and interprocess communication using command line tools. Lecture, lab. Prerequisites: CET 383, 386.

CET 489 Network Administration with TCP/IP. (3)

spring

Writing C programs and shell scripts to create, control, and administer computer networks. Installation and maintenance of computer networks. Lecture, lab. Prerequisites: CET 383, 458, 473.

CET 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Computer Project

CET 501 Digital Signal Processing Applications. (3)

fall

Applies DSP techniques to the design and analysis of digital filters. Solution of filtering problems using computer techniques. Cross-listed as EET 501. Credit is allowed for only CET 501 or EET 501. Prerequisite: EET 401 or instructor approval.

CET 520 Computer Architecture. (3)

fall

Basics of computer architecture. RTN, RISC, CISC concepts; computer arithmetic; ALUs; memory systems; I/O. Prerequisite: CET 354.

CET 533 Database Management Systems. (3)

fall

Systems aspects of relational databases: relational database design, index and access structures, implementation and performance evaluation, query processing and optimization. Prerequisite: CET 433.

CET 552 Digital Systems Design. (3)

spring

Digital system design techniques and applications. Prerequisite: CET 452 or instructor approval.

CET 554 Distributed Computing. (3)

spring

Topics in distributed systems, including communications, distributed operating systems, fault-tolerance, and performance issues. Prerequisites: CET 354, 386.

CET 556 Windows Programming. (3)

fall

Programming techniques in the MS Windows and X Window environments. Prerequisite: CET 256 (or its equivalent).

CET 557 Microcomputers and Applications. (3)

fall

Applications of small computer systems, mini- and microcomputer hardware and software. Prerequisites: CET 354; CSE 100 (or 183); EET 310.

CET 566 Principles and Practices of Operating Systems. (3)

spring

Principles and practices of operating systems: virtual memory systems, I/O devices and systems, file systems and organization, and other topics. Prerequisite: CET 386.

CET 576 Embedded Real-Time Programming. (3)

fall

Topics in real-time embedded operating systems such as synchronization, communications, file systems, and memory sharing. Prerequisite: CET 420.

CET 580 Practicum. (1–12)

selected semesters

CET 583 Network Administration with TCP/IP. (3)

spring

Writing C programs and shell scripts to create, control, and administer computer networks. Installation and maintenance of computer networks. Lecture, project. Prerequisites: CET 383, 458, 473.

CET 584 Internship. (1–12)

selected semesters

CET 586 Digital Modeling Techniques. (3)

spring

Digital system modeling and simulation using hardware description languages. Prerequisites: CET 350, 354.

CET 590 Reading and Conference. (1–12)

selected semesters

CET 591 Seminar. (1–12)*selected semesters***CET 592 Research. (1–12)***selected semesters***CET 593 Applied Project. (1–12)***selected semesters***CET 594 Conference and Workshop. (1–12)***selected semesters***CET 595 Continuing Registration. (1)***selected semesters***CET 598 Special Topics. (1–4)***selected semesters***CET 599 Thesis. (1–12)***selected semesters*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

ELECTRONICS ENGINEERING TECHNOLOGY (EET)**EET 401 Digital Signal Processing for Multimedia. (3)***fall*

Applies DSP techniques to multimedia. Digital filter analysis and design. Time and frequency techniques. Computer applications. Cross-listed as CET 401. Credit is allowed for only CET 401 or EET 401. Prerequisites: EET 301; MAT 262.

EET 406 Control System Technology. (4)*spring*

Control system components, analysis of feedback control systems, stability, performance, and application. Lecture, lab, computer simulations. Prerequisites: EET 301; MAT 262.

EET 407 Energy Conversion and Applications. (4)*fall*

Electricity, magnetism, mechanics, heat and units, and three-phase circuits. Electrical machines, transformers, generation, transmission, and distribution of electrical energy. Lecture, lab. Prerequisite: EET 208.

EET 410 Electronic Circuits II. (4)*fall and spring*

Analysis and design of OP-amps, power amplifiers, and digital logic families. Feedback design using frequency response. Computer analysis and design. Lecture, lab. Prerequisites: EET 301, 310.

EET 422 Electronic Switching Circuits. (4)*once a year*

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)*fall*

Measurement principles and instrumentation, techniques. Signal and error analysis. Lecture, lab. Prerequisites: EET 301, 310.

EET 460 Power Electronics. (4)*spring*

Analyzes circuits for control and conversion of electrical power and energy. Lecture, lab. Prerequisites: EET 301, 310, 407.

EET 470 Communication Circuits. (4)*spring*

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 500 Research/Writing. (2)*fall and spring*

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 Applications. (3)*fall*

Applies DSP techniques to the design and analysis of digital filters. Solution of filtering problems using computer techniques. Cross-listed as CET 501. Credit is allowed for only CET 501 or EET 501. Prerequisite: EET 401 or instructor approval.

EET 506 System Dynamics and Control. (3)*spring*

Time, frequency, and transform domain analysis of physical systems. Transfer function analysis of feedback control systems performance and stability. Compensation. Prerequisite: EET 301 or MAT 262.

EET 508 Digital Real-Time Control. (3)*once a year*

Sample data control techniques and applications to process control. Prerequisites: CET 354; EET 406.

EET 522 Digital Integrated Circuits and Applications. (3)*spring*

Analysis, design, and application of integrated circuits and systems. Prerequisites: CET 350; EET 301, 310.

EET 530 Electronic Test Systems and Applications. (3)*fall*

Analysis, design, and application of electronic test equipment, test systems, specifications, and documentation. Prerequisites: CET 354; EET 301, 310.

EET 560 Industrial Electronics and Applications. (3)*spring*

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 578 Digital Filter Hardware Design. (3)*spring*

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)*spring*

Image capture, transform, compression, storage, and transmission. Provides computer environment (software and hardware) to emphasize the practical aspect. Prerequisite: EET 401 or instructor approval.

EET 580 Practicum. (1–12)*selected semesters***EET 584 Internship. (1–12)***selected semesters***EET 590 Reading and Conference. (1–12)***selected semesters***EET 591 Graduate Seminar. (1–12)***selected semesters***EET 592 Research. (1–12)***selected semesters***EET 593 Applied Project. (1–12)***selected semesters***EET 594 Conference and Workshop. (1–12)***selected semesters***EET 595 Continuing Registration. (1)***selected semesters***EET 598 Special Topics. (1–4)***selected semesters***EET 599 Thesis. (1–12)***selected semesters*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

**MICROELECTRONICS
ENGINEERING TECHNOLOGY (UET)****UET 411 Applied Vacuum Technology. (3)***spring*

Fundamentals, applications, and practical aspects of vacuum systems and their uses in semiconductor fabrication. Prerequisite: UET 331.

UET 416 Monolithic Integrated Circuit Devices. (3)*fall*

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)*fall*

Laboratory practice in the fabrication of integrated circuits. Lab. Prerequisite: UET 331. Corequisite: UET 416.

GRADUATE PROGRAMS AND COURSES

UET 418 Hybrid Integrated Circuit Technology. (4)

spring

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)

fall

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)

fall

Fundamentals, applications, and techniques for the fabrication of integrated circuit masks. Prerequisite: UET 331.

UET 426 Software Tools for the Semiconductor Industry. (3)

spring

Introduces software tools commonly used in the semiconductor industry, such as SUPREM IV, PSPICE, VIEWLOGIC, and ICED. Prerequisite: UET 331.

UET 432 Semiconductor Packaging and Heat Transfer. (3)

spring

Packaging theory and techniques; hermetic and plastic assembly; thermal management; electrical characteristics and reliability. Prerequisites: ETC 340 and UET 331 (or their equivalents).

UET 437 Integrated Circuit Testing. (3)

spring

Principles, techniques, and strategies employed at wafer level and final product testing, both destructive and nondestructive. Prerequisite: UET 416.

UET 485 Digital Testing Techniques. (3)

once a year

Hardware/software aspects of digital testing technology; systems, board, and logic testing and equipment. Lecture, lab. Prerequisites: CET 350; EET 310.

UET 513 VLSI Circuit Design and Layout. (3)

fall

Techniques and practice for the design and layout of very large-scale integrated (VLSI) circuits. Emphasizes "system on silicon" using tools for computer-aided design layout. Seminar. Prerequisite: UET 416.

UET 516 Semiconductor Process Simulation and Integration. (3)

spring

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)

spring

Theory, processing, fabrication, and manufacturing of hybrid microelectronics devices and products. Applications. Prerequisite: UET 331 (or its equivalent) or instructor approval.

UET 521 Device Physics. (3)

fall

Band structure of solids, electron hole-pairs, mobility, lifetime, fermi-level, pn junctions, diodes, and bipolar and MOS transistors. Prerequisite: graduate standing in the department.

UET 532 IC Packaging. (3)

spring

IC packaging theory and techniques; assembly techniques, material issues; thermal management; electrical performance and reliability. Lecture, lab. Prerequisites: ETC 340 and UET 331 (or their equivalents).

UET 580 Practicum. (1–12)

selected semesters

UET 584 Internship. (1–12)

selected semesters

UET 590 Reading and Conference. (1–4)

selected semesters

UET 591 Seminar. (1–12)

selected semesters

UET 592 Research. (1–12)

selected semesters

UET 593 Applied Project. (1–12)

selected semesters

UET 594 Conference and Workshop. (1–12)

selected semesters

UET 595 Continuing Registration. (1)

selected semesters

UET 598 Special Topics. (1–4)

selected semesters

UET 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Department of Information and Management Technology

The faculty in the Department of Information and Management Technology through the College of Technology and Applied Sciences at ASU East offer the M.S.Tech. degree. The student may select one of four technical concentrations: environmental technology management, fire service administration, graphic information technology, or management of technology.

Graphic Information Technology. The graphic information technology concentration provides students with a seamless graphic user interface from traditional printing and publishing applications to digital/printing/photography/multimedia, 3-D modeling, animation, database management, and Internet/Intranet Web development. Computer hardware/software configurations, information protocols, and networks provide students with an applications-level working knowledge of the different facets of the graphic information industry.

Environmental Technology Management. The environmental technology management concentration for the M.S.Tech. degree provides three areas of study: environmental management, emergency management, and international environmental management. Classes are scheduled to minimize disruption of work schedules by meeting six times a semester on alternating Fridays and Saturdays. A Web-based distance learning format is also available. For more information, access the program Web site at www.east.asu.edu/ctas/imt/etm.

Fire Service Administration. The fire service administration concentration is the advanced study of fire administration and leadership concepts. Students learn concepts and develop skills needed to be effective fire administrators. This program is designed to build a bridge between grounded theory and applied practice. Students completing this program are able to perform the functions of a fire chief in any size public sector fire department, administer fire related programs in the private sector, and conduct meaningful research applicable to fire service programs. The technical concentration is 21 semester hours and includes an applied research project. Students select from the list of technical classes or related support electives to complete the balance of the 33 required hours. Course work in the related area of support cannot exceed six semester hours.

Management of Technology. The management of technology concentration provides the necessary content and technical knowledge to improve management functions in industry, manufacturing, and public service organizations. The curriculum addresses topics to include data analysis,

ethical issues, project management, organizational effectiveness, personnel development, project management, quality assurance, and technological advancements that impact a global marketplace.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants who have deficiencies or who do not meet the prerequisites may be required to complete them before being admitted to the degree program.

Program of Study. All candidates for the M.S.Tech. degree program are required to complete a minimum of 33 semester hours of graduate credit. Additional courses may be assigned by the faculty supervisory committee depending on the background of the candidate.

Final Examinations. Either an applied project or thesis is required. Upon completion of the approved course of study or during the last semester, an oral defense of the applied project or thesis is required.

Master's degree candidates are required to complete a six semester hour research block that includes either ITM 549 Research Techniques and Applications and IMC 593 Applied Project, ITM 549 Research Techniques and Applications and IMC 599 Thesis, or ETM 592 Research and ITM 593 Applied Project. The program of study is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

For more information concerning the M.S.Tech. degree, see ["Technology," page 329.](#)

RESEARCH ACTIVITY

Research interests of faculty in the Department of Information and Management Technology include digital imaging, digital publishing, internet development/e-commerce, information databases, multimedia, animation, 3-D modeling, perishability studies of technology, hazardous materials and waste management, environmental regulations, remediation processes, operations management, quality assurance, and industrial training.

ENVIRONMENTAL TECHNOLOGY MANAGEMENT (ETM)

ETM 401 Hazardous Waste Management. (3)

fall and spring

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)

spring

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)

fall and spring

Examines reactions, transport, and fates of hazardous chemicals in water, soil, air, and living organisms. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170.

ETM 407 Occupational Hygiene. (3)

spring

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)

summer

Addresses theory and management techniques for emergency preparedness, including mitigation, preparedness, response, and recovery. Pre- or corequisite: ETM 301.

ETM 426 Environmental Issues. (3)

spring

Explores 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)

summer

Emphasizes technological and economic pressures experienced by developing countries. Prerequisite: ETM 301.

ETM 501 Principles of Hazardous Materials and Waste Management. (3)

fall

Foundation for courses in curriculum. Topics include definitions of toxic and hazardous substances and wastes, RCRA classification, and OSHA criteria. Pre- or corequisites: both CHM 113 and 115 or only CHM 114.

ETM 502 Regulatory Framework for Toxic and Hazardous Substances. (3)

fall

Examines 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)

spring

Interaction of chemicals with life and environment. Mechanisms of toxic action, dose-response relationships, toxicity testing models, predictive toxicology, and epidemiology. Prerequisites: both CHM 113 and 115 or only CHM 114.

ETM 504 Technology for Storage, Treatment, and Disposal of Hazardous Materials. (3)

fall

Current and state-of-the-art technologies and future trends for storage, treatment, and disposal of hazardous materials and waste. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501.

ETM 505 Quantitative Analysis and Practical Laboratory Techniques. (3)

fall and spring

EPA methodologies for sampling and analysis of soils and water. Includes quality assurance and regulatory requirements. Lab is arranged off site. Prerequisites: CHM 114 (or 113 and 115), 231; MAT 170.

ETM 506 Chemistry of Hazardous Materials. (3)

fall

Chemistry and toxicology of hazardous chemicals. Topics include proper handling, storage, transportation, and disposal. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170. Corequisite: CHM 231.

ETM 507 Industrial Hygiene. (3)

selected semesters

Emphasizes chemical hazards in industrial settings. Topics include recognizing and measuring hazards, control techniques, and regulatory standards. Prerequisites: both CHM 113 and 115 or only CHM 114; MAT 170.

ETM 522 Air Pollution and Toxic Chemicals. (3)

fall

Examines issues in the measurement analysis and control of toxic chemicals in air pollution. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 523 Soils and Groundwater Contamination. (3)

fall

Theoretical and practical hydrogeology as it applies to cleaning up contamination. Investigative techniques, monitoring, risk assumptions, and assessment methodology. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170. Corequisite: CHM 231.

GRADUATE PROGRAMS AND COURSES

ETM 524 Emergency Preparedness, Response, and Planning for Hazardous Materials. (3)

summer

In-house or on-site emergency response contingency planning. Preemergency assessment, resources for cooperation, equipment requirements, and coordination with other agencies. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 525 Risk Assessment for Hazardous Materials. (3)

spring

Applies the risk assessment process in situations ranging from hazardous facilities regulation to toxic substances in the environment. Prerequisites: both CHM 113 and 115 or only CHM 114; ETM 501; MAT 170.

ETM 526 Current Environmental Technology Issues. (3)

fall

In-depth study of current issues in environmental technology facing both the private and public sectors.

ETM 527 Environmental/Resources Regulations Concepts. (3)

spring

Develops environmental regulations from common law to statutory requirements. Emphasizes Superfund, hazardous materials, toxics, and liability contracts. Pre- or corequisite: ETM 501.

ETM 592 Research. (1–12)

selected semesters

ETM 598 Special Topics. (1–4)

spring

Topics may include the following:

- **Advanced Bioremediation. (3)**
Management and policy issues related to bioremediation of mining and animal waste and replacement of chemical control with biological methods. Lecture, case studies.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

FIRE SERVICE ADMINISTRATION (FSA)

FSA 500 Research Methods. (1–12)

selected semesters

Topics may include the following:

- **Fire Administration. (3)**
Relationship of fire administration and the role of executive fire administrator in administration of complex issues in a dynamic environment.

FSA 502 Managing Change in the Fire Service. (3)

selected semesters

Dynamics of organizational change and the effect change has on the delivery of fire services to the community.

FSA 503 Fire Service and the Community. (3)

selected semesters

Theoretical concepts of public service to build an understanding of how the fire service fits within the community.

FSA 510 Fire Department Budgeting and Finance. (3)

selected semesters

Functions of budgeting and finance in fire departments within the context of the public sector.

FSA 522 Leadership in the Fire Service. (3)

selected semesters

Leadership theories analyzed in a variety of contexts within public and private organizations, then applied to the leadership challenges in the fire service.

FSA 530 Public Policy in the Fire Service. (3)

selected semesters

Public policy and the fire services' role in the making of public policy in the community.

FSA 540 Applied Research Methods in the Fire Service. (3)

selected semesters

Research methods applicable to problems that arise in the fire service, including assessments of programs and customer service research.

FSA 550 Fire Service Program Management. (3)

selected semesters

Functions of developing and managing fire service programs. Designed for advanced students of fire service administration.

FSA 551 Fire Prevention and Public Fire Education. (3)

selected semesters

Managing fire prevention organizations and administering fire prevention programs in a contemporary society.

FSA 552 Emergency Medical Services Administration. (3)

selected semesters

Complex issues of administering an Emergency Medical Services (EMS) division in a fire department.

FSA 553 Special Operations in the Fire Service. (3)

selected semesters

Focuses on the variety of special emergency services operations provided by contemporary fire departments.

FSA 554 Emergency Fire Operations Administration. (3)

selected semesters

Delivery of emergency services to a community by a contemporary fire department.

FSA 580 Practicum. (1–12)

selected semesters

Topics may include the following:

- **Fire Service Practicum. (3)**
Structured practical fire service research experience that is supervised by an approved fire service professional or faculty member.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

FIRE SERVICE MANAGEMENT (FSM)

FSM 598 Special Topics. (1–4)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

GRAPHIC INFORMATION TECHNOLOGY (GIT)

GIT 411 Computer Animation. (3)

fall and spring

2D and 3D computer animation methods: project planning, scripting, storyboards, advanced modeling, lighting, materials mapping, and motion. Lecture, lab. Prerequisites: GIT 312, 334.

GIT 412 Multimedia Authoring, Scripting, and Production. (3)

fall and spring

Production of multimedia projects using industry-standard authoring applications: project management, client considerations, and project documentation; user interface design, interactivity, media, and databases. Lecture, lab. Prerequisite: GIT 314.

GIT 413 Professional Portfolio Design and Presentation. (3)

spring

Digital media portfolio design and production: planning, audience analysis, media selection, authoring, media formats, production, copyright considerations, marketing, and delivery. Lecture, lab. Prerequisites: GIT 314, 334.

GIT 414 Web Site Design and Internet/Web Technologies. (3)

spring

Web site design, authoring, standards, protocols, tools, and development techniques for commercial client-sided Web-based graphic information systems. Lecture, lab. Prerequisites: GIT 334, 337.

GIT 415 Computer Graphics: Business Planning and Management. (3)

spring

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: senior standing in Information Technology (graphic information technology concentration).

GIT 417 Advanced Internet Programming. (3)

fall

Uses industry-standard programming languages and techniques to create interactive graphic information Web sites and applications. Lecture, lab. Prerequisite: GIT 414.

GIT 432 Graphic Industry Business Practices. (3)*selected semesters*

Business practices related to press/prepress/Web industries; trade customs, cost analysis, marketing and management approaches. Lecture, lab, field trips. Prerequisite: GIT 414.

GIT 435 Web Management and E-commerce. (3)*spring*

Internet Web site management, security, online databases, and new e-commerce business models. Lecture, lab. Prerequisite: GIT 414.

GIT 436 Gravure Technology. (3)*spring*

In-depth study of the market profile and production sequences related to the gravure method of printing. Prerequisite: GIT 135.

GIT 437 Color Reproduction Systems. (3)*fall*

Scientific analysis for the engineering of color reproduction systems and color models used in the graphics industry. Prerequisite: GIT 334.

GIT 441 Graphic Information Systems. (3)*selected semesters*

Graphic information systems common to the workplace: graphic user interfaces for online databases, geographic, industrial, architectural, and management applications. Lecture, lab. Prerequisite: senior standing in Information Technology (graphic information technology concentration).

GIT 450 Digital Workflow in Graphic Industries. (3)*fall*

Analyzes digital production systems for input, assembly, and output of graphic information to print and Web, including networking and job tracking. Lecture, lab. Prerequisite: GIT 334.

GIT 510 Computer Graphics Programming: Design, Customization, and Development. (3)*selected semesters*

Advanced design, development, and documentation of graphic application programs. Lecture, lab.

GIT 512 Multimedia-Based Education and Training. (3)*fall*

Creative design, planning, development, documentation, and production of technology-based learning and multimedia-based education and training materials and programs. Lecture, lab. Prerequisite: GIT 412.

GIT 537 Current Issues in Quality Assurance. (3)*selected semesters*

Directed group study of selected issues relating to quality assurance in the printing, publishing, and information industry.

GIT 538 Personnel Development for the Graphics Industry. (3)*selected semesters*

Employee training and development specific to production and management in the graphics industry.

GIT 590 Reading and Conference. (1–12)*selected semesters***GIT 598 Special Topics. (1–4)***selected semesters*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

INFORMATION AND MANAGEMENT CORE (IMC)**IMC 470 Project Management. (3)***spring*

Introduces 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.

IMC 584 Internship. (1–3)*fall and spring***IMC 590 Reading and Conference. (1–12)***selected semesters***IMC 592 Research. (1–12)***fall and spring***IMC 593 Applied Project. (1–12)***fall and spring***IMC 595 Continuing Registration. (1)***selected semesters***IMC 599 Thesis. (1–12)***fall and spring*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

INDUSTRIAL TECHNOLOGY MANAGEMENT (ITM)**ITM 402 Legal Issues for Technologists. (3)***fall*

American legal system and impact on technology management issues: contracts, torts, intellectual property, white collar crime, anti-trust, environmental, and employment.

ITM 405 Forecasting and Evolution of Technology. (3)*selected semesters*

History and evolutionary nature of selected technologies, issues in the management of emerging technologies, and methods of technological forecasting. Prerequisite: IMC 346 (or its equivalent).

ITM 430 Ethical Issues in Technology. (3)*spring*

Topics in social responsibility for industrial technology and engineering. Prerequisite: IMC 346.

ITM 440 Introduction to International Business. (3)*spring*

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)*fall, spring, summer*

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 Industrial Distribution and Materials Management. (3)*selected semesters*

Surveys topics in industrial distribution including, but not limited to, materials handling, purchasing, receiving, warehousing, traffic, inventory control, and shipping. Prerequisite: IMC 346 or ITM 343.

ITM 452 Industrial Human Resource Management. (3)*fall*

Concepts and practices of human resource management in a global industrial environment. Prerequisite: IMC 346.

ITM 453 Safety Management. (3)*selected semesters*

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)*selected semesters*

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)*spring*

Introduces labor relations, unions, federations, collective bargaining, grievances, and labor legislation. Prerequisites: IMC 346; ITM 344.

ITM 461 Operations Management. (3)*fall*

Introduces supervisory principles as applied to production of goods and services. Prerequisites: IMC 346; ITM 344.

ITM 480 Organizational Effectiveness. (3)*spring*

Human aspects of supervisory behavior in the industrial setting and how they influence efficiency, morale, and organizational practices. Prerequisite: IMC 346.

ITM 502 Financial Management. (3)*selected semesters*

Examines corporate financial and managerial accounting systems, budgeting, and financial policy, using microcomputers to analyze, forecast, and report information.

GRADUATE PROGRAMS AND COURSES

ITM 503 Marketing Management. (3)

selected semesters

Modern methods and industrial case studies of planning, pricing, promoting, and distributing goods and services in the global marketplace. Prerequisites: ITM 480 (or its equivalent); instructor approval.

ITM 504 Law and Ethics for Technical Professionals. (3)

selected semesters

Analyzes 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)

selected semesters

Analyzes entrepreneurial dynamics and technology development, methods of research and development management, new technology implementation, and start-up organization. Prerequisites: ITM 480 (or its equivalent); instructor approval.

ITM 540 International Management. (3)

selected semesters

Practices and procedures for effective management of multinational business organizations, including partnerships, joint ownerships, and global subsidiaries.

ITM 548 Statistical Methods for Research. (3)

selected semesters

Multivariate statistical techniques to analyze research data. Uses statistical software and applications. Prerequisite: STP 420 (or its equivalent).

ITM 549 Research Techniques and Applications. (3)

fall and spring

Selection of research problems, analysis of literature, individual investigations, preparing reports, and proposal writing. Prerequisite: STP 420 (or its equivalent).

ITM 550 Industrial Training and Development. (3)

selected semesters

Training techniques and learning processes. Planning, developing, evaluating, and managing industrial and governmental programs. Prerequisite: ITM 480.

ITM 552 Global Management Philosophies. (3)

selected semesters

Analyzes and compares significant supervision philosophies developed in various industrial nations and their potential application in the United States.

ITM 560 Managerial Decision Making. (3)

fall

Analyzes common decision-making biases and techniques to overcome them. Uses both subjective quantitative decision tools and computerized decision aids.

ITM 570 Advanced Project Management. (3)

spring

Planning, organizing, coordinating, and controlling staff and project groups to accomplish the project objective.

ITM 593 Applied Project. (1–12)

selected semesters

ITM 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Quantitative Research Analysis

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)

Department of Manufacturing and Aeronautical Engineering Technology

The faculty in the Department of Manufacturing and Aeronautical Engineering Technology (MAET) in the College of Technology and Applied Sciences, ASU East, offer the M.S.Tech. degree. A minimum of 33 semester hours of approved courses is required. Both a thesis and applied project option are available. The flexible program permits

the student to select a combination of courses in the relevant concentration and supporting areas to meet individual career goals in technology or to provide the foundation for further advanced study.

The department provides the student with a number of programs of study that presuppose a sound technical undergraduate degree. The programs are designed to provide the graduates with technical and professional skills that will facilitate preparation for and advancement in leadership positions in industry, education, government, and military. Laboratories and classrooms are well equipped, and the faculty members administering the classes have relevant teaching, research, industry and training experience and background. Areas of concentrations include aeronautical engineering technology, instrumentation and measurement technology, manufacturing engineering technology, and mechanical engineering technology. The instrumentation and measurement technology concentration is offered jointly with the Department of Electronics and Computer Engineering Technology.

The student may select one of the areas to meet the requirement of 16–18 semester hours. Careful program selection in coordination with a faculty advisor and/or advisory committee is an essential aspect of building a focused program for the student. The selection process also facilitates the potential for expanding the depth and breadth of the training the student may receive in related areas. The supporting area (six to nine semester hours) may be selected from outside the department upon approval from the supervisory committee. The thesis option includes six hours of research credits spread over at least two semesters.

Admission. Applicants are expected to satisfy all requirements for admission to the Graduate College. Industrial experience beyond completion of a baccalaureate degree is strongly recommended. Applicants with deficiencies or those not meeting the prerequisites may be required to complete them before being admitted to the degree program. A statement of purpose and current résumé should also be submitted to the department.

Program of Study. All candidates for the M.S.Tech. degree program are required to complete a minimum of 33 semester hours of graduate credit as follows:

Thesis Option	
Technical area of emphasis	18
Supporting area	6
Research course	3
Research	6
Total	33
Applied Project Option	
Technical area of emphasis	18
Supporting area	9
Research course	3
Applied project.....	3
Total	33

Additional courses may be assigned by the supervisory committee depending on the background of the candidate. The program is designed for flexibility, permitting the student to select a combination of courses in a technical area and supporting area to meet individual goals.

RESEARCH ACTIVITY

Department faculty are engaged in both theoretical and applied research projects, involving undergraduate and graduate students in both manufacturing and aeronautical-related topic areas. Graduate students employed in local industry are encouraged to develop research topics that address problems of interest to their employers.

Current research interests of the faculty include manufacturing modeling and simulation—with a particular focus on the semiconductor fabrication process, “smart” materials—especially composite materials, hydrogen generation and fuel cells, optimization of turbine engines, machinability and manufacturing processes, manufacturing and program management, manufacturing cost economics, and design.

Applied research projects are carried out in a number of well-equipped laboratories and facilities: computer-aided design and computer-aided manufacturing laboratory, machining center laboratory, composite materials laboratory, energy conversion and combustion laboratory, automation laboratory, welding and casting laboratory, materials inspection and metrology laboratory, and metallurgy/materials testing laboratory.

For more information on research areas and laboratories, access the department Web site at www.east.asu.edu/ctas/maet.

AERONAUTICAL ENGINEERING TECHNOLOGY (AET)

AET Note 1. Flight instruction costs are not included in university tuition and fees.

AET 409 Nondestructive Testing and Quality Assurance. (1)

selected semesters

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. Credit is allowed for only AET 409 or AMT 409. See AET Note 1. Prerequisite: AMT 280 or MET 230.

AET 415 Gas Dynamics and Propulsion. (3)

spring

Introduces compressible flow, internal and external flow, and aerothermodynamic analysis of propulsion systems. Prerequisite: MET 434.

AET 417 Aerospace Structures. (3)

fall

Analysis and design of aircraft and aerospace structures. Shear flow. Semimonocoque structures. Effects of dynamic loading. Prerequisites: AET 300, 312; MET 313.

AET 420 Applied Aerodynamics and Wind Tunnel Testing. (3)

fall

Introduces viscous and inviscid flow and their relationship to aircraft lift and drag. Wind tunnel design and testing. Lecture, lab. Prerequisites: AET 300; MET 434.

AET 432 Applied Heat Transfer. (3)

fall

Heat transfer by conduction, convection, and radiation. Applies heat transfer to engineering design problems. Prerequisite: ETC 340. Pre- or corequisite: MET 434 or instructor approval.

AET 487 Aircraft Design II. (3)

spring

Basic aerodynamics and airplane performance analysis methods applied to practical design project. Prerequisite: AET 300.

AET 500 Research Methods. (1–12)

selected semesters

AET 524 Application of Heat Transfer. (3)

fall

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)

spring

Mechanics and thermodynamics of propulsion systems. Solid, liquid propellant rocket design performance. Electrical nuclear propulsion systems. Space missions. Prerequisites: both AET 415 and 420 (or MET 434) or only instructor approval.

AET 560 Numerical Methods in Engineering Technology. (3)

selected semesters

Analyzes problems in physical sciences, models physical problems, perturbation techniques, curvefitting, data analysis, numerical solutions, ordinary and partial differential equations.

AET 580 Practicum. (1–12)

selected semesters

AET 583 Field Work. (1–12)

selected semesters

AET 584 Internship. (1–12)

selected semesters

AET 590 Reading and Conference. (1–12)

selected semesters

AET 591 Seminar. (1–12)

selected semesters

AET 592 Research. (1–12)

selected semesters

AET 593 Applied Project. (1–12)

selected semesters

AET 594 Conference and Workshop. (1–12)

selected semesters

AET 595 Continuing Registration. (1)

selected semesters

AET 598 Special Topics. (1–4)

selected semesters

AET 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48](#).

MANUFACTURING ENGINEERING TECHNOLOGY (MET)

MET 401 Quality Assurance. (3)

spring

Introduces statistical quality control methods design of experiments, sampling, gauge requirements, specifications, quality assurance tools emphasizing CNC-CMM programming. Lecture, lab. Prerequisite: junior standing.

MET 416 Applied Computer-Integrated Manufacturing. (3)

fall

Techniques and practices of computer-integrated manufacturing, with emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 345.

MET 432 Thermodynamics. (3)

spring

Thermodynamics of mixtures. Combustion process. Applies thermodynamics to power and refrigeration cycles. Prerequisite: ETC 340.

MET 433 Thermal Power Systems. (4)

selected semesters

Analyzes gas power, vapor power, and refrigeration cycles. Components of air conditioning systems. Direct energy conversion. Psychrometry. Analyzes internal combustion engines and fluid machines. Lecture, lab. Prerequisite: MET 432 or instructor approval.

MET 434 Applied Fluid Mechanics. (3)

spring

Fluid statics. Basic fluid flow equations. Viscous flow in pipes and channels. Compressible flow. Applies fluid measurement and flow in conduits. Prerequisite: ETC 340.

GRADUATE PROGRAMS AND COURSES

MET 435 Alternate Energy Sources. (3)

selected semesters

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)

selected semesters

Applies thermodynamics and fluid mechanics to the analysis of machinery design and power cycle performance predictions. Prerequisites: ETC 340; MET 434.

MET 438 Machine Design II. (3)

spring

Applies mechanics to the design of machine elements and structures. Emphasizes basics of gears, springs, brakes, clutches, and bearings. Prerequisite: AET 312; MET 331.

MET 442 Specialized Production Processes. (3)

fall

Nontraditional manufacturing processes, emphasizing EDM, ECM, ECG, CM, PM, HERF, EBW, and LBW. Prerequisite: MET 231.

MET 443 CNC Computer Programming. (3)

fall

Theory and application of N/C languages using CAM software and CNC machine tools. Lecture, lab. Prerequisite: MET 345 or instructor approval.

MET 444 Production Tooling. (3)

fall

Design and fabrication of jigs, fixtures, and special industrial tooling related to manufacturing methods. Lecture, lab. Prerequisite: MET 345.

MET 451 Introduction to Automation. (3)

spring

Introduces automation. Topics include assembly techniques, fixed and flexible automation systems, robots, material-handling systems, sensors, and controls. Lecture, lab. Prerequisite: MET 345.

MET 452 Implementation of Robots in Manufacturing. (3)

selected semesters

Robotic workcell design, including end effectors, parts presenters, and optimum material flow. Prerequisite: MET 451 or instructor approval.

MET 460 Manufacturing Capstone Project I. (3)

fall

Group project designing, evaluating, and analyzing components, assemblies, and systems. Develop products/manufacturing techniques demonstrating state-of-the-art technology. Lecture, lab. Prerequisites: MET 331, 341; senior standing.

MET 461 Manufacturing Capstone Project II. (3)

spring

Small-group projects applying manufacturing techniques, with emphasis on demonstrating state-of-the-art technology. Lecture, lab. Prerequisite: MET 460 or instructor approval.

MET 500 Research Methods. (1–12)

selected semesters

MET 501 Statistical Quality Control Applications. (3)

spring

SPC problem-solving techniques for implementation in industrial setting; design and analysis of experiments. Prerequisite: instructor approval.

MET 502 Specialized Production Processes. (3)

fall

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)

fall

Design and fabrication of fixtures, jigs, templates, and specialized industrial tooling for manufacturing. Lecture, lab. Prerequisite: instructor approval.

MET 507 Manufacturing Enterprise. (3)

fall and spring

Organization and project management of cellular manufacturing methods, including IIT and lean manufacturing. Prerequisite: instructor approval.

MET 509 Applied Engineering Economics. (3)

spring

Fundamentals of engineering economics in a practical, industry-based approach. Includes effects of depreciation, taxes, inflation, and replacement analysis. Lecture, computer lab experiences.

MET 512 Introduction to Robotics. (3)

selected semesters

Introduces industrial robots. Topics include: robot workspace, trajectory generation, robot actuators and sensors, design of end effectors, and economic justification. Application case studies. Prerequisite: instructor approval.

MET 513 Advanced Automation. (3)

fall

Analysis and design of hard and flexible automation systems. Particular attention to material-handling technology. Prerequisite: instructor approval.

MET 514 CNC Computer Programming. (3)

spring

Theory and application of N/C languages using CAM software and CNC machine tools. Lecture, lab. Prerequisite: instructor approval.

MET 515 Manufacturing Simulation. (3)

spring

Computer simulation of manufacturing operations. Discrete event simulation models range from individual processes to whole factories. Lecture, computer lab experiences.

MET 517 Applied Computer-Integrated Manufacturing. (3)

fall

Techniques and practices of computer-integrated manufacturing, with emphasis on computer-aided design and computer-aided manufacturing. Prerequisite: MET 345 or instructor approval.

MET 571 Waste Minimization and Waste Prevention. (3)

spring

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.

MET 580 Practicum. (1–12)

selected semesters

MET 584 Internship. (1–12)

selected semesters

MET 590 Reading and Conference. (1–12)

selected semesters

MET 591 Seminar. (1–12)

selected semesters

MET 592 Research. (1–12)

selected semesters

MET 593 Applied Project. (1–12)

selected semesters

MET 594 Conference and Workshop. (1–12)

selected semesters

MET 595 Continuing Registration. (1)

selected semesters

MET 598 Special Topics. (1–4)

selected semesters

MET 599 Thesis. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Theatre

Master's and Doctoral Programs

herbergercollege.asu.edu/theatre

480/965-5337

GHALL 232

Johnny Saldaña, Interim Chair

Professors: Barker, Bedard, Eckard, Giner, Knapp, Mason, Saldaña, Thomson, Wills

Associate Professors: Acker, Edwards, Holloway, Riske, Vining

Assistant Professors: Furr-Soloman, Gharavi, Reyes, Steenerson, Sterling, Underiner, Woodson

Senior Lecturer: McMahon

Lecturers: Irvine, Tongret

The faculty in the Department of Theatre offer graduate programs leading to the M.A., the Master of Fine Arts, and the Ph.D. degrees in Theatre. Areas of concentration are performance, scenography and theatre for youth at the M.F.A. level and theatre for youth at the Ph.D. level. Students may also pursue an interdisciplinary program leading to the M.F.A. degree in Creative Writing. This program is offered by the faculties in the Departments of English and Theatre (see "[English](#)," page 198).

MASTER OF ARTS

The M.A. degree in Theatre is a flexible program of advanced theatre studies that prepares students for graduate study beyond the master's level. The program primarily emphasizes theoretical studies.

See "[Master's Degrees](#)," page 93, for general requirements.

Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires comprehensive undergraduate preparation in theatre (at least a Theatre minor or its equivalent), acceptable scores on either the Graduate Record Examination (GRE) or Miller Analogies Test, three letters of recommendation, and an undergraduate GPA of 3.00.

Application Deadline. The first deadline for receipt of applications and test scores is March 1 (February 1 for Creative Writing). After that date, admission is subject to space availability.

Deficiencies. Deficiencies in undergraduate preparation (not to exceed 12 hours) may be removed while pursuing the M.A. degree; courses taken to remove deficiencies may not be counted toward the degree.



Cady Mall looking north toward "A" Mountain

Tim Trumble photo

Program of Study. The required courses are THE 500, 504, 505, 520, and 521. Additional course work to complete the degree is selected by the student with the approval of the supervisory committee. Theatre courses must be completed with a grade of "B" or higher. A thesis or equivalent is required.

Foreign Language Requirements. Optional, depending upon research area, and with the approval of the supervisory committee.

Thesis or Equivalent Requirements. For students electing to prepare a thesis, the program consists of a minimum of 24 semester hours of graduate work and three hours each of thesis (599) and research (592) credit. A research thesis is especially recommended for students planning to continue graduate study beyond the master's degree and may be elected with the approval of the supervisory committee.

In consultation with their supervisory committee, students may elect to prepare a thesis equivalent. This option consists of 36 semester hours of graduate work, of which six hours are research (592) credit, and three hours of THP 593 Applied Project. Each student develops an approved project and supports this project with a written document. In addition, at least 18 semester hours of course work on the program of study must be 500-level courses and 20 semester hours must be in the major field.

GRADUATE PROGRAMS AND COURSES

Final Examinations. Both final written and oral examinations are required of all candidates. The written examination is based on the required courses; the oral examination is a defense of the thesis or equivalent.

MASTER OF FINE ARTS

The M.F.A. degree in Theatre is a 60-semester-hour professional program with concentrations in performance, scenography, and theatre for youth. The concentration in performance is focused on developing performers as creative artists. It emphasizes skills for approaching and creating new work and developing entrepreneurship, performance applications in multimedia, interdisciplinary collaboration, artistic integrity, and social responsibility.

In the scenography concentration, students learn skills and methodologies to create and execute designs in costumes, lighting, and scenery.

The concentration in theatre for youth is designed to prepare candidates for work as drama specialists; for college and university teaching in the field of theatre for youth; for professional careers in children's theatre; and for work in community theatres, recreational programs, and various social agencies.

Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires a minimum of 30 semester hours of course work in theatre, a minimum GPA of 3.20 for all course work in theatre, and acceptable scores on either the GRE or MAT.

For the concentration in performance, requirements include:

1. an interview and audition consisting of two performed selections, not to exceed four minutes total;
2. three letters of recommendation; and
3. a detailed statement of purpose.

Dates and sites for interviews may be obtained from the Department of Theatre.

For the concentration in scenography, three letters of recommendation are required from leaders in the field of theatre, education, or art. In addition, applicants must provide a portfolio of 12 slides or photographs of their work with a return envelope and postage, as well as a statement of educational and artistic objectives. An interview is recommended; dates and sites may be obtained from the Department of Theatre.

For the concentration in theatre for youth, three letters of recommendation are required from leaders in the field of theatre for youth, theatre education, or recreation, as well as a statement of educational and career goals. Submission of a current résumé is also necessary. An interview is strongly suggested but not required.

More detailed information regarding admission requirements for the concentration may be obtained from the Department of Theatre Web site.

Application Deadline. The first deadline for receipt of applications and test scores is March 1. After that date, admission is subject to space availability.

Program of Study. Each student works closely with a supervisory committee to develop a program of study in required and elective course work. All M.F.A. candidates majoring in Theatre are evaluated at the end of each semester by their supervisory committee, with the responsibility resting on each student for documenting professional development. The advancement of each student through each of the three years in the M.F.A. program is dependent upon a positive recommendation of the supervisory committee.

The program for the performance concentration consists of a minimum of 60 semester hours, distributed as follows: 48 hours of course work in the major (THE 500, 504, 505, 520, 521; THP 501, 502, 503, 504, 598); six hours of THE 692 Research; and six hours of THP 693 Applied Project.

The program for the scenography concentration consists of 60 semester hours distributed as follows: 43 hours of required course work in the major (THE 500 [one hour], 504, 505, 520, 521; THP 506, 530, 540, 545, 649 [three hours], 691, six hours each of THP 684 Internship and THP 693 Applied Project); 12 hours of additional design and/or technical theatre classes which may be selected from THE 430; THP 431, 435, 441, 442, 444, 445, 494; and five additional hours of electives subject to the approval of the supervisory committee.

The program for theatre for youth consists of 60 semester hours, distributed as follows: 39 hours of required course work in the major (THE 500, 504, 505, 520, 521, 524; THP 411, 511, and 611 or 618, six hours each of THP 684 Internship and THP 693 Applied Project); and 21 hours of approved electives in the major and related areas.

Credit Before Admission. Subject to approval by the supervisory committee, a maximum of 24 semester hours of graduate work from a completed master's degree program earned at ASU or another accredited institution may be applied to the program of study. In other cases, a maximum of nine semester hours of nondegree graduate work from ASU or another institution may be applied (see "[Credit Completed Before Admission](#)," page 93). All course work for the degree must be completed within the six-year time limit.

Foreign Language Requirements. Optional.

Final Examinations. A comprehensive examination or comprehensive review in the area of concentration is required. In addition, students failing to receive a grade of "B" or higher in THE 504, 505, 520, and 521 must pass a written comprehensive examination on the subject matter of those courses. A final project THP 693 Applied Project (six hours), supported by written documentation and defended in an oral defense, is required.

Deficiencies. Deficiencies in undergraduate preparation of no more than 12 hours may be removed while pursuing the M.F.A. degree; courses taken to remove deficiencies may not be counted toward the degree.

DOCTOR OF PHILOSOPHY

The Ph.D. degree is designed to give students a broad knowledge of theatre as well as special research, production, and teaching skills in theatre for youth. A detailed

description of the program may be obtained from the Department of Theatre Web site.

See [“Doctor of Philosophy,” page 96](#), for general requirements.

Application and Admission. Applicants must meet all admission requirements of the Graduate College. In addition, the Department of Theatre requires a master’s degree in theatre or education; a minimum of 36 hours of undergraduate and graduate course work in theatre (to include courses in dramatic literature, acting, directing, stagecraft, improvisation with youth, theatre for children, children’s literature, research methods, theatre history, and theatre theory/criticism); acceptable scores on the GRE and on the Test of English as a Foreign Language (where applicable); three letters of recommendation; a current résumé; writing sample; transcripts; and statement of purpose.

Application Deadline. The first deadline for receipt of applications and test scores is March 1. After that date admission is subject to space availability.

Program of Study. A total of 90 semester hours is required for this degree, consisting of (1) a minimum of 66 semester hours of graduate course work (including a maximum of 30 semesters hours accepted from the first year of graduate study, a core of 15 semester hours of required courses, and 21 semester hours of elective and research credits); and (2) 24 semester hours of research and dissertation preparation.

A minimum of 30 semester hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. at ASU.

In meeting these requirements, students, with the advice of the supervisory committee, may select theatre courses in areas such as theatre education, directing, acting, design, playwriting, theatre history, and theatre theory/criticism, in addition to tutorial courses, as well as courses offered by other departments in areas such as pertinent research methodologies, educational theory and methodology, aesthetic theory, the arts and arts education, and children’s literature. Students are encouraged to be involved in on- and off-campus production and teaching. All activities are selected to help students meet the goals of the program and develop the capability of becoming leaders in the field.

Research Technique Requirement. Students must successfully complete two graduate level courses in qualitative or quantitative research methods approved by their committee, or they must successfully pass an examination in a foreign language approved by their committee.

Preliminary Reviews. Reviews of a student’s performance in courses and development of research skills, artistic skills, and teaching competencies are conducted by the supervisory committee at the end of each semester.

Comprehensive Examinations. These examinations are composed of written and oral components centering upon: theatre history, literature, and criticism; theatre for youth and theatre education; and the research area.

Dissertation Requirements. A dissertation based on original research work of high quality, demonstrating proficiency

in the student’s special field, is required. (See [“Doctoral Dissertations,” page 95](#).)

Financial Assistance. University scholarships, fellowships, grants, and other forms of financial assistance are available. See [“Financing Graduate Studies,” page 45](#), and [“Assistantships and Associateships,” page 91](#). Graduate assistantships are granted by the Department of Theatre; application forms and information concerning graduate assistantships are available through the graduate secretary, Department of Theatre.

RESEARCH ACTIVITY

Recent Ph.D. dissertations completed in Theatre for Youth:

An Interrogation of Drama in Colonial Educational Contexts: Three Boys Schools in Queensland, Australia, by Janet McDonald.

Mapping the Cultural Geography of Childhood or Constructing the Child in Child Drama: 1950–Present, by Stephani Woodson.

Drama Activities at the Ethical Culture School, 1878–1930, by Virginia Page Tennyson.

Longevity and the Secondary Theatre Arts Teacher: A Case Study, by Cynthia Brown.

Russian Theatre for Young Audiences and the Changes in Ideological Function with Glasnost and Perestroika, by Manon C. van de Water.

Understanding Two Teachers’ Practices and Their Use of Theatre in the Elementary School Classroom, by Lorenzo Garcia.

THEATRE (THE)

THE 400 Focus on Film. (3)

fall, spring, summer

Specialized study of prominent film artists, techniques, and genres. Emphasizes the creative process. May be repeated for credit. Prerequisite: ENG 101 or 105.

THE 402 Gender Identity in Film. (3)

selected semesters

Examines the representation of gender in Hollywood cinema with particular focus on films from 1970 to the present. Prerequisite: THE 300.

THE 403 Independent Film. (3)

once a year

Examines independent films and filmmakers in the United States, 1968 to the present.

THE 404 Foreign Films and Filmmakers. (3)

once a year

Films and filmmakers from Europe, Asia, Australia, Far East, South America, and Caribbean. Emphasizes cultural content and filmmaking philosophies.

THE 405 Film: Great Performers and Directors. (3)

fall, spring, summer

Examines processes and influences of one or more great film performers and/or directors. May be repeated for credit. Prerequisite: THE 300.

THE 421 History of the English Theatre. (3)

selected semesters

History of the artists, events, and plays in the development of English theatre from medieval times to the present. Lecture, group and independent work. Prerequisite: THE 100 or 220.

THE 422 Latino and Latina Theatre. (3)

selected semesters

Readings, discussion, video of dramatic literature and production styles of Latino/Latina playwrights and theatre companies in the United States. Prerequisites: both ENG 101 and 102 or only ENG 105.

GRADUATE PROGRAMS AND COURSES

THE 424 Trends in Theatre for Youth. (3)

selected semesters

Surveys the history, literature, and contemporary practices in theatre for youth.

THE 430 History of Costume: Western Tradition. (3)

selected semesters

Studies major costume styles throughout history of Western civilization and how these fashions reflected society. Explores how styles can be used by theatrical costumers.

THE 440 Theatre Forms and Contexts. (3)

fall and spring

Explores 20th-century modernist theatrical forms and movements and development of alternative strategies for analyzing contemporary theatre and performance. Prerequisites: THE 220, 320, 321; Theatre major.

THE 480 Methods of Teaching Theatre. (4)

spring

Applies materials, techniques, and theories for theatre with 9th through 12th-grade students. Emphasizes curriculum development and praxis. Prerequisite: theatre education concentration or written instructor approval.

THE 500 Research Methods. (1–3)

fall

Introduces graduate study in theatre.

THE 504 Studies in Dramatic Theory and Criticism. (3)

fall

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)

spring

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)

fall and spring

Assigned individual reading program in standard sources and masterpieces in theatre literature. May be repeated for credit.

THE 520 Theatre History and Literature I. (3)

fall

Surveys historiographical issues, historical periods, and theatre literature, through the 17th century.

THE 521 Theatre History and Literature II. (3)

spring

Surveys historiographical issues, historical periods, and theatre literature, from the 17th century to present.

THE 524 Advanced Studies in Theatre for Youth. (3)

fall

In-depth study of the history, literature, and contemporary practice of theatre for youth. Prerequisite: written instructor approval.

THE 562 Literary Management Workshop. (3)

once a year

Advanced literary management for the contemporary theatre, including trends in new play development, festivals and productions throughout the United States. Participation in Arizona Playwriting Competition. Prerequisite: THP 560 or written instructor approval.

THE 591 Seminar. (3)

selected semesters

Selected topics in child drama, community theatre, and theatre history. Prerequisite: written instructor approval.

THE 598 Special Topics. (1–4)

fall and spring

Topics may include the following:

- College Teaching: Dramatic Analysis

THE 692 Research. (1–12)

selected semesters

THE 700 Advanced Research Methods. (3)

fall

Critical review of research, development, and design of research in theatre and theatre for youth.

THE 791 Seminar. (3)

selected semesters

Selected topics offered on a revolving basis. May be repeated for credit when topics vary.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 48.](#)

THEATRE PERFORMANCE AND PRODUCTION (THP)

THP 401 Theatre Practicum. (1–3)

fall and spring

Production assignments for advanced students of technical production, stage and business management, and design. May be repeated for credit. Prerequisites: THP 301; written instructor approval.

THP 406 Advanced Scenography. (3)

selected semesters

Process of production collaboration among scenographers, directors, and playwrights. Taught in conjunction with THP 519. Prerequisites: a combination of THP 214 and 340 and 345 or both THP 313 and 340.

THP 411 Methods of Teaching Drama. (3)

fall

Applies materials, techniques, and theories with grades K–8 youth. Regular participation with children. Prerequisite: THP 311 or written instructor approval.

THP 418 Directing the Actor. (3)

once a year

Practical applications of directing for the stage. Rehearsal and presentation of scenes and short plays. Prerequisites: THP 318; instructor approval.

THP 430 Costume Design. (3)

selected semesters

Principles of costume design with projects in both modern and period styles. Includes budgets and fabric/pattern estimates. Lecture, studio. Prerequisite: THP 214.

THP 431 Advanced Costume Construction. (3)

selected semesters

Specialized training in costume construction problems and crafts with projects in tailoring, millinery, and period accessories. Prerequisites: both THP 214 and 331 or only instructor approval.

THP 435 Advanced Technical Theatre. (3)

selected semesters

Selection of materials, drafting of working drawings, tool operation, and construction techniques. 2 hours lecture, 2 hours lab. Prerequisites: both THP 340 and 345 or only written instructor approval.

THP 440 Advanced Scene Design. (3)

selected semesters

Advanced studio projects in designing scenery for a variety of stage forms. Fee. Prerequisite: THP 340 or written instructor approval.

THP 441 Scene Painting. (3)

selected semesters

Studio projects in painting stage scenery. Fee. Prerequisite: THP 340 or written instructor approval.

THP 442 Drawing. (3)

selected semesters

Techniques in drawing and rendering for scenic, costume, and lighting design. Prerequisite: written instructor approval.

THP 444 Drafting for the Stage. (3)

selected semesters

Fundamentals of and practice in graphic techniques for the stage. Introduces computer-aided design for the stage. 2 hours lecture, 3 hours studio. Fee. Prerequisites: THP 213; written instructor approval.

THP 445 Advanced Lighting Design. (3)

selected semesters

Specialized techniques in stage lighting. Advanced application of design process, graphic techniques of design presentation, and use of qualities of light. Lecture, class workshops. Fee. Prerequisite: THP 345 or written instructor approval.

THP 450 Theatre Organization and Management. (3)

once a year

Overview of nonprofit arts: organizational design, strategic planning, financial management, and leadership. Prerequisite: THE 220.

THP 460 Playwright's Workshop. (3)*fall and spring*

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)*fall and spring*

Studio work with the instructor, centered on revisions of original plays. May be repeated for credit. Studio. Prerequisite: THP 460 or written instructor approval.

THP 472 Advanced Movement for the Stage. (3)*once a year*

Movement techniques for the classical and nonrealistic theatre; stage combat and special skills. Prerequisite: THP 272 or instructor approval.

THP 477 Advanced Speech for the Stage. (3)*once a year*

Exercises to develop vocal flexibility and power; mastery of elevated American diction and language skills applied to classical and nonrealistic drama; stage dialects. Prerequisite: THP 377.

THP 481 Secondary School Play Production. (3)*fall*

Methods of directing, designing, and coordinating play production experiences at the secondary school level. Off-campus practicum. Prerequisites: both THP 318 and theatre education concentration or only instructor approval.

THP 484 Internship. (1–4)*selected semesters***THP 485 Acting: Advanced Classical Scene Study. (3)***once a year*

Rehearsal and performance of period, classical, and nonrealistic plays. Emphasizes understanding poetic language and strong vocal and physical skills. Prerequisite: THP 385 or instructor approval.

THP 486 The Meisner Approach to Acting. (3)*once a year*

Improvisations and exercises developed by Sanford Meisner applied to scene work from selected texts. Studio. Prerequisite: introductory acting classes.

THP 487 Acting for TV and Film. (3)*once a year*

Professional television and film acting techniques, terminology, and on-camera experience. Studio. Prerequisite: THP 207 or 285.

THP 488 Audition Techniques. (3)*once a year*

Techniques and preparation for stage, commercial, and TV/film auditions utilizing monologues, cold readings, and personal style. Studio. Prerequisite: introductory acting classes.

THP 489 Actor Career Development. (3)*once a year*

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)*once a year*

Topics may include the following:

- Advanced Screenwriting
- Performance and Technology
- Problems in Directing
- Solo and Collaborative Performance
- Solo Performance
- Stage Dialects
- Storytelling
- Theory and Practice of Performance

THP 498 Pro-Seminar. (1–7)*once a year*

Topics may include the following:

- Directing. (1–6)
- Theatre-for-Youth Tour. (1–6)
- Theatre in Education. (1–6)

Prerequisite: written instructor approval.

THP 501 Performance: Solo Performance. (1–8)*once a year*

Students begin to define their mission in art. Emphasizes the actor as a solo storyteller, speaking as herself or himself. Studio. Prerequisite: instructor approval.

THP 502 Performance: Aesthetics of Theatre Art. (1–8)*once a year*

Understanding and analyzing scripts and performance in order to be an effective actor/storyteller who speaks as a character. Projects focus on solo, duet performances. Studio. Prerequisite: instructor approval.

THP 503 Performance: The Ensemble. (1–8)*once a year*

Ensemble, working with a playwright, creates a play that addresses social issues through improvisation and community input. Studio. Prerequisite: instructor approval.

THP 504 Acting: Transformation. (1–8)*once a year*

Fundamentals including combat, scansion, poetic language, acting style. Scene study, ensemble performance projects focused on Shakespeare, new scripts. Studio. Prerequisite: THP 503 or written instructor approval.

THP 506 Scenography. (3)*selected semesters*

Process of production collaboration. Taught in conjunction with THP 519. Fee. Prerequisite: theatre graduate standing or written instructor approval.

THP 507 Acting: Advanced Research and Performance. (1–3)*once a year*

Acting in advanced theatre projects, productions, or collaborative performance in directing classes. May be repeated for credit. Studio. Prerequisite: instructor approval.

THP 509 Singing for Actors. (1)*fall and spring*

Introduces 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. performance concentration or written instructor approval.

THP 511 Improvisation with Youth Workshop. (3)*spring*

Theories and techniques of drama with various populations of youth. Emphasizes how research informs practice. Includes practicum. Prerequisites: only THP 411 or both graduate standing and written instructor approval.

THP 512 Puppetry Workshop. (3)*fall, spring, summer*

Survey of puppetry in education, puppetry as an art form in design and performance. Fee. Prerequisite: graduate standing or written instructor approval.

THP 517 Stage Management Practicum. (3)*once a year*

Readings and research in stage management and participation as a stage manager in a university theatre production. Prerequisite: written instructor approval.

THP 518 Advanced Directing Lab. (3)*once a year*

Active discovery of directing concepts through practical exercises and collaboration; deconstruction of contemporary/classic literature. Explores director as primary artist. Lab. Prerequisite: written instructor approval.

THP 519 Directing: Works in Progress. (3)*once a year*

Advanced projects in directing concentrating on a collaborative process between director, playwright, actors, and designers. Focuses primarily on new scripts or adaptations of literature. May be repeated for credit. Studio, on-site practicum. Prerequisites: THP 418; instructor approval.

THP 530 Advanced Costume Design. (3)*selected semesters*

Advanced studio projects in costume design for a variety of production forms. Prerequisite: written instructor approval.

GRADUATE PROGRAMS AND COURSES

THP 540 Scene Design Applications. (3)

selected semesters

Conceptual and practical application of the design process including graphic and sculptural projects. Practical design problems investigated in laboratory. Lecture, lab. Lab fee. Prerequisite: written instructor approval.

THP 545 Lighting Design Applications. (3)

selected semesters

Advanced studio projects in stage lighting design. Prerequisite: written instructor approval.

THP 560 Playwright's Workshop. (3)

fall and spring

Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. May be repeated for credit. Studio. Prerequisite: written instructor approval.

THP 561 Scripts in Progress. (3)

fall and spring

Studio work with the instructor centered on revisions of original plays. May be repeated for credit. Studio. Prerequisite: THP 560 or written instructor approval.

THP 584 Internship. (1–3)

selected semesters

Field research and on-site training in theatre for youth, community theatre, and production techniques. Prerequisite: written instructor approval.

THP 592 Research. (1–12)

selected semesters

THP 593 Applied Project. (1–12)

selected semesters

Prerequisite: written instructor approval.

THP 594 Conference and Workshop in Child Drama. (3)

once a year

Prerequisite: written instructor approval.

THP 598 Special Topics. (1–4)

once a year

Lecture, studio. Topics may include the following:

- Advanced Screenwriting
- College Teaching:
 - Acting
 - Improvisation with Youth
 - Movement
 - Puppetry
 - Theatre for Social Change
 - Voice
- Performance and Technology
- Solo and Collaborative Performance
- Solo Performance
- Stage Dialects
- Storytelling

THP 599 Thesis. (1–12)

selected semesters

THP 611 Improvisation with Youth Seminar. (3)

once a year

Examines current research, theory, and practices in drama with youth. Development and execution of research projects. Prerequisite: written instructor approval.

THP 618 Directing Practicum. (3)

fall and spring

Practical experience in directing and producing an entire play or musical for young audiences. Prerequisite: written instructor approval.

THP 649 Design Studio. (3)

fall and spring

Projects include design of scenery, costume, lighting, or sound for laboratory or mainstage productions. May be repeated for credit. Prerequisite: written instructor approval.

THP 684 Internship. (1–6)

fall, spring, summer

Field research in performance, improvisation with youth, theatre for youth, puppetry, and scenography. Prerequisite: written instructor approval.

THP 691 Seminar: Scenography. (3)

selected semesters

Examines and researches modern concepts and practices of scenography. Prerequisite: written instructor approval.

THP 693 Applied Project. (1–12)

fall, spring, summer

Final projects for M.F.A. Theatre candidates in performance, scenography, and theatre for youth. Prerequisite: written instructor approval.

THP 783 Field Work. (1–12)

selected semesters

Topics may include the following:

- Theatre Education

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 48.

Translation

See "[Certificate in Translation](#)," page 246.

Transportation Systems

Interdisciplinary Certificate Program

www.asu.edu/caed/transportation

480/965-6395

ARCH 119

Mary Kihl, Director

Aeronautical Management Technology (ASU East)

Professor: Gesell

Associate Professor: Jackson

Assistant Professor: Karp

Civil and Environmental Engineering

Professor: Mamlouk

Assistant Professors: Owusu-Antwi, Zhu

Geography

Professor: Burns

Associate Professor: Kuby

Planning and Landscape Architecture

Professors: Kihl, Mushkatel, Pijawka

Associate Professor: Guhathakurta

Under the auspices of the Graduate College, 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 to examine transportation-related issues from a variety of perspectives and in the context of different travel modes.

The certificate program requires a minimum of 15 semester hours of course work. To qualify for the certificate, the student must complete an interdisciplinary issues proseminar class (three semester hours) and a capstone research paper that explores a transportation problem from a multidisciplinary perspective (three semester hours). A thesis in the area of transportation may substitute for the capstone paper. Students selecting the thesis option must take one additional elective course.

Core Courses

TRC 591 Seminar3
 TRC 593 Applied Project3

Elective Courses. Nine semester hours of elective course work is also required. Students should choose three classes from the following list of approved transportation-related courses.

AMT 521 Air Transportation Regulation3
 AMT 525 Airport Planning and Design3
 AMT 527 Airline Management Strategies3
 AMT 598 Special Topics3
 CEE 475 Highway Geometric Design3
 CEE 512 Pavement Performance and Management3
 CEE 515 Properties of Concrete3
 CEE 573 Traffic Engineering3
 CEE 598 Special Topics3
 GCU 442 Geographical Analysis of Transportation3
 GCU 444 Geographic Studies in Urban Transportation3
 GCU 591 Seminar3
 GPH 471 Cartographic Design3
 GPH 494 Special Topics3

GPH 598 Special Topics3
 PAF 505 Public Policy Analysis3
 PAF 591 Seminar3
 PUP 510 Citizen Participation3
 PUP 544 Urban Land Use Planning3
 PUP 598 Special Topics3
 PUP 642 Land Economics3

Master’s degree candidates in good standing in participating departments may apply. Current practicing professionals who already hold a graduate degree or who have at least three years of postbaccalaureate professional transportation experience may also apply for admission to the certificate program. Applications are reviewed by the Transportation Systems Certificate Admissions and Advisory Committee, made up of representatives of participating departments. Enrollment in all classes outside the major requires permission of the instructor. For more information, contact the program director, 480/965-6395.

TRANSPORTATION SYSTEMS CERTIFICATE (TRC)

TRC 591 Seminar. (1–12)

fall and spring

Topics may include the following:

- Transportation Systems Pro-Seminar. (3)

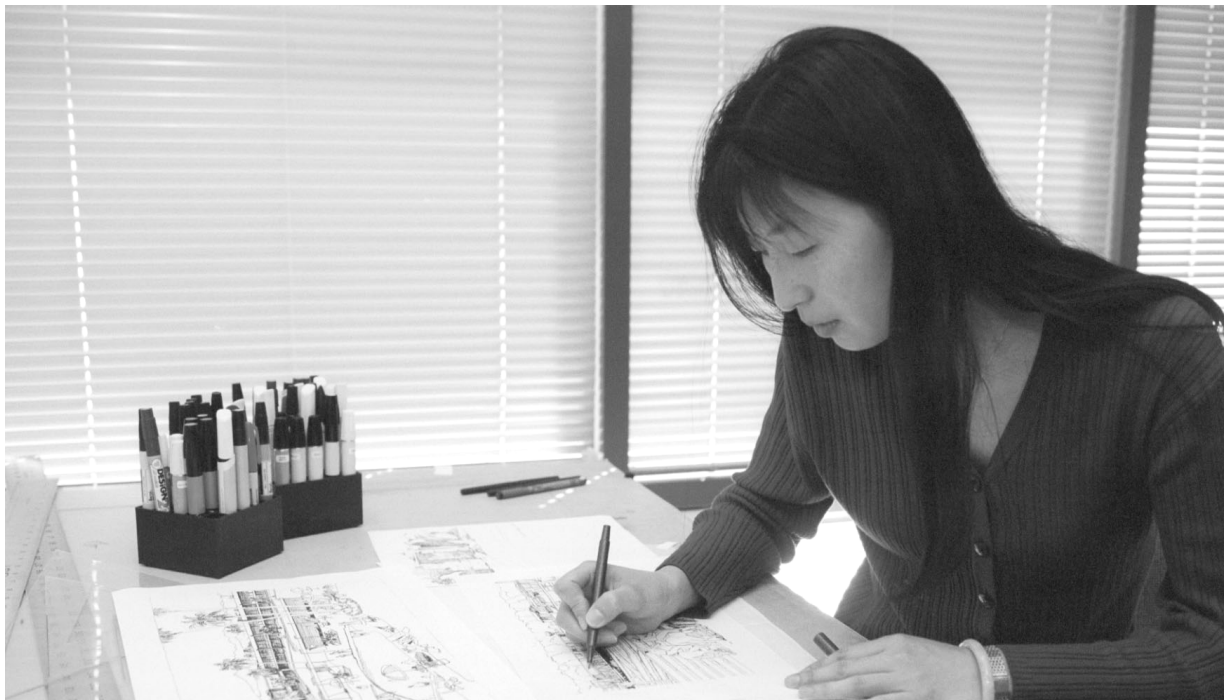
TRC 593 Applied Project. (1–12)

fall and spring

Topics may include the following:

- Transportation, Advanced Research. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 48.](#)



Xin He works on drawings in the Joint Urban Design Studio in the Downtown Center—a partnership between the Colleges of Architecture and Environmental Design and Extended Education.

Tim Trumble photo

International Programs

ipo.asu.edu

William G. Davey, Ph.D., Director

PURPOSE

Arizona State University is an internationally recognized research and doctoral granting institution. The International Programs Office (IPO) is responsible for developing and implementing a wide variety of international policies and activities. As part of the Office of the Senior Vice President and Provost, IPO administers university study programs abroad, visiting scholar programs at ASU, and protocol for international visitors. In cooperation with academic and administrative units, IPO develops the international policies for ASU, represents the international interests of the university to the community at large, administers scholarships for studying abroad, supports faculty exchanges, and facilitates joint international research and training projects. IPO also represents the university's international interests to professional organizations and government agencies. The Office of Immigration Programs for International Faculty and Scholars within IPO not only assumes responsibility for international visitors who come to work, study, or conduct research on the ASU campus, but also operates one of the nation's first U.S. Passport Offices located at a state university.

ACADEMIC PROGRAMS

Two types of programs—study abroad and student exchange—are designed to enhance the academic development professional preparation, and international perspective of students.

IPO offers more than 100 fall and spring semester, summer sessions, and year-long international programs for ASU resident credit.

Procedures. Students interested in participating in such programs should identify their interests as soon as possible and should express their interests to the International Programs Office in TMPCT 198. Students on an official study abroad or exchange program retain full-time student status and the catalog status they held at the time of their departure.

IPO assists students through every stage of planning, preparation, participation, and return from exciting international educational experiences. Advisors are available to assist students in choosing a program that meets one's academic, personal, and professional goals.

Information on programs can be obtained from the International Programs Office in TMPCT 198, from the IPO Web page at ipo.asu.edu, or by phone at 480/965-5965.

How to Apply. Before participating in a study abroad or an exchange program, students must complete an IPO Qualifying Application, available on the Web at ipo.asu.edu. An interview is then conducted at which time qualified applicants are guided through any additional application procedures that are specific to the student's particular international program. After the application process is completed, students attend pre-departure orientations conducted by IPO. These presentations are designed to thoroughly prepare participants for a rewarding international experience.

Immigration Programs for International Faculty and Scholars. The International Faculty and Scholars Office (Immigration/Employment Visa Services), of the IPO is responsible for administration of the university's Exchange Visitor Program and Employment-Based Visa Programs. The responsibilities of this office also include providing information, guidance, and advice to the various departments, programs and colleges of ASU Main, ASU East, and ASU West, as well as to the university's faculty, staff, students, and guests on questions and issues related to the university's J-1 Exchange Visitor, and Employment-Based Visa programs, and other immigration-related issues.



The Campo Plaza in Siena, Italy

Mark Gallovic photo

Summer Sessions

www.asu.edu/ssc

[Carol Switzer, M.S., Director](#)

PURPOSE

The summer sessions, offering more than 3,000 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 terms of content, credit awarded, and the standards expected of students regarding academic performance.

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. See the "[Graduate College Calendar](#)," page 17, for specific dates.

All ASU Main courses (except some EPE courses) are held in air-conditioned classrooms or laboratories. A number of courses are offered at off-campus locations.

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 during the last week of January.

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. An application form is provided in the *Summer Sessions Bulletin* and is also available on the Web at www.asu.edu/ssc/bulletin/application. 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 Graduate College](#)," page 86.

Bulletin. The *Summer Sessions Bulletin*, which contains the class schedule, the application form, and the registration procedure, is available the last week of January at the Office of Summer Sessions, ADM B167, and at all registrar sites. The *Summer Sessions Bulletin* is also available on the Web at www.asu.edu/ssc.

To request the *Summer Sessions Bulletin*, summer study abroad brochures, or other summer information, call 480/965-6611 or write

SUMMER SESSIONS
ARIZONA STATE UNIVERSITY
PO BOX 873003
TEMPE AZ 85287-3003

Food Services. Meal plans are available. For more information, call 480/965-3464 or write

SODEXHO MARRIOTT SERVICES
ARIZONA STATE UNIVERSITY
PO BOX 870901
TEMPE AZ 85287-0901

Housing. Air-conditioned dormitories are available for ASU Main students. For more information, call 480/965-3515 or write

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](#)," page 21.

Parking. A decal is required to park at ASU. For more information, call 480/965-6124 or write

PARKING SERVICES
ARIZONA STATE UNIVERSITY
PO BOX 870704
TEMPE AZ 85287-0704

Registration. Registration may be completed in person or by using SunDial. See the *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.

Tuition and Fees. Summer sessions students pay for the actual number of semester hours enrolled, plus the Associated Students' Association fee, the Financial Aid Trust Fee, and the Student Recreation Complex fee. Students are also required to pay any special fees attached to specific classes. See the *Summer Sessions Bulletin*.

ASU Main Directory

For the “[ASU East Directory](#),” see page 438. For the “[ASU West Directory](#),” see page 447. For the “[ASU Extended Campus Directory](#),” see page 463.

Organization	Location	Telephone	Web Address
Accounts Receivable	ADM A109	480/965-6341	www-comp.vpas.asu.edu
Admissions	—	—	—
Graduate	WILSN 101	480/965-6113	www.asu.edu/graduate/admissions
Law	LAW 101	480/965-1474	www.law.asu.edu
Readmissions (Undergraduate)	SSV 142	480/965-7440	www.asu.edu/registrar/readmissions
Undergraduate	SSV 112	480/965-7788	www.asu.edu/admissions
Adult Re-Entry	MU 14	480/965-2252	www.asu.edu/studentlife/reentry
Architecture and Environmental Design, College of	ARCH 134	480/965-8169	www.asu.edu/caed
Architecture, School of	AED 162	480/965-3536	www.asu.edu/caed/architecture
Design, School of	AED 154	480/965-4135	www.asu.edu/caed/design/designHOME.html
Herberger Center for Design Excellence	ARCH 119	480/965-6693	www.asu.edu/caed/herberger
Planning and Landscape Architecture, School of	AED 158	480/965-7167	www.asu.edu/caed/Landscape_and_Planning/ planningHome.htm
Arizona Drug and Gang Prevention Resource Center	ASUDC B2	480/727-5015 1-888-432-2347	www.asu.edu/adgprc
Arizona Prevention Resource Center	ASUDC B2	480/727-2772 1-888-432-2772	www.asu.edu/aprc
Associated Students of ASU (ASASU)	MU 310	480/965-3161	www.asu.edu/asasu
ASU Alumni Association	MAIN 200	480/965-2586	www.asu.edu/alumni
Administration	MAIN 200	480/965-2086	—
Alumni Publications/ASU Vision Magazine	MAIN 200	480/727-6280	—
Alumni Relations	MAIN 200	480/965-5276	—
Alumni Travel	MAIN 200	480/965-0099	—
Business Office	MAIN 200	480/965-9357	—
Campuses, Chapters, and College Associations	MAIN 200	480/965-5276	—
Career Programs	MAIN 200	480/965-5074	—
Membership/Marketing	MAIN 200	480/965-8346	—
Records Department	MAIN 200	480/965-2127	—
Reunions and Traditions	MAIN 200	480/965-4282	—
Scholarships/Alumni Development	MAIN 200	480/965-4034	—
Student Relations	MAIN 200	480/965-7754	—
Sun Devil Advocates (Grass Roots Network)	MAIN 200	480/965-4078	—
ASU West Alumni Programs	FAB S363	602/543-5315	—
ASU East ¹	—	480/727-3278	www.east.asu.edu
ASU Extended Campus ²	—	480/965-9696	www.asu.edu/xed
ASU Main	—	480/965-9011	www.asu.edu
ASU West ³	—	602/543-5500	www.west.asu.edu
Bookstore, ASU	BKSTR	480/965-7928	bookstore.asu.edu/index2.html

¹ See “[ASU East Directory](#),” see page 438.

² See “[ASU Extended Campus Directory](#),” see page 463.

³ See “[ASU West Directory](#),” see page 447.

Organization	Location	Telephone	Web Address
Business, College of	BA 109	480/965-4227	www.cob.asu.edu
Accountancy and Information Management, School of	BA 223	480/965-3631	www.cob.asu.edu/acct
Business Administration (M.B.A.)	BA 160	480/965-3332	www.cob.asu.edu/mba
Business Administration (Ph.D.)	BA 151	480/965-3368	www.cob.asu.edu/grad/phd
Economics, Department of	BAC 659	480/965-3531	www.cob.asu.edu/ecn
Finance, Department of	BAC 519	480/965-3131	www.cob.asu.edu/fin
Health Administration and Policy, School of	BA 318	480/965-7778	www.cob.asu.edu/hap
International Business Studies	BA 109	480/965-0596	www.cob.asu.edu/up/jpo.cfm
Management, Department of	BA 323	480/965-3431	www.cob.asu.edu/mgt
Marketing, Department of	BAC 460	480/965-3621	www.cob.asu.edu/mkt
Small Business, Center for the Advancement of	BAC 111	480/965-3962	www.cob.asu.edu/up/smallbusiness.cfm
Supply Chain Management, Department of	BA 446	480/965-6044	www.cob.asu.edu/scm
Campus Dining Services	MU 138	480/965-3464	www.asucampusdining.com
Career Services	SSV 329	480/965-2350	career.asu.edu
Cashiering Services	SSV 244	480/965-7468	www-comp.vpas.asu.edu
Child and Family Services	MU 14C	480/965-9515	www.asu.edu/vpsa/family
Co-Curricular Programs	MCL 109B	480/965-9600	www.asu.edu/vpsa/partnerships
Community Service Program	MU 303	480/965-2255	www.asu.edu/mu/community
Counseling and Consultation	SSV 334	480/965-6146	www.asu.edu/counseling_center
	SHS A168	480/965-4726	—
Creative Writing (M.F.A.)	LL 307C	480/965-3528	www.asu.edu/clas/english/creativewriting
Disability Resources for Students	MCENT	—	www.asu.edu/drs
TTY	—	480/965-9000	—
Voice	—	480/965-1234	—
Drop/Add and Withdrawal Information	SSV 144	480/965-3124	—
Education, College of	EDB 108	480/965-3306	coe.asu.edu/coe
Computer Support/Student Computer Lab	EDB 122	480/965-2126	coecs.asu.edu
Curriculum and Instruction, Division of	ED 426	480/965-1644	www.ed.asu.edu/coe/candi
Curriculum and Instruction, Graduate Program Office	ED 434	480/965-4602	hal.asu.edu/cni/home.htm
Dean's Office	EDB 104	480/965-3306	courses.ed.asu.edu/deanos
Education Policy Studies Laboratory	EDB L1-01	480/965-1886	www.asu.edu/educ/epsl
Educational Leadership and Policy Studies, Division of	ED 120	480/965-6357	www.ed.asu.edu/elps
Educational Research and Services, Bureau of	ED 140	480/965-3538	bers.asu.edu
Indian Education, Center for	ED 402	480/965-6292	coe.asu.edu/cie
Professional Field Experiences, Office of (Student Teaching)	EDB L1-14	480/965-6255	www.ed.asu.edu/coe/pfe
Psychology in Education Admissions Information (Recording, Voice Mail)	—	480/965-6420	—
Psychology in Education, Division of	EDB 302	480/965-3384	coe.asu.edu/psyched
Southwest Center for Education Equity and Language Diversity	ED 440	480/965-7134	www.asu.edu/educ/sceed

¹ See "ASU East Directory," see page 438.

² See "ASU Extended Campus Directory," see page 463.

³ See "ASU West Directory," see page 447.

ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
Education, College of (continued)			
Student Services, Office of (Academic Advising and Certification)	EDB L1-13	480/965-5555	coe.asu.edu/osa
Student Services, Office of (Recruitment and Support Programs) (Tutoring Scholarships)	EDB L1-19	480/965-5555	coe.asu.edu/oss
Educational Opportunity Center	1000 E. Apache No. 118	480/894-8451	www.asu.edu/studentlife/eoc
Engineering and Applied Sciences, College of	ECG 100	480/965-3421	www.eas.asu.edu
Bioengineering, Department of	ECG 334	480/965-3028	www.eas.asu.edu/~bme
Chemical and Materials Engineering, Department of	ECG 202	480/965-3313	www.eas.asu.edu/~cme
Civil and Environmental Engineering, Department of	ECG 252	480/965-3589	www.eas.asu.edu/~civil
Computer Science and Engineering, Department of	GWC 206	480/965-3190	cse.asu.edu
Construction, Del E. Webb School of	SCOB 241	480/965-3615	construction.asu.edu
Electrical Engineering, Department of	ENGR 552	480/965-3424	www.eas.asu.edu/ie
Engineering, School of	ECG 104	480/965-1726	—
Industrial Engineering, Department of	GWC 502	480/965-3185	www.eas.asu.edu/~imse
Mechanical and Aerospace Engineering, Department of	ECG 346	480/965-3291	www.eas.asu.edu/~mae
Equal Opportunity/ Affirmative Action TTY	ADM B171 —	480/965-5057 480/965-0471	www.eoaa.asu.edu —
Exercise Science (Ph.D.)	PEBW M201	480/965-7906	www.asu.edu/clas/espe
Extended Education, College of ²	ASUDC C319	480/965-3046	www.asu.edu/xed
FASTT (Financial Aid Services Through Technology)	—	—	www.asu.edu/fa
Fine Arts, Herberger College of	GHALL 132	480/965-6536	herbergercollege.asu.edu
Art, School of	ART 102	480/965-3468	herbergercollege.asu.edu/art
Dance, Department of	PEBE 107A	480/965-5029	herbergercollege.asu.edu/dance
Music, School of	MUSIC E185	480/965-3371	herbergercollege.asu.edu/music
Theatre, Department of	GHALL 232	480/965-5359	herbergercollege.asu.edu/theatre
Fine Arts Box Office	FAC	480/965-6447	—
Freshman Year Experience	SSV 176	480/965-1512	www.asu.edu/vpsa/fye
Gerontology (Certificate)	WHALL 116	480/965-3225	www.asu.edu/graduate/gerontology
Graduate College	WILSN lobby	480/965-3521	www.asu.edu/graduate
Admissions	WILSN 101	480/965-6113	www.asu.edu/graduate/admissions
Advising/Referral Office	WILSN lobby	480/965-3521	www.asu.edu/graduate
Financial Assistance	WILSN 123	480/965-3521	www.asu.edu/graduate/financial
Format Office	—	480/965-3521	www.asu.edu/graduate/resources/student/formatinfo
General Office	—	480/965-3521	—
Scholarships	—	480/965-3521	—
Graduation Section	—	—	www.asu.edu/registrar/graduation
Commencement Office	ADM B167	480/965-6611	www.asu.edu/ssc/commence
Graduate Division	SSV 140	480/965-6980	
Greek Life	MU 305	480/965-2255	www.asu.edu/mu/greeklife

¹ See “ASU East Directory,” see page 438.

² See “ASU Extended Campus Directory,” see page 463.

³ See “ASU West Directory,” see page 447.

Organization	Location	Telephone	Web Address
Health and Wellness Center	SHS	480/965-3346	www.asu.edu/health
Appointments	—	480/965-3349	—
Fax	—	480/965-8914	—
Measles Information	—	480/965-1358	—
Human Resources Customer Service Center	ADM B263	480/965-2701	www.asu.edu/hr
Information Technology	—	—	www.asu.edu/it
Computer Accounts Office	CPCOM 105	480/965-1211	www.asu.edu/it/fyi/accounts
Computing Site Hours	—	480/965-6500	www.asu.edu/it/fyi/sites/siteschedule.html
Computing Sites	CPCOM atrium	480/965-4459	www.asu.edu/it/fyi/sites
	BAC 16	480/965-3074	—
	ECG 150	480/965-6280	—
	GWC 185	480/965-4307	—
Customer Assistance Center	CPCOM 202	480/965-5939	www.asu.edu/cacenter
Geographic Information Systems (GIS) Services	CPCOM 235	480/965-4007	www.asu.edu/gislab
Help Desk	CPCOM 202	480/965-6500	www.asu.edu/helpdesk
Instruction Support Lab	CPCOM 213	480/965-6739	is.asu.edu
Visualization Services	CPCOM 235	480/965-9699	www.asu.edu/visualization
International Programs Office	TMPCT 198	480/965-5965	ipo.asu.edu
International Student Office	SSV 265	480/965-7451	www.asu.edu/studentlife/iso
Justice Studies (Ph.D.)	WILSN 316	480/965-7682	www.asu.edu/copp/justice
Law, College of	LAW 101	480/965-6181	www.law.asu.edu
Admissions Office	LAW 120	480/965-1474	—
TTY	—	480/965-2048	—
Learning Resource Center	SSV 394	480/965-6254	www.asu.edu/vpsa/lrc
Liberal Arts and Sciences, College of	SS 111	480/965-6506	www.asu.edu/clas
Aerospace Studies, Department of	TC 324	480/965-3181	www.asu.edu/clas/afrotc
African American Studies Program	COWDN 227	480/965-4399	www.asu.edu/clas/afamstu
Anthropology, Department of	ANTH 233	480/965-6213	www.asu.edu/clas/anthropology
Biology, Department of	LSC 226	480/965-3571	lifesciences.asu.edu/biology
Chemistry and Biochemistry, Department of	PS D102	480/965-3461	www.asu.edu/clas/chemistry
Chicana and Chicano Studies, Department of	COWDN 224	480/965-5091	www.asu.edu/clas/chicana
Computational Biosciences Program	PSA 216	480/965-3951	www.asu.edu/compbiosci
English, Department of	LL 542	480/965-3168	www.asu.edu/clas/english
Exercise Science and Physical Education, Department of	PEBW M212	480/965-3875	www.asu.edu/clas/espe
Family and Human Development, Department of	COWDN 106	480/965-6978	www.asu.edu/clas/frhd
Geography, Department of	SCOB 340H1	480/965-7533	geography.asu.edu
Geological Sciences, Department of	PS F686	480/965-5081	geology.asu.edu
History, Department of	SS 204	480/965-5778	www.asu.edu/clas/history
Interdisciplinary Humanities Program	LL 641	480/965-6747	www.asu.edu/clas/humanities
Languages and Literatures, Department of	LL 440	480/965-6281	www.asu.edu/languages/index.htm
Mathematics and Statistics, Department of	PS A216	480/965-3951	math.la.asu.edu
Microbiology, Department of	LSE 210	480/965-1457	lifesciences.asu.edu/microbiology

¹ See “ASU East Directory,” see page 438.

² See “ASU Extended Campus Directory,” see page 463.

³ See “ASU West Directory,” see page 447.

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Organization	Location	Telephone	Web Address
Liberal Arts and Sciences, College of (continued)			
Molecular and Cellular Biology	LSE 441	480/965-0743	ls.la.asu.edu/mcb
Molecular Bioscience and Biotechnology	LSE 218	480/965-3414	lifesciences.asu.edu/mbb
Military Science, Department of	TC 100	480/965-3318	www.asu.edu/clas/military
Philosophy, Department of	PS A524	480/965-3394	www.asu.edu/clas/philosophy
Physics and Astronomy, Department of	PS F470	480/965-3561	phy.asu.edu
Plant Biology, Department of	LSE 218	480/965-3414	lifesciences.asu.edu/plantbiology
Political Science, Department of	MCENT 205	480/965-6551	www.asu.edu/clas/polisci
Psychology, Department of	PSY 237	480/965-3326	psych.la.asu.edu
Religious Studies, Department of	ECA 377	480/965-7145	www.asu.edu/clas/religious_studies
Sociology, Department of	SS 321	480/965-3546	www.asu.edu/clas/sociology
Speech and Hearing Science, Department of	LL 173A	480/965-2374	www.asu.edu/clas/shs
Women's Studies Program	ECA 209	480/965-2358	www.asu.edu/clas/womens_studies
Libraries (See " University Libraries ," page 358.)			
Memorial Union	MU	—	www.asu.edu/mu
Administrative Offices	MU mezzanine	480/965-5310	www.asu.edu/mu/staff.html
Event and Meeting Services	MU 1st level	480/965-3406	www.asu.edu/mu/ems.html
Information Desk	MU 1st level	480/965-5728	—
Lost and Found	MU 1st level	480/965-5728	—
Montgomery Computer Lab and Workroom	MU 1st level	480/727-6663	www.asu.edu/mu/lab.html
Sparky's Den	MU lower level	480/965-3646	www.asu.edu/mu/recreation.html
Multicultural Student Center	SSV 394	480/965-6060	www.asu.edu/studentlife/msc
Nursing, College of	NUR 344	480/965-3244	nursing.asu.edu
Community Health Services Clinic	—	480/941-9283	nursing.asu.edu/chs
Continuing and Extended Education	CSB 334	480/965-7431	nursing.asu.edu/ce
Graduate Program	NUR 444	480/965-3948	nursing.asu.edu/programs/graduate
Student Service Office	NUR 108	480/965-2987	nursing.asu.edu/studentervices
Operator, University	—	480/965-9011	—
Parents Association (Programs)	SSV 110	480/965-2602	www.asu.edu/admissions/parentprograms
Parking and Transit Services	University Towers	480/965-6406	www.asu.edu/dps/pts
Programming and Visual Arts	MU 304	480/965-6649	—
Public Programs, College of	WILSN 234	480/965-1034	www.asu.edu/copp
Advanced Public Executive Program	ASUDC C110	480/965-4006	www.asu.edu/copp/apep
American Indian Studies Program	AG 372	480/965-3634	www.asu.edu/copp/americanindian
Asian Pacific American Studies Program	AG 352	480/965-9711	www.asu.edu/copp/asianamerican
Human Communication, Hugh Downs School of	STAUF A412	480/965-5095	com.pp.asu.edu
Journalism and Mass Communication, Walter Cronkite School of	STAUF A231	480/965-5011	www.asu.edu/cronkite
Justice Studies, School of	WILSN 331	480/965-7682	www.asu.edu/copp/justice
Morrison Institute for Public Policy	UVCMN 203	480/965-4525	www.asu.edu/copp/morrison
Nonprofit Leadership and Management, Center for	AG 346	480/965-0607	www.asu.edu/copp/nonprofit
Public Affairs, School of	WILSN 208	480/965-3926	spa.asu.edu
Recreation Management and Tourism, Department of	MOEUR 134	480/965-7291	www.asu.edu/copp/recreation
Social Work, School of	WHALL 135	480/965-3304	ssw.asu.edu
Urban Inquiry, Center for	AG 320B	480/965-9216	www.asu.edu/copp/urban

¹ See "[ASU East Directory](#)," see page 438.

² See "[ASU Extended Campus Directory](#)," see page 463.

³ See "[ASU West Directory](#)," see page 447.

Organization	Location	Telephone	Web Address
Registrar	SSV 140	—	www.asu.edu/registrar
Expedite	—	480/965-4747	www.asu.edu/registrar/general/expedite.html
TTY	—	480/965-3236	—
Voice	—	480/965-3124	—
Residency Classification	SSV 146	480/965-7712	www.asu.edu/registrar/residency
Residential Life	SSV 170	480/965-3515	www.asu.edu/reslife
Science and Engineering of Materials (Ph.D.)	PS B135	480/965-2460	www.asu.edu/graduate/SEM
Speech and Hearing Science (Ph.D.)	CSB 146	480/965-2373	www.asu.edu/clas/shs
Statistics (M.S.)	BAC 570	480/965-2671	www.asu.edu/graduate/statistics
Student Affairs Research and Evaluation Office	MU 14D	480/965-4070	www.asu.edu/vpsa/research
Student Aid Disbursement	SSV 235	480/965-2956	www.asu.edu/fastt/apply/disbursement.html
Student Business Services	ADM A105	480/965-6301	—
Student Development	MU Mezzanine	480/965-5310	www.asu.edu/mu
Student Employment	SSV 202	—	www.asu.edu/fa/studemp
Off-Campus	—	480/965-6318	—
On-Campus	—	480/965-5186	—
Student Financial Assistance	SSV 216A	480/965-3355	www.asu.edu/fa
Student ID (Sun Card)	MU 190	480/965-2273	www.suncard1.com
Student Leadership Programs	MU 340	480/965-2255	www.asu.edu/mu/slp
Student Life	SSV 263	480/965-6547	www.asu.edu/studentlife
Student Media	MCENT 2	480/965-7572	www.statepress.com
State Press Advertising	—	480/965-6555	www.statepress.com
State Press Information	—	480/965-7572	—
State Press Newsroom	—	480/965-2292	—
Web Devil	—	480/727-6941	www.asuwebdevil.com
Student Organization Resource Center	MU 340	480/965-2255	www.asu.edu/clubs
Student Recreation Complex and Recreational Sports	SRC 220	480/965-8900	www.asu.edu/src
Summer Sessions, Office of	ADM B167	480/965-6611	www.asu.edu/ssc
Summer International Programs	AG 313	480/965-6611	www.asu.edu/ssc/StudyAbroad
Sun Devil Involvement Center	MU 3rd level	480/965-2255	www.asu.edu/mu/sdic.html
SunDial	—	480/350-1500	www.asu.edu/registrar/registration/intouch.html
Testing Support Services	SSV 382	480/965-6777	www.asu.edu/vpsa/tss
Tickets	—	—	—
Athletic Events, Intercollegiate (Sun Devil Ticket Office)	—	480/965-2381	—
Public Events Administrative Offices	—	480/965-5062	—
Public Events Box Office	GGMA	480/965-3434	—
Transcripts (Outgoing)	SSV 140B	480/965-7276	www.asu.edu/registrar/transcripts
Transportation Systems (Certificate)	ARCH 119	480/965-6395	www.asu.edu/caed/transportation
Tuition Payment Office	SSV 235	480/965-4347	—
University Evaluation, Office of	AG 281	480/965-9291	www.asu.edu/oue

¹ See “ASU East Directory,” see page 438.

² See “ASU Extended Campus Directory,” see page 463.

³ See “ASU West Directory,” see page 447.

ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
University Libraries	LIB	480/965-6164	www.asu.edu/libraries
Architecture and Environmental Design Library	AED 153	480/965-6400	www.asu.edu/caed/AEDlibrary
Archives and Manuscripts, Department of	LIB 413	480/965-3145	www.asu.edu/lib/archives
Hayden Library (Circulation Desk)	LIB	480/965-3605	www.asu.edu/lib/hayden
Library Administration	LIB	480/965-3417	—
Music Library	MUSIC W302	480/965-3513	www.asu.edu/lib/music
Noble Science and Engineering Library	NOBLE	480/965-2600	www.asu.edu/lib/noble
Reference Questions	—	480/965-4932	www.asu.edu/lib/hayden/ref
Video Resources	ECA 100	480/965-5046	www.asu.edu/lib/video
West Campus Library	FLHLB	602/543-5717	www.west.asu.edu/library
University Testing Services	EDB 301	480/965-7146	www.asu.edu/uts
Upward Bound	SSV 276	480/965-6483	www.asu.edu/studentlife/ub
Veterans Services Section	SSV 148	480/965-7723	www.asu.edu/registrar/veterans
Veterans Upward Bound	1000 E. Apache No. 106	480/965-3944	www.asu.edu/studentlife/vub
Winter Session	—	480/965-9797	www.asu.edu/xed/winter

¹ See “ASU East Directory,” see page 438.

² See “ASU Extended Campus Directory,” see page 463.

³ See “ASU West Directory,” see page 447.



Participants in graduation ceremonies

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. Emeritae and emeriti are included.

A

Aanenson, Todd (2000), Faculty Associate of Construction; B.S., Arizona State University

Aannestad, Per (1975), Associate Professor of Physics and Astronomy; B.S., University of Oslo (Norway); Ph.D., University of California, Berkeley

Abbaszadegan, Morteza (1999), Associate Professor of Civil and Environmental Engineering and Adjunct Faculty of Microbiology; B.S., University of Montana; M.S., Northern Arizona University; Ph.D., University of Arizona

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, Boston

Abramson, Jay (1999), Lecturer of Mathematics and Statistics; B.S., University of New Mexico; M.S., University of New Hampshire

Abston, Deborah (1990), Associate Librarian, Hayden Reference Services; B.S., M.S.L.S., Wayne State University

Acereda, Alberto (1998), Associate Professor of Latin American Literature; Licenciado, University of Barcelona (Spain); M.A., Ph.D., University of Georgia

Acevedo, Roberto M. (1964), Professor Emeritus of Spanish; B.A., University of California, Berkeley; M.A., Ph.D., University of Arizona

Acharya, Raghunath (1976), Professor Emeritus 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, James B. (1996), Professor of Materials Engineering; Interim Codirector, Science and Engineering of Materials; B.S., Duke University; M.S., Ph.D., University of Wisconsin, Madison

Adams, Karen L. (1984), Professor of English; Director, Program for Southeast Asian Studies; B.A., M.A., Ph.D., University of Michigan

Adams, Sue (2001), Faculty Associate of Nursing; B.S.N., University of Arizona; M.S., Arizona State University

Adelman, Madelaine (1998), Assistant Professor of Justice Studies; A.B., Ph.D., Duke University

Adelson, Roger D. (1974), Professor of History; B.A., George Washington University; B.Litt., University of Oxford (United Kingdom); M.A., Ph.D., Washington University

Aerni, Wayne (1991), Faculty Associate of Public Affairs; B.A., University of Oregon; M.P.A., D.P.A., Arizona State University

Afflitto, Frank M. (2001), Assistant Professor of Justice Studies; B.A., University of Massachusetts, Boston; M.A., Ph.D., University of California, Irvine

Agadjanian, Victor (1995), Assistant Professor of Sociology; B.A., Moscow State University (Russia); M.S., Ph.D., University of Southern California

Aguiar, John L. (1976), Professor Emeritus 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 (South Korea); M.A., Ph.D., Michigan State University

Ahrendt, Laurie (2000), Faculty Associate of Nursing; B.S.N., M.S., Arizona 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), Professor of Physics and Astronomy; B.S., M.S., University of Chile (Chile); Ph.D., Ohio University

Alberts, Jess K. (1989), Professor of Communication; Director, Hugh Downs School of Human 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 (1981), Law Librarian, Reference; B.A., University of Washington; M.L.S., University of Southern California

Aldama, Arturo (1996), Associate Professor of Chicana and Chicano Studies; B.A., Evergreen State University; M.A., Ph.D., University of California, Berkeley

Aldrich, Frank T. (1969), Professor Emeritus 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

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Alford, Terry L. (1993), Associate Professor of Materials 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., University of Cincinnati; M.S., Ph.D., Stanford University

Allen, Craig M. (1991), Associate Professor of Journalism and Mass Communication; B.A., Linfield College; M.S., University of Oregon; Ph.D., Ohio University

Allen, James P. (1989), Professor of Chemistry and Biochemistry; B.S., Saint Joseph's University; M.S., Ph.D., University of Illinois

Allen, Jonathan (2001), Assistant Professor of Chemical Engineering and Civil and Environmental Engineering; B.S., University of Pennsylvania; M.S., Sc.D., Massachusetts Institute of Technology

Allison, Maria T. (1984), Professor of Recreation Management and Tourism; Associate Dean, Academic Programs, Graduate College; B.S., M.S., University of New Mexico; Ph.D., University of Illinois

Alozie, Nicholas O. (1991), Professor of Public Affairs; B.A., M.P.A., Texas Southern University; M.A., Ph.D., University of Texas, Dallas

Alpers, Rojann (1995), Associate 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

Amann, Nancy (2001), Lecturer of Speech and Hearing Science; B.A., M.S., Gallaudet University

Amazeen, Eric P. (1999), Assistant Professor of Psychology; B.A., Franklin and Marshall College; M.A., Ph.D., University of Connecticut

Amazeen, Polemnia G. (1999), Assistant Professor of Psychology; B.A., Franklin and Marshall College; M.A., Ph.D., University of Connecticut

Ames, James G. (1985), Senior Research Associate, Institute for Manufacturing Enterprise Systems; B.S., San Diego State University

Anderson, Gary (1975), Professor Emeritus of Curriculum and Instruction; B.S., M.Ed., Edinboro State College; Ph.D., University of Pittsburgh

Anderson, James R. (1984), Associate Research Scientist; B.A., Williams College; Ph.D., California Institute of Technology

Anderson, Lisa M. (2000), Assistant Professor of Women's Studies; A.B., Mount Holyoke College; M.A., Smith College; Ph.D., University of Washington

Anderson, Marcia L. (1986), Librarian, Collection Development; B.A., University of Michigan; M.L.S., Wayne State University

Anderson, Melvin S. (1967), Professor Emeritus of Finance; B.S., M.S., Oklahoma State University; Ed.D., University of Arkansas

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- Braun, J. Jay** (1973), Professor of Psychology; B.A., University of Oregon; M.A., Ph.D., Ohio State University
- Braver, Sanford L.** (1970), Professor of Psychology; B.A., Wayne State University; Ph.D., University of Michigan
- Bray, Sandra** (1987), Associate Librarian, Technical Services Department; B.A., Ottawa University; M.L.S., Indiana University, Bloomington
- Brazel, Anthony J.** (1974), Professor of Geography; B.A., M.A., Rutgers, The State University of New Jersey; Ph.D., University of Michigan
- Breckenridge, Jack D.** (1962), Professor Emeritus of Art; B.S., University of Wisconsin, Milwaukee; M.F.A., University of Iowa
- Brem, Sarah Kate** (1999), Assistant Professor of Psychology in Education; A.B., University of Chicago; M.S., Ph.D., Northwestern University
- Bremner, Andrew** (1984), Professor of Mathematics and Statistics; Chair, Department of Mathematics and Statistics; B.A., M.A., University of Oxford (United Kingdom); Ph.D., University of Cambridge (United Kingdom)
- Brenenstuhl, Daniel C.** (1978), Associate Professor of Management; B.S., M.B.A., Ohio University; M.S., St. Bonaventure University; D.B.A., Indiana University
- Brennan, Patrick** (1996), Professor of Law; Associate Dean for Academic Affairs and Research, College of Law; B.A., Yale University; M.A., University of Toronto; J.D., University of California, Berkeley
- Briggs, John M.** (1999), Associate Professor of Plant Biology; B.S., M.Sc., Pittsburg State University; Ph.D., University of Arkansas
- Briley, Lane D.** (1970), Associate Research Professional of Chemistry and Biochemistry; B.A., Arizona State University
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- Brink, Jean R.** (1974), Professor of English; B.A., Northwestern University; M.A., Harvard University; Ph.D., University of Wisconsin, Madison
- Britton, Daniel R.** (1976), Professor of Art; B.F.A., M.F.A., University of Colorado
- Britton, David** (1987), Professor of Music; B.M., North Texas State University
- Broadley, Hugh T.** (1969), Professor Emeritus of Art; A.B., Park College; M.A., Yale University; Ph.D., New York University
- Brookey, Robert Alan** (2000), Assistant Professor of Communication; B.A., M.A., University of Arkansas; Ph.D., University of Minnesota
- Brooks, Daniel G.** (1981), Associate Professor of Supply Chain Management; Director, Executive M.B.A. Program; B.S., M.S., Colorado School of Mines; M.B.A., Ph.D., Indiana University, Bloomington
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- Broome, Benjamin J.** (1999), Professor of Communication; B.A., University of Georgia; M.A., Ph.D., University of Kansas
- Brose, Marianna F.** (1963), Professor Emerita of English; B.A., College of William and Mary; Diploma, Royal Academy of Dramatic Art (United Kingdom); M.A., Arizona State University
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- Brown, David E.** (1993), Adjunct Professor of Biology; B.A., San Jose State College
- Brown, Duane** (1950), Professor Emeritus of Chemistry and Biochemistry; B.S., Brigham Young University; Ph.D., Cornell University
- Brown, Jean C.** (1991), Clinical Associate Professor of Speech and Hearing Science; B.S., University of Montevallo; M.A., University of Tennessee; M.S.W., Arizona State University
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- Brown, William A.** (1999), Assistant Professor of Recreation Management and Tourism; B.S., Northeastern University; M.A., Ph.D., Claremont Graduate University
- Bruhn, Karen** (1998), Lecturer of the Barrett Honors College; B.A., City University of New York; M.A., Ph.D., University of North Carolina, Chapel Hill
- Brune, Daniel C.** (1986), Associate Research Professional of Chemistry and Biochemistry; B.A., University of Kansas; Ph.D., Indiana University, Bloomington
- Bruner, May I.** (1961), Professor Emerita of Nursing; B.S., University of Hawaii, Honolulu; M.S., University of Colorado
- Brunning, Dennis R.** (1984), Librarian, Collection Development; B.A., University of Iowa; M.A., M.L.S., University of Illinois
- Brunson-Hadley, Judy L.** (1998), Adjunct Professor of Anthropology; B.A., M.A., Ph.D., Arizona State University
- Brush, Thomas A.** (1998), Associate Professor of Educational Technology; Academic Program Leader, Educational Technology; B.A., M.S., State University of New York, Potsdam; Ph.D., Indiana University
- Bryan, Harvey** (1999), Associate Professor of Architecture; B.Arch., Arizona State University; M.Arch., M.Sc., Ph.D., University of California, Berkeley
- Bryan, Karen M.** (1997), Assistant Professor of Music; Associate Director, Undergraduate Studies, School of Music; B.M., Georgia State University, Atlanta; M.A., University of Georgia, Atlanta; Ph.D., Indiana University, Bloomington
- Bryan, Tanis** (1992), Adjunct Professor of Speech and Hearing Science; B.S., M.A., Ph.D., Northwestern University
- Bryant, Edwin H.** (2000), Adjunct Professor of Biology; A.B., California State University; Ph.D., University of Kansas
- Bryant, Fred O.** (1950), Professor Emeritus of Exercise Science and Physical Education; B.S., Springfield College; M.S., University of Illinois; Ed.D., Arizona State University
- Brzuzny, Stephanie** (1995), Associate Professor of Social Work; B.S.W., Indiana University, Bloomington; M.S.W., University of Illinois, Urbana-Champaign; Ph.D., Ohio State University
- Buckingham, Willis J.** (1969), Professor Emeritus of English; A.B., Harvard University; M.S., University of Wisconsin, Madison; Ph.D., Indiana University
- Buksbaum, Rebecca** (2000), Faculty Associate of Nursing; B.A., University of Illinois; M.S.N., University of Hartford, West Hartford
- Buley, Jerry L.** (1973), Associate Professor of Communication; B.A., University of Colorado; M.A., Michigan State University; Ph.D., Florida State University
- Burdette, Walter E.** (1956), Professor Emeritus of Technology; B.S., M.S., Kansas State College of Pittsburg; Ed.D., University of Missouri, Columbia
- Burdick, Richard K.** (1976), Professor of Economics; B.S., University of Wyoming; M.S., Ph.D., Texas A&M University
- Burg, B. Richard** (1967), Professor of History; B.A., University of Colorado; M.A., Western State College of Colorado; Ph.D., University of Colorado
- Burgess, Paul L.** (1969), Professor of Economics; B.A., Ph.D., University of Colorado
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- Burk, Karl W.** (1949), Professor Emeritus of Technology; B.A., M.A., Arizona State University; Ed.D., Bradley University
- Burke, Janet M.** (1996), Assistant Administrative Professional, the Barrett Honors College; Associate Dean, the Barrett Honors College; B.A., Wells College; M.A., Syracuse University; Ph.D., Arizona State University
- Burke, Rebecca J.** (1981), Librarian; Head, Government Documents/Map Collection; B.A., San Jose State University; M.L.S., University of Arizona
- Burke, William F. Jr.** (1977), Professor of Microbiology; B.A., University of Dallas; M.S., North Texas State University; Ph.D., Arizona State University
- Burnette, Wendell** (2000), Assistant Professor of Architecture
- Burnham, Maralou E.** (1988), Assistant Research Scientist, Center for Advanced Research in Transportation; B.A., University of Southern California; M.A., Ph.D., Arizona State University
- Burns, Elizabeth K.** (1983), Professor of Geography; Director, Center for Advanced Transportation Research; B.A., Smith College; M.A., Ph.D., University of California, Berkeley
- Burrows, Veronica** (1986), Associate Professor of Chemical Engineering; B.S., Drexel University; Ph.D., Princeton University
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- Burton, Foster M.** (1969), Professor Emeritus of Construction; B.S.C.E., B.S., Carnegie Institute of Technology; M.B.A., New York University; Ph.D., University of Pittsburgh
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- Bush, Jeffrey E.** (1997), Associate Professor of Music Education; B.M., M.M., Northern Illinois University, De Kalb; Ph.D., University of Arizona
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- Butler, Jay Q.** (1972), Associate Professor of Real Estate; Director, Arizona Real Estate Center; B.B.A., M.B.A., University of New Mexico; Ph.D., University of Washington
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- Caicco, Gregory** (2000), Assistant Professor of Architecture; B.Arch., Carleton University (Canada); M.Phil., University of Cambridge (United Kingdom); Ph.D., McGill University (Canada)
- Calhoun, Ronald J.** (2001), Assistant Professor of Mechanical and Aerospace Engineering; B.S., M.S., Ph.D., Stanford University
- Calkins, Jerry M.** (1992), Adjunct Professor of Bioengineering; B.S.Ch.E., M.S.Ch.E., University of Wyoming; Ph.D., University of Maryland, College Park; M.D., University of Arizona
- Callarman, Thomas E.** (1980), Associate Professor of Management; Director, Institute for Manufacturing Enterprise Systems; B.B.A., West Texas State University; M.B.A., Arizona State University; Ph.D., Purdue University
- Calleros, Charles R.** (1980), Professor of Law; B.A., University of California, Santa Cruz; J.D., University of California, Davis
- Cam, Hasan** (2001), Assistant Professor of Computer Science and Engineering; B.S., M.S., Istanbul Technical University (Turkey); Ph.D., Purdue University
- Cameron, Theresa** (1997), Associate Professor of Planning and Landscape Architecture; B.A., State University of New York, Buffalo; M.U.P., University of Michigan; D.Des., Harvard University
- Campbell, Gary L.** (1997), Fine Arts Specialist; B.A., M.F.A., University of Southern California
- Campbell, Heather E.** (1991), Associate Professor of Public Affairs; B.A., University of California, San Diego; M.Phil., Ph.D., Carnegie Mellon University
- Campos-Outcalt, Douglas** (1998), Adjunct Professor of Anthropology; B.S., M.P.A., Arizona State University; M.D., University of Arizona
- Canary, Daniel J.** (1999), Professor of Communication; B.A., California State University, Fullerton; M.A., California State University, Fullerton; M.A., Ph.D., University of Southern California
- Candan, Kasim Selcuk** (1997), Assistant Professor of Computer Science and Engineering; B.S., Bilkent University (Turkey); Ph.D., University of Maryland, College Park
- Candela, Giuseppe** (1995), Associate Professor of Italian; M.A., Ph.D., University of Wisconsin
- Candelaria, Cordelia C.** (1992), Professor of English and Chicana and Chicano Studies; Chair, Department of Chicana and Chicano Studies; B.A., Fort Lewis College; M.A., Ph.D., University of Notre Dame
- Canovas, Frédéric** (1999), Assistant Professor of French; Diplôme d'Études Universitaires Générales de Lettres Modernes, Maîtrise de Lettres Modernes, Diplôme d'Études Approfondies de Lettres Modernes, Lyon University (France); Ph.D., University of Oregon
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- Cardy, Robert L.** (1988), Professor of Management; B.S., Central Michigan University; Ph.D., Virginia Polytechnic Institute and State University
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- Carlson, A. Cheree** (1988), Professor of Communication; B.A., M.A., Colorado State University; Ph.D., University of Southern California
- Carlson, Ingeborg L.** (1964), Professor Emerita of German; Abitur, Hölderlin School (Germany); Vorsemaster and cand.phil., University of Heidelberg (Germany); Dr. phil., University of Erlangen-Nuremberg (Germany)
- Carlson, Marilyn P.** (1995), Associate Professor of Mathematics and Statistics; B.S., Central Missouri State University; M.S., Ph.D., University of Kansas
- Carlson, Ron** (1986), Professor of English; B.A., M.A., University of Utah
- Carlyle, Matthew W.** (1997), Assistant Professor of Industrial Engineering; B.S., Georgia Institute of Technology; Ph.D., Stanford University
- Carney, James D.** (1967), Professor Emeritus of Philosophy; B.A. equivalent, Northern Baptist Theological Seminary; M.A., Roosevelt University; Ph.D., University of Nebraska, Lincoln
- Carpenter, Ellon D.** (1988), Associate Professor of Music; B.A., Denison University; M.A., Kent State University; Ph.D., University of Pennsylvania
- Carpenter, Ray W.** (1981), Professor, Center for Solid State Science; B.S., M.S., Ph.D., University of California, Berkeley
- Carpio, Myla Vicenti** (1967), Assistant Professor of American Indian Studies; B.A.E., University of New Mexico; M.A., Arizona State University
- Carr, Christopher** (1985), Professor of Anthropology; B.A., University of Illinois; M.A., Ph.D., University of Michigan
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- Carroll, Kevin K.** (1975), Associate Professor of History; B.A., Canisius College; M.A., Ph.D., Harvard University
- Carroll, Steven** (1985), Professor Emeritus of Biology; B.S., Tulane University; M.S., Oregon State University; Ph.D., University of Oregon
- Carter, Joseph R.** (1991), Avnet Professor of Supply Chain Management; Chair, Department of Supply Chain Management; B.S., M.B.A., Northeastern University; Ph.D., Boston University
- Carter, Phillip L.** (1995), Professor of Supply Chain Management; Harold E. Fearon Chair, Purchasing Management; Director, Center for Advanced Purchasing Studies; B.S.E.E., Rose-Hulman Institute of Technology; M.B.A., D.B.A., Indiana University
- Carver, George L.** (1965), Professor Emeritus of Classical Languages; B.A., M.A., University of Texas, Austin; S.T.B., Saint Mary's Seminary; Ph.D., Saint Louis University
- Casanova, Ursula** (1987), Professor Emerita of Educational Leadership and Policy Studies; B.A., Hunter College; M.S., State University of New York, Brockport; Ph.D., Arizona State University
- Casavantes, Michael D.** (1990), Lecturer of Journalism and Mass Communication; B.A., University of Texas, El Paso; M.A., New Mexico State University

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- Cashman, Holly** (2001), Assistant Professor of Spanish; B.A., Hood College; M.A., Ph.D., University of Michigan, Ann Arbor
- Cassidy, Virginia L.** (1988), Librarian Emerita; A.B., Oberlin College; M.L.S., Pratt Institute
- Castaneda, Eddie** (1990), Associate Professor of Psychology; B.S., M.A., University of Texas, El Paso; Ph.D., University of Michigan
- Castle, Gregory** (1992), Associate Professor of English; B.A., California State University, Fresno; M.A., Ph.D., University of California, Los Angeles
- Castro, Felipe G.** (1991), Professor of Psychology; B.A., University of California, Santa Barbara; M.S.W., University of California, Los Angeles; Ph.D., University of Washington
- Caudle, M. Tyler** (1997), Assistant Professor of Chemistry and Biochemistry; B.S., University of North Carolina, Charlotte; Ph.D., Duke University
- Cavalliere, William A.** (1946), Professor Emeritus of Technology; B.A., M.A., Arizona State University
- Cavanaugh, Carolyn J.** (1996), Academic Associate of Psychology; A.B., Duke University; Ph.D., Arizona State University
- Cavanaugh, Ellen May** (1995), Faculty Associate of Nursing; B.S.N., University of Phoenix; M.S., University of Arizona
- Cavender, Gray** (1977), Professor of Justice Studies; B.S., University of Tennessee; M.S., Middle Tennessee State University; Ph.D., Florida State University; J.D., University of Tennessee, Knoxville
- Cavinato, Joseph L.** (2000), Adjunct Professor of Supply Chain Management; B.S., B.A., M.B.A., American University; Ph.D., Pennsylvania State University
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- Cervený, Randall S.** (1986), Professor of Geography; B.S., M.A., Ph.D., University of Nebraska, Lincoln
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- Cesta, John R.** (1975), Associate Professor of Finance; B.S., Capital University; M.B.A., Ph.D., Florida State University
- Cevette, Michael J.** (1989), Adjunct Professor of Speech and Hearing Science; B.A., University of Nevada, Las Vegas; M.S., Utah State University; Ph.D., University of Utah
- Chade, Hector A.** (1997), Assistant Professor of Economics; Licenciado en Economía, National University of Cuyo (Argentina); M.S., Ph.D., University of Illinois, Urbana-Champaign
- Chakrabarti, Chaitali** (1990), Associate Professor of Electrical Engineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., University of Maryland, College Park
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- Chamberlin, Ralph V.** (1986), Professor of Physics and Astronomy; B.S., University of Utah; M.S., Ph.D., University of California, Los Angeles
- Chambers, Anthony** (1998), Professor of Japanese; B.A., Pomona College; M.A., Stanford University; Ph.D., University of Michigan
- Chance, John K.** (1987), Professor of Anthropology; Chair, Department of Anthropology; A.B., University of Pennsylvania; A.M., Ph.D., University of Illinois
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- Chandler, Douglas E.** (1980), Professor of Biology; B.S., University of Rochester; M.A., Johns Hopkins University; Ph.D., University of California, San Francisco
- Chang, Yung** (1996), Assistant Professor of Microbiology; M.D., Beijing Medical College (China); Ph.D., University of Iowa
- Chaparian, Michael G.** (2000), Adjunct Professor of Plant Biology; B.S., Michigan Technological University; Ph.D., Wayne State University
- Chapman, Jeffrey** (1999), Professor of Public Affairs; Director, School of Public Affairs; A.B., Occidental College; M.A., Ph.D., University of California, Berkeley
- Chapsky, Lars** (1998), Assistant Professor of Engineering; B.A., Ph.D., University of California, Berkeley
- Chapuis, Jean-Charles** (1991), Associate Research Professional, Cancer Research Institute; B.S., Ph.D., University of Lausanne (Switzerland)
- Chartier, George M.** (1971), Professor Emeritus of Psychology; B.S., University of Illinois; M.A., Ph.D., University of Oregon
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- Chasey, Allan D.** (1995), Associate Professor of Construction; B.S., Arizona State University; M.S., Air Force Institute of Technology; Ph.D., Virginia Polytechnic Institute and State University
- Chasey, Eugene F.** (1965), Professor Emeritus of Education; B.S., Northwestern State College; M.A., Colorado State College; Ed.D., University of Wyoming
- Chassin, Laurie** (1979), Professor of Psychology; B.A., Brown University; M.S., Ph.D., Columbia University
- Chatha, Karamvir** (2001), Assistant Professor of Computer Science and Engineering; B.S.E., University of Bombay (India); M.S., Ph.D., University of Cincinnati
- Chattopadhyay, Aditi** (1990), Professor of Mechanical and Aerospace Engineering; M.S., Ph.D., Georgia Institute of Technology
- Chaudhuri, Joyotpaul** (1985), Professor of Political Science; B.A., Central State University, Oklahoma; M.A., Ph.D., University of Oklahoma
- Chawla, Nikhilesh** (2000), Assistant Professor of Materials Engineering; B.S., New Mexico Institute of Mining and Technology; M.S., University of Tennessee, Knoxville; Ph.D., University of Michigan, Ann Arbor
- Chen, Kang Ping** (1991), Associate Professor of Engineering; B.S., Peking University (China); Ph.D., University of Minnesota, Twin Cities
- Chen, Nai-Kuang** (1998), Assistant Professor of Computer Information Systems; B.B.A., Soochow University (Taiwan); M.S., George Washington University; Ph.D., University of Connecticut
- Chen, Stanley S.** (1967), Professor Emeritus of Engineering; Diploma, Taipei Institute of Technology (Taiwan); M.S., Ohio University; Ph.D., University of Wisconsin, Madison

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- Childress, Nancy** (1991), Associate Professor of Mathematics and Statistics; B.S., B.S.Ed., M.S., Ph.D., Ohio State University
- Chilton, Leslie Anne** (1998), Academic Associate, Division of Undergraduate Academic Services; Coordinator, Student Success Curriculum; B.A., M.A., Ph.D., Arizona State University
- Chin, Michelle** (2001), Assistant Professor of Political Science; B.S., Andrews University; M.A., Ph.D., Texas A&M University
- Chizmeshya, Andrew V. G.** (1994), Associate Research Scientist, Center for Solid State Science; B.S., University of Toronto (Canada); M.Sc., Ph.D., Queen's University, Kingston (Canada)
- Chlistowa, Xenia** (1980), Professor Emerita of Dance
- Choi, Hyaewol** (1998), Assistant Professor of Korean; B.A., M.A., Yonsei University (South Korea); Ph.D., State University of New York, Buffalo
- Choi, Jaehoon** (1989), Assistant Research Engineer, Telecommunication Research Center; B.S., Han-Yang University (South Korea); M.S., Ph.D., Ohio State University
- Choi, Kwan-Yiu** (1987), Assistant Research Scientist, Center for Solid State Electronics Research; B.S., The Chinese University of Hong Kong (China); M.S., Rutgers, The State University of New Jersey; Ph.D., Arizona State University
- Choi, Thomas** (1998), Associate Professor of Management and Supply Chain Management; A.B., University of California, Berkeley; Ph.D., University of Michigan
- Chou, Ju-Hsi** (1975), Professor Emeritus of Art; B.A., University of Kentucky; M.A., Ph.D., Princeton University
- Christensen, George** (1975), Professor Emeritus of Architecture; B.Arch., Illinois Institute of Technology
- Christensen, Philip R.** (1987), Korrick Professor of Geological Sciences; B.S., M.S., Ph.D., University of California, Los Angeles
- Christian, Charles W.** (1985), Professor of Accountancy and Information Management; B.B.A., University of Georgia; J.D., University of Virginia; Ph.D., University of Georgia
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- Clark, Geoffrey A.** (1971) Regents' Professor of Anthropology; B.A., M.A., University of Arizona; Ph.D., University of Chicago
- Clark, James C.** (1978), Associate Research Professional of Chemistry and Biochemistry
- Clark, Robert C.** (1981), Professor Emeritus of Music; B.Mus., Central Methodist College; S.M.M., Union Theological Seminary
- Clark, William Dennis** (1976), Associate Professor of Plant Biology; B.A., Sacramento State College; Ph.D., University of Texas, Austin
- Clay, J. Eugene** (1993), Associate Professor of Religious Studies; A.B., A.M., Ph.D., University of Chicago
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- Clinton, Robert N.** (2001), Professor of Law; B.A., University of Michigan; J.D., University of Chicago
- Clinton, Steven R.** (1999), Assistant Professor of Supply Chain Management; B.A., University of Wisconsin, Madison; M.I.B.S., University of South Carolina; M.S., University of Wisconsin, Milwaukee; Ph.D., Michigan State University
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- Cluff, Gordon L.** (1963), Professor Emeritus of Speech and Hearing Science; B.A., Arizona State University; M.S., Ph.D., Southern Illinois University
- Cobas, José A.** (1975), Professor of Sociology; B.A., Maryville College; M.A., University of Tennessee, Knoxville; Ph.D., University of Texas, Austin
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- Kroeger, Michael** (1997), Faculty Associate of Design; M.F.A., Rhode Island School of Design
- Kroelinger, Michael D.** (1980), Professor of Design; B.S., University of Alabama; M.S., Ph.D., University of Tennessee, Knoxville
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Munk, Morton E. (1961), Professor of Chemistry and Biochemistry; B.S., Northwestern University; M.S., University of Miami; Ph.D., Wayne State University

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Murff, Scott (1998), Assistant Professor of Architecture; B.S.D., Clemson University; B.Arch., The Cooper Union

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Musheno, Michael C. (1977), Professor of Justice Studies and Public Affairs; B.A., Lycoming College; M.A., Ph.D., American University

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Myhajlenko, Stefan (1986), Associate Research Scientist and Associate Director, Center for Solid State Electronics Research; Ph.D., University of Manchester, Victoria (United Kingdom)

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- Nardari, Federico** (1999), Assistant Professor of Finance; B.S., University of Bergamo (Italy); M.S.B.A., Ph.D., Washington University, St. Louis
- Nardella, Francis A.** (1992), Adjunct Professor of Bioengineering; A.B., West Virginia University; M.D., West Virginia University, School of Medicine
- Nash, Leanne T.** (1971), Professor of Anthropology; B.A., University of California, Davis; M.A., Ph.D., University of California, Berkeley
- Nash, Thomas H. III** (1971), Professor of Plant Biology; B.S., Duke University; M.S., Ph.D., Rutgers, The State University of New Jersey
- Navabi, Faye** (1997), Lecturer of Computer Science and Engineering; B.S., M.S., University of Southwestern Louisiana
- Neal, Berna E.** (1988), Librarian Emerita; B.A., M.L.S., Syracuse University
- Nebeker, Helen E.** (1958), Professor Emerita of English; B.A., M.A., Arizona State University
- Neisewander, Janet L.** (1991), Professor of Psychology; B.S., Rockford College; M.S., Ph.D., University of Kentucky
- Nelsen, Edward A.** (1975), Professor of Education; Academic Program Leader, Educational Psychology; B.S., University of Wisconsin, Madison; Ph.D., Stanford University
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- Nemeroff, Carol** (1988), Associate Professor of Psychology; B.A., McGill University (Canada); M.A., Ph.D., University of Pennsylvania
- Nemiro, Jay S.** (1995), Adjunct Professor of Biology; B.A., Temple University; M.D., George Washington University School of Medicine
- Nering, Evar D.** (1960), Professor Emeritus of Mathematics and Statistics; B.A., Indiana University, Fort Wayne; M.A., Ph.D., Princeton University
- Neuberg, Steven L.** (1988), Professor of Psychology; A.B., Cornell University; M.S., Ph.D., Carnegie Mellon University
- Neuer, Susanne** (2000), Assistant Research Professor of Biology; B.S., Kiel University (Germany); M.S., University of Washington; Ph.D., Oregon State University
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- Newfeld, Stuart J.** (1997), Assistant Professor of Biology; B.S., Hobart College; M.A., M.S., University of Hawaii; Ph.D., Emory University
- Newman, Nathan** (2000), Professor of Materials Engineering; B.S., University of Southern California; M.S., Ph.D., Stanford University
- Newport, Mark** (2001), Assistant Professor of Art; B.F.A., Kansas City Art Institute; M.F.A., Art School of the Art Institute of Chicago
- Ney, James W.** (1969), Professor Emeritus of English; B.A., M.A., Wheaton College; Ed.D., University of Michigan
- Nichols, Ann W.** (1970), Associate Professor of Social Work; A.B., Stanford University; M.S.W., D.S.W., Columbia University
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- Nicolaenko, Basil** (1989), Professor of Mathematics and Statistics; M.S., University of Paris (France); Ph.D., University of Michigan
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- Ohmart, Robert D.** (1970), Professor of Biology; B.S., M.S., New Mexico State University; Ph.D., University of Arizona
- Ojala, William T.** (1971), Professor Emeritus of English; B.S., M.A., University of Minnesota, Twin Cities; Ph.D., Florida State University
- Okamoto, Scott K.** (2000), Assistant Professor of Social Work; B.S., University of California, Los Angeles; M.S.W., San Jose State University; Ph.D., University of Hawaii, Manoa
- Okun, Morris A.** (1976), Professor of Psychology; Director, Gerontology Program; Acting Chair, Department of Psychology; B.A., Brooklyn College; M.S., Ph.D., Pennsylvania State University
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- Oldroyd, Mark, SFC** (2000), Instructor of Military Science
- Olivas, Louis** (1979), Associate Professor of Management; Assistant Vice President for Academic Affairs; B.A., M.A., Ed.D., Arizona State University
- Oliver, Robert S.** (1963), Professor Emeritus of Architecture; B.A., M.A., University of California, Berkeley; M.F.A., Allende Institute (Mexico)
- Olson, Clark D.** (1984), Instructional Professional of Communication; B.A., Iowa State University; M.S., University of Utah; Ph.D., University of Minnesota, Twin Cities
- Orchinik, Miles** (1995), Associate Professor of Biology; B.A., San Francisco State University; Ph.D., Oregon State University
- Orlich, Ileana** (1996), Assistant Professor of Romanian; B.A., University of Bucharest (Romania); M.A., Ph.D., Arizona State University
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- Ostrom, Amy** (1996), Assistant Professor of Marketing; B.A., Arizona State University; Ph.D., Northwestern University
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- Ota Wang, Vivian** (1998), Assistant Professor of Counseling Psychology and Counselor Education; B.A., Colorado College; M.S., University of Colorado; Ph.D., Columbia University
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- Owusu-Antwi, Emmanuel B.** (1997), Assistant Professor of Civil and Environmental Engineering; B.S., University of Science and Technology (Ghana); M.S., University of Alberta (Canada); Ph.D., University of Texas, Austin
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Paz, Juan J. Jr. (1988), Associate Professor of Social Work; B.A., University of Texas, El Paso; M.S., University of Houston; D.S.W., Howard University

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Privateer, Paul (1991), Associate Professor of Interdisciplinary Humanities; B.A., M.A., California State University, Stanislaus; Ph.D., University of California, Davis

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Q

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- Ramakrishna, B.L.** (1999), Associate Professor of Plant Biology and Solid State Science; B.Sc., Bangalore University (India); M.Sc., Indian Institute of Technology, Kanpur (India); Ph.D., Indian Institute of Technology, Madras (India)
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- Rankin, W. Parkman** (1982), Professor Emeritus of Journalism and Mass Communication; B.S., Syracuse University; M.B.A., Ph.D., New York University
- Rapp, James R.** (1962), Professor Emeritus of Architecture; Associate Dean, College of Architecture and Environmental Design; B.Arch, University of Detroit; M.S.Arch., Columbia University
- Rasmussen, David I.** (1963), Professor Emeritus of Biology; B.S., M.S., University of Utah; Ph.D., University of Michigan
- Ratner, Esther** (1988), Associate Professor of Design; B.F.A., Washington University; M.F.A., University of Michigan
- Raupp, Gregory B.** (1985), Professor of Chemical Engineering; Associate Dean for Research, College of Engineering and Applied Sciences; B.S., M.S., Purdue University; Ph.D., University of Wisconsin, Madison
- Rausch, Jack D.** (1965), Professor Emeritus of Music; B.S., M.A., Ohio State University
- Rave, Wallace J.** (1967), Professor Emeritus of Music; B.S., Illinois State University; M.M., Ph.D., University of Illinois
- Ravesloot, John C.** (1993), Adjunct Professor of Anthropology; B.A., M.A., Ph.D., Southern Illinois University, Carbondale
- Ravindran, Suryanarayanan** (2001), Assistant Professor of Accountancy and Information Management; B.A., Indian Institute of Technology, (India); M.B.A., Indian Institute of Management, (India); Ph.D., University of Texas, Austin
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- Rawls, J. Alan** (1997), Assistant Professor of Biology; B.S., University of Western Ontario (Canada); Ph.D., Saint Louis University
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- Reader, Mark** (1967), Professor Emeritus of Political Science; A.B., A.M., Ph.D., University of Michigan
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- Reiser, Mark R.** (1988), Associate Professor of Economics; B.S., University of Michigan; Ph.D., University of Chicago
- Reiss, Peter W.** (1976), Professor Emeritus of Business Administration; B.S., Marquette University; M.A., Arizona State University; J.D., Marquette University
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- Rogerson, Richard** (2001), Rondthaler Professor of Economics, B.Sc., University of Alberta (Canada); Ph.D., University of Minnesota
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- Rolstad, Kellie** (1999), Assistant Professor of Curriculum and Instruction; B.A., M.A., Ph.D., University of California, Los Angeles
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- Rose, Seth D.** (1976), Professor of Chemistry and Biochemistry; B.S., University of California, Berkeley; Ph.D., University of California, San Diego
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- Rosen, Seymour L.** (1986), Professor Emeritus of Music; Dean Emeritus, Herberger College of Fine Arts; B.S., The Juilliard School
- Rosier, Kathlene** (2000), Director, Indian Legal Program; B.A., Capital University; J.D., University of Utah
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- Rotondi, Michael** (1999), Professor of Architecture; Dipl. Arch., Southern California Institute of Architecture
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S

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- Samuelson, Norbert M.** (1998), Professor of Religious Studies; Harold and Jean Grossman Chair in Jewish Studies; B.A., Northwestern University; B.H.L., M.H.L., Hebrew Union College Jewish Institute of Religion; Ph.D., Indiana University
- Sanchez, Angel** (1990), Associate Professor of Languages and Literatures; Licenciatura, University Complutense (Spain); M.A., University of Minnesota, Twin Cities; Ph.D., University of Minnesota, Minneapolis
- Sanders, Bevie T.** (1957), Professor Emeritus of Accountancy and Information Management; B.B.A., North Texas State University; M.S., Texas A&M University; Ph.D., University of Texas; C.P.A., Arizona, Texas
- Sandler, Irwin** (1970), Professor of Psychology; B.A., Brooklyn College; Ph.D., University of Rochester
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- Sankey, Otto F.** (1982), Professor of Physics and Astronomy; B.S., University of Missouri, St. Louis; M.S., Ph.D., Washington University
- Sansone, Fred J.** (1965), Professor Emeritus of Mathematics and Statistics; B.S.E., M.S.E., University of Michigan; M.S., Ph.D., Rutgers, The State University of New Jersey
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- Schmidt, Sherrie** (1990), Librarian; Dean, University Libraries; B.A., Ohio State University; M.L.S., Emory University
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- Youngblood, Robert L.** (1973), Professor of Political Science; Chair, Department of Political Science; B.A., Willamette University; M.A., University of Hawaii, Manoa; Ph.D., University of Michigan

Z

- Zaffrann, Annie** (1997), Academic Associate of Interdisciplinary Humanities; B.S., M.S., University of Wisconsin
- Zandieh, Michelle** (1997), Assistant Professor of Mathematics and Statistics; B.A., Northwestern University; M.S., Ph.D., Oregon State University
- Zaslow, Bertram** (1956), Professor Emeritus of Chemistry and Biochemistry; B.A., Cornell University; M.S., University of Minnesota, Twin Cities; Ph.D., Iowa State University
- Zatz, Marjorie S.** (1982), Professor of Justice Studies; Associate Dean, Student Support Services, Graduate College; B.A., University of Massachusetts, Amherst; M.A., Ph.D., Indiana University, Bloomington
- Zautra, Alex** (1976), Professor of Psychology; Director, Clinical Program in Psychology; B.A., Antioch College; M.S., Ph.D., University of Utah
- Zehnder, Joseph A.** (2000), Professor of Geography; B.S., M.S., University of Illinois, Chicago; Ph.D., University of Chicago
- Zeitlin, Marilyn A.** (1992), Director, ASU Art Museum; A.B., M.A., Harvard University
- Zell, Ann** (2000), Academic Associate of Electrical Engineering
- Zellmer, Linda R.** (1997), Assistant Librarian, Map Collection; B.S., University of Wisconsin, Oshkosh; M.A., College of William and Mary; M.L.S., University of Wisconsin, Milwaukee
- Zhang, Junshan** (2000), Assistant Professor of Electrical Engineering; B.E., Huazong University of Science and Technology (China); M.S., University of Georgia; Ph.D., Purdue University
- Zhang, Young-Hang** (1997), Professor of Electrical Engineering; Nanjing Normal University (China); M.Sc., Institute of Semiconductors, Chinese Science and Technology University (China); Ph.D., University of Stuttgart (Germany)
- Zhou, Lin** (2001), Lincoln Professor of Ethics; B.S., Fudan University (China); Ph.D., Princeton University
- Zhu, Anmin** (1997), Senior Lecturer of Mathematics and Statistics; B.S., Anhui University (China); M.S., Milin University (China); Ph.D., Arizona State University
- Zhu, Han** (1997), Assistant Professor of Civil and Environmental Engineering; B.S., M.S., Fudan University (China); Ph.D., Northwestern University
- Zhu, Yingxian** (1996), Lecturer of Mathematics and Statistics; B.S., Anhui University (China); M.S., Dalian University of Science and Technology (China); Ph.D., Arizona State University
- Zimiles, Herbert** (1988), Professor of Educational Psychology; B.A., New York University; Ph.D., University of Rochester
- Zimmer, Carl R.** (1959), Professor Emeritus of Engineering; B.S.E.E., Cornell University; M.S.E.E., Ph.D., Syracuse University
- Zucker, Stanley H.** (1975), Professor of Curriculum and Instruction; B.A., State University of New York, Stony Brook; M.S., Hofstra University; Ph.D., University of Missouri, Columbia
- Zunkel, Gretchen M.** (1998), Assistant Professor of Nursing; B.S.N., University of Colorado; M.N., University of California, Los Angeles; M.N., Ph.D., University of Washington
- Zuo, Yijun** (1998), Assistant Professor of Mathematics and Statistics; B.S., Zhenjiang Teachers University (China); M.S., Lanzhou University (China); M.S., Ph.D., University of Texas, Dallas
- Zwiebel, Imre** (1979), Professor Emeritus of Chemical 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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Associate Director of Initial Teacher Certification, Division of Curriculum and Instruction Elaine Surbeck
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Director, Education Policy Studies Laboratory Alex Molnar
Academic Program Coordinator, DELTA Doctorate Kay Hartwell Hunnicutt

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Academic Program Coordinator, Education Policy Studies	Gary Hanson
Academic Program Coordinator, Education Policy Studies	Terrence G. Wiley
Academic Program Coordinator, Social and Philosophical Foundations	Eric Margolis
Academic Program Coordinator, Higher and Postsecondary Education	Gary Hanson
Internship Coordinator, Educational Administration and Supervision	Donna J. Macey
Recruitment and External Program Planning Coordinator, Educational Leadership and Supervision	Timothy J. Dyer
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Academic Program Leader, Counselor Education	Terence Tracey
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Director, Center for Professional Development and Distance Education	<i>To Be Appointed</i>
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Director, Institute for Manufacturing Enterprise Systems	Thomas E. Callarman
Interim Director, Telecommunications Research Center	Sayfe Kiaei

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Assistant Dean, Student Services	Leslie Mamaghani
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Director, Development	Tom Stevick
Director, Legal Research and Writing and Academic Success Program	Judith M. Stinson

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W.P. Carey Director of Placement	Ilona DeRemer
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Executive Director, Center for the Study of Law, Science, and Technology	Gary E. Marchant
Director, Indian Legal Program	Kathlene Rosier

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Associate Dean, Academic Programs	<i>To Be Appointed</i>
Associate Dean, Administration and Personnel	Nancy A. Gutierrez
Chair, Department of Aerospace Studies	Col. Ronald Scott Jr.
Chair, Department of Anthropology	John K. Chance
Chair, Department of Biology	James P. Collins
Chair, Department of Chemistry and Biochemistry	J. Devens Gust
Chair, Department of Chicana and Chicano Studies	Cordelia Candelaria
Chair, Department of English	<i>To Be Appointed</i>
Chair, Department of Exercise Science and Physical Education	Philip E. Martin
Chair, Department of Family and Human Development	Richard A. Fabes
Chair, Department of Geography	Breandán Ó hUallacháin
Chair, Department of Geological Sciences	Simon M. Peacock
Chair, Department of History	Noel J. Stowe
Chair, Department of Languages and Literatures	Deborah N. Losse
Chair, Department of Mathematics and Statistics	Andrew Bremner
Chair, Department of Microbiology	Edward A. Birge
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Chair, Department of Philosophy	Brad Armendt
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Acting Chair, Department of Psychology	Morris Okun
Chair, Department of Religious Studies	Joel D. Gereboff
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Director, Hispanic Research Center	Gary D. Keller
Interim Director, Interdisciplinary Humanities Program	Mary L. Rothschild
Director, Interdisciplinary Committee for Molecular and Cellular Biology	Robert W. McGaughey
Director, Institute of Human Origins	Donald C. Johanson
Director, Latin American Studies Center	Tod D. Swanson
Director, Arizona Center for Medieval and Renaissance Studies	Robert E. Bjork
Director, Center for Meteorite Studies	Carleton B. Moore
Director, Center for Solid State Science	David J. Smith
Director, Program for Southeast Asian Studies	Karen L. Adams
Director, Women's Studies Program	Kathleen J. Ferraro

College of Nursing

Dean, College of Nursing	Barbara A. Durand
Associate Dean for Graduate Programs and Research	Pamela Kidd
Associate Dean for Undergraduate Programs and Extended Education	Mary Killeen
Director, Continuing and Extended Education	David Hrabe
Director, Student Services	Jean Craig Stengel

ADMINISTRATIVE PERSONNEL

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Chair, Division of Community Health/Psychosocial Nursing Systems	Betty J. Gale
Manager, Community Health Services Clinic	Elizabeth Holman

College of Public Programs

Dean, College of Public Programs	Anne L. Schneider
Associate Dean, College of Public Programs	Frederick C. Corey
Assistant Dean, College of Public Programs	Kathryn Gundersen
Director, Student Services	Cheryl Herrera
Director, Hugh Downs School of Human Communication	Jess K. Alberts
Director, Walter Cronkite School of Journalism and Mass Communication	Joe S. Foote
Director, School of Justice Studies	Doris Marie Provine
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Chair, Department of Recreation Management and Tourism	Randy J. Virden
Director, Advanced Public Executive Program	Peggy O'Sullivan-Kachel
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Division of Undergraduate Academic Services

Executive Director, Division of Undergraduate Academic Services	William S. Johnson
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Director, Academic Advising Services	Casey Self
Director, Bachelor of Interdisciplinary Studies	Christina Stage
Senior Program Coordinator, General Studies	Phyllis Lucie
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Graduate College

Dean, Graduate College	Bianca L. Bernstein
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Associate Dean, Academic Programs	Maria T. Allison
Assistant Dean, Academic Programs	Sarah B. Lindquist
Assistant Dean, Administrative Services and Information Systems	Kent D. Blaylock

Herberger College of Fine Arts

Dean, Herberger College of Fine Arts	J. Robert Wills
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Chair, Department of Dance	Claudia Murphey
Director, School of Music	Wayne A. Bailey
Interim Chair, Department of Theatre	Johnny Saldaña
Director, Communications	Stacey Shaw
Director, Community Programs	Melanie Ohm
Director, Institute for Studies in the Arts	Thanasis Rikakis
Director, Public Art	Dianne Cripe
Director, Student Academic Services	Gina Stephens
Director, ASU Art Museum	Marilyn A. Zeitlin

University Libraries

Dean, University Libraries	Sherrie Schmidt
Associate Dean, Continuous Improvement/Total Quality Service	<i>To Be Appointed</i>
Associate Dean, Library Services	Jane A. Conrow
Interim Associate Dean, Video Resources	Robert Follet
Assistant Dean, Personnel	Kurt R. Murphy
Head, Access Services/Interlibrary Loan and Document Delivery	Ginny Sylvester

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Head, Department of Archives and Manuscripts	Robert P. Spindler
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Basketball–Women	Charli Turner Thorne
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Cross Country–Women	Walt Drenth
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Track and Field–Women	Greg Kraft
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Student Affairs

Vice President	Christine K. Wilkinson
Associate Vice President for Student Affairs and Dean, Student Development	Jim Rund
Assistant Vice President for Student Affairs and Dean, Student Life	Bob Soza
Director, Counseling and Consultation	Martha Dennis Christiansen
Manager of Student Affairs Computing Services	Michael Schaefer
Associate Dean, Student Development and Director, Memorial Union	Sally Ramage
Director, Arizona Prevention Resource Center	Gail Chadwick
Director, Career Services	Raymond I. Castillo
Director, Recreational Sports	Howard Taylor
Director, Residential Life and Assistant Dean, Student Development	Kevin Cook
Director, Student Financial Assistance	Diane Stemper
Director, Student Health and Wellness Center	Mary Rimza
Director, Student Media	<i>To Be Appointed</i>
Director, Undergraduate Admissions	Tim Desch
Registrar	Lou Ann Denny

University Continuous Improvement

Project Administrator	Jacquie Gentry
Program Coordinator	Vicki Harmon
Human Resources Specialist Senior	Patrick Patterson

ASU East

See [“ASU East Administrative Personnel,” page 443.](#)

ASU Extended Campus

See [“ASU Extended Campus Administrative Personnel,” page 463.](#)

ASU West

See [“ASU West Administrative Personnel,” page 454.](#)

ASU East

www.east.asu.edu

Charles E. Backus, Ph.D., Campus Chief Executive Officer
and Provost, ASU East; Vice President, ASU

Arizona State University East, located 23 miles southeast of ASU Main, was established in 1996 at the former Williams Air Force Base. There, ASU East and its educational partners have created the Williams Campus—an academic community focused on meeting the needs of students, business, industry, and the larger community. The 600-acre campus offers a small residential college environment, with access to the amenities of a major metropolitan area and the resources of a major research university.

ASU East offers degree programs that help students develop knowledge and skills they need for success in their professional, civic, and personal lives in the 21st century. Sixteen baccalaureate degree programs, five master's degree programs, and two certificate programs can be completed at ASU East.

The College of Technology and Applied Sciences offers a master's degree and a range of bachelor's programs in high demand areas of technology, the only programs of their kind in Arizona. The unique bachelor's and master's degrees in Agribusiness offered by the faculty in the Morrison School of Agribusiness and Resource Management lead to careers in one of the fastest growing sectors of global business. The Environmental Resources degrees offered through the Morrison School provide opportunities to study wilderness areas and urban habitats and how people's activities affect the regenerative ability of natural resources.

East College offers a range of supporting courses for all ASU East programs and bachelor's degrees with majors in Business Administration, Applied Psychology, Nutrition, Elementary Education, Multimedia Writing and Technical Communication, Exercise and Wellness, and Interdisciplinary Studies. The campus is easily accessible via major interstate routes. See the "[ASU East Map](#)," page 437. For the latest information, call 480/727-EAST (3278) or access the Web site at www.east.asu.edu.

CAMPUS AND STUDENT SERVICES

ASU East is a student-centered campus that offers many of the features of a small residential college in a rural area while providing access to the resources of a major research university and the amenities of a large metropolitan area. The campus includes excellent educational facilities: modern classrooms and laboratories, a 21st-century electronic library, and state-of-the-art computer equipment. Other amenities include a learning center, child care services, campus union, bookstore, copy center, and free parking. A shuttle service provides transportation between ASU East, Mesa Community College, and ASU Main. An additional

shuttle is available for transportation from ASU Main to ASU West.

Enrollment Services—OASIS

The OASIS provides one-stop services for admission, financial aid, business services, and registration. Conveniently located in the Academic Center Building, students find personnel ready to assist them with registration processes, tuition payment, financial assistance information, student employment, ASU Sun Cards (photo IDs), and parking information.

Learning Center

In the Learning Center, undergraduate and graduate students can study, utilize computers for research and writing, and access tutoring services that support ASU East course work. Qualified undergraduate and graduate students provide tutoring by appointment or on a drop-in basis. Writing assistance is offered both face-to-face and online through the Learning Center Web site. Other services include workshops on writing, presentation and study skills, and computer-assisted instruction.

Located in the Academic Center Building, the Learning Center offers a convenient and quiet study location for individuals and groups. The center encourages leisure reading by offering paperback books to borrow and comfortable furnishings in which to relax. All Learning Center services are free to currently enrolled students. For more information or to schedule a tutoring appointment, call 480/727-1452, or visit the Web site at www.east.asu.edu/learningcenter.

Library Services

Strong resources and personal service define the ASU East Library. As a primarily electronic research library, it is designed to take maximum advantage of new technology. Electronic indexes, catalogs, and journals support study and research in many fields, with an emphasis on the majors offered at ASU East. While the library acquires materials in all formats, by intention it prefers electronic text. Thousands of periodicals are available digitally in all subjects, while those that remain in print form can be obtained by the library quickly. Documents in electronic form can be delivered directly to students' computers. Librarians and staff pursue service customized to individual students' needs, cultivating a small college atmosphere. The library's Web address is eastlib.east.asu.edu.

Computing Services

With more than 200 workstations in five classrooms and a Computing Commons, Information Technology at ASU East provides general computing services, including e-mail and general purpose computing. The IT East department provides specialized software and systems to meet the particular needs of the ASU East programs. In addition, IT East provides mediated classrooms and audiovisual material to support e-learning initiatives. IT East has a staff of support personnel to aid the campus community's diverse computing needs, including Web development.

Food Services

ASU East has a variety of food service options on campus to serve student, faculty, staff, and visitor needs. Services include a coffee bar/convenience shop in the Williams Campus Union, a full-service dining facility in the Campus Dining Hall, and catering services. Food can be purchased on a cash basis; a meal plan can be selected to suit individual preferences. For more information about food service at the Williams Campus, call 480/988-5212.

Student Health Services

Health services for ASU East students are provided by the Veteran's Administration Medical Center located at the Williams Campus. Services include primary assessment and treatment of health problems and injuries, physical exami-

nations and immunizations, women's health care, diagnostic tests, laboratory tests/X-rays, and a pharmacy. Student registration fees cover the cost of office visits for full-time ASU East students. Part-time students pay a nominal fee. Some office procedures and laboratory tests require additional charges. Health insurance is not required to use the health services; however, it is strongly advised for all students and is required for international students. For more information, call 602/222-6568.

Student Counseling

Confidential professional counseling services are available to help ASU East students achieve their academic goals by addressing a variety of problems and issues often faced in college. Students may schedule an appointment by calling 480/727-1041. Appointments may also be made in person at Student Services (Garden Level of the Academic Center Building).

Career Preparation Center

Professional career counselors are available to meet with ASU East students. They provide individual career advising, group workshops, assistance in researching job and internship possibilities, resume and cover letter critiques, preparation for employment interviews, and career resources in print and online. For more information, call 480/727-1411 or access the Web site at www.east.asu.edu/sta/career.html.



Preflight instruction

Dave Tevis photo

Williams Campus Union

The Williams Campus Union is in the center of campus and serves as a common gathering place for students, faculty, staff, and guests. The union has meeting space, study rooms, private computer rooms, a TV lounge, a coffee bar/convenience shop, a game room, and a ballroom. Programs and services that complement the academic experience and enhance campus life include a film series, dances, live performances, resources for student organizations, cultural awareness activities, leadership workshops, community service information, and holiday celebrations. The union is staffed primarily by students, providing them the opportunity to develop valuable leadership skills and work experience. For more information, call 480/727-1098.

Recreational Facilities and Services

The Williams Campus Fitness Center is equipped with state-of-the-art strength training and cardiovascular equipment, racquetball courts, and a full-size gymnasium. Trained exercise and wellness professionals are on duty daily to provide expert advice and personal training assistance. A variety of health, fitness, and sports classes also are offered at the fitness center.

The gymnasium is available for open recreation volleyball and basketball during the noon hour and some evenings.

The ASU East Physical Activity Center (PAC) serves two primary purposes. It is the headquarters for a variety of professional and nonprofessional activity classes offered by the Department of Exercise and Wellness. The PAC is also available during the lunch hour and evenings for open recreation and group fitness classes for Williams Campus students, faculty, and staff. The PAC offers three activity gyms, a fitness center equipped with state-of-the-art strength training equipment, a lounge, and a snack bar area for relaxing or studying.

In addition to high quality indoor fitness and recreation facilities, Williams Campus offers an all-weather quarter mile track, four newly resurfaced and remodeled tennis courts, numerous sand volleyball courts, outdoor basketball courts, a softball field, soccer field, and swimming pool. The Williams Campus Intramural and Recreation program offers a variety of team sports, individual sports, and special events. For more information on intramural activities, call 480/727-1972. For more information on open recreation and group fitness classes in the PAC, call 480/727-1971. For a fee of \$30 per semester, students, faculty and staff may use the Williams Campus Fitness Center and the PAC. To sign up, call the Williams Campus Fitness Center at 480/988-8400.

Child Care

Child care programs on campus are offered through the East Mesa/Apache Junction YMCA, Head Start and Early Head Start, and the East Valley Boys & Girls Club. The YMCA offers toddler and preschool programs with full- and part-time options available. Head Start and Early Head Start also offer child care programs on campus for individuals who meet certain income criteria. The Boys & Girls Club offers after school programs for children ages 6 to 18. For more information, call the YMCA at 480/727-1400, the Boys & Girls Club at 480/279-1406, or Head Start at 480/988-9389.

Williams Campus Housing and Residential Life

Living on-campus at ASU East provides students with the best opportunity to make the most of their college experience. No matter which housing option students choose, the residential life program offers social, academic, and recreational activities that are designed to support and enrich the student's campus life experience. Residential students benefit from easy access to campus resources such as the library, learning center, fitness center, and campus union; and parking is available for residents at no extra cost.

ASU East's unique residential environment offers housing options for Williams Campus students throughout their undergraduate and graduate education. This includes residence halls, houses, and special residential communities. Residential students can also take advantage of such amenities as outdoor swimming, sand volleyball, tennis, and picnic areas.

For more information, call the Williams Campus Housing Office at 480/727-1700, or access the Web site at www.east.asu.edu/sta/u-life/housing.

Residence Halls. Undergraduate and graduate students are eligible for residence halls with a large private room, featuring a private bath and a shared kitchenette. Students may, if they prefer, elect to share a room with another student. Each room includes basic furnishings; the kitchenette includes a refrigerator and microwave.

Houses. A large number of two-to-five bedroom houses are available for students with families or for groups of single undergraduate or graduate students. Each house includes basic appliances.

Special Residential Communities. Special residential communities for students in particular academic majors, and students sharing common interest areas are also available. All residential facilities are non-smoking.

Accreditation

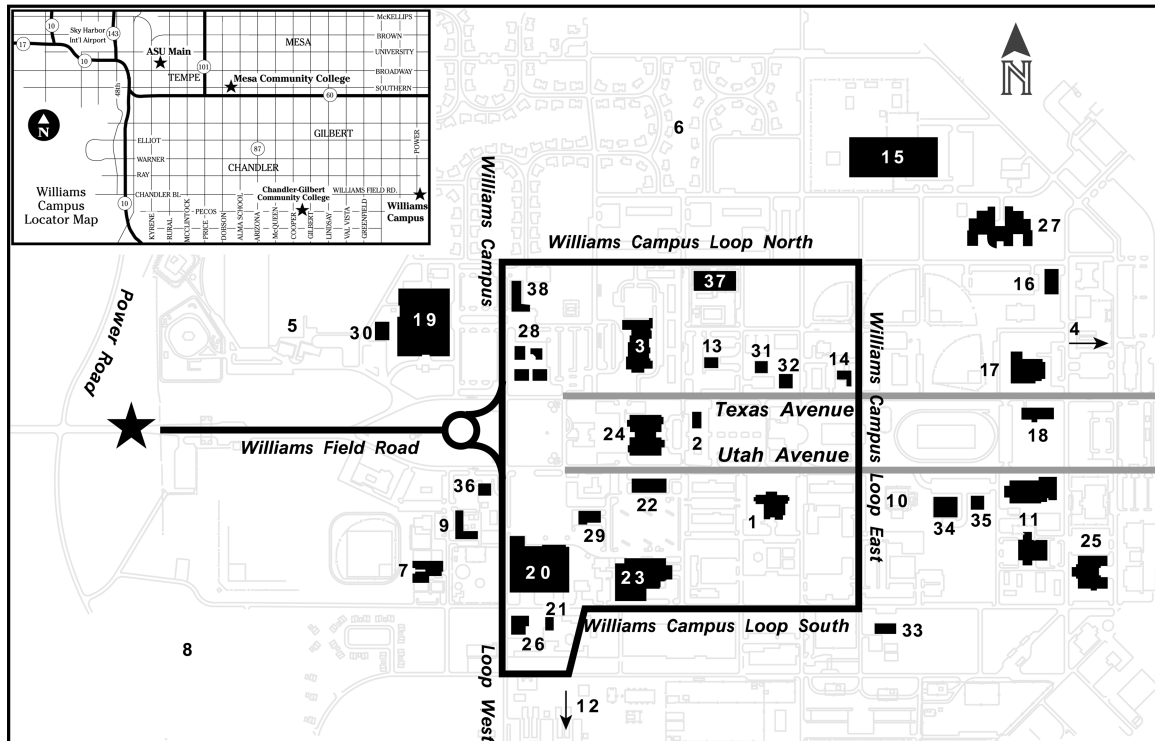
The North Central Association of Colleges and Schools accreditation of ASU Main includes ASU East. In addition, ASU East programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (TAC of ABET). For more 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 21202-7102

Both the professional flight and the air transportation management concentrations, in the Department of Aeronautical Management Technology, are fully accredited by the Council on Aviation Accreditation. For more information, call 334/844-2431, e-mail caa@auburn.edu, or write

COUNCIL ON AVIATION ACCREDITATION
3410 SKYWAY DRIVE
AUBURN AL 36830

ASU East Map



Williams Campus

- 1 Williams Campus Dining Hall (FOOD)
- 2 Williams Campus Housing Office (WCHO)
- 3 Williams Campus Union (UNION)
- 4 Williams Gateway Airport and Flight Line
- 5 Toka Sticks Clubhouse and Golf Course
- 6 North Desert Village
- 7 Child Development Center (CDC)
- 8 West Desert Village
- 9 Facilities Management/DPS (FMDP)
- 10 Swimming Pool (POOL)
- 11 Research Training Laboratory
- 12 South Desert Village
- 13 Williams Express Copy Services (COPY)
- 14 Williams Campus Post Office (WCPO)

Chandler-Gilbert Community College at Williams Campus

- 15 Aviation Technology Center, Embry-Riddle, and University of North Dakota (ATC)
- 16 General Studies Building (GSB)
- 17 Physical Education Center (PEC)
- 18 Science Lab Building (SLB)

ASU East

- 19 Health Sciences Center (HSC)
(ASU East Student Health, VA Clinic)
- 20 Technology Center (TECH)
- 21 Agribusiness Food Science Lab (FDSCI)
- 22 Auditorium (EAUD)
- 23 Future Classroom and Lab Building
- 24 Academic Center Building (CNTR)
- 25 Classroom Building (CLRB)
- 26 TECH 2
- 27 Flight Simulator Building (SIM)
- 28 Morrison School of Agribusiness and Resource Management Complex (1-4)
- 29 Communication (COMM2)
- 30 Professional Golf Management (PGM)
- 31 American Indian Programs (AIP)
- 32 International Projects Unit (INTRP)
- 33 Photovoltaic Testing Lab (SOLAR)
- 34 Physical Activity Center (PAC)
- 35 Exercise Instructional Lab Building (EAW2)
- 36 Administrative Services (ADSVC)
- 37 Tennis Courts (TENNIS)
- 38 Altitude Chamber Building (ALTCH)

ASU East Directory

For the [“ASU Main Directory,”](#) see page 352. For the [“ASU West Directory,”](#) see page 447. For the [“ASU Extended Campus Directory,”](#) see page 463.

Organization	Location	Telephone	Web Address
Agribusiness and Resource Management, Morrison School of Environmental Resources	CNTR 20	480/727-1585	www.east.asu.edu/msabr
Professional Golf Management	CNTR 20	480/727-1585	cactus.east.asu.edu
American Indian Programs	CNTR 20	480/727-1017	www.east.asu.edu/msabr/pgm
	AIP	480/727-1161	www.east.asu.edu/aip
		480/727-1075	
Bookstore	CNTR 102	480/727-1146	www.asu.edu/east/admin/business.htm
Campus Copy Center, Williams	CNTR Terrace Level	480/727-1175	www.asu.edu/east/admin/business.htm
Campus Union	UNION	480/727-1098	www.asu.edu/east/cls/union.htm
Cashiering Services	CNTR 81	480/727-1081	www.asu.edu/east/admin/business.htm
Computer Commons, ASU East	CNTR 150	480/727-1118	www.east.asu.edu/infotech/labs
East College	CNTR 92	480/727-1515	www.east.asu.edu/ecollege
Applied Psychology, Faculty of	CNTR	480/727-1515	www.east.asu.edu/ecollege/appliedpsych
Business Administration, Faculty of	CNTR	480/727-1515	www.east.asu.edu/ecollege/businessadmin
Education, Faculty of	COMM2	480/727-1103	www.east.asu.edu/ecollege/elementaryed
Exercise and Wellness, Department of	CLRB	480/727-1945	www.east.asu.edu/ecollege/wellness
Multimedia Writing and Technical Communication, Faculty of	CNTR	480/727-1515	www.east.asu.edu/ecollege/multimedia
Nutrition, Department of	HSC 1386	480/727-1728	www.east.asu.edu/ecollege/nutrition
Fitness Center, Williams Campus	WCFC Bldg	480/988-8400	www.asu.edu/east/cls/recreation.htm
General Information	CNTR Garden Level	480/727-3278	www.east.asu.edu
Housing, Williams Campus	WCHO Bldg	480/727-1700	www.asu.edu/east/cls/housing
Learning Center	CNTR 160	480/727-1452	www.east.asu.edu/learningcenter
Library Services	CNTR 110	480/727-1037	eastlib.east.asu.edu
OASIS (Student Services)*	CNTR Garden Level	480/727-3278	www.east.asu.edu/sta/contact1.html
Provost, Office of the Student Health Services	CNTR 30	480/727-1028	—
Technology and Applied Sciences, College of	HSC	602/222-6568	www.asu.edu/east/student/stuheal.html
Aeronautical Management Technology, Department of	CNTR 10	480/727-1874	www.east.asu.edu/ctas
Electronics and Computer Engineering Technology, Department of	SIM 201	480/727-1381	eastair.east.asu.edu
Information and Management Technology, Department of	TECH 101	480/727-1029	www.east.asu.edu/ctas/ecet
Manufacturing and Aeronautical Engineering Technology, Department of	TECH 102	480/727-1781	www.east.asu.edu/ctas/imt
	SIM 295	480/727-1584	www.east.asu.edu/ctas/maet

* OASIS includes ASU Sun Cards, Office of the Registrar, Student Business Services, Student Financial Assistance, Undergraduate Admissions, and Williams Campus Parking Decals.

ASU East Faculty and Academic Professionals

A

Autore, Donald D. (1959), Professor Emeritus of Technology; B.S.E., University of Michigan; M.S.E., Arizona State University

B

Backus, Charles E. (1968), Professor of Electrical Engineering; Campus Chief Executive Officer and Provost, ASU East; Vice President, ASU; B.S.M.E., Ohio University; M.S., Ph.D., University of Arizona

Barchilon, Marian G. (1989), Associate Professor of Technical Communication; B.A., 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

Bergeron, Bette S. (2000), Professor of Education; Head, Faculty of Education; B.S.Ed., University of Maine, Orono; M.S.Ed., Ph.D., Purdue University

Biekert, Russell G. (2001), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Southern Illinois University; Ed.D., Arizona State University

Brady, Ward W. (1973), Professor of Environmental Resources; B.S., M.S., Ph.D., Colorado State University

Brock, John H. (1977), Professor of Environmental Resources; B.S., M.S., Fort Hayes State University; Ph.D., Texas A&M 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

Burkett, Lee N. (1974), Professor of Exercise and Wellness; B.A., M.A., San Diego State University; Ph.D., Washington State University

Busch, Jay S. (2001), Lecturer of General Studies; B.A., Michigan State University; M.A., Arizona State 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 Emeritus of Agribusiness and Resource Management; B.S., D.V.M., Washington State University; M.S., Ph.D., Cornell University

Collins, Donald W. (1989), Professor of Manufacturing and Aeronautical Engineering Technology; B.Arch., Virginia Polytechnic Institute and State University; M.S., Ph.D., University of Illinois, Chicago

Corbin, Charles B. (1982), Professor of Exercise and Wellness; B.S., University of New Mexico; M.S., University of Illinois; Ph.D., University of New Mexico

Cox, Frank E. (1972), Professor Emeritus of Technology; B.S.M.E., Purdue University; M.S.E., Arizona State University

D

D'Angelo, Barbara J. (2001), Assistant Librarian, ASU East Library Services; B.A., Emmanuel College; M.S., University of Illinois, Urbana-Champaign

Daneke, Gregory A. (1982), Professor of Agribusiness and Resource Management; B.A., M.A., Brigham Young University; Ph.D., University of California, Santa Barbara

Danielson, Scott G. (1999), Associate Professor of Manufacturing and Aeronautical Engineering Technology; Chair, Department of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., University of Wyoming; Ph.D., North Dakota State University

Dixon, Kathleen S. (2000), Lecturer of Nutrition; B.S., University of Arizona; M.Ed., Northern Arizona University

Dolin, Penny Ann (1998), Lecturer of Information and Management Technology; B.A., Bard College; M.S., Arizona State University

Duff, Jon M. (1997), Professor of Information and Management Technology; B.S., M.S., Purdue University; Ph.D., Ohio State University

E

Edwards, Mark R. (1978), Professor of Agribusiness and Resource Management; B.S.M.E., United States Naval Academy; M.B.A., D.B.A., Arizona State University

Edwards, Marvin J. (1959), Professor Emeritus of Technology; B.S., M.A., Arizona State University

F

Fordemwalt, James N. (1987), Professor Emeritus of Electronics and Computer Engineering Technology; B.S., M.S., University of Arizona; Ph.D., Iowa State University of Science and Technology

G

Gannod, Barbara D. (2001), Assistant Professor of Electronics and Computer Engineering Technology; B.Sc., Calvin College; M.Sc., Ph.D., Michigan State University

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 Emeritus of Agribusiness and Resource Management; A.B., University of Rochester; M.A., Harvard University; Ph.D., Massachusetts Institute of Technology

ASU EAST FACULTY AND ACADEMIC PROFESSIONALS

Gray, Robert D. (2001), Assistant Professor of Applied Psychology; B.A., Queen's University (Canada); M.A., Ph.D., York University (Canada)

Green, Douglas M. (1990), Associate Professor of Environmental Resources; B.S., Oregon State University; M.S., North Dakota State University; Ph.D., Oregon State University

Grossman, Gary M. (1994), Associate Professor of Information and Management Technology; B.A., University of the Pacific; M.S., Ph.D., Purdue University

Gryder, Missy (2001), Lecturer of Elementary Education; B.A., M.B.A., Ed.D., Arizona State University

H

Hampf, Jeffrey (1998), Assistant Professor of Nutrition; B.S., Liberty University; M.S., University of Massachusetts, Lowell; Ph.D., University of Nebraska

Harris, Laverne Abe (1999), Lecturer of Information and Management Technology; B.A., M.Tech., Arizona State University

Hefner, Stephen P. (1973), Instructional Professional of Agribusiness and Resource Management, Morrison School of Agribusiness and Resource Management; B.S., Illinois State University; M.S., Arizona State University

Hild, Nicholas R. (1983), Professor of Information and Management Technology; B.S.M.E., M.S.Enve., University of Iowa; Ph.D., Union Graduate School

Hirata, Ernest T. (1974), Associate Professor of Information and Management Technology; B.A., San Diego State College; Ed.D., Arizona State University

Hopper, Lee Ann (2001), Lecturer of Elementary Education; B.S., Texas Tech University; M.A., Arizona State University

Horowitz, Renee B. (1986), Professor Emerita of Information and Management Technology; B.A., Brooklyn College; M.A., Ph.D., University of Colorado

Humble, Jane E. (1989), Associate Professor of Information and Management Technology; B.S.E., M.S.E., Ph.D., Arizona State University

Hutchins, Andrea M. (2001), Assistant Professor of Nutrition; B.S., Kansas State University; M.S., Ph.D., University of Minnesota

Hutt, Roger W. (1975), Associate Professor of Business Administration; Head, Faculty of Business Administration; B.S., M.B.A., Ohio State University; Ph.D., Michigan State University

J

Jackson, Andrew E. (1995), Associate Professor of Aeronautical Management Technology; B.A., University of Louisville; M.B.A., Embry-Riddle Aeronautical University; Ph.D., University of Central Florida

Johnston, Carol S. (1986), Professor of Nutrition; B.S., University of Michigan; M.S., Ph.D., University of Texas, Austin

Jones, Kathy (1996), Assistant Professor of Exercise and Wellness; B.A., University of California, Berkeley; M.S., Ph.D., Arizona State University

K

Kagan, Albert (1992), Professor of Agribusiness and Resource Management; B.S., M.S., Ph.D., Iowa State University of Science and Technology

Karp, Merrill R. (1994), Associate Professor of Aeronautical Management Technology; B.S., Arizona State University; M.A., Central Michigan University; Ph.D., Walden University

Keith, Marlow F. (1946), Professor Emeritus of Technology; B.A., M.A., Arizona State University

Kelley, Donald G. (1980), Professor Emeritus of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Arizona State University

Kigin, Denis J. (1958–65; 1967), Professor Emeritus of Technology; Dean Emeritus, Continuing Education and Summer Sessions; B.S., Mankato State University; M.S., University of Wisconsin, Stout; Ed.D., University of Missouri

Kime, Charles H. (1999), Assistant Professor of Information and Management Technology; B.S., Arizona State University; M.B.A., University of Phoenix; D.P.A., Arizona State University

Kisielewski, Robert V. (1978), Professor Emeritus of Technology; B.S.M.E., M.S.M.E., University of Wisconsin, Madison

Kleemann, Gary L. (1979), Administrative Professional, Academic Programs; Director, E-Learning; B.A., M.S., San Jose State University; Ph.D., Arizona State University

Koehnemann, Harry E. (2001), Associate Professor, Electronics and Computer Engineering Technology; B.S., Northern Arizona University; M.S., Ph.D., Arizona State University

L

Lawler, Eugene D. (1967), Professor Emeritus of Technology; B.S., Northern State College; M.A., Arizona State University

Lestar, Dot J. (1995), Lecturer of Information and Management Technology; B.S., M.Tech., Arizona State University

Lindley, James (2001), Senior Lecturer of Preveterinary Medicine; B.S., D.V.M., University of Missouri

Lindquist, Timothy (1985), Professor of Electronics and Computer Engineering Technology; Chair, Department of Electronics and Computer Engineering Technology; B.S., Purdue University; M.S., Ph.D., Iowa State University

Lytle, Robert G. (1972), Professor Emeritus of Agribusiness and Resource Management; B.S., Western Kentucky University; M.S., Arizona State University

M

Macia, Narciso F. (1990), Associate Professor of Electronics and Computer Engineering Technology; B.S., M.S., University of Texas, Arlington; Ph.D., Arizona State University

Maddy, Kenneth H. (1980), Professor Emeritus of Agribusiness and Resource Management; B.S., Pennsylvania State University; M.S., University of Wisconsin, Madison; Ph.D., Pennsylvania State University

Maid, Barry M. (2000), Professor of Multimedia Writing and Technical Communication; Head, Faculty of Multimedia Writing and Technical Communication; B.A., University of Wisconsin, Madison; M.A., University of Texas, Austin; Ph.D., University of Massachusetts, Amherst

Maisel, James E. (1985), Professor Emeritus of Electronics and Computer Engineering Technology; B.Eng.Sci., B.E.E., Fenn College; M.S.E.E., Ohio State University

Manfredo, Mark R. (1999), Assistant Professor of Agribusiness and Resource Management; B.S., California State University, Fresno; M.S., New Mexico State University; Ph.D., University of Illinois, Urbana

Manore, Melinda M. (1984), Professor Emerita of Nutrition; B.S., Seattle Pacific University; M.S., University of Oregon; Ph.D., Oregon State University

Marquardt, Raymond A. (1997), Professor of Agribusiness and Resource Management; Dean, Morrison School of Agribusiness and Resource Management; B.S., M.S., Colorado State University; Ph.D., Michigan State University

Martin, Rose L. (1990), Senior Lecturer of Nutrition; B.S., University of Illinois; M.S., Pennsylvania State University

Matson, John H. (1978), Associate Professor of Information and Management Technology; B.S., M.S., Illinois State University

Matthews, James B. (1989), Professor Emeritus of Aeronautical Technology; B.S., Rose-Hulman Institute of Technology; M.S., Massachusetts Institute of Technology; Ph.D., University of Arizona

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

McHenry, Albert L. (1978), Professor of Electronics and Computer Engineering Technology; Dean, College of Technology and Applied Sciences; B.S., Southern University and A&M College; M.S., Ph.D., Arizona State University

Mermis, William L. (1995), Professor of Human Health; B.S., M.S., Saint Louis University; Ph.D., Arizona State University

Millard, Bruce R. (1988), Associate Professor of Electronics and Computer Engineering Technology; B.A., M.S., Washington State University; Ph.D., Arizona State University

Miller, Victor J. (1958), Professor Emeritus of Agribusiness and Resource Management; B.S., M.S., Ph.D., University of Illinois

Miller, William H. (1984), Associate Professor of Environmental Resources; B.S., M.S., Ph.D., Washington State University

Minter, Marshall R. Jr. (1965), Professor Emeritus of Technology; B.S.M.E., Purdue University; M.S.M.E., University of Arizona

Monte, Woodrow (1979), Professor Emeritus of Nutrition; B.S., New Mexico Institute of Mining and Technology; M.S., Ph.D., Colorado State University

Moody, E. Grant (1951), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Arizona; M.S., Kansas State University; Ph.D., Purdue University

Munukutla, Lakshmi V. (1987), Professor of Electronics and Computer Engineering Technology; Associate Dean, College of Technology and Applied Sciences; B.S., M.S., Andhra University (India); Ph.D., Ohio University

N

Nam, Changho (1998), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Seoul National University (South Korea); Ph.D., Purdue University

Newman, Richard L. (2001), Assistant Administrative Professional; Director, Training Services, College of Technology and Applied Sciences; B.S., M.S., Arizona State University

O

O'Brien, Marc H. (1997), Lecturer of Aeronautical Management Technology; B.A., Boston University; M.S., Indiana State University

Olson, Larry W. (1995), Associate Professor of Information and Management Technology; B.S., Baylor University; Ph.D., University of Pennsylvania

P

Palmgren, Dale E. (1984), Associate Professor of Manufacturing and Aeronautical Engineering Technology; Assistant Dean, College of Technology and Applied Sciences; B.S., M.S., Ph.D., University of Wisconsin, Madison

Pardini, Louis J. (1967), Professor Emeritus of Technology; B.A., A.M., Idaho State University; Ed.D., University of Northern Colorado

Patterson, Paul M. (1995), Associate Professor of Agribusiness and Resource Management; B.S., Auburn University; M.S., Ph.D., Purdue University

Pearce, Martha V. (1977), Professor Emerita of Technology; B.S., Columbia University; M.S., Boston University; Ed.D., Arizona State University

Pearson, Michael W. (1998), Assistant Professor of Aeronautical Management Technology; B.A., University of Houston; M.B.A., J.D., Arizona State University

Peterson, Danny M. (1999), Associate Professor of Information and Management Technology; B.S., University of Idaho; M.B.A., California State University, Sacramento; M.S., Ph.D., Arizona State University

Peterson, Edward R. (1977), Professor Emeritus of Electronics and Computer Engineering Technology; B.S.E.E., Fairleigh Dickinson University; M.S.E.E., Arizona State University

Phillips, Wayne T. (1997), Assistant Professor of Exercise and Wellness; Cert. Ed., Cardiff College of Education, Cardiff (United Kingdom); M.S., Loughborough University of Technology (United Kingdom); Ph.D., Arizona State University

Post, Alvin (2000), Assistant Professor of Manufacturing and Aeronautical Engineering Technology; B.S., University of Arizona; M.S., Stanford University; Ph.D., University of Hawaii

Prust, Zenas A. (1959), Professor Emeritus of Technology; B.S., University of Wisconsin, Stout; M.A., University of Minnesota, Twin Cities; Ed.D., University of Northern Colorado

R

Raccach, Moshe (1980), Associate Professor of Agribusiness and Resource Management; B.Sc., M.Sc., The Hebrew University (Israel); Ph.D., Cornell University

Rajadas, John N. (1996), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., Georgia Institute of Technology

Reed, William H. (1968), Professor Emeritus of Manufacturing and Aeronautical Engineering Technology; B.S., University of Oklahoma; M.S., Arizona State University

Richards, Timothy J. (1994), Associate Professor of Agribusiness and Resource Management; B.Comm., University of British Columbia; M.A., Ph.D., Stanford University

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

Robertson, John M. (2001), Professor of Electronics and Computer Engineering Technology; B.S., University of St. Andrews (United Kingdom); M.S., University of Dundee (United Kingdom); Ph.D., University of Edinburgh (United Kingdom)

Roe, Keith B. (1979), Professor Emeritus of Technology; B.S., Wisconsin State College; M.A., University of Michigan

ASU EAST FACULTY AND ACADEMIC PROFESSIONALS

Rogers, Bradley B. (1984), Associate Professor of Manufacturing and Aeronautical Engineering Technology; B.S., M.S., Montana State University; Ph.D., Arizona State University

Rook, Fern H. (1969), Professor Emerita 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

Sadowski, Mary A. (1999), Professor of Information and Management Technology; B.S.E., Bowling Green University; M.A., Ohio State University; Ph.D., Purdue University

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), Professor Emeritus of Manufacturing and Aeronautical Engineering Technology; B.S., Northern Illinois University; M.A., Ed.D., Arizona State University

Schmitz, Troy G. (1998), Assistant Professor of Agribusiness and Resource Management; B.S., University of Saskatchewan (Canada); M.S., Ph.D., University of California, Berkeley

Schoen, Robert A. (1966), Professor Emeritus of Technology; B.S., M.S., Arizona State University

Schvaneveldt, Roger (2000), Professor of Applied Psychology; Head, Faculty of Applied Psychology; B.A., University of Utah; M.S., Ph.D., University of Wisconsin, Madison

Schwalm, David E. (1986), Associate Professor of English; Dean of East College, Vice Provost ASU East; B.A., Carlton College; M.S., Ph.D., University of Chicago

Seperich, George J. (1976), Professor of Agribusiness and Resource Management; Associate Dean, Morrison School of Agribusiness and Resource Management; B.S., Loyola University, Chicago; M.S., Ph.D., Michigan State University

Shepard, Christina W. (1999), Academic Associate of Nutrition; B.S., University of Arizona; M.S., Arizona State University

Shultz, Clifford J. (1992), Professor of Agribusiness and Resource Management; Marley Foundation Chair in Consumer Food Marketing; B.A., DePauw University; M.S., Ph.D., Columbia University

Stanton, Julie V. (1996), Assistant Professor of Agribusiness and Resource Management; B.A., Georgetown University; Ph.D., University of Maryland, College Park

Stiles, Philip G. (1969), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Arkansas; M.S., University of Kentucky; Ph.D., Michigan State University

Stone, William J. (1967), Professor of Exercise and Wellness; Chair, Department of Exercise and Wellness; B.S., Boston University; M.S., Florida State University; Ed.D., University of California, Berkeley

Strawn, Roland S. (1967), Professor Emeritus of Technology; B.S.E.E., M.S.E.E., University of Illinois; Ph.D., Arizona State University

Sundararajan, Rajeswari (1996), Associate 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

Swan, Pamela (1994), Associate Professor of Exercise and Wellness; B.A., University of California, Santa Barbara; M.S., University of North Carolina, Greensboro; Ph.D., University of Tennessee

T

Taysom, Elvin D. (1953), Professor Emeritus of Agribusiness and Resource Management; B.S., University of Idaho; M.S., Utah State University; Ph.D., Washington State University

Thomason, Leslie L. (1969), Professor Emeritus of Technology; A.B., M.A., Ed.D., University of Oklahoma

Thor, Eric P. (1990), Professor of Agribusiness and Resource Management; B.S., M.S., Ph.D., University of California, Berkeley

Tudor-Locke, Catrine (2001), Assistant Professor of Exercise and Wellness; B.A., University of Lethbridge (Canada); M.S., Dalhousie University (Canada); Ph.D., University of Waterloo (Canada)

Turney, Mary Ann (1999), Associate Professor of Aeronautical Management Technology; B.A., LeMoyne College; M.A., Hofstra University; Ed.D., Nova Southeastern University

V

Vaughan, Linda A. (1982), Professor of Nutrition; Chair, Department of Nutrition; B.S., University of California, Davis; M.N.S., Cornell University; Ph.D., University of Arizona

W

Watkins, Thomas B. (1972), Professor Emeritus of Technology; B.S., University of Wyoming; M.S., Arizona State University

Wely, Ellen L. (1996), Reference/Instruction Librarian, ASU East Library Services; B.A., University of Wyoming; M.L.S., University of Arizona

Wenhardt, James C. (1996), Senior Lecturer of Elementary Education; B.S., M.Ed., Arizona State University

Whitehouse, Richard O. (1997), Senior Lecturer of Computer Science and Engineering; B.S., Worcester State College; M.S., University of Tennessee

Whysong, Gary L. (1974), Associate Professor of Environmental Resources; B.S., M.S., Montana State University; Ph.D., University of Wyoming

Wilson, Daniel (1978), Senior Lecturer of Information and Management Technology; B.S., Drexel University; M.S.E., Ph.D., Arizona State University

Wood, Billy G. (1977), Professor Emeritus of Electronics and Computer Engineering Technology; A.B., University of California; B.S., Eastern Illinois University; M.S., University of Arizona

Woodruff, Larry (1998), Lecturer of Exercise and Wellness; B.S., University of Oregon; M.S., Western Oregon University

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

ASU East Administrative Personnel

Academic Administration

Campus CEO and Provost, ASU East; Vice President, ASU	Charles E. Backus
Vice Provost, Academic Programs	David E. Schwalm
Dean, Student Affairs	Gary L. McGrath
Director, Academic Services	C. Vinette Williams
Director, Administrative Services	Terry C. Isaacson
Director, American Indian Programs	Phillip J. Huebner
Director, Information Technology	Kati L. Weingartner
Interim Director, Institutional Advancement	C. Vinette Williams
Director, Library Services	Charles W. Brownson
Director, Planning and Budget	Sheila L. Ainlay
Director, Research and Sponsored Projects	Jean N. Humphries
Marley Foundation Chair in Consumer Food Marketing	Clifford J. Shultz
Coordinator, Sustainable Technologies, Agribusiness, and Resources Center	John H. Brock

College of Technology and Applied Sciences

Dean, College of Technology and Applied Sciences	Albert L. McHenry
Associate Dean, College of Technology and Applied Sciences	Lakshmi V. Munukutla
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	Timothy E. Lindquist
Chair, Department of Information and Management Technology	Thomas E. Schildgen
Chair, Department of Manufacturing and Aeronautical Engineering Technology	Scott G. Danielson
Project Director, International Projects Unit	Gary M. Grossman

East College

Dean, East College	David E. Schwalm
Chair, Department of Nutrition	Linda A. Vaughan
Head, Faculty of Applied Psychology	Roger W. Schvaneveldt
Head, Faculty of Business Administration	Roger W. Hutt
Head, Faculty of Education	Bette S. Bergeron
Chair, Department of Exercise and Wellness	William J. Stone
Head, Faculty of Multimedia Writing and Technical Communication	Barry M. Maid

Morrison School of Agribusiness and Resource Management

Dean, Morrison School of Agribusiness and Resource Management	Raymond A. Marquardt
Associate Dean, Morrison School of Agribusiness and Resource Management	George J. Seperich



The ASU East campus offers a variety of programs, from Agribusiness to Aeronautical Engineering Technology.

Tim Trumble photo

ASU West

www.west.asu.edu

Elaine P. Maimon, Ph.D., Campus CEO and Provost

A vital component of the ASU multicampus system, ASU West serves nearly 6,000 undergraduate and graduate students on its growing campus in northwest Phoenix. ASU West provides a friendly, small-campus atmosphere along with the services, resources, and expertise of a nationally acclaimed, PAC-10 research university. Founded in 1984 with upper-division and master's programs, ASU West became a four-year university campus in 2001.

ASU West prides itself on serving the diverse needs of students who balance academics with the multiple demands of work and family through convenient scheduling of small classes. Courses at ASU West lead to 29 bachelor's degrees, nine master's degrees, and eight professional certificates. Academic programs are linked directly to community needs, providing relevant, applied learning opportunities, such as internships. The campus mission balances teaching and research, faculty-student collaboration, interdisciplinary perspectives, and many thriving university-community partnerships. The faculty and staff share a deep commitment to learner-centered education.

ASU West offers many on-campus services and facilities, including a multimedia resource library, state-of-the-art computer classrooms and labs, tutoring services, bookstore, cafeteria, credit union, fitness center, recreational facilities, child care, and post office, plus many student activities, clubs, and organizations. ASU West facilities are completely accessible for those with disabilities, with academic services provided by a disability resource center. Classes are offered in the day and evening, as well as on weekends, and via television and the Internet.

The architecture and courtyards at ASU West are modeled on those of the University of Oxford in Great Britain, enhanced by a beautifully landscaped natural environment featuring widely acclaimed public art. The campus occupies approximately 300 square acres between 43rd and 51st Avenues on West Thunderbird Road in Phoenix, easily accessed from Interstate 17 and Loop 101.

ACCREDITATION

ASU West is accredited by the Higher Learning Commission and is a member of the North Central Association.

Professional programs in various academic areas are also accredited.

The Business and Accountancy degree programs in the School of Management are accredited by the AACSB International—The Association to Advance Collegiate Schools of Business. The Accountancy program is also an Endorsed Internal Auditing Program by the Institute of Internal Auditors.

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 Council on Accreditation, and the Bachelor in Social Work program is accredited by the Council on Social Work Education (CSWE). The Master in Social Work program is currently in candidacy for accreditation by the CSWE. Full accreditation is anticipated in 2003. See the [“Academic Accreditation at ASU West” table, page 466.](#)

ACADEMIC ORGANIZATION AND ADMINISTRATION

The campus chief executive officer and provost provides executive leadership for the continuing development and management of the campus and reports directly to the president of ASU. The 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 and a Division of Collaborative Programs administered by deans. 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, Associated Students of ASU West, and numerous cross-campus and joint ASU West–ASU Main–ASU East committees serving the needs of a rapidly growing institution.

See [“ASU West Faculty and Academic Professionals,” page 449,](#) and [“ASU West Administrative Personnel,” page 454.](#)

ADMISSION

Degree-Seeking Students

Any student admitted to ASU may take courses at ASU West. To be admitted to an ASU West degree program, the student must meet university 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 602/543-8203, visit the Web site at www.west.asu.edu/graduate, or write

GRADUATE STUDIES
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069-7100

ASU West Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Business Administration	M.B.A.	—	School of Management
Communication Studies	M.A.	—	Department of Communication Studies
Criminal Justice	M.A.	—	Department of Administration of Justice
Educational Administration and Supervision	M.Ed.	—	Department of Graduate Studies and Professional Development
Elementary Education	M.Ed.	Bilingual education, educational technology, ESL education, reading	Department of Graduate Studies and Professional Development
Interdisciplinary Studies	M.A.	—	College of Arts and Sciences
Secondary Education	M.Ed.	Educational technology	Department of Graduate Studies and Professional Development
Social Work	M.S.W.	Advanced generalist practice	Department of Social Work
Special Education	M.Ed.	Infants and young children	Department of Graduate Studies and Professional Development

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 Graduate Studies 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 requirements may differ between ASU West and ASU Main for the same major.

Application of Course Credit. The application of transfer course credit to the degree program is determined by the department 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 university or ASU campus.

DEGREE AND CERTIFICATE PROGRAMS

Refer to the [“ASU West Graduate Degrees and Majors,” on this page.](#)

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.

ASU West offers a graduate certificate in Gerontology, and postbaccalaureate certificates in Accountancy, Professional Accountancy, and Communication and Human Relations. For more information, refer to the individual department or college descriptions in the *ASU West Catalog*.

Course Information

For information on ASU West course offerings, see the current ASU West *Schedule of Classes*. For ASU West course descriptions see the *ASU West Catalog*.

LIBRARY SERVICES

The ASU West Library provides resources that support the curriculum of the West Campus with a collection of

315,000 volumes, 1.4 million microforms, 7,500 videos, 15,000 slides, 230 electronic databases, and nearly 6,000 serial titles including 3,000 electronic full-text journals. Approximately 47% of electronic databases are available to ASU registered users from home computers.

The library is open seven days a week. Knowledgeable staff members are available to provide reference service and instruction in the use of the library's considerable resources. Individual consultations with subject specialist librarians are available by appointment. The Library Instruction Program provides introduction to the tools and resources available for research in academic disciplines, including Internet resources.

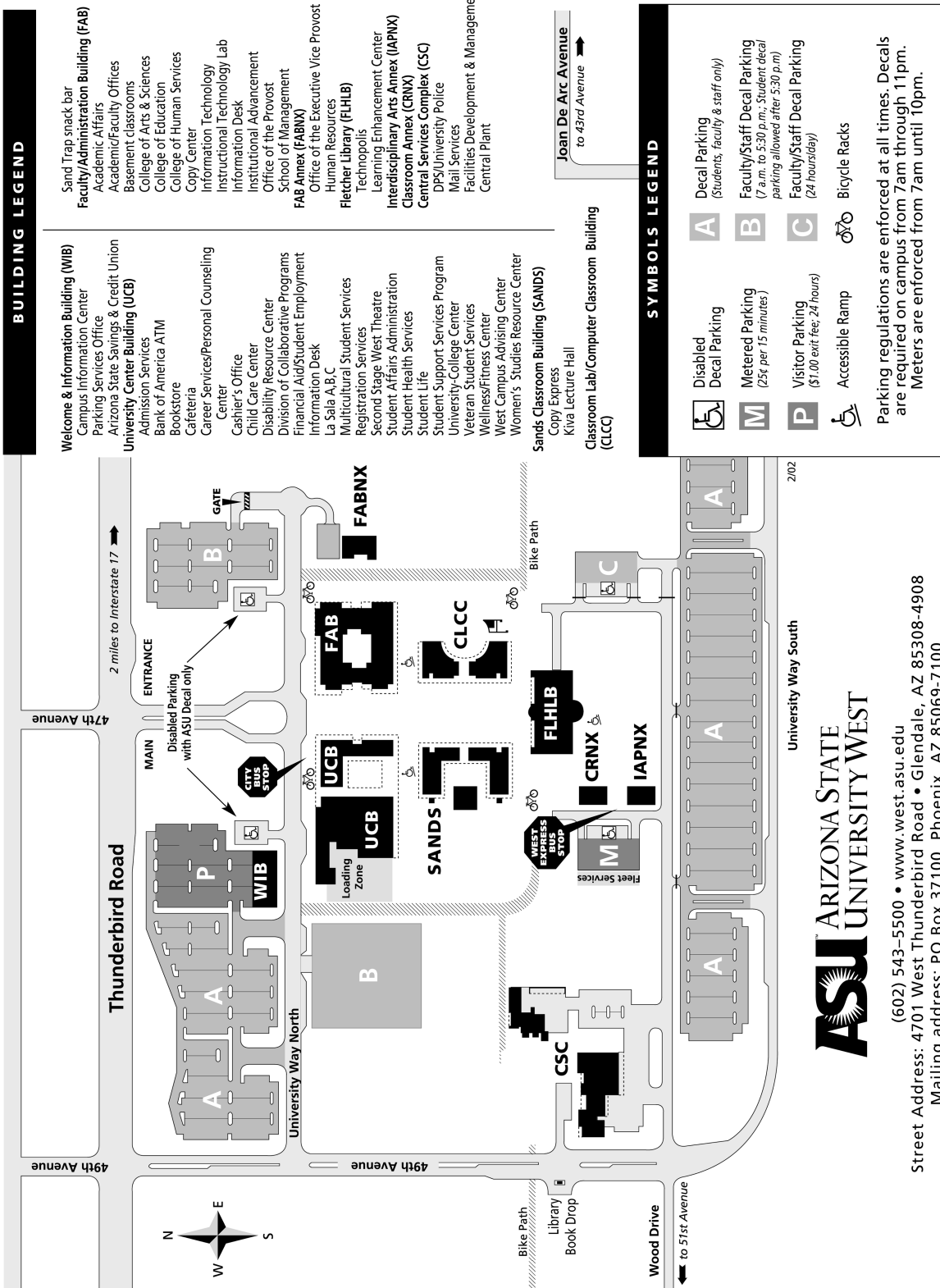
A wide range of information and research tools—most accessible from off-campus—are available through the ASU West Library Web site at www.west.asu.edu/library. For library hours and information, call 602/543-5717.

STUDENT AFFAIRS

Student Affairs is responsible for the delivery of a variety of services and developmental programs to a diverse student population. These services support both the administrative needs and educational pursuits of students and include

1. admissions information and services,
2. career services and personal counseling,
3. disability support services,
4. financial aid,
5. testing services,
6. multicultural student services,
7. registration services,
8. student employment,
9. student health services,
10. student life, and
11. veterans services.

For more information, visit the University Center Building, the Web site at www.west.asu.edu/sa, or call 602/543-8203.



BUILDING LEGEND

- Welcome & Information Building (WIB)
- Campus Information Center
- Parking Services Office
- Arizona State Savings & Credit Union
- University Center Building (UCB)
- Admission Services
- Bank of America ATM
- Bookstore
- Cafeteria
- Career Services/Personal Counseling Center
- Cashier's Office
- Child Care Center
- Disability Resource Center
- Division of Collaborative Programs
- Financial Aid/Student Employment
- Information Desk
- La Sala A,B,C
- Multicultural Student Services
- Registration Services
- Second Stage West Theatre
- Student Affairs Administration
- Student Health Services
- Student Life
- Student Support Services Program
- University-College Center
- Veteran Student Services
- Wellness/Fitness Center
- West Campus Advising Center
- Women's Studies Resource Center
- Sands Classroom Building (SANDS)
- Copy Express
- Kiva Lecture Hall
- Classroom Lab/Computer Classroom Building (CLCC)
- Sand Trap snack bar
- Faculty/Administration Building (FAB)
- Academic Affairs
- Academic/Faculty Offices
- Basement classrooms
- College of Arts & Sciences
- College of Education
- College of Human Services
- Copy Center
- Information Technology
- Instructional Technology Lab
- Information Desk
- Institutional Advancement
- Office of the Provost
- School of Management
- FAB Annex (FABNX)
- Office of the Executive Vice Provost
- Human Resources
- Fletcher Library (FLHLB)
- Technopolis
- Learning Enhancement Center
- Interdisciplinary Arts Annex (IAPNX)
- Classroom Annex (CRNX)
- Central Services Complex (CSC)
- DPS/University Police
- Mail Services
- Facilities Development & Management
- Central Plant

SYMBOLS LEGEND

- Disabled Decal Parking
 - Metered Parking (25¢ per 15 minutes)
 - Visitor Parking (\$1.00 exit fee, 24 hours)
 - Accessible Ramp
 - Decal Parking (Students, faculty & staff only)
 - Faculty/Staff Decal Parking (7 a.m. to 5:30 p.m.; Student decal parking allowed after 5:30 p.m.)
 - Faculty/Staff Decal Parking (24 hours/day)
 - Bicycle Racks
- Parking regulations are enforced at all times. Decals are required on campus from 7am through 11pm. Meters are enforced from 7am until 10pm.

ASU ARIZONA STATE UNIVERSITY WEST

(602) 543-5500 • www.west.asu.edu
 Street Address: 4701 West Thunderbird Road • Glendale, AZ 85308-4908
 Mailing address: PO Box 37100, Phoenix, AZ 85069-7100

ASU West Directory

For the [“ASU Main Directory,”](#) see page 352. For the [“ASU East Directory,”](#) see page 438. For the [“ASU Extended Campus Directory,”](#) see page 463.

Organization	Location	Telephone	Web Address
Admission Services	UCB 120	602/543-8203	www.west.asu.edu/admissions
Arts and Sciences, College of	FAB N201	602/543-6000	www.west.asu.edu/coas
American Studies, Department of	FAB N220C	602/543-6090	www.west.asu.edu/amerstud
Ethnic Studies Program	FAB N204	602/543-6007	www.west.asu.edu/ethnic
Integrative Studies, Department of	FAB N279-1	602/543-6003	www.west.asu.edu/iasweb
Interdisciplinary Arts and Performance, Department of	AB N230F	602/543-6057	www.west.asu.edu/iap
Life Sciences, Department of	CLCC 210	602/543-6050	www.west.asu.edu/lifesci
M.A. Interdisciplinary Studies	FABN 201F	602/543-6241	www.west.asu.edu/mais
Social and Behavioral Sciences, Department of	FAB N250	602/543-6058	www.west.asu.edu/social
Women's Studies Program	FAB N291	602/543-3300	www.west.asu.edu/wsteam
Associated Students of ASU West	UCB 221	602/543-8186	www.west.asu.edu/asasuwest
ASU West	—	602/543-5500	www.west.asu.edu
Bookstore	UCB 140	602/543-6800	www.west.asu.edu/adaff/auxs/bookstore
Campus Chief Executive Officer and Provost	FAB N303	602/543-7000	—
Career Services and Personal Counseling Center	UCB 320	602/543-8124	www.west.asu.edu/cspc
Collaborative Programs, Division of	UCB 201	602/543-4600	www.west.asu.edu/dcp
Bachelor of Applied Science Program	UCB 201	602/543-4BAS	www.west.asu.edu/bas
Barrett Honors College	UCB 201	602/543-4503	www.asu.edu/honors
Learning Enhancement Center	FLHLB LL2	602/543-6151	www.west.asu.edu/lec
Native American Programs	UCB 201	602/543-8138	www.west.asu.edu/gowest/nativeamerican
Research Consulting Center	UCB 201	602/543-3410	www.west.asu.edu/rcc
Transition and Outreach Services	UCB 201	602/543-8217	www.west.asu.edu/tos
University-College Center	UCB 201	602/543-4222	www.west.asu.edu/ucc
West Campus Advising Center	UCB 201	602/543-WCAC	www.west.asu.edu/wcac
Disability Resource Center	UCB 130	602/543-8145	www.west.asu.edu/drc
TDD	—	602/543-8168	—
Education, College of	FAB S210A	602/543-6300	www.west.asu.edu/coe
Elementary Education, Department of	FAB S218	602/543-6315	www.west.asu.edu/coe
Graduate Studies and Professional Development, Department of	FAB S220	602/543-3634	www.west.asu.edu/coe/graduate
Secondary Education, Department of	FAB S251A	602/543-6445	www.west.asu.edu/coe
Special Education, Department of	FAB S252	602/543-6380	www.west.asu.edu/coe
Financial Aid Services	UCB 120	602/543-8178	www.west.asu.edu/financialaid
Graduate Studies	FAB S 301	602/543-4567	www.west.asu.edu/graduate
Human Services, College of	FAB S105-A	602/543-6600	www.west.asu.edu/chs
Administration of Justice, Department of	FAB S270C-1	602/543-6607	www.west.asu.edu/chs/aoj
Communication Studies, Department of	FAB S141C	602/543-6606	www.west.asu.edu/chs/comm
Gerontology Program	FAB S170	602/543-6642	www.west.asu.edu/chs/grn
Nursing (ASU Main Program)	FAB N290A-2	602/543-6605	nursing.asu.edu
Recreation and Tourism Management, Department of	FAB S115A	602/543-6603	www.west.asu.edu/chs/rtm
Social Work, Department of	FAB S149	602/543-6602	www.west.asu.edu/chs/sw
Information Desk	FAB Lobby	602/543-5500	www.west.asu.edu/adaff/auxs/info

ASU WEST DIRECTORY

Organization	Location	Telephone	Web Address
Library	FLHLB	602/543-5717	www.west.asu.edu/library
Management, School of	FAB N101	602/543-6200	www.west.asu.edu/som
Accounting and Information Systems	FAB S190-1	602/543-6275	www.west.asu.edu/som/acct
Management, Department of			
Economics, Finance, Marketing and Quantitative Business Analysis,	FAB N120-A	602/543-6101	www.west.asu.edu/som
Department of			
Management, Department of	FAB N120-D	602/543-6204	www.west.asu.edu/som
Master of Business Administration (MBA) Program	FAB N151	602/543-6201	www.west.asu.edu/som/MBA
Multicultural Student Services	UCB 220	602/543-8148	www.west.asu.edu/multicultural
Parking Services (Decals, Appeals)	Welcome Center	602/543-7275	www.west.asu.edu/adaff/auxs/parking
Residency Classification	UCB 120	602/543-8203	www.west.asu.edu/registrar/residency.htm
Student Employment	UCB 120	602/543-8178	www.west.asu.edu/financialaid/ stdemploy.htm
Student Health Services	UCB 170	602/543-8019	www.west.asu.edu/studenthealth
Student Life	UCB 220	602/543-8200	www.west.asu.edu/studentlife
Student Support Services Program	UCB 220	602/543-8121	www.west.asu.edu/sssp
Testing Services	UCB 120	602/543-8136	www.west.asu.edu/testing
Transition and Outreach Services (General Advising)	UCB 201	602/543-8217	www.west.asu.edu/tos
Veteran Student Services	UCB 120	602/543-8220	www.west.asu.edu/veteran
Vice Provost, Academic Affairs	FAB N301	602/543-4500	www.west.asu.edu/acadaffairs
West Campus Advising Center	UCB 201	602/543-WCAC	www.west.asu.edu/wcac
Women's Studies Resource Center	UCB 323	602/543-3421	www.west.asu.edu/wsteam/resource.htm



Mary Beth Saffo, professor of life sciences, conducts marine research that has had an impact in medicine.

John Phillips photo

ASU West Faculty and Academic Professionals

A

- Abramson, Marianne** (1999), Visiting Assistant Professor of Psychology; B.A., Northern Arizona University; M.A., Ph.D., Arizona State University
- Achilles, Elaine R.** (1986), Associate Professor of Education; B.M.Ed., Temple University; M.M., Ed.D., Arizona State University
- Ackroyd, William S.** (2000), Lecturer of Social and Behavioral Sciences; B.A., M.A., M.S., Portland State University; Ph.D., University of Arizona
- Aleshire, Peter** (1993), Senior Lecturer of Professional Writing; B.A., M.A., Stanford University
- Amobi, Olufunmilayo A.** (2001), Assistant Professor of Secondary Education; B.A., University of Ibadan (Nigeria); M.Ed., Ed.D., Arizona State University
- Anastasi, Jeffery S.** (2001), Assistant Professor of Cognitive Psychology; B.A., M.A., Ph.D., State University of New York, Binghamton
- 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; Director, Institute for International Business, School of Management; B.S., West Texas State University; M.A., Ph.D., University of Notre Dame
- 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
- Anoyke, Akua Duku** (1999), Associate Professor of American Studies; Cochair, Department of American Studies; B.A., Michigan State University; M.A., Federal City College, District of Columbia; M.A., Ph.D., City University of New York Graduate School and University Center
- Armstrong, Gaylene S.** (2000), Assistant Professor of Administration of Justice; B.A., University of Manitoba (Canada); M.A., Ph.D., University of Maryland
- Armstrong, Todd A.** (1999), Assistant Professor of Administration of Justice; B.A., M.A., Ph.D., University of Maryland, College Park
- Atwater, Leanne E.** (1993), Professor of Management; Chair, Department of Management; B.A., M.A., San Diego State University; Ph.D., Claremont Graduate School
- Ávalos, Manuel** (1990), Associate Professor of Political Science; Associate Vice Provost for Research and Faculty Development; B.A., M.A., University of Arizona; Ph.D., University of New Mexico
- Awender, Michael A.** (2000), Professor of Education; Dean, College of Education; B.A., M.A., University of Windsor (Canada); M.Ed., University of Toronto (Canada); Ph.D., Claremont Graduate School
- B**
- Baldwin, Bruce A.** (1989), Professor of Accountancy; B.A., M.B.A., Michigan State University; Ph.D., Arizona State University
- Balthazard, Pierre A.** (1999), Associate Professor of Information Management Systems; B.S., McGill University (Canada); M.S., Ph.D., University of Arizona
- 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; Chair, Department of Economics, Finance, Marketing and Quantitative Business Analysis; B.S., M.A., Ph.D., University of Nebraska, Lincoln
- Bernat, Frances P.** (1993), Associate Professor of Administration of Justice; B.S., M.A., J.D., State University of New York, Buffalo; Ph.D., Washington State University
- Brawley, E. Allan** (1992), Professor of Social Work; Vice Provost for Academic Personnel; Certificate of Social Work, University of Strathclyde (United Kingdom); D.S.W., University of Pennsylvania
- Bredbenner, Candice D.** (1990), Associate Professor of American History; Assistant Dean, College of Arts and Sciences; B.A., Russell Sage College; M.A., Ph.D., University of Virginia
- Brett, Joan F.** (1999), Associate Professor of Management; B.A., B.S., Ohio State University; Ph.D., New York University
- Bristol, Terry** (2000), Assistant Professor of Marketing; B.S., M.S., San Diego State University; Ph.D., Virginia Polytechnic Institute
- Britt, Chester L. III** (1999), Associate Professor of Administration of Justice; B.S., University of Iowa; M.A., Washington State University; Ph.D., University of Arizona
- Broadus, Dorothy C.** (1990), Associate Professor of English; B.A., Eastern Kentucky University; M.Ed., Ph.D., University of Louisville
- Brown, Lee H.** (2001), Assistant Professor of Secondary Education; B.A., Union College; M.A., Ed.D., State University of New York, Albany
- Buenker, Joe** (2000), Assistant Librarian; B.A., University of Wisconsin, Parkside; M.S., University of Illinois, Urbana
- 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
- Byam, L. Dale** (1999), Visiting Assistant Professor of Interdisciplinary Arts and Performance; B.A., Concordia University (Canada); M.A., Ph.D., New York University
- C**
- Cardelle-Elawar, Maria** (1987), 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
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Champion, Kelly M. (2001), Assistant Professor of Psychology; A.B., University of Michigan, Ann Arbor; M.S., Eastern Michigan University; Ph.D., University of Kansas

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

Chavez, José G. (2000), Assistant Professor of Spanish; B.A., M.A., California State University, Sacramento; Ph.D., Arizona State 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), Associate Professor of Technology and Education; B.A., Denison University; M.Ed., Boston University; Ph.D., Arizona State University

Cleland, Jo Ann V. (1991), Associate Professor of Reading/Language Arts; B.A., Saint Olaf College; M.A., Ed.D., Northern Arizona University

Collins-Chobanian, Shari C. (1994), Associate Professor of Philosophy; B.A., Colorado State University; M.A., Ph.D., Washington University

Corley, Ted L. (2001), Lecturer in Mathematics; B.S., Grand Canyon University; M.A., Ed.D., Arizona State University

Costantino, James (1998), Lecturer of Accountancy; B.S., M.Acc., Arizona State University; M.A., University of Southern California

Cuádriz, Gloria H. (1994), Associate Professor of American Studies; Director, Ethnic Studies Program; 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 Dean, College of Arts and Sciences; B.A., M.A., Ph.D., University of Texas, Austin

Cutrer, Thomas W. (1992), Professor of American Studies; Cochair, Department of American Studies; B.A., M.A., Louisiana State University; Ph.D., University of Texas, Austin

D

Dallmus, John T. (2000), Lecturer of Accountancy; B.S., Towson University; M.B.A., Loyola College in Maryland

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De La Cruz, Yolanda (1991), Associate Professor of Mathematics Education; B.A., M.A., California State University, Northridge; Ed.D., University of California, Berkeley

Delgado, Fernando (1994), Associate Professor of Communication Studies; Associate Vice Provost for Academic Programs and Graduate 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; B.A., Buena Vista College; M.S.W., University of Chicago

Duncan, William A. (1991), Associate Professor of Accountancy; Chair, Department of Accounting and Information Systems Management; B.S., Portland State University; Ph.D., University of Texas, Austin

E

Elenes, C. Alejandra (1992), Associate Professor of Women's Studies; Licenciada en Ciencias de la Información, University of Monterrey (Mexico); M.A., Ph.D., University of Wisconsin, Madison

F

Farone, Diane Weis (2001), Assistant Professor of Social Work; B.A., University of Colorado, Boulder; M.B.A., University of Tennessee; M.S., D.S.W., Columbia University; J.D., Vanderbilt University

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Firat, A. Fuat (1990), Professor of Marketing; Licencié en Economie, Istanbul University (Turkey); Ph.D., Northwestern University

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Foster, Madison J. III (2001), Visiting Associate Professor of Social Work; B.A., Morehouse College; M.S.W., University of Michigan, Ann Arbor; Ph.D., Bryn Mawr College

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George, Peggy J. (2001), Lecturer of Elementary Education; B.A., Arizona State University; M.Ed., Ed.D., University of Massachusetts, Amherst

Gilkeson, John S. (1991), Associate Professor of History; A.B., Amherst College; M.A., University of Oklahoma; Ph.D., Brown University

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Graves, Joseph L (1994), Professor of Evolutionary Biology; A.B., Oberlin College; Ph.D., Wayne State University

Greenhut, John G. (1989), Associate Professor of Finance; B.A., Ph.D., Texas A&M University

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Haasnoot, Richard (2000), Lecturer of Marketing; B.A., Pennsylvania State University

Haladyna, Thomas M. (1986), Professor of Educational Psychology; B.S., Illinois State University; M.A., San Jose State University; Ph.D., Arizona State University

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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

Hayden, Mary (1998), Lecturer of Management; B.A., M.B.A., Arizona State University

Hess, Robert K. (1990), Associate Professor of Measurement and Evaluation; B.A., M.Ed., University of Georgia; Ph.D., University of South Carolina

Hino, Jo Ann (2001), Lecturer in Elementary Education; B.S., State University of New York, Cortland; M.A., Kean College; Ed.D., Rutgers University

Hultsman, John (1990), Professor of Recreation and Tourism Management; Director, Partnership for Community Development, College of Human Services; 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

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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 Education 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

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Katz, Charles (1997), Assistant Professor of Administration of Justice; B.S., Truman State University; M.A., Ph.D., University of Nebraska, Omaha

Keil, Thomas J. (1999), Professor of Sociology; B.A., King's College; M.A., Ph.D., Temple University

Kelley, Douglas L. (1994), Associate 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; Chair, Department of Elementary Education; B.S., M.S., Arizona State University; Ed.D., University of Georgia

Kennedy, Jeffery T. (2000), Fine Arts Specialist; B.A., California State University, Fullerton; M.A., New York University

Kirby, Andrew (1995), Professor of Social and Behavioral Sciences and Geography; Director, M.A. in Interdisciplinary Studies Program; B.A., Ph.D., University of Newcastle (United Kingdom)

Kline, Elliot (1993), Lecturer 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

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- Lash, Christine** (1999), Academic Professional; Coordinator, Women's Studies Resource Center; B.S., M.C., Ph.D., Arizona State University
- Lavitt, Melissa R.** (1991), Associate Professor of Social Work; Chair, Department of Social Work; B.A., University of Chicago; M.S.W., Ph.D., Tulane University
- Lentz, Daniel** (1991), Associate Professor of Music Theory and Composition; B.A., Saint Vincent College; M.F.A., Ohio University, Athens
- Lerman, Richard** (1995), Professor of Media Arts; B.A., M.F.A., Brandeis University
- Levy, Emanuel** (1990), Professor of Sociology; B.A., M.A., Tel Aviv University (Israel); M.Ph., Ph.D., Columbia University
- Luken, Paul C.** (1993), Senior Lecturer of Sociology; B.A., Quincy College; M.A., Ph.D., Ohio State University

M

- Maimon, Elaine P.** (1996), Professor of English; Campus Chief Executive Officer and Provost, ASU West; Vice President, ASU; B.A., M.A., Ph.D., University of Pennsylvania
- Malian, Ida M.** (1990), Professor of Special Education; Chair, Department of Special Education; B.A., Oakland University; M.A., Ph.D., University of Michigan
- McCabe, James** (2000), Visiting Assistant Professor of Social Work; B.A., St. Ambrose College; M.P.H., M.S.W., University of Hawaii; D.S.W., University of California, Berkeley
- McGovern, Thomas V.** (1990), Professor of Psychology; A.B., Fordham University; M.A., Ph.D., Southern Illinois University, Carbondale
- McKennon, Edward** (2000), Assistant Librarian; B.A., Rutgers University; M.A., University of Arizona
- Medville, Karen K.** (1995), Assistant Research Scientist in Life Sciences; B.A., Colorado College; M.S., Colorado State University
- Mengesha, Astair Gebre Mariam** (1991), Associate Professor of Women's Studies; Chair, Women's Studies Program; B.A., Purdue University; M.A., Michigan State University; Ph.D., Iowa State University
- Meznar, Martin** (1994), Associate Professor of International Business; B.A., B.S., Bryan College; M.S., University of Texas, Dallas; Ph.D., University of South Carolina
- Midobuche, Eva** (1996), Assistant Professor of Bilingual Education; B.S., M.A., Ed.D., Texas A&M University
- Miller, Paul A.** (1988), Associate Professor of Psychology; Chair, Department of Social and Behavioral Sciences; B.S., Saint Vincent College; M.S., North Carolina State University, Raleigh; M.A., Ph.D., University of Texas, Austin
- Mizzi, Philip J.** (1988), Associate Professor of Economics; B.A., Rockford College; Ph.D., Texas A&M University
- Mohan, Srimathy** (1999), Visiting Assistant Professor of Operations Production Management; B.S., M.S., University of Alabama, Tuscaloosa; M.S., Massachusetts Institute of Technology; Ph.D., University of Montreal (Canada)
- Montaño, Henry** (2000), Instructor of Social Work; B.A., California State University, Northridge; M.S.W., University of California, Los Angeles
- Moore, David W.** (1989), Professor of Reading; B.A., M.Ed., University of Arizona; Ph.D., University of Georgia
- Moore, Harold E. Jr.** (1990), Lecturer of Administration of Justice; B.A., J.D., University of Denver

- Morris, Richard** (1999), Professor of Communication Studies; B.A., San Jose State University; M.A., Ph.D., University of Wisconsin, Madison
- Moulton, Ian F.** (1995), Associate Professor of British Literature; B.A., University of Manitoba, Winnipeg (Canada); M.A., University of Western Ontario (Canada); Ph.D., Columbia University
- Mueller, Carol M.** (1988), Professor of Sociology; B.A., University of California, Berkeley; M.A., Rutgers, The State University of New Jersey; Ph.D., Cornell University
- Muller, Barbara J.** (1991), Senior Lecturer of Accountancy; B.S., M.B.A., Arizona State University
- Murphy Erfani, Julie A.** (1989), Associate Professor of Political Science; B.A., Knox College; M.A., Ph.D., University of Minnesota, Twin Cities
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- Nadir, P. Aneesah** (1994), Lecturer of Social Work; B.S.W., Adelphi University; M.S.W., Arizona State University
- Nahavandi, Afsaneh** (1989), Professor of Management; B.A., University of Denver; M.A., Ph.D., University of Utah
- Náñez, José E. Sr.** (1988), Associate Professor of Psychology; B.A., M.A., California State University; Ph.D., University of Minnesota, Twin Cities
- Nevin, Ann** (1991), Professor of Special Education; B.A., Westminster College; M.Ed., University of Vermont; Ph.D., University of Minnesota, Twin Cities
- Nichols, Mark Heitzler** (2001), Lecturer in Elementary Education; B.A., Colorado College; M.A., Princeton Theological Seminary; M.A.P.P., Claremont Graduate School
- Noronha, Gregory M.** (1995), Associate Professor of Finance; B.S.E., University of Michigan; M.B.A., Ph.D., Virginia Polytechnic Institute and State University
- Nucci, Christine** (1998), Assistant Professor of Early Childhood Education; B.A., Hunter College, City University of New York; M.S., Brooklyn College, City University of New York; Ph.D., City University of New York

O

- Olander, George A.** (2000), Lecturer of Finance; B.S., Xavier University; M.B.A., Pepperdine University; D.B.A., United States International University
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P

- Painter, Suzanne R.** (1995), Assistant Professor of Educational Administration; B.S., Eastern Oregon State College; M.Ed., Ph.D., University of Oregon
- Pambuccian, Victor V.** (1994), Associate Professor of Mathematics; Baccalaureat, German Lyceum (Romania); M.S., University of Bucharest (Romania); Ph.D., University of Michigan

- Pecuch-Herrero, Marta** (1994), Assistant Professor of Mathematics; M.S., Ph.D., University of Chicago
- Perry, Eleanor A.** (1996), Assistant Professor of Educational Administration; Chair, Department of Graduate Studies and Professional Development; B.A., Douglas College; M.Ed., Rutgers, The State University of New Jersey; Ph.D., University of Oregon
- Persau, Linda** (1999), Lecturer of Integrative Studies; B.A., University of California, Davis; M.A., Ottawa University
- Pisa, Rosaria Angela** (2001), Visiting Assistant Professor of Social Sciences; B.A., University of Texas, Dallas; M.A., Ph.D., Northeastern University
- Pough, F. Harvey** (1993), Professor of Integrative Biology; Chair, Department of Life Sciences; B.A., Amherst College; M.A., Ph.D., University of California, Los Angeles
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- Ragle, Gael L.** (1988), Senior Lecturer of Educational Psychology; B.S.Ed., M.A.Ed., Northern Arizona University; Ed.D., Arizona State University
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- Reese, Ruth** (1988), Senior Lecturer of Educational Psychology; B.S., University of Wisconsin, Madison; M.S., Ph.D., University of Wisconsin, Milwaukee
- Renne, Diane J.** (2000), Lecturer of Special Education; B.S., M.S., University of Kansas; Ed.D., University of Kentucky
- Ridley, Dale Scott** (1990), Associate Professor of Educational Psychology; B.S., New Mexico State University; M.A., Ph.D., University of Texas, Austin
- Rillero, Peter** (1994), Associate Professor of Science Education; B.A., State University of New York, Buffalo; M.A., Columbia University; Ph.D., Ohio State University
- Rodriguez, Nancy** (1998), Assistant Professor of Administration of Justice; B.S., Sam Houston University; Ph.D., Washington State University
- Ryan, Joseph M.** (1995), Professor of Education and Collaborative Programs; Director, Research Consulting Center; A.B., M.Ed., Boston College; Ph.D., University of Chicago

S

- Sabatini, Arthur J.** (1991), Associate Professor of Performance Studies; B.A., M.A., Ohio University; Ph.D., New York University
- Saffo, Mary Beth** (1994), Professor of Physiology; B.A., University of California, Santa Cruz; Ph.D., Stanford University
- Schmidtke, Paul C.** (1998), Senior Lecturer of Astronomy; B.S., Rose-Hulman Institute of Technology; Ph.D., Ohio State University
- Schuett, Gordon W.** (1995), Assistant Professor of Integrative Biology; B.A., University of Toledo; M.S., Central Michigan University; Ph.D., University of Wyoming
- Searle, Mark S.** (1995), Professor of Recreation and Tourism Management; Dean, College of Human Services; B.A., University of Winnipeg (Canada); M.S., University of North Dakota; Ph.D., University of Maryland
- Sen, Nilanjan** (1992), Associate Professor of Finance; B.A., Jadavpur University (India); M.A., Ph.D., Virginia Polytechnic Institute

- Shaffer, Dennis M.** (2000), Assistant Professor of Social and Behavioral Sciences; B.S., Denison University; M.A., Ph.D., Kent State University
- Shell, Leslee B.** (2001), Assistant Librarian; B.A., Oklahoma State University; M.L.S., University of Arizona
- Shirreffs, Janet H.** (1977), Professor of Recreation and Tourism Management; Director, Gerontology Program; B.S., Ithaca College; M.S., Syracuse University; Ph.D., Texas Woman's University
- Shome, Raka** (1999), Assistant Professor of Communication Studies; B.A., University of Calcutta (India); Ph.D., University of Georgia, Athens
- Silberman, Jonathan** (1992), Professor of Economics; B.S., Bowling Green State University; M.S., Ph.D., Florida State University
- Slotnick, Susan A.** (1998), Assistant Professor of Operations Productions Management; A.B., Brandeis University; M.S., Ph.D., Carnegie Mellon University; M.A., M.Phil., Ph.D., Columbia University
- Solovey, Mark** (1996), Assistant Professor of History and Philosophy of Science; B.A., Rollins College; M.A., Ph.D., University of Wisconsin, Madison
- Sowell, Evelyn J.** (1990), Professor of Education; B.A., Howard Payne College; M.Ed., Wichita State University; Ed.D., Northern Illinois University
- St. Clair, Charles E.** (1991), Fine Arts Specialist; B.F.A., Fairmount Center for Creative and Performing Arts
- Stage, Sarah J.** (1994), Professor of Women's Studies; B.A., University of Iowa; M.A., University of Massachusetts; M.Phil., Ph.D., Yale University
- Stryker, Linda L.** (1985), Associate Professor of Astronomy; Chair, Department of Integrative Studies; B.A., Whittier College; B.A., M.S., San Diego State University; M.A., California State University, Los Angeles; Ph.D., Yale University
- Sullivan, Brian K.** (1989), Associate Professor of Evolutionary Biology; B.A., University of California, Berkeley; Ph.D., Arizona State University
- Svoboda, William S.** (1969), Professor Emeritus of Education; B.S., M.S., Ed.D., University of Kansas
- Sweat, Ken Gunter** (2000), Lecturer of Life Sciences; B.A., Claremont McKenna College; M.S., Arizona State University
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T

- Taylor, Robert D.** (1996), Associate Professor of Theatre Performance; Chair, Department of Interdisciplinary Arts and Performance; B.A., Crewe and Alsager College, Manchester Metropolitan University (United Kingdom); M.A., University of Essex (United Kingdom); Ph.D., University of Kansas
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Waldman, David A. (1995), Professor of Management; B.A., University of Kentucky; M.S., Ph.D., Colorado State University

Waldron, Vincent R. (1992), Associate Professor of Communication Studies; Interim Dean, Division of Collaborative Programs; B.A., M.A., University of Arizona; Ph.D., Ohio State University

Webb, Vincent J. (1996), Professor of Administration of Justice; Chair, Department of Administration of Justice; B.A., University of Omaha; M.A., University of Nebraska, Omaha; Ph.D., Iowa State University

Wertheimer, Eric H. R. (1995), Assistant Professor of American Literature; B.A., Haverford College; M.A., Ph.D., University of Pennsylvania

Wetzel, Keith (1991), Associate Professor of Educational Technology; B.A., Greenville College; M.A., Goddard College; M.A., Ph.D., University of Oregon

Wilson, Denward J. (1989), Lecturer of Philosophy; B.A., Arizona State University; M.A., University of California, Davis

Wise, John Macgregor (1999), Assistant Professor of Communication Studies; B.A., Trinity University; M.A., Ph.D., University of Illinois, Urbana-Champaign

Wosinska, Wilhelmina (1994), Senior Lecturer of Social Psychology; B.A., University of Warsaw (Poland); M.A., Ph.D., Jagiellonian University (Poland)

X

Y

Yungbluth, Stephen C. (2000), Lecturer of Communication Studies; B.A., Xavier University; M.A., Ph.D., University of Kentucky

Z

Zambo, Ronald W. (1991), Associate Professor of Mathematics Education; B.S., Indiana University, Bloomington; M.A., Ph.D., University of South Florida

Zorita, Paz Méndez-Bonito (1993), Associate Professor of Social Work; A.S., School of Social Work of Gijon (Spain); M.S.S.A., Ph.D., Case Western Reserve University

ASU West Administrative Personnel

Administration

Campus Chief Executive Officer and Provost, ASU West; Vice President, ASU Elaine P. Maimon
Executive Vice Provost Gebeyehu Ejigu
Vice Provost for Academic Affairs Glenn W. Irvin
Associate Vice Provost, Academic Programs and Graduate Studies Fernando Delgado
Director, Curriculum and Academic Articulation Julia R. Ramsden
Vice Provost for Academic Personnel E. Allan Brawley
Associate Vice Provost, Research and Faculty Development Manuel Ávalos
Vice Provost for Planning and Budget Barry R. Bruns
Vice Provost for Institutional Advancement John E. Collins
Dean, ASU West Library Marilyn Myers
Interim Dean of Students Jo Ann Madonna

University Offices

Vice Provost for Research Jonathan Fink
Dean, College of Extended Education Bette F. DeGraw
Dean, Craig and Barbara Barrett Honors College Ted Humphrey

College of Arts and Sciences

Interim Dean, College of Arts and Sciences Emily F. Cutrer
Assistant Dean Candice Bredbenner
Cochair, Department of American Studies A. Duku Anokye
Cochair, Department of American Studies Thomas Cutrer
Chair, Department of Integrative Studies Linda L. Stryker
Chair, Department of Interdisciplinary Arts and Performance Robert Taylor
Chair, Department of Life Sciences Harvey F. Pough
Chair, Department of Social and Behavioral Sciences Paul A. Miller
Chair, Women's Studies Program Astair G. M. Mengesha
Director, M.A. Interdisciplinary Studies Program Andrew Kirby

ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

College of Education

Dean, College of Education	Michael A. Awender
Assistant Dean, College of Education	Ray R. Buss
Chair, Department of Elementary Education	Michael F. Kelley
Chair, Department of Graduate Studies and Professional Development	Eleanor A. Perry
Chair, Department of Secondary Education	Nancy S. Haas
Chair, Department of Special Education	Ida M. Malian

College of Human Services

Dean, College of Human Services	Mark S. Searle
Chair, Department of Administration of Justice	Vincent J. Webb
Chair, Department of Communication Studies	Lesley Di Mare
Chair, Department of Recreation and Tourism Management	Richard Gitelson
Chair, Department of Social Work	Melissa R. Lavitt
Director, Gerontology Program	Janet Shirreffs
Director, Partnership for Community Development	John T. Hultsman
Liaison, Nursing (ASU Main Program)	Lasca Beck

Division of Collaborative Programs

Interim Dean, Division of Collaborative Programs	Vincent R. Waldron
Assistant Director, West Campus Advising Center	Cynthia Rasmussen
Coordinator, Bachelor of Applied Science Program	Cynthia Rasmussen
Coordinator, Transition and Outreach Services	Deborah S. Moore
Coordinator, University College Center	Christina Hahn
Director, Research Consulting Center	Joseph M. Ryan
Faculty Director, Barrett Honors College	Eric Ramsey

School of Management

Dean, School of Management	Bruce A. Forster
Chair, Department of Accounting and Information Systems Management	William Duncan
Chair, Department of Economics, Finance, Marketing and Quantitative Business Analysis	Joseph A. Bellizzi
Chair, Department of Management	Leanne E. Atwater



A view of ASU West campus with the University Center Building and Faculty and Administration Building in the foreground

Mark Boisclair photo

ASU Extended Campus

www.asu.edu/xed

Gary S. Krahenbuhl, Ed.D., Senior Vice President, ASU
Bette F. DeGraw, D.P.A., Dean, College of Extended Education

PURPOSE

The College of Extended Education was created in 1990 to extend the resources of ASU throughout Maricopa County, the state, and the region. The College of Extended Education is a university-wide college that oversees the ASU Extended Campus and forms partnerships with other ASU colleges 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 boundaries of the university's three physical campuses to provide access to quality 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, and independent learning. The ASU Extended Campus also offers a variety of professional continuing education and community outreach programs.

Graduate Degrees

DEGREE PROGRAMS

ASU offers 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 by the respective academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and in the *Schedule of Classes*. All graduate degree programs offered through the college are shown in the "[Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education](#)" table, page 457.

OFF-CAMPUS DEGREE PROGRAMS

Business Administration—M.B.A.

ASU Main. 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. For more information, call 480/965-3332.

The evening M.B.A. is offered at the ASU Downtown Center. It is designed to meet the needs of working profes-

sionals and combines theoretical concepts with practical applications. For more information, call 480/965-3332.

ASU West. The Scottsdale M.B.A. degree program meets in the Scottsdale Airpark in north Scottsdale. Classes emphasize the development of critical learning skills, with practical application in analyzing local industries. Students, faculty, and industry experts work together on projects for local companies. The integrated curriculum provides a comprehensive understanding of interrelated business issues. For more information, call 602/543-6201.

PUBLIC ADMINISTRATION—M.P.A.

ASU Main. The School of Public Affairs offers this interdisciplinary program. The program provides professional training for careers in public administration and management. Opportunities for completing course work leading to the M.P.A. are offered during evening hours at ASU Main, the ASU Downtown Center, and various off-campus sites. For more information, call 480/965-3926 or write

SCHOOL OF PUBLIC AFFAIRS
ARIZONA STATE UNIVERSITY
PO BOX 870603
TEMPE AZ 85287-0603

CURRICULUM AND INSTRUCTION—M.ED.

ASU Main. The Master of Education degree in Curriculum and Instruction is offered with concentrations in either multicultural education or secondary education. This is an off-campus degree program targeted to school district audiences. For more information, call 480/965-1644.

Social Work—M.S.W.

ASU Main. The Master of Social Work program prepares social workers to respond effectively to the needs of the state and other populations of the Southwest. This program is offered in Tucson and Flagstaff. Call 520/884-5507 for more information about the Tucson Component or 480/965-3304 for more information about the Flagstaff Component.

DELTA Doctorate

ASU Main. The DELTA Doctorate, which leads to the Doctor of Education degree in Educational Administration and Supervision, is available as an off-campus degree program. The program is targeted to qualified public school administrators. For more information, call 480/965-7224.

Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education

Major	Degree	Concentration	Administered By
Business Administration	M.B.A.	—	College of Business (ASU Main) School of Management (ASU West)
Curriculum and Instruction	M.Ed.	Secondary education	College of Education
Educational Administration and Supervision	Ed.D.	—	College of Education
Electrical Engineering	M.S.E.	—	Department of Electrical Engineering
Engineering	M.E.*	—	School of Engineering
Public Administration	M.P.A.	Public information management, public management, public policy analysis and evaluation, urban management and planning	School of Public Affairs
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	School of Social Work

* This collaborative program is offered by the three state universities.

TECHNOLOGY-DELIVERED DEGREE PROGRAMS

Electrical Engineering—M.S.E.

ASU Main. The faculty in the Department of Electrical Engineering offer the Master of Science in Engineering (M.S.E.) degree in Electrical Engineering via interactive television. This 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 must pass a comprehensive examination covering topics in the major. Using the department's three-year schedule of courses, students can complete course requirements over the interactive television system. For more information, call 480/965-3590.

Business Administration—M.B.A.

ASU Main. The ASU MBA Online program leverages computer and communications technologies to offer the highly ranked ASU M.B.A. to managers and professionals who do not wish to attend a traditional, on-campus program. The program consists of on-site sessions, asynchronous technology-based materials, and electronic communication among faculty and students. This two-year program consists of 12 four-semester-hour courses. For more information, call 480/965-3332.

ASU West. The connectMBA from ASU West allows working professionals to complete a quality, AACSB International-accredited M.B.A. without weekly attendance on campus. Course delivery combines classroom instruction (every seventh weekend) with self-paced, computer-assisted learning. The two-year program consists of 15 three-semester-hour courses. For more information, access the Web site at www.west.asu.edu/som/mba.

Engineering—M.E.

ASU Main. The tri-university Master of Engineering (M.E.) degree program is intended to meet the educational needs of Arizona's practicing engineers. With industry

input, Arizona's three state universities—Arizona State University, Northern Arizona University, and University of Arizona—enhance the skills, knowledge, and understanding that are critical to today's practicing engineers. The courses are offered through a variety of distance-delivery methods in flexible formats at any of the three universities.

The M.E. degree offers the practicing engineer opportunities to design, in conjunction with an advisory committee, a program of study that can reflect the increasingly interdisciplinary nature of engineering practice. The M.E. degree requires the completion of 30 semester hours of course work; students must complete a minimum of three semester hours in applied engineering mathematics as well as three semester hours of engineering management/business. Up to six semester hours from a practice-oriented project may be applied. A final examination is required.

For application information, call 480/965-1726, send e-mail to m.eng@asu.edu, or access the program's Web site at triuniv.engr.arizona.edu.

Technology—M.S.

ASU East. The faculty in the Department of Information and Management Technology offer this degree with concentrations in environmental management, international environmental management, or emergency management through a Web-based distance learning format. Students in this program are part of a cohort group that begins each January and graduates 24 months later at the December ceremony.

Students in the distance learning cohort are expected to be working professionals in fields such as ES&H (environmental, health, and safety), environmental engineering, emergency management, national or local regulatory and permitting activities, environmental law, and environmental laboratories. A variety of undergraduate degree preparation is appropriate, but students should have at least one course in inorganic chemistry and one course in organic chemistry. For more information, access the Web site at www.east.asu.edu/ctas/imt/etm/html/dmasters.html.

ON-CAMPUS EVENING DEGREE PROGRAM

Public Administration—M.P.A.

ASU Main. The School of Public Affairs offers this interdisciplinary program, designed to provide professional training for careers in public administration and management. Opportunities for completing course work leading to the M.P.A. are offered during evening hours at ASU Main, the ASU Downtown Center, and various off-campus sites. For more information, call 480/965-3926 or write

SCHOOL OF PUBLIC AFFAIRS
ARIZONA STATE UNIVERSITY
PO BOX 870603
TEMPE AZ 85287-0603

Winter Session (ASU Main)

The College of Extended Education schedules the Winter Session courses in collaboration with academic departments. The condensed session is offered between the fall and spring semesters. For more information about Winter Session, call 480/965-9797.

Certificate Programs

Certificate programs provide opportunities for those seeking to advance their careers, to begin a new career, to reenter the workplace, or simply to 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 Gerontology Program is interdisciplinary, bringing together faculty from several disciplines to collaborate on gerontological research, to teach courses related to adult development and aging, and to participate in projects of service to older adults.

The Certificate in Gerontology, offered by the Graduate College, is available to graduate students enrolled in master's or doctoral degree programs 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 semester hours evenly divided between required and elective course work.

The Gerontology Program has an affiliated faculty of more than 60 members based in 22 different departments throughout the university. Students can work on independent study or participate with faculty in their aging-related research.

Because of increased longevity, there could be more than 30 million Americans over the age of 85 by 2040, a demographic change with many ramifications. The certificate is designed for individuals interested in learning more about the aging process. For more information, call 480/965-3225 (ASU Main) or 602/543-6642 (ASU West).

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. 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. All courses and degrees are offered by the respective university academic departments. These courses are published each fall and spring semester in the *Extended Campus Catalog* and the *Schedule of Classes*.

Academic and Professional Programs. As a convenience to students, courses are conducted off campus in locations throughout the state, and on campus in the evening and during the Winter Session.

Academic credits earned off campus are recorded on a student's permanent record in the same manner as those earned on campus and are equivalent in all academic considerations. All ASU academic standards, 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 tuition and fees for off-campus credit courses are the same as for those offered on campus. (See resident and non-resident rates in the latest *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 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 tuition separate from (but in addition to) those courses starting before the 21st calendar day of the semester.

Professional continuing education activities focus on professional and personal development as well as lifelong 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.

Distance Learning and Technology. Distance Learning and Technology uses a variety of technologies. Semester-based courses are offered through Instructional Television Fixed Service, cable television, public television, satellite, microwave, videotape, and the Internet. In addition, independent learning courses are offered (print- or Internet-based). Distance Learning and 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. The distance learning course

schedule consists of approximately 175 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 students in the classroom 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, Qwest, Digital Choice TV, and other cable providers. Televised courses are also available in 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. An M.S.E. degree with a major in Electrical Engineering is available through the IITP. More information about the degree is available from the College of Engineering and Applied Sciences at 480/965-6738.

Interactive Television (Public Sites). Certain sites are open to the public. Students can participate in most televised courses at locations such as ASU Downtown Center, ASU East, ASU West, select community college campuses, Cactus Shadows High School, and the Gila River Indian Community. Each site has an on-site coordinator to assist with registration, to provide information, and to proctor exams.

Internet Courses. ASUonline is the university's gateway to an "online campus." Internet courses are offered by various departments through ASU Extended Campus, allowing students to participate from any location in the world. Through the Web, students can access lectures, participate in class assignments, interact with the instructor, collaborate with other students, and earn ASU credit at convenient times and locations. Students register for Internet courses through the normal university admissions and registration process. Certain computer hardware and software may be required for Internet courses. For more information, call 480/965-6738, or access the Web site at asuonline.asu.edu.

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 seeking flexibility in progressing through ASU courses. Anyone 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 an 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. Independent Learning courses may not be used to change a grade at ASU. An independent learning registration fee is required of all students, including full-time students who have paid registration fees and tuition. Tuition waivers do not apply to independent learning. On-campus services and activities for students are not covered by independent learning fees. More information is available in a catalog from the Independent Learning office, at 480/965-6563.

Professional Continuing Education

Academic and Professional Programs provides professional continuing education programs throughout the Phoenix metropolitan area. 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 organizations. In addition, the Elderhostel Program, a series of challenging, thought-provoking college-level courses, is offered to people over 55. For more information, call 480/965-9200.

The Nonprofit Management Institute is offered by the College of Extended Education and the Valley of the Sun 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, or environmental groups, and others in the nonprofit sector. For more information, see ["Nonprofit Leadership and Management," page 280](#), or call 480/965-9200.

Global and Community Outreach

American English and Culture Program. The American English and Culture Program (AECP) 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 must 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, grammar, and writing. Academic advising and orientation to Arizona and the United States are integral parts of the program.

The program provides a wide variety of social, cultural, and recreational activities including field trips, sports, parties, arts and crafts, concerts, and visits to museums and historical sites.

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 AECP: business English, pronunciation, conversation, TOEFL and TOEIC preparation, grammar, and idioms.

ASU EXTENDED CAMPUS

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 is also offered. Four-week sessions are offered in January and July. AECPC also offers evening English classes and business English certificates.

Inquiries concerning admission requirements, enrollment, and fee schedules should be sent to

AMERICAN ENGLISH AND CULTURE PROGRAM
ARIZONA STATE UNIVERSITY
PO BOX 873504
TEMPE AZ 85287-3504

For more information, call 480/965-2376, send e-mail to aecp@asu.edu, or access the Web page at www.asu.edu/xed/aecp/aboutaecp.html.

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 links to further the university's and college's missions.

The major components of Extended Campus Programs are the lectures and events at the ASU Downtown Center and emerging programs in the east Valley, Scottsdale, and Ahwatukee. For more information, call 480/965-3046.

ASU Downtown Center. The ASU Downtown Center is a university-wide resource located in downtown Phoenix that serves as an educational, applied-research, and community-service facility.

Responding to the needs of business, industry, and state and local governments, the center offers traditional and interdisciplinary upper-division and graduate-level courses. The center also offers professional and continuing education programs, lectures, and community forums, and serves as a meeting location for conferences, workshops and seminars.

ASU faculty, staff, and students may take advantage of the center's computer lab. A lab assistant is available during posted hours. Faculty, staff, and students also can access the ASU library online catalog and ASU library information and resources. Library books may be ordered and returned through the center, and copied materials may be ordered as well. Textbooks for all courses held at the center are available during the first week of classes.

Accommodations for small or large meetings or conferences are available at attractive rates and can include beverages, food service, and professional equipment. Meeting rooms include conference rooms, a board room, and two computer classrooms. Most meeting rooms can be configured in a variety of styles and setups. In addition, break-out areas are conveniently located throughout the facilities. Advice in logistics planning is available as well as a wide range of related services. The center is available for use by outside organizations, subject to the limits of ASU policies

and procedures. Contact the center's facility scheduler for details. For more information, call 480/965-3046 or write

ASU DOWNTOWN CENTER
502 E MONROE ST
PHOENIX AZ 85004-2337

Several ASU programs and partnerships are located at the ASU Downtown Center.

Academic and Professional Programs. As part of ASU Extended Campus and the College of Extended Education, Academic and Professional Programs brings the resources of ASU to many who may not be pursuing a traditional degree but are seeking professional and personal enrichment. See "[Academic and Professional Programs](#)," [page 458](#), for a description.

Joint Urban Design Program. The Joint Urban Design Program, located in the ASU Downtown Center, is a partnership between the 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 480/727-5146.

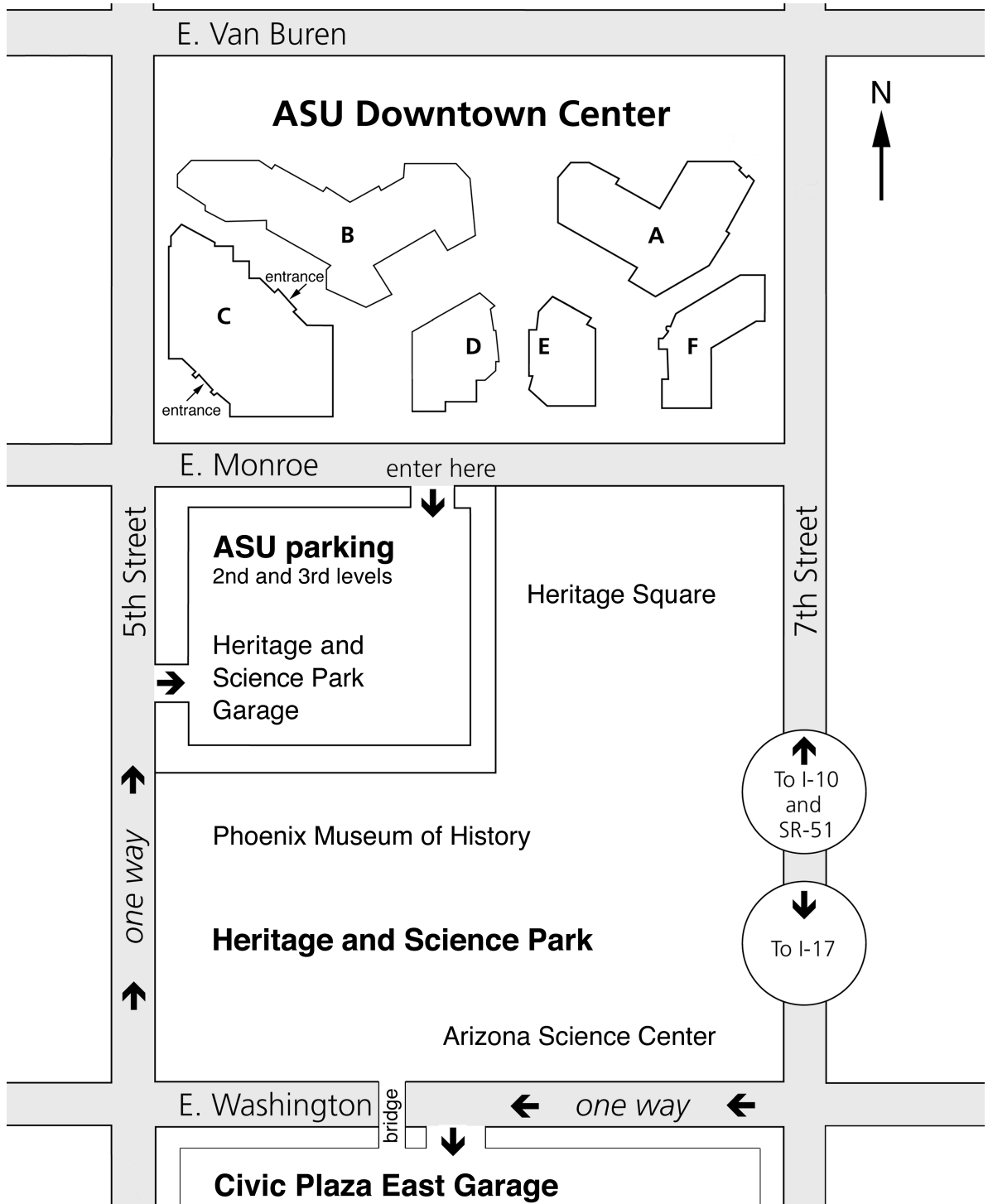
Urban Data Center. The Urban Data Center, a partnership with the College of Public Programs, serves as a resource for analysis and implementation of public policy in the Phoenix metropolitan area. The center works closely with ASU researchers and organizations such as the Joint Urban Design Program, the Morrison Institute for Public Policy, University Libraries, local governments, state agencies, and other independent organizations to build a comprehensive database on policy issues for urban planners and community leaders. For more information, call 480/965-5195.

Advanced Public Executive Program. The Advanced Public Executive Program of the College of Public Programs is housed at the ASU Downtown Center. This program is designed to provide public managers and administrators 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 480/965-4006.

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 12th-grade students and their families at targeted Arizona schools. For more information, call 480/965-8510.

Arizona Drug and Gang Prevention Resource Center. The Arizona Drug and Gang Prevention Resource Center serves as a centralized source for individuals, schools, and communities throughout Arizona to support, enhance, and initiate prevention efforts. For more information, call 480/727-2772.

ASU Downtown Center Map



ASU Extended Campus Faculty and Academic Professionals

B

Backer, Linda R. (1997), Assistant Instructional Professional, College of Extended Education; Manager, Interdisciplinary Programs, Academic and Professional Programs, College of Extended Education; B.A., University of Colorado; M.S., Colorado State University

C

Caglan, Janet (1977), Lecturer, College of Extended Education; B.A., M.A., Arizona State University

Cole, Tom (1981), Lecturer, College of Extended Education; Associate Director, American English and Culture Program, College of Extended Education; B.S., Northern Arizona University; M.A., Arizona State University

Craft, Elizabeth H. (1982), Administrative Professional, College of Extended Education; Director, Distance Learning and Technology, College of Extended Education; B.F.A., Ohio University; M.A., Arizona State University

D

DeGraw, Bette F. (1986), Administrative Professional, College of Extended Education; Associate Professor of Public Affairs; Dean, College of Extended Education; Director, Downtown Center, College of Extended Education; B.A., Thiel College; M.S.W., Rutgers, The State University of New Jersey; D.P.A., Arizona State University

Dehghanpisheh, Elaine (1983), Lecturer, College of Extended Education; B.A., M.A., Pahlavi University (Iran)

E

Edwards, Regina (1995), Assistant Instructional Professional, College of Extended Education; Associate Director, Academic and Professional Programs, College of Extended Education; B.S., M.A., University of Nebraska, Lincoln; Ph.D., University of Hawaii, Manoa

F

Feldman, Patricia A. (1990), Associate Administrative Professional, College of Extended Education; Director, Academic and Professional Programs, College of Extended Education; B.S., M.Ed., Colorado State University

Felix-Sol, Carol (1994), Lecturer, College of Extended Education; B.A., M.A., University of Colorado

Fontaine, Steven (1990), Lecturer, College of Extended Education; B.A., Shepherd College; M.A., Temple University; Ph.D., Arizona State University

G

Graham, Andrea (2000), Instructor, College of Extended Education; B.A., M.A., Arizona State University

J

Jones, Dawnell (2001), Instructional Specialist, College of Extended Education; International Student Advisor, American English and Culture Program, College of Extended Education; B.A., M.A., Brigham Young University

K

Kegelman, Jan (1978), Lecturer, College of Extended Education; Coordinator, International Teaching Assistants Program, American English and Culture Program; B.S., University of Massachusetts; M.A., Arizona State University

Kyselka, Christine K. (1990), Associate Administrative Professional, College of Extended Education; Assistant Director, Extended Campus Programs, College of Extended Education; B.S., M.P.A., Arizona State University

L

Lindeman, Mary (1988), Lecturer, College of Extended Education; B.A., St. Mary's University; M.A., University of Houston

Livingston, Mary (1978), Lecturer, College of Extended Education; B.A., M.A., Arizona State University

M

Mitchell, Marie (1980), Lecturer, College of Extended Education; B.A., Fort Hays State University; M.A., School for International Training

P

Parker, Denise (1997), Instructor, College of Extended Education; B.A., Miami University; M.A., University of Virginia

Pope, Donna (1999), Assistant Instructional Professional, College of Extended Education; Manager, Nonprofit Management Program, Academic and Professional Programs, College of Extended Education; B.S.W., Texas Women's University; M.S.S.W., University of Texas, Arlington

R

Rentz, Mark D. (1984), Lecturer, College of Extended Education; Director, American English and Culture Program, College of Extended Education; B.A., Bethel College; M.A., William Carey International University

Robinson, Antoniette (1994), Instructor, College of Extended Education; B.A., M.A., State University of New York

S

Schlather, Erica (1993), Instructional Specialist, College of Extended Education; Marketing Coordinator, American English and Culture Program, College of Extended Education; B.A., M.A., Northern Arizona University

T

Thursby, Gayle (1994), Lecturer, College of Extended Education; B.A., University of Colorado; M.A., University of California, Los Angeles

V

Verdini, William A. (1976), Associate Professor of Supply Chain Management; Associate Dean, College of Extended Education; B.S., Case Western Reserve University; M.B.A., D.B.A., Kent State University

Vicens, Wendy (1977), Senior Lecturer, College of Extended Education; B.A., M.A., Northern Arizona University

W

Wagy, Scott (2001), Instructional Specialist, College of Extended Education; Coordinator for Cultural Activities and Programs, American English and Culture Program, College of Extended Education; B.A., M.A., West Virginia University

ASU Extended Campus Administrative Personnel

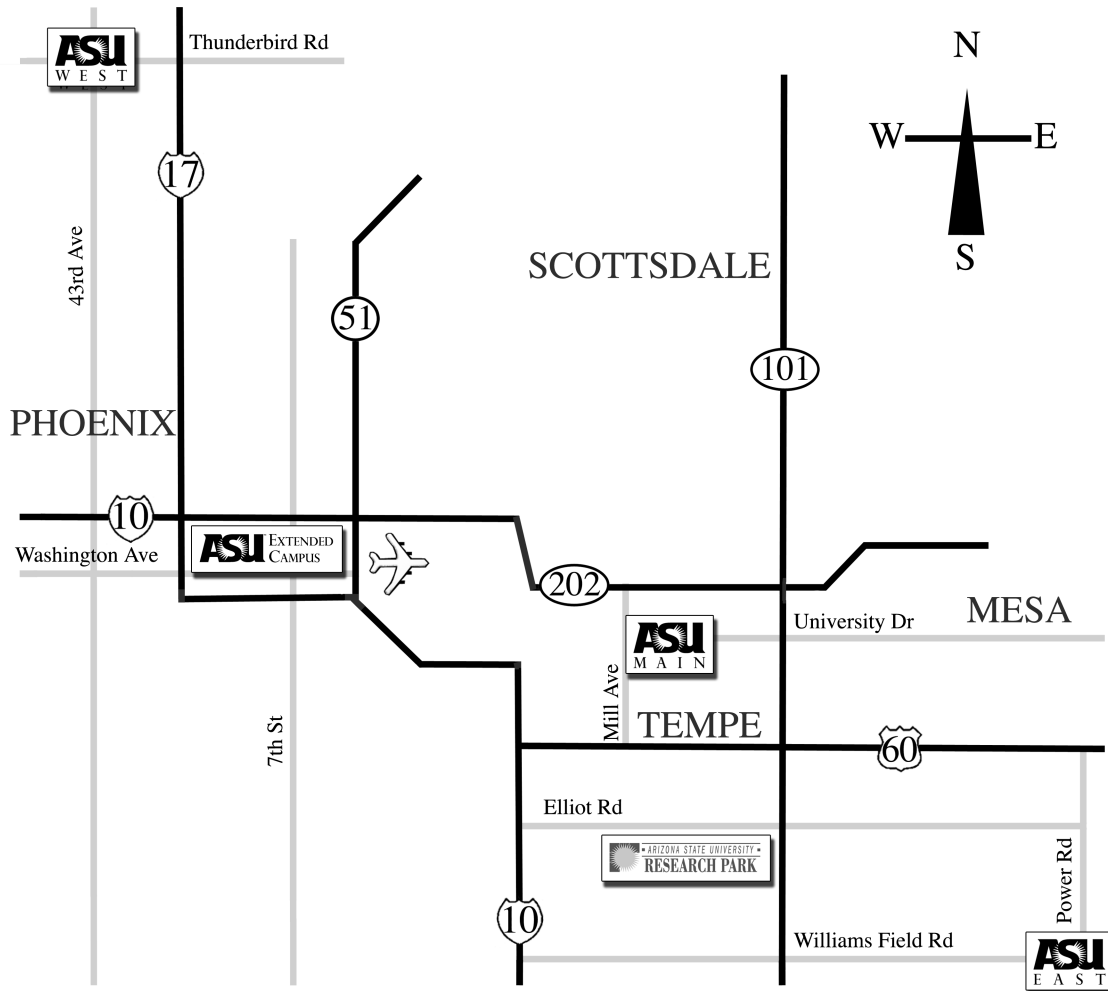
Senior Vice President, ASU	Gary S. Krahenbuhl
Dean, College of Extended Education	Bette F. DeGraw
Associate Dean	William A. Verdini
Assistant Dean	Elaine Sweet
Director, Academic and Professional Programs	Patricia A. Feldman
Director, American English and Culture Program	Mark D. Rentz
Director, Communications and Marketing	Randy Bailey
Director, Development and Outreach	Scott Sheldon
Director, Distance Learning and Technology	Elizabeth H. Craft
Director, Downtown Center	Bette F. DeGraw
Director, Extended Campus Programs	Jim Patzer
Director, Property Administration	Cathie Fox

ASU Extended Campus Directory

For the [“ASU Main Directory,”](#) see page 352. For the [“ASU East Directory,”](#) see page 438. For the [“ASU West Directory,”](#) see page 447.

Organization	Location	Telephone	Web Address
Extended Education, College of	ASUDC C319	480/965-3046	www.asu.edu/xed
Academic and Professional Programs	RITT B132	480/965-9797	—
	ASUDC	480/965-9200	—
American English and Culture Program	MARIP	480/965-2376	www.asu.edu/xed/aecp/esl.html
ASU Downtown Center	ASUDC	480/965-3046	www.asu.edu/xed/dtc
Communications and Marketing	ASUDC C319	480/965-9696	—
Development and Outreach	ASUDC C250	480/727-5330	—
Distance Learning and Technology	RITT A129	480/965-6738	www.dlt.asu.edu
Extended Campus Programs	ASUDC C250	480/965-3046	—
Independent Learning	RITT B132	480/965-6563 or 1-800-533-4806	www.dlt.asu.edu/info/indlearn.html
Planning and Business Services	ASUDC C319	480/965-3046	—
Property Administration	ASUDC C319	480/965-3046	—

ASU Vicinity Map



Near Downtown Tempe



Monroe and Fifth Streets,
Phoenix



Power and Williams Field
Roads, Mesa



Price and Elliot Roads,
Tempe



43rd Avenue and
Thunderbird Road



Phoenix Sky Harbor
International Airport

Accreditation and Affiliation

ASU Main and ASU East. Arizona State University Main is accredited by the Higher Learning Commission and is a member of the North Central Association (NCA). Arizona State University East is recognized by the Higher Learning Commission as a full-service campus and is accredited under the ASU Main umbrella. 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 at ASU Main and East” table below](#); [“Academic Affiliation” table, page 467](#); and [“Academic Membership” table, page 467](#). Some programs in the College of Education are approved by the State Board of Education (Arizona) and the National Association of School Psychologists.

ASU West. ASU West is separately accredited by the Higher Learning Commission. Professional programs in the various academic areas are accredited by national bodies as described in the [“Academic Accreditation at ASU West” table, page 466](#).

Academic Accreditation at ASU Main and East

Unit or Program	Accredited By
College of Architecture and Environmental Design	
B.S.D., Graphic Design, Industrial Design	National Association of Schools of Art and Design
B.S.D., Interior Design	Foundation for Interior Design Education Research
B.S.L.A.	Landscape Architectural Accreditation Board
M.Arch.	National Architectural Accrediting Board
M.E.P.	Planning Accreditation Board
M.S.D., Design, with concentrations in graphic design and industrial design.	National Association of Schools of Art and Design
College of Business	
All programs	AACSB International, the Association to Advance Collegiate Schools of Business
M.H.S.A., School of Health Administration and Policy	Accrediting Commission on Education for Health Services Administration
School of Accountancy and Information Management	AACSB International, the Association to Advance Collegiate Schools of Business
College of Education	
M.C., Counseling	Council for Accreditation of Counseling and Related Educational Programs
Ph.D., Counseling Psychology; Educational Psychology, with a concentration in school psychology	American Psychological Association
College of Engineering and Applied Sciences	
B.S., Computer Science	Computer Science Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Construction	American Council for Construction Education
B.S.E., Aerospace Engineering; Bioengineering; Chemical Engineering; Civil Engineering; Computer Systems Engineering; Electrical Engineering; Industrial Engineering; Materials Science and Engineering; Mechanical Engineering	Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
College of Law	
J.D.	American Bar Association

* This program is accredited through the ASU Main College of Business.

ACCREDITATION AND AFFILIATION

Academic Accreditation at ASU Main and East (continued)

Unit or Program	Accredited By
College of Liberal Arts and Sciences	
B.S., Clinical Laboratory Sciences	National Accrediting Agency for Clinical Laboratory Sciences
M.S., Communication Disorders	American Speech-Language-Hearing Association
Ph.D., Psychology, with a concentration in clinical psychology	American Psychological Association
College of Nursing	
B.S.N., M.S., Nursing	Arizona State Board of Nursing Commission on Collegiate Nursing Education, initial approval National League for Nursing
College of Public Programs	
B.S., Recreation	Council on Accreditation of the National Recreation and Park Association
B.S.W., M.S.W., School of Social Work	Council on Social Work Education
Walter Cronkite School of Journalism and Mass Communication	Accrediting Council on Education in Journalism and Mass Communications
M.P.A.	National Association of Schools of Public Affairs and Administration
College of Technology and Applied Sciences	
B.S., Aeronautical Engineering Technology; Electronics Engineering Technology; Manufacturing Engineering Technology	Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Aeronautical Management Technology, with concentrations in professional flight and air transportation management	Council on Aviation Accreditation
East College	
B.S., Business Administration*	AACSB International, the Association to Advance Collegiate Schools of Business
B.S., Nutrition (didactic program in dietetics); M.S., Nutrition (dietetic internship)	American Dietetic Association
Herberger College of Fine Arts	
Department of Theatre	National Association of Schools of Theatre
School of Music	American Music Therapy Association National Association of Schools of Music

* This program is accredited through the ASU Main College of Business.

Academic Accreditation at ASU West

Unit or Program	Accredited By
College of Human Services	
B.S.W., Department of Social Work	Council on Social Work Education
Department of Recreation and Tourism Management	National Recreation and Park Association/American Association for Leisure and Recreation Council on Accreditation
School of Management	
All programs	AACSB International, the Association to Advance Collegiate Schools of Business

Academic Affiliation

Unit or Program	Affiliated With
Barrett Honors College	National Collegiate Honors Council
College of Architecture and Environmental Design	
School of Architecture	American Institute of Architects, Central Arizona and Rio Salado Chapters
School of Design	Architectural Research Centers Consortium Association for Computer-Aided Design in Architecture Association of Collegiate Schools of Architecture American Society of Interior Designers Human Factors and Ergonomics Society Industrial Designers Society of America Interior Design Educators Council
School of Planning and Landscape Architecture	Society of Environmental Graphic Designers American Planning Association American Society of Landscape Architects Association of Collegiate Schools of Planning Council of Educators in Landscape Architecture
College of Education	American Association of Colleges for Teacher Education American Educational Research Association American Psychological Association University Council for Educational Administration
College of Nursing	
Continuing and Extended Education Programs	Arizona Nurses Association (American Nurses Credentialing Center's Commission on Accreditation)
Morrison School of Agribusiness and Resource Management	
B.S., M.S., Environmental Resources	Society for Range Management Soil and Water Conservation Society Wildlife Society

Academic Membership

Unit or Program	Membership With
Barrett Honors College	National Collegiate Honors Council
College of Education	American Association of Colleges for Teacher Education American Educational Research Association University Council for Educational Administration
Ph.D., Educational Psychology, with a concentration in school psychology	National Association of School Psychologists
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 the Advancement of Science American Chemical Society American Society for Advancement of Science

ACCREDITATION AND AFFILIATION

Academic Membership (continued)

Unit or Program	Membership With
Department of Exercise and Wellness	American Academy of Kinesiology and Physical Education American Alliance for Health, Physical Education, Recreation and Dance American Association of Health Education American College of Sports Medicine Association of Worksite Health Promotion Committee on Allied Health Education Council on Physical Education for Children National Association for Physical Education in Higher Education National Strength and Conditioning Association National Wellness Association North American Society for Sports Psychology and Physical Activity North American Society for the Study of Obesity
Department of Exercise Science and Physical Education	American Academy of Kinesiology and Physical Education American Alliance for Health, Physical Education, Recreation, and Dance American College of Sports Medicine American Society of Biomechanics Committee on Allied Health Education Council on Physical Education for Children International Society of Biomechanics National Association for Physical Education in Higher Education North American Society for Sports Psychology and Physical Activity Physiological Society Society for Experimental Biology Society for Neuroscience
Department of Geography	Association of American Geographers
Department of Geological Sciences	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 Coordinating Committee for History in Arizona Institute of Historical Research National Council on Public History Western History Association
Department of Languages and Literatures	American Council on Teaching Foreign Language International Studies Association Modern Language Association
Department of Mathematics and Statistics	American Mathematical Society Mathematical Association of America Rocky Mountain Mathematics Consortium Society for Industrial and Applied Mathematics
Department of Microbiology	American Association of Immunologists American Association of Immunology American Society for Virology American Society of Microbiology Society for Neuroscience
Department of Military Science	Association of U.S. Army
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 Chemical Society American Institute of Biological Sciences American Society for Biochemistry and Molecular Biology American Society for Photobiology American Society of Cell Biology American Society of Horticultural Science American Society of Plant Physiologists American Society of Plant Taxonomy Arizona-Nevada Academy of Science Botanical Society of America Botanical Society of Japan California Botanical Society Ecological Society of America International Association for Study of Plant Succulents International Association of Landscape Ecology International Association of Plant Taxonomy International Association of Wood Anatomists International Organization of Paleobotany International Photosynthesis Society International Phycological Society International Society of Arboriculture International Society of Ecological Modeling International Society of Plant Molecular Biology International Society of Plant Propagators International Union of Woody Plant Physiologists Microscopy Society of America Mycological Society of America Phycological Society of America Phytochemical Society of North America Sigma Xi Society for Economic Botany Society of Ecological Restoration Society of Wetlands Scientists Soil Science Society of America Southwestern Association of Naturalists
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
M.S., Ph.D., Molecular and Cellular Biology	American Society of Medical Technology
Women's Studies Program	Association for Women in Science
	National Women's Studies Association
College of Nursing	American Association of Colleges of Nursing Western Institute of Nursing

ACCREDITATION AND AFFILIATION

Academic Membership (continued)

Unit or Program	Membership With
College of Public Programs	
Walter Cronkite School of Journalism and Mass Communication	Association of Schools of Journalism and Mass Communication Broadcast Education Association American Humanics, Inc.
Department of Recreation Management and Tourism	Arizona American Indian Tourism Association Arizona Heritage Alliance Arizona Park and Recreation Association Arizona State Therapeutic Recreation Association Association for Research on Nonprofit Organizations and Voluntary Action Association for Volunteer Administration Learning Institute National Center for Nonprofit Boards National Park and Recreation Association National Society of Fund Raising Executives National Training Institute for Community Youth Work Nonprofit Academic Centers Council Nonprofit Risk Management Center Peter F. Drucker Foundation for Nonprofit Management Society for Nonprofit Organizations Travel Tourism Research Association
Hugh Downs School of Human Communication	National Communication Association Western States Communication Association
School of Justice Studies	Arizona Justice Educators Association of Criminal Justice Doctoral Programs National Academic Advising Onati International Institute for the Sociology of Law
School of Public Affairs	National Association of Schools of Public Affairs and Administration
School of Social Work	Baccalaureate Program Directors Association Council on Social Work Education Group for the Advancement of Doctoral Education National Association of Deans and Directors of Social Work National Association of Social Workers
East College	
Department of Nutrition	American Dietetic Association
Graduate College	
Council of Graduate Schools	
Herberger College of Fine Arts	
Department of Theatre	American Alliance for Theatre and Education Association for Theatre in Higher Education
Morrison School of Agribusiness and Resource Management	
B.S., Agribusiness with a concentration in professional golf management	Professional Golfer's Association of America

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Building Abbreviations

Buildings are located at ASU Main unless otherwise noted. For the ASU Main map, see the inside back cover. For other locations, see the [“ASU East Map,” page 437](#); [“ASU West Map,” page 446](#); and [“ASU Downtown Center Map,” page 461](#).

ADM	Administration (wings A–B)	ECANX	Engineering Center Annex
ADPCM	Adelphi Commons	ED	Hiram B. Farmer Education Building
AED	College of Architecture and Environmental Design/North	EDB	Ira D. Payne Education Hall
AG	Agriculture Building	EDC	Education Lecture Hall
AGB1–4	ASU East Agribusiness Quads 1–4 ¹	ELAB	Electronics Laboratory Building ³
AIP	ASU East American Indian Programs ¹	ENGRC	Engineering Research Center
ALTCH	ASU East Altitude Chamber ¹	ENVIR	Environmental Lab
ANTH	Anthropology Building	FAB	Faculty and Administration Building ³
ANX	Visual Arts Annex	FABNX	Faculty and Administration Building Annex ³
AQUAT	Mona Plummer Aquatics Center (wings A–B)	FAC	Nelson Fine Arts Center
ARCH	College of Architecture and Environmental Design/South	FDSC1	ASU East Agribusiness Food Science Lab ¹
ARCV	University Archives	FIELD	University Field Lab
ART	Art Building	FLHLB	Fletcher Library ³
ARWH	Art Warehouse	GGMA	Grady Gammage Memorial Auditorium
ASUDC	Downtown Center ²	GHALL	Dixie Gammage Hall
BA	Business Administration Building	GWC	Barry M. Goldwater Center for Science and Engineering Research
BAC	Business Administration C-Wing	HAYDN	Hayden Hall
BKSTR	ASU Bookstore	HSC	ASU East Health Sciences Center ¹
CERA	Ceramics Annex (wings A–B)	HSC2	ASU East Health Sciences Center Research ¹
CFS	Center for Family Studies	IAPNX	Interdisciplinary Arts and Performance Annex ³
CHAPL	Danforth Chapel	ICA	Intercollegiate Athletics
CHOLA	Cholla Apartments	IRISH	Frederick M. Irish Hall (wings A–C)
CLCC	Classroom Laboratory/Computer Classroom Building ³	LAW	John S. Armstrong Hall
CLRB	ASU East Classroom Building ¹	LAWLB	John J. Ross-William C. Blakley Law Library
CMPIN	Campus Inn	LIB	Charles T. Hayden Library
CNTR	ASU East Academic Center Building ¹	LL	G. Homer Durham Language and Literature Building
COMM2	ASU East Communications Building ¹	LSA	Life Sciences A-Wing
COWDN	Cowden Family Resources Building	LSC	Life Sciences C-Wing
CP	Central Plant	LSE	Life Sciences E-Wing
CPCOM	Computing Commons Building	LYC	Lyceum Theatre
CRI	Cancer Research Institute	MAIN	Old Main
CRNX	Classroom Annex ³	MANZH	Manzanita Hall
CSAC	Nadine and Ed Carson Student Athlete Center	MARIP	Mariposa Hall
CSB	Community Services Building	MB	M.O. Best Hall
CSC	Central Services Complex ³	MCENT	A.J. Matthews Center
DPSMN	Department of Public Safety—Main	MCL	James H. McClintock Hall
EAW2	ASU East Exercise Instructional Lab Building ¹	MHALL	Carrie Matthews Hall
ECA	Engineering Center A-Wing	MOEUR	B.B. Moeur Administration
ECB	Engineering Center B-Wing	MTCHL	Mitchell School (Tempe)
ECC	Engineering Center C-Wing	MU	Memorial Union
ECD	Engineering Center D-Wing		
ECE	Engineering Center E-Wing		
ECF	Engineering Center F-Wing		
ECG	Engineering Center G-Wing		

¹ This building is located at ASU East.

² The ASU Downtown Center is located at 502 E. Monroe Street in Phoenix.

³ This building is located at ASU West.

BUILDING ABBREVIATIONS

MUR	John Murdock Lecture Hall	SS	Social Sciences Building
MUSIC	Music Building (wings E–W)	SSV	Student Services Building
NEEB	L.S. Neeb Hall	STAD	Sun Devil Stadium
NOBLE	Daniel E. Noble Science and Engineering Library	STAUF	Charles Stauffer Communication Arts Building (wings A–B)
NUR	Nursing Building	TC	Technology Center
OCOT	Ocotilla Hall	TCB	Aeronautics Building
PABLO	San Pablo Residence Hall	TCC	Technology Center Annex
PAC	ASU East Physical Activity Center ¹	TECH	ASU East Technology Center ¹
PBS	Packard Baseball Stadium	TECH2	ASU East Technology Center Annex ¹
PEBE	Physical Education Building East	THWH	Theatre Warehouse
PEBW	Physical Education Building West	TMPCT	Tempe Center
PGM	ASU East Professional Golf Management ¹	TOWER	Tower Center (wings A–B)
PPS	Facilities Management	TRACK	Joe Selleh Track
PRNT	ASU East Technology Print Building ¹	UASB	Undergraduate Academic Services Building
PS	George M. Bateman Physical Sciences Center (wings A–G)	UCB	University Center Building ³
PSH	Physical Science H-Wing	UCLUB	University Club
PSY	Psychology Building	UNION	ASU East Williams Campus Union Building ¹
PVE	Palo Verde East Hall	UVCMN	University Commons
PVM	Palo Verde Main Hall	UWT	Unsteady Wind Tunnel
PVW	Palo Verde West Hall	VISIT	ASU Visitor’s Information Center
RITT	Ritter Building (wings A–B)	WFA	Wells Fargo Arena
SAHU	Sahuaro Hall	WFLD	ASU West Alternate Locations ³
SANDS	Sands Classroom Building ³	WH	Warehouse
SCOB	John W. Schwada Classroom Office Building	WHALL	West Hall
SCRED	Sonora Center Residence Education Center	WILSN	George W. Wilson Hall
SDF	Solar Demonstration Facility	WTC	Whiteman Tennis Center
SHS	Student Health Service (wings A–B)		
SIM	ASU East Flight Simulator Building ¹		
SOLAR	ASU East Photovoltaics Testing Laboratory ¹		
SRC	Student Recreation Complex		

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