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Arizona State University

2003–2004 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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Academic and Administrative Documents

Manager / Steve Gobbell
Associate Editors / Dot DiRienzi, John MacIsaac
Assistant Editor / Rebecca Howe
Senior Office Specialist / Julie Zehring
Senior Desktop Publishing Specialist / Michael J. Martin
Desktop Publishing Specialist / Margaret Dempsey
Proofreader / Jeanne Fairbanks
Computer Support Specialist IV / Anthony Garone
Editorial Assistant II / Elizabeth Moreau

Graduate College Coordination

Editor / Gabriel Goltz
Associate Editor / Dennis Durband
Graphics Consultant / Marilyn Canteloupe
Editorial Consultant / Virginia Hunter

Course Coordination

Manager, Communications / Katty McIntosh
Desktop Publishing Assistant / Michael J. Belisle

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CATALOG EDITOR
ARIZONA STATE UNIVERSITY
PO BOX 874211
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President Michael M. Crow

Tim Trumble photo

Dear ASU Students and Prospective Students:

It is my privilege, as its 16th president, to welcome you to Arizona State University and introduce you to the 2003–2004 *Graduate Catalog*. Within these pages you will find confirmation of why ASU is a Research Extensive university and on the verge of becoming the new American University, in one of the fastest growing metropolitan areas in the country.

ASU consistently attracts talented and diverse students and faculty who are drawn by our commitment to delivering a quality education, to achievements in research and creative activities, and by the richness in our cultural diversity. The depth and breath of ASU graduate degree programs will give you a true sense of our commitment to quality in research and teaching.

I am tremendously excited to welcome you to ASU and to our vigorous academic community.

Sincerely,

A handwritten signature in black ink that reads "Michael Crow". The signature is written in a cursive, flowing style.

Michael M. Crow
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, 95 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,

A handwritten signature in cursive script that reads "Bianca L. Bernstein". The signature is fluid and elegant, written in dark ink.

Bianca L. Bernstein
Dean of the Graduate College

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AET Aeronautical Engineering Technology.....	345	CED Counselor Education	162
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AFR African American Studies ¹		CET Computer Engineering Technology.....	338
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AJS Administration of Justice ²		CHM Chemistry	143
AMS American Studies ²		CHP Community Health Practice	284
AMT Aeronautical Management Technology	336	CIS Computer Information Systems	100
ANP Environmental Analysis and Programming	115	CLS Clinical Laboratory Sciences/Medical Technology ¹	
APA Asian Pacific American Studies ¹		COB School of Business ¹	
APH Architectural Philosophy and History.....	115	COE College of Education	184
APM Applied Mathematics ¹		COM Communication Studies ²	
ARA Art Auxiliary	119	COM Hugh Downs School of Human Communication	148
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ARP Architecture Professional Studies	116	CPY Counseling Psychology	163
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ASC Applied Science Core ¹		CSS Chicana and Chicano Studies Social Science ¹	
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¹ See the *General Catalog*.

² See the *ASU West Catalog*.

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HPS History and Philosophy of Science ¹	
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¹ See the *General Catalog*.

² See the *ASU West Catalog*.

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MUS Music ¹		SLV Slavic ¹	
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PHS Physical Sciences	295	THA Thai ¹	
PHY Physics	295	THE Theatre.....	350
PLA Landscape Architecture.....	208	THP Theatre Performance and Production.....	351
PLB Plant Biology	298	TRC Transportation Systems Certificate	353
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POR Portuguese ¹		UET Microelectronics Engineering Technology	340
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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, which points to the primary page where more information can be found, includes only officially approved concentrations; other informal areas of study may be available. See also the “[Concurrent and Dual Degrees](#)” table, [page 16](#).

ASU offers these graduate degrees, abbreviated in the table below and elsewhere in the catalog:

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	101
Agribusiness	M.S.	Agribusiness management and marketing, food quality assurance	East	102
Anthropology	M.A.	Archaeology, bioarchaeology, linguistics, museum studies, physical anthropology, social-cultural anthropology	Main	105
	Ph.D.	Archaeology, physical anthropology, social-cultural anthropology	Main	106
Applied Psychology	M.S.	—	East	—
Architecture	M.Arch.	—	Main	109
Art	M.A.	Art education, art history	Main	117
	M.F.A.	Ceramics, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, wood	Main	118
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Main	246

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.

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Business Administration	M.B.A.	—	Main	132
	Ph.D.	Accountancy, computer information systems, finance, health services research, ² management, marketing, supply chain management	West Extended Main	449 462 133
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Main	140
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	449
Composition	M.M.	—	Main	275
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	160
Counseling	M.C.	—	Main	161
Counseling Psychology	Ph.D.	—	Main	163
Counselor Education	M.Ed.	—	Main	164
Creative Writing	M.F.A.	—	Main	164
Criminal Justice	M.A.	—	West	449
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	166
		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	Main
	Secondary education	Extended	461	

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

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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	172
Dance	M.F.A.	—	Main	175
Design	M.S.D.	Graphic design, industrial design, interior design	Main	177
Economics	M.S., Ph.D.	—	Main	180
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	Ed.D.	—	West	449
	Ed.D.	—	Main Extended	185 461
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	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; school psychology	Main	188
Educational Technology	M.Ed., Ph.D.	—	Main	190
Electrical Engineering	M.S., Ph.D.	—	Main	191
	M.S.E.	—	Main	192
	M.S.E.	—	Extended	461
Elementary Education	M.Ed.	Bilingual education, educational technology, ESL education, reading	West	449
Engineering ³	M.E.	—	Main	197
	M.E.	—	Extended	462
Engineering Science	M.S., M.S.E., Ph.D.	—	Main	198
English	M.A.	Comparative literature, English linguistics, literature and language, rhetoric and composition	Main	199
	Ph.D.	Literature, rhetoric/composition and linguistics	Main	200
Environmental Design and Planning	Ph.D.	Design; history, theory, and criticism; planning	Main	204
Environmental Planning	M.E.P.	Landscape ecological planning, urban and regional development, urban design ²	Main	207
Environmental Resources	M.S.	GIS/remote sensing, natural resource management, range ecology	East	210
Exercise and Wellness	M.S.	—	East	212
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, physiology of exercise	Main	214

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

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ASU GRADUATE DEGREES

ASU Graduate Degrees (continued)

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	Ph.D.	Asian history, British history, European history, Latin American history, U.S. history	Main	231
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Interdisciplinary Studies	M.A.	—	West	449
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Kinesiology	M.S.	—	Main	244
Law ⁵	J.D.	—	Main	77
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Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Main	266
Microbiology	M.S., Ph.D.	—	Main	270
Molecular and Cellular Biology	M.S., Ph.D.	—	Main	272
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	D.M.A.	Conducting, music composition, music education, performance	Main	276
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Natural Science	M.N.S.	Biology, chemistry, geological sciences, mathematics, microbiology, physics, plant biology	Main	281

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 (continued)

Major	Degree	Concentration	Campus	Page
Nursing	M.S.	Adult health nursing, community health nursing, family health nursing, nursing administration, ² parent-child nursing, psychiatric/mental health nursing, women's health	Main	283
Nutrition	M.S.	—	East	287
Performance	M.M.	Music theatre/opera musical direction, music theatre/opera performance, performance, performance pedagogy, piano accompanying	Main	276
Philosophy	M.A., Ph.D.	—	Main	289
Physical Education	M.P.E.	—	Main	244
Physics	M.S., Ph.D.	—	Main	292
Plant Biology ¹	M.S., Ph.D.	Ecology, photosynthesis	Main	297
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, political theory	Main	299
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, quantitative research methods, social psychology	Main	303
Public Administration	M.P.A.	Nonprofit administration	Main	305
	Ph.D.	—	Extended Main	461 308
Public Health ³	M.P.H.	Community health practice, health administration and policy	Main	310
Recreation	M.S.	—	Main	311
Religious Studies	M.A., Ph.D.	—	Main	312
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis, solid-state device materials design	Main	315
Secondary Education	M.Ed.	Educational technology	West	449
Social and Philosophical Foundations of Education	M.A.	—	Main	317
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice Advanced generalist practice	Main Extended	318 461
	Ph.D.	—	West Main	449 321
Sociology	M.A., Ph.D.	—	Main	325
Spanish	M.A.	Comparative literature, language and culture, linguistics, literature	Main	326
	Ph.D.	Cultural studies, literature		
Special Education	M.A.	—	Main	327
	M.Ed.	Gifted, mildly disabled, multicultural exceptional, severely/multiply disabled Infants and young children	Main	327
			West	449
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Main	329
Statistics	M.S.	—	Main	330

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
Taxation	M.Tax.	—	Main	332
Teaching English as a Second Language	M.TESL	—	Main	332
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 Environmental technology management	East Extended	333 462
Theatre	M.A.	—	Main	347
	M.F.A.	Performance, scenography, theatre for youth	Main	348
	Ph.D.	Theatre for youth	Main	349

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.

Concurrent and Dual Degrees

Degrees	Administered By	Campus	Page(s)
J.D./M.B.A.	College of Law/W. P. Carey School of Business	Main	61, 73
J.D./M.H.S.A.	College of Law/School of Health Administration and Policy	Main	—
J.D./M.S. in Economics ¹	College of Law/Department of Economics	Main	73, 180
J.D./Ph.D. in Justice Studies	College of Law/Committee on Law and Social Sciences	Main	73, 244
M.A. in Anthropology/M.S. in Justice Studies	Department of Anthropology/School of Justice Studies	Main	241
M.A.I.S./M.B.A.	W. P. Carey School of Business	Main	61, 99
M.Arch./M.B.A.	School of Architecture/W. P. Carey School of Business	Main	61, 112
M.B.A./M.H.S.A.	W. P. Carey School of Business	Main	61, 227
M.B.A./M.S. in Economics	W. P. Carey School of Business	Main	61, 180
M.B.A./M.S. in Information Management	W. P. Carey School of Business	Main	61, 132
M.B.A./M.Tax.	W. P. Carey School of Business	Main	61, 332
M.B.A./Master of International Management	W. P. Carey School 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	61
M.S. in Nursing/M.P.H. ²	College of Public Health/College of Nursing	Main	79
M.S.E. in Industrial Engineering/ Master of International Management of Technology	Department of Industrial Engineering/American Graduate School of International Management (Thunderbird)	Main	237

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

² This program is jointly offered with the University of Arizona and Northern Arizona University.

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
Asian Studies Certificate	College of Liberal Arts and Sciences	Main	124
Atmospheric Science Certificate	College of Engineering and Applied Sciences and College of Liberal Arts and Sciences	Main	125
Geographic Information Science, Interdisciplinary Certificate in	Graduate College and College of Liberal Arts and Sciences	Main	218
Gerontology, Certificate in	College of Human Services*	Main West Extended	225 449 463
Indian Law Certificate	College of Law	Main	73
Law, Science, and Technology, Certificate in	College of Law	Main	73
Medieval Studies Certificate	Arizona Center for Medieval and Renaissance Studies (ACMRS)	Main	269
Museum Studies Certificate	Department of Anthropology	Main	106
Nonprofit Leadership and Management Certificate	College of Public Programs	Main	282
Post-Bachelor’s Artist Diploma	School of Music	Main	277
Post-Master’s Nurse Practitioner Certificate	College of Nursing	Main	282
Renaissance Studies Certificate	ACMRS	Main	269
Scholarly Publishing Certificate	Department of History	Main	314
Statistics, Certificate in	Committee on Statistics and the Graduate College	Main	330
Transportation Systems Certificate	Committee on Transportation Systems and the Graduate College	Main Extended	353 463

* This certificate is a university-wide program administered by ASU West.

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

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 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						

September 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				

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

Fri., July 11

Fri., July 11

Mon., July 14

Fri., July 18

Fri., July 25

Fri., July 25

Fri., July 25

Tues., July 29

Fri., Aug. 1

Fri., Aug. 8

Fri., Aug. 8

2003

Check the fall 2003 *Schedule of Classes* for details and to confirm these dates.

Thurs., Mar. 27–

Fri., Apr. 4

Mon., Apr. 21–

Sun., Aug. 31

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 holiday

Instruction begins for second five-week session

Deadline to submit thesis or dissertation for format review to Graduate College and schedule defense

Doctoral participation form due to reserve seat at commencement

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

Restricted complete withdrawal deadline for eight-week session

Eight-week session ends

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

Restricted course withdrawal deadline for second five-week session

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.

Restricted complete withdrawal deadline for second five-week session

Second five-week session ends

Commencement

Fall Semester

Preregistration

Drop/add

GRADUATE COLLEGE CALENDAR

September 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				

October 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	

November 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						

December 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			

January 2004

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 2004

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						

Wed., Apr. 23–
Sun., Aug. 31
Thurs., July 30
Tues., Aug. 5

Mon., Aug. 11–
Sat., Aug. 16
Mon., Aug. 18

Tues., Aug. 19–
Thurs., Aug. 21
Wed., Aug. 20
Thurs., Aug. 21
Mon., Aug. 25
Mon., Sept. 1
Fri., Sept. 26
Tues., Oct. 1
Tues., Oct. 7

Wed., Oct. 15

Fri., Oct. 31
Tues., Nov. 11
Wed., Nov. 26

Thurs., Nov. 27–
Fri., Nov. 28
Wed., Dec. 3
Fri., Dec. 5

Tues., Dec. 9
Wed., Dec. 10
Fri., Dec. 12

Tues., Dec. 16

Thurs., Dec. 11–
Sat., Dec. 13;
Mon., Dec. 15–
Wed., Dec. 17
Thurs., Dec. 18
Fri., Dec. 19
Sat., Dec. 20
Mon., Dec. 29

Registration

Early Teaching Assistant Orientation (8:15 A.M.–12:30 P.M.)
Final tuition payment deadline for fall 2003
(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 holiday
Unrestricted withdrawal deadline
Winter Session registration begins
Thesis/Dissertation Workshop, Memorial Union,
Ventana Room (3–5 P.M.)
December graduation filing deadline (must be met to have name
appear in commencement program)
Restricted course withdrawal deadline
Classes are excused for Veterans Day holiday
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
Winter Session instruction begins

GRADUATE COLLEGE CALENDAR

March 2004

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			

April 2004

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 2004

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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June 2004

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 2004

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 2004

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				

2004

Spring Semester

Check the spring 2004 <i>Schedule of Classes</i> for details and to confirm these dates.	
Mon., Oct. 27–	Preregistration
Tues., Nov. 4, 2003	
Mon., Nov. 17, 2003–	Drop/add
Sun., Jan. 25, 2004	
Wed., Nov. 19, 2003–	Registration
Fri., Jan. 25, 2004	
Tues., Dec. 16, 2003	Final tuition payment deadline for spring 2004 (For students who register on or after the deadline, fees are due daily.)
Thurs., Jan. 1, 2004	Winter Session classes are excused for New Year’s Day holiday
Mon., Jan. 5–	International Student Orientation and activities
Sat., Jan. 10	
Mon., Jan. 12	New Teaching Assistant Orientation (8:15 A.M.–12:30 P.M.)
Wed., Jan. 14	Residence halls open
Fri., Jan. 16	Winter Session instruction ends
Mon., Jan. 19	Classes are excused for Martin Luther King Jr. Day holiday
Tues., Jan. 20	Instruction begins
Fri., Feb. 13	Unrestricted withdrawal deadline
Thurs., Feb. 26	Thesis/Dissertation Workshop, Memorial Union, Ventana Room (3–5 P.M.)
Sun., Mar. 14–	Classes are excused for spring recess; semester midpoint
Sun., Mar. 21	
Fri., Mar. 26	Restricted course withdrawal deadline
Wed., Mar. 31	May graduation filing deadline (must be met to have name appear in commencement program)
Tues., Apr. 6	Graduate Forum and Information Fair
Fri., Apr. 23	Last day to submit materials for thesis and dissertation format review and oral defense
Wed., Apr. 28	Restricted complete withdrawal deadline
Fri., Apr. 30	Deadline for submission of Doctoral Participation Form to reserve seat at commencement
Tues., May 4	Instruction ends
Wed., May 5	Reading day
Thurs., May 6–	Final examinations
Sat., May 8;	
Mon., May 10–	
Wed., May 12	
Fri., May 7	Last day to hold oral examination in defense of a thesis or dissertation
Tues., May 11	Last day to obtain signature of the Graduate College dean for thesis and dissertation approval
Tues., May 11	Last day to submit to ASU Bookstore binding for thesis and dissertation (due by 3 P.M.)
Thurs., May 13	Commencement
Fri., May 14	Residence halls close

April 2004

S	M	T	W	T	F	S
					1	2
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 2004

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 2004

S	M	T	W	T	F	S
					1	2
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 2004

S	M	T	W	T	F	S
					1	2
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 2004

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				

2004

Check the 2004 *Summer Sessions Bulletin* for details and to confirm these dates.

Mon., Feb. 2–

Wed., June 2

Mon., Feb. 2–

Wed., July 7

Tues., Apr. 27

Mon., May 31

Tues., June 1

Tues., June 8

Fri., June 18

Fri., June 25

Thurs., July 1

Fri., July 2

Mon., July 5

Tues., July 6

Tues., July 13

Fri., July 16

Fri., July 16

Fri., July 23

Fri., July 23

Fri., July 23

Fri., July 30

Fri., July 30

Tues., Aug. 3

Tues., Aug. 3

Fri., Aug. 6

Fri., Aug. 6

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 holiday

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 441; “ASU West Map,” page 451; “ASU Downtown Center Map,” page 466; and “ASU Vicinity Map,” page 469. 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 356, 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 Services, College of Education, at 480/965-5555.

TOEFL Scores? See “TOEFL Requirement,” page 85.

Transcripts? See “Transcripts,” page 42.

General Information

Arizona State University has emerged as a leading national and international research and teaching institution. Located in the Phoenix metropolitan area, this rapidly growing, multicampus public research university offers programs from the baccalaureate through the doctorate for approximately 55,491 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. See the “2002–2003 Enrollment” table below.

2002–2003 Enrollment

Type	Students
Total	55,491
ASU Main	47,359
ASU East	3,126
ASU West	6,630
National Merit Scholars	368

MISSION

Arizona State University’s goal is to become a world-class university in a multicampus setting. 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, recognizing 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; the elected governor and state superintendent of public instruction are 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. Refer to “[Administrative Personnel](#),” page 429.

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 470.

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 protected 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 protected 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

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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.

Student Antiretaliation Statement

Students have the right to be free from retaliation. Threats or other forms of intimidation or retribution against a student who files a complaint or grievance, requests an administrative remedy, participates in an investigation, appears as a witness at an administrative hearing, or opposes an unlawful act, discriminatory practice or policy, are prohibited. Individuals making such threats are subject to university disciplinary procedures. Students with complaints of retaliation should utilize the procedures available under the *Arizona Board of Regents Student Code of Conduct*, the Graduate Student Grievance Procedure, the Student Employee Grievance Procedure, the Sexual Harassment Policy, non-discrimination policies, or other available administrative procedures as appropriate. For assistance with procedures, students should contact the dean of the particular college if the circumstances relate to a course or academic evaluation, or the dean of students for all other circumstances.

INTERGROUP RELATIONS CENTER

The first 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, religious and nonreligious students, and other groups to interact with and learn about each other. Leadership 2000, an annual 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 students met in a single room on land donated by George and Martha Wilson of Tempe.

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

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

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

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

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 landmark 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.

Under the leadership of Dr. Lattie F. Coor, from 1990 to June 2002, ASU grew to serve the Valley of the Sun through multiple campuses and extended education sites. His commitment to diversity, quality in undergraduate education,

research, and economic development underscored the university's significant gains in each of these areas over his 12-year tenure. Part of Dr. Coor's legacy to the university was a successful fund-raising campaign. Through private donations, primarily from the local community, more than \$500 million was invested in targeted areas that significantly impact the future of ASU. Among the campaign's achievements were 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.

A New Vision. ASU now enters a new era with the tenure of its 16th president, Dr. Michael M. Crow, which began on July 1, 2002. At Dr. Crow's inauguration on November 8, 2002, he detailed his vision of ASU as the New American University. ASU has the unique opportunity to become a major metropolitan research university, serving the higher education needs of one of the largest metropolitan areas in the country and conducting leading-edge research.

The foundation to move forward with Dr. Crow's vision is in place. ASU admitted the largest and highest-quality freshman class ever in fall 2002 and has developed 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. ASU will assume a leadership role in biomedicine and biotechnology through its AZ BioDesign Center and its partnership in the International Genomics consortium in Phoenix.

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 to 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.

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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. The newest of the ASU campuses, ASU East opened in 1996 and serves more than 3,000 undergraduate and graduate students. Located in the east Valley, the 600-acre campus offers many of the features of a small residential college in a suburban area while providing access to the resources of ASU Main in Tempe and the amenities of the metropolitan Phoenix area.

ASU East offers a variety of bachelor's and master's degrees, certificate programs, and, through partnerships with programs at ASU Main, select doctoral degrees. Sharing the campus with ASU East are two community colleges, an elementary school, a regional airport, a golf course, and several corporate research facilities. A partnership with Chandler-Gilbert Community College provides lower-division general education, general interest, and major prerequisite courses to ASU East students and transfers the credits seamlessly to ASU.

Fully mediated classrooms and specialized educational facilities such as the Microelectronics Teaching Factory, the Graphic Information Technology Facility, and the flight pro-

gram's Altitude Chamber offer unique teaching-learning opportunities for ASU East students.

On-campus housing for married students and families in addition to traditional residence halls for single students are available at ASU East. The Freshman Year Experience residence hall at ASU East offers a specialized community that integrates a variety of academic resources into residential life.

A shuttle service provides transportation between ASU East and ASU Main. The campus, located at Power and Williams Field Roads in Mesa, is easily accessible via major interstate routes. For more information, see "ASU East," page 438.

ASU West. Arizona State University West, a vital component of ASU's multicampus structure, serves more than 7,000 students on its growing campus in northwest Phoenix. The four-year urban campus features a friendly, supportive atmosphere in the context of a nationally acclaimed, PAC-10 university. Courses at ASU West lead to 29 bachelor's degrees, nine master's degrees, and eight professional certificates through the Colleges of Arts and Sciences, Education, and Human Services and the School of Management.

The campus is located in the center of 300 acres. The surrounding undeveloped land holds promise as a future home for many new jobs, and hundreds of potential internships, classes, workshops and knowledge exchange opportunities. The next significant addition to the campus will be completed in August 2003 when a 400-bed, state-of-the-art student residence hall is expected to open at the start of the fall semester. Students will have the opportunity to live in an environment designed specifically to integrate their living and learning experiences in a setting that includes seminar rooms, computer facilities, and a community center for student activities.

The campus is dedicated to serving the evolving needs of high school graduates, working adults, and returning and continuing students. Expanding campus facilities and programs, along with a diverse student body, faculty, and staff, all contribute to a culturally rich academic and social campus environment.

ASU West's mission encompasses research and teaching, faculty-student research collaboration, interdisciplinary perspectives, and the development of university-community partnerships. Academic programs, classes, and student services are innovative and provide students with a high-quality education.

The campus is located in northwest Phoenix between 43rd and 51st Avenues on West Thunderbird Road.

For more information, see "ASU West," page 448. For complete information and course listings, see the *ASU West Catalog*.

ASU Extended Campus. The ASU Extended Campus allows individuals to experience ASU 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. Through

the Extended Campus, students can access programs, including a variety of professional continuing education programs. ASU Extended Campus offers lifelong learning opportunities throughout Maricopa County and the state of Arizona.

For more information, see “[ASU Extended Campus](#),” page 461.

ASU Downtown Center. The ASU Downtown Center is the anchor location of the ASU Extended Campus. Located in downtown Phoenix at 502 E. Monroe, the ASU Downtown Center offers a variety of daytime and evening courses and degree programs of interest to employees in private businesses and government agencies and to individuals seeking personal growth and enrichment. These offerings 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 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, Edward Jones, Iridium Satellite, Motorola Labs, the Institute for Supply Management, Philips Electronics, and many others. The Research Park contains more than 1.5 million square feet of developed space on 320 acres.

For more information, access researchpark.asu.edu on the Web.

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 Sono-

ran 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 LIBRARY AND COLLECTIONS

ASU Main Libraries

The collections of the university’s libraries comprise more than 3.6 million volumes, approximately 7 million microform units, and more than 32,565 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 “[Libraries](#),” page 360. For more information, access the Web site at www.asu.edu/libraries.

Charles Trumbull Hayden Library. The Charles Trumbull Hayden Library, designed by Weaver and Drower 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; Periodicals/Videos/Microforms; Government Documents Services; Interlibrary Loan and Document Delivery Services; Library Instruction, Systems, and Technology (L.I.S.T.); Reference; Reserve; and Archives and Manuscripts, which includes Special Collections, the Arizona Collection, the Chicano Research Collection, the Benedict Visual Literacy Collection, the Child Drama 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.

Other special collections include 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

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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/RESOURCES/AEDLIBRARY/html/AEDLibrary.htm.

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.

College of Law Library

Law Library. The John J. Ross–William C. Blakley Law Library is located on McAllister Avenue. See “**Organization,**” page 72, for more information.

ASU West Library

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, 5,990 serial titles, 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.

University Collections

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.

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.

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. The museum serves the global public through traveling exhibitions, publications that contextualize art in the larger issues of society, and its Web site.

Exhibitions, education programs, and publications are interdisciplinary and 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 ceramics. In 2002, the Ceramics Research Center was opened, presenting exhibitions and giving access to research in 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. Ceramics, with a focus in 20th-century examples, include Peter Voulkos, Ken Price, Lucie Rie, and Robert Arneson. 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, research assistantships, lectures and symposia, in-gallery materials, community video projects with children, and school and public tours. For information on upcoming exhibitions and programs, call 480/965-2787.

ASU Downtown Center Galleria. The Galleria features work by ASU faculty, staff, students, and local artists. Exhibits rotate monthly. The Galleria participates in the monthly and annual art tours First Friday and Art Detour, sponsored by a local artists' group, ArtLink, Inc. For information on exhibitions, call 480/965-3046.

Computing Commons Gallery. Located on the ground floor of ASU's high-traffic, centrally located Computing Commons, the gallery extends the arts to a diverse community. This Institute for Studies in the Arts' (ISA) exhibition space has highly adaptable power and lighting options and more than 30 ethernet connections to facilitate work with a focus on art and technology.

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

Digital Arts Ranch. The Institute for Studies in the Arts' (ISA) Digital Arts Ranch includes a black box theatre. The theatre features a matrix of video, audio and movement sensors, controllable projection screens, surround sound capable of Dolby 5.1 and DTS reproduction, shops for design and fabrication using a variety of materials, including wood, aluminum, brass, steel and plastic, and a CAD unit. The theatre space serves as the ISA's principal venue for arts and technology performance events.

Gallery of Design. Housed in the College of Architecture and Environmental Design, the Gallery of Design is used to display student work, semester end final critiques, shows exhibiting faculty work, an annual alumni show, and special exhibits. Exhibits tend to focus on architecture, design, and planning and landscape design. It is open Monday through Friday from 8 A.M. to 5 P.M., except when the university is closed.

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 research environment and performance space at the Institute for Studies in the Arts (ISA). It is dedicated to the expansion of studies in interactive performance technologies. Current research includes 3-D motion capturing and 2-D sensing technologies, body sensors for real-time control of digital media, and multisite performances through the use of shared data and streaming digital media. The Intelligent Stage serves the Motion Capturing Partnership, which includes the ISA, computer science, bioengineering, and PRISM (Partnership for Research in Stereo Modeling).

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.

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.

Evelyn K. Smith Music Theatre. As part of the music complex, the Evelyn K. Smith 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.

Step Gallery. Located in the Tempe Center, the Step Gallery is dedicated to exhibitions by undergraduate students.

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.

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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. Works by undergraduate and graduate students, as well as the general public, are showcased.

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 a wide variety of applications, including those required for development, research, and other learning needs. University-wide productivity software and knowledge-sharing resources 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 (www.asu.edu/emma) and creating personal and course Web pages;
4. accessing courses online via myASU (my.asu.edu);
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 253-workstation computing site, seven computer classrooms, two Classroom Support Centers, the Customer Assistance Center, a computer store, and the Computing Commons Gallery which is described under Performing and Fine Arts Facilities (see “[Computing Commons Gallery](#),” page 28).

Classroom Support. Classroom Support assists instructors in integrating technology into the educational process. To achieve this goal Classroom Support personnel provide

equipment, technical support, maintenance, and instructor training for open-access classrooms, mediated classrooms, computer classrooms, and special events. Classroom Support Centers are located strategically around campus so that staff can provide help to instructors who request assistance. For more information, access the Web site at www.asu.edu/classroomsupport.

Computing Sites. In addition to the Computing Commons Atrium, there are three additional (IT or open access) 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 on the second floor of the Computing Commons in room 202, 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 online at www.asu.edu/asurite. Additional information about Computer Accounts is available on the Web at www.asu.edu/computeraccounts.

Customer Assistance Center. The Customer Assistance Center, located on the second floor of the Computing Commons in room 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, and how-to documentation in a “print-on-demand” format. Print on demand is also available on the Web at www.asu.edu/quicklook. Additional information about the center is available on the Web at www.asu.edu/cacenter.

Geographic Information Systems Lab. The Geographic Information Systems (GIS) Lab seeks to establish partnerships with faculty, staff, and students to acquire, create, and enhance research and creative endeavors through the effective use of GIS technologies. The lab is located on the second floor of the Computing Commons in room 235. Lab staff members assist 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 classes for GIS instruction, serving as a focal point for GIS users to meet and share information and technical expertise. For more information, access the Web site at www.asu.edu/gis-lab.

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. The IT Help Desk assists with data recovery and repair; AFS file space and permissions for Web sites; communication, e-mail, and virus protection software; and computing and equipment problem referral. Services are available by telephone at 480/965-6500, and by walk-in at the Customer Assistance Center, CPCOM 202. For more information, access the Web site at www.asu.edu/helpdesk.

Information Technology Instruction Support. The Information Technology Instruction Support (IT/IS) Group serves as a development center for the effective use of technology in the design and delivery of instruction. Staffed with faculty, researchers, and students skilled in the areas of system design, graphics, interactive software, Web-based instructional design and delivery, and digital video production, this innovation-driven group enables faculty to maximize the impact of their instruction through the use of 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 ASU faculty and researchers, other educational institutions, as well as public and private community entities, grant-writing teams are assembled 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, University Libraries, Disability Resources for Students, and the Office for Research and Sponsored Projects Administration—to provide faculty with a wide array of instruction support services.

IT/IS offers consultation and workshops 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.

For more information about IT/IS, access the Web site at is.asu.edu.

Instruction Support Lab. The Instruction Support (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 asyn-

chronous. 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. For more information about IS Lab resources, support, and workshops, access the Web site at is.asu.edu/islab.

ALUMNI ASSOCIATION

Founded in 1894, the Alumni Association is a volunteer organization committed to serve and unite alumni for the purpose of advancing the interests of ASU and its alumni. The association, located in MAIN 200, provides a variety of services for ASU alumni, as well as a series of events scheduled around the country.

With more than 250,000 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 435. For more information about the association or its board of directors, call 1-800-ALUMNUS or 480/965-ALUM (2586), or access the Web site at www.asu.edu/alumni.

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. The center's 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.

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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 50.

RESEARCH CENTERS, INSTITUTES, AND LABORATORIES

These units serve the university’s mission in research. They are overseen by eight of the colleges, the Office of the Vice President for Research and Economic Affairs, 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 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,” on this page.

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, EPSL 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 Electronic Research. The Center for Low Power Electronic Research 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 center 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 the world's leading companies involved in the manufacture of portable computing and communication systems. The technical areas of focus of the center 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, or access the Engineering Research Services Web site at www.eas.asu.edu/~ers.

CRESMET. See “Center for Research on Education in Science, Mathematics, Engineering, and Technology,” page 32.

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.

Institute for Manufacturing Enterprise Systems. The Institute for Manufacturing Enterprise Systems (IMES) is a joint venture of the W. P. Carey School 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, or access the Engineering Research Services Web site at www.eas.asu.edu/~ers.

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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 480/965-3576.

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 (0–2 mm) of solids by ion beam analysis where elemental composition and depth distribution information are needed. Channeling experiments are used to determine crystal perfection and site occupancy;
4. the 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 President for Research and Economic Affairs 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 School of Life

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Sciences. 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, fluorometer, 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 within the Plant Biology curriculum are central components of the center's activities.

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 32.

Exercise and Sport Research Institute. The Exercise and Sport Research Institute (ESRI) is an interdisciplinary research unit located in the Department of Kinesiology 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 underlying 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), Chicana 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/ihp.

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 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

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in community building; technical assistance to neighborhood organizations, schools, and hospitals; and the production 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. It features selections from the more than 3,000 ceramics works in the collection. Works are shown in open storage, in a gallery with changing exhibitions, and in the Susan Harnly Peterson Ceramics Archive. The center offers an opportunity for hands-on study and enjoyment of one of the outstanding ceramics collections in the country. 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) is an interdisciplinary research center within the Herberger College of Fine Arts (HCFA) at ASU. Its infrastructure has been developed especially to facilitate interdisciplinary digital arts and includes a collaborative relationship with the College of Engineering and Applied Sciences (CEAS). The ISA supports creation, research, development, presentation, and education at the intersection of the arts and technology.

The institute offers courses and training programs in interdisciplinary digital media and performance and in signal processing and programming for the arts. Courses are designed for graduate students exploring both the theory and practice of interdisciplinary collaboration between the arts and technology. Faculty include ISA artists, visiting artists, a faculty appointee jointly serving HCFA and CEAS and affiliated CEAS faculty.

ISA facilities include Digital Arts Ranch—a black-box theater with a matrix of video, audio, and movement sensors; controllable projection screens; surround sound capabilities; shops for design and fabrication; a CAD unit; the Intelligent Stage—a research environment and performance space dedicated to the expansion of studies in interactive

performance technologies, including three-dimensional motion capturing and two-dimensional sensing technologies; a state-of-the-art Audio Lab and Digital Imaging Lab; the Technology Development Studio—staffed by an electronics engineer and research assistant from the ASU Department of Electrical Engineering and dedicated to the development and creation of software and hardware tools for creative applications—and the Computing Commons Gallery, a highly adaptable exhibition space for works with a focus on art and technology.

For more information, call 480/965-9438, or access the ISA Web site at isa.asu.edu.

W. P. Carey School 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.

For more information, call 480/965-5440, access the AREC Web site at www.wpcarey.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 for 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.wpcarey.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 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 prac-

tices. CASB also engages in applied research on entrepreneurship and the emerging changes and trends in small business.

For more information, visit CASB in BAC 101, call 480/965-3962, access the CASB Web site at www.wpcarey.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 W. P. Carey School 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 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 the Fiesta Bowl, a study of seasonal migration to Arizona, and an analysis of the Arizona Lottery. 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.wpcarey.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 market-

ing, 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 W. P. Carey School 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 W. P. Carey School 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 W. P. Carey School 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; Internet 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.wpcarey.asu.edu/seid, or write

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

Institute for Manufacturing Enterprise Systems. See “[Institute for Manufacturing Enterprise Systems,](#)” page 33, for information about this joint venture of the W. P. Carey School of Business and the College of Engineering and Applied Sciences.

Vice President for Research and Economic Affairs

Arizona Biodesign Institute. The Arizona Biodesign Institute (AzBio) was established by ASU to provide an intellectual and physical environment for large-scale interdisciplinary and collaborative research. The vision for the institute is to make it the benchmark for excellence in use-inspired research focused on the intentional manipulation of biological systems. Arizona Biodesign will be a catalyst for innovation, facilitating the multidisciplinary investigations in basic science and engineering that are required to design critical biotechnology solutions in the 21st century.

The hallmark of AzBio will be a physical and intellectual environment that leverages communication, collaboration, integration, and a research agenda that emphasizes the application of discoveries to commercial uses and societal benefits. The research programs are clustered into two focus areas of increasing contemporary importance: (1) biologics and therapeutics and (2) nano-biosystems and devices. The integrative tools of genomics and informatics will connect and support these broad focus areas.

The output of AzBio will be measurable in terms of highly trained professionals, pioneering discoveries, new technologies, new practices, and new businesses—all of which can drive statewide economic development. Arizona Biodesign will be a hub for biotechnical and biodesign research in central Arizona, building collaborative networks among scientists and clinical researchers from leading industries and institutions. The institute will be anchored in a research complex on the main campus of ASU.

For more information, access the AzBio’s Web site at www.azbio.org.

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 com-

munity, 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 ces.asu.edu.

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 ces.asu.edu.

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 480/727-1249, or access the STAR Center Web site at www.east.asu.edu/research/star.

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 includes up-to-date amounts. The following fees apply to 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 "2003–2004 Graduate 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 45.

Students registered for seven or more resident hours or 12 or more nonresident hours are considered full-time for tuition payment purposes. See "[Enrollment Verification Guidelines](#)," page 88.

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

2003–2004 Graduate Tuition

Hours	Resident*	Nonresident*
1	\$ 194.00	\$ 510.00
2	388.00	1,020.00
3	582.00	1,530.00
4	776.00	2,040.00
5	970.00	2,550.00
6	1,164.00	3,060.00
7	1,854.00	3,570.00
8	1,854.00	4,080.00
9	1,854.00	4,590.00
10	1,854.00	5,100.00
11	1,854.00	5,610.00
12 and more	1,854.00	6,114.00

* 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).

Graduate College Program Fees. Certain graduate programs assess an additional program 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 registra-

tion fee per semester hour for law students is \$301. For more information, see the *Summer Sessions Bulletin*.

Tuition Installment Plan

The tuition installment plan offers students an option to divide tuition payments up over several months. Students may enroll in the tuition installment plan and reserve their classes over the phone using SunDial, on the Internet through ASU Interactive, in person, and by mail. For the fall 2003 semester, enrollment in the plan will be an available option by July 1; in future semesters the plan will be available when online registration begins. Students must reenroll in the plan each semester.

All students are eligible to enroll in the plan after they register for classes, with the exception of students owing past-due charges. Enrollment in the plan is an available option through the end of the first week of classes. If students receiving financial aid choose to enroll in the plan, all tuition charges are paid by financial aid and any remaining financial aid is refunded to the student. Students with financial aid continue to have the option to hold their classes at no extra cost rather than enrolling in the plan.

Upon enrollment in the plan, tuition is billed in three installments on the Student Account Receivable System. For example, for the fall semester, the first billing statement will be mailed in early August, with tuition due on August 25, September 25, and October 25.

Students are charged a per semester administrative fee to cover costs associated with enrollment in the plan. The fee is billed on the Student Account Receivable System and is due at the same time as the first installment. The fee is non-refundable, even if students withdraw from classes.

Once a student enrolls in the plan for a given semester, he or she will not be withdrawn from classes during the current semester. Students must withdraw from classes if they decide not to attend. If students enrolled in the plan do not make scheduled payments, the students are prohibited from registering for classes in future semesters and are blocked from receiving university services, such as transcripts. Former students with outstanding tuition charges are referred to an outside collection agency.

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. Students enrolled for seven or more hours are charged \$25 per semester. Students registered for fewer than seven hours pay \$12 per semester, and summer students pay \$12

FEES, DEPOSITS, AND OTHER CHARGES

per session. See the latest *Schedule of Classes* for more information.

Financial Aid Trust Fee. All students must pay a financial aid trust fee. 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 students enrolled for seven or more hours. The total summer sessions fee does not exceed the amount for a student enrolled for seven or more hours. Fees collected from students are matched by the State of Arizona and used to create the Arizona Student 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 \$50. A separate fee of \$35 is assessed on registration payments received after the fee payment deadline but processed before the class enrollment purge.



The College of Architecture and Environmental Design provides graduate programs in architecture, design, landscape architecture, and environmental and urban planning.

John Buchholz photo

Admission Application. The nonrefundable fee for graduate admission or readmission 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;
2. former name(s);
3. date of birth;
4. first and last dates of attendance;
5. return address;
6. phone number;
7. specific mailing address for each transcript ordered;
8. ASU ID number; and
9. Social Security Number (SSN).

Students must also select one of the following options to be displayed on the transcript (if the student attended ASU before 1980, these ID/SSN options are not available):

1. ASU ID only;
2. SSN only;
3. both ASU ID and SSN displayed; or
4. neither ASU ID or SSN displayed.

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 is \$6 per copy. "Rush" transcripts (requested to be printed and picked up on the same day) will cost \$5 in addition to the total cost of the transcripts ordered. Special delivery requests via Federal Express or U.S. Express Mail, instead of regular mail, will cost \$17.50 per delivery address, in the 48 contiguous U.S. states, in addition to the cost of the transcript(s). The additional cost of special express deliveries to addresses outside the contiguous states (e.g., Hawaii, Alaska, and other countries) varies. Students are billed the initial \$17.50 as part of this credit card transaction and sent a bill for the remainder. Fees are subject to change without notice.

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. Also, students may view and print their own unofficial transcripts via the Web using ASU Interactive at www.asu.edu/registrar.

Note: Pre-1980 records are not available via the Web.

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 SunDial touch-tone telephone system, 480/350-1500, 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, or 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 44. 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.

ASU 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.

On-Campus Housing. The cost of ASU Main housing varies. In 2002–2003 the typical cost for graduate students was \$3,400 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 northwest Phoenix; another shuttle runs among ASU Main, Mesa Community College, and ASU East in Mesa; and a Free Local Area Shuttle (FLASH) is available around the periphery of ASU Main. 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 and ASU Interactive. The SunDial telephone system, at 480/350-1500, and ASU Interactive, on the Web at www.asu.edu/interactive, are the preferred methods for accessing tuition services. Students may enroll in the tuition installment plan, hold classes with financial aid, and/or make fee payment from any touch-tone phone or via the Web. Visa, MasterCard, or Discover are accepted. Refer to the *Schedule of Classes* for more information.

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.

Veterans Deferred Payment. The Veterans Readjustment Assistance Act allows veterans to apply for deferred payment of fees, books, materials, and supplies required for

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courses. To assist eligible students, a Veteran Promissory Note may be issued deferring payment during their first semester of benefits. Visit the Veterans Services section at SSV 148, or call 480/965-7723 for information on meeting the requirements. ASU 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, which may be obtained at the UASB Registrar site or via the Web at www.asu.edu/interactive, 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 \$15 is assessed for balances due the university between \$20 and \$100 not paid within 30 days of the initial due date. A second and third \$15 late charge is assessed at 60 and 90 days past due. A late charge of \$25 is assessed for balances due the university in excess of \$100 that are not paid within 30 days of the initial due date. A second and third \$25 late charge is assessed at 60 and 90 days past due, for balances in excess of \$100. Procedures to be followed for disputed charges are available from the Student Accounts section of Student Business Services, located in SSV 230.

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 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 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

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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.



The Katherine K. Herberger College of Fine Arts Department of Dance presented "New Danceworks I."

Tim Trumble photo

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.

Graduate Tuition Awards. A small number of full and partial tuition awards are available on a competitive basis to students with outstanding academic records. Applicants must be regularly admitted to a graduate degree program; continuing students must be in good standing. For more information, access www.asu.edu/graduate/financial.

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 or nonresident tuition waiver for three years, and an additional \$5,000, which may be split over two summers. Application fees are waived for all McNair scholars applying for graduate study. Students should contact their academic department.

James J. Sweitzer Memorial Scholarship. This scholarship provides a stipend to a graduate student in Agribusi-

ness. 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 master’s 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.

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 \$16,000 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 \$21,500 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 graduate degree in fine arts.

FINANCING GRADUATE STUDIES

National Science Foundation Graduate Fellowships and Minority Graduate Fellowships. These fellowships provide a stipend of \$21,500 for 12-month tenures. ASU offers 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 scholarships for both resident and nonresident tuition.

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 of Wilson Hall and on the Web at www.asu.edu/graduate/financial.

FINANCIAL AID

To be considered for federal aid, 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 accrues and is 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, a 3 percent loan origination fee is deducted from each disbursement. The federal government provides several options for repayment once the student has left school. These total annual loan limits for subsidized and unsubsidized apply: \$8,500 for subsidized and \$10,000 for unsubsidized. Current interest rates can be found at www.ed.gov/directloan.

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, access 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), and 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). This 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 teaching or research assistantships; 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 ASU Interactive at www.asu.edu/interactive or the SunDial phone system at 480/350-1500. Students can check on (1) documents still needed to complete the financial aid file—which can be printed from the Student Financial Assistance Web site at www.asu.edu/fa—and (2) award information. For more information, visit the Graduate College Student Financial Assistance Office, in the center lobby of 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 within the catalog of all ASU courses by prefix. See the “Key to Course Listings” diagram, on this page, for help in understanding listings.

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.

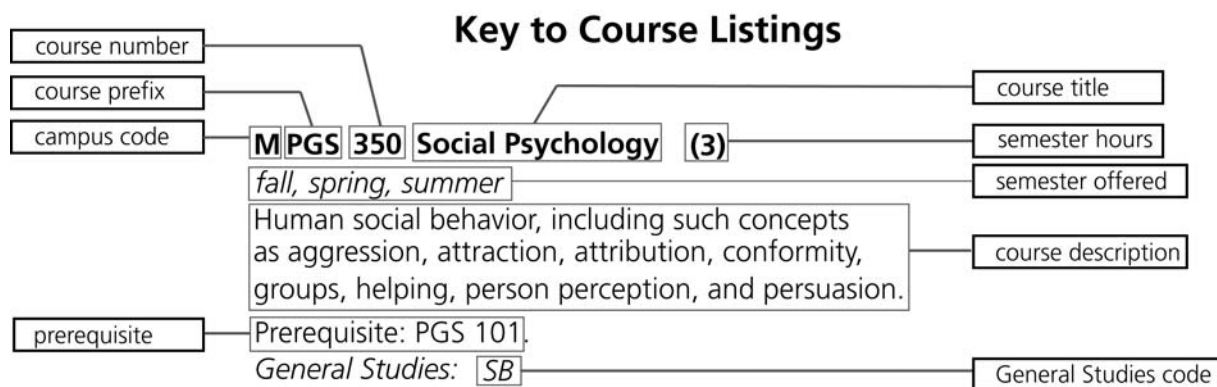
General Studies Code. The General Studies requirement does not apply to graduate students.

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.



CLASSIFICATION OF COURSES

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	194, 294, 394, 494, 598

OMNIBUS UNDERGRADUATE COURSES

194, 294, 394, 494 Special Topics. (1–4)

Covers topics of immediate or special interest to a faculty member and students.

484 Internship. (1–12)

Structured practical experience following a contract or plan, supervised by faculty and practitioners.

498 Pro-Seminar. (1–7)

Small-group study and research for advanced students within their majors. Major status in the department or instructor approval is required.

499 Individualized Instruction. (1–3)

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

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 a synthesis of literature on a specified topic, writing a 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 executive vice president and provost of the university, 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 Programs Overseas 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. After completion, undergraduate students receive credit for the study completed, with a minimum of 12 semester hours and a maximum of 18 semester hours; graduate students receive credit 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.



The ASU Art Museum’s entry with the music building in the background

John MacIsaac photo

Colleges

Colleges and schools at ASU Main and 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 99.

Graduate College

www.asu.edu/graduate

Maria T. Allison, Ph.D., Interim Dean

Through the faculty, the ASU 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 95 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 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 colleges and universities across the nation.

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 President for Research and Economic Affairs 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, 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 postbaccalaureate 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 a step toward more advanced work, such as doctoral studies, that prepares students for a lifetime of intellectual inquiry 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.), Master of Social Work (M.S.W.), and Doctor of Education (Ed.D.). 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 students enter graduate studies without intending to obtain a new degree but rather to enhance personal or professional knowledge. These students may want to advance in their present careers, 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.

Graduate Studies and the 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, and graduate degrees offered by ASU West. Since more than 1,600 ASU faculty members teach graduate students in more than 100 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 fields that are still emerging as recognized academic disciplines and, therefore, do not customarily form the academic bases for departments. Other fields of study are inherently interdisciplinary and do not fit well with con-

ventional 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 10 interdisciplinary programs; several others are planned. Existing programs include

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 (certificate);
5. Justice Studies (Ph.D.);
6. Materials Science (M.S.);
7. Science and Engineering of Materials (Ph.D.);
8. Speech and Hearing Science (Ph.D.);
9. Statistics (M.S. and certificate); and
10. Transportation Systems (certificate).

Other interdisciplinary degree and certificate programs include

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

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 and 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 54.

Certificate Programs

A number of certificate programs are offered by various academic units or programs on campus (see “[ASU Graduate Certificates](#),” page 17).

Interdisciplinary Committee on Linguistics. Linguistics at ASU is interdisciplinary in nature, with faculty coming from the Departments of Anthropology, Computer Science and Engineering, English, Languages and Literatures, Philosophy, Psychology, and Speech and Hearing Science; the Hugh Downs School of Human Communications; and the College of Education.

COLLEGES

Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College

Major	Degree	Concentration	Administered By
Creative Writing Curriculum and Instruction	M.F.A. Ph.D. ¹	— Art education, ² curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, ³ language and literacy, mathematics education, music education, physical education, science education, special education	Creative Writing Committee 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

¹ This program is administered in collaboration with the College of Education.

² This concentration is administered in collaboration with the Herberger College of Fine Arts.

³ Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

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

Faculty from three departments (Anthropology, English, and 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.

Research Programs

ASU continues to advance as a major research institution. The Office of the Vice President for Research and Economic Affairs 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 32.

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 Library and Collections,”](#) page 27). 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 Collec-

tion 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 referral, individual mentoring for disadvantaged students, financial assistance, orientation sessions, workshops, career seminars, and research conferences.

Graduate College Student Programs/Services maintains a variety of programs specifically for graduate students (degree and nondegree). For more information, see the Graduate College Web site at www.asu.edu/graduate.

Graduate College Financial Assistance Office. The Graduate College 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 may obtain general information about graduate financial assistance at ASU, 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. For more information, see "[Financing Graduate Studies](#)," page 47, or access 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 and Consultation, offers seminars to groups of graduate students interested in exploring career-related subject matters. Examples of seminar topics include 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 and Consultation, the Graduate College provides a brochure listing numerous career planning services for graduate student needs. This publication is also available on the Career Services Web site at career.asu.edu.

Strategies for Success. The Strategies for Success series of professional development workshops is broken into three categories: teaching and instruction, career development, and enriching the graduate experience. These workshops are open to all registered graduate students.

Preparing Future Faculty. Preparing Future Faculty (PFF) is a program coordinated by the Graduate College for doctoral students who are seeking careers in the professorate. Originally 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, identifies strategies to improve the quality of teaching and learning, and orients doctoral students to different types of higher education institutions.

Preparing Future Professionals. The Preparing Future Professionals (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 develop skills to successfully pursue a wide range of career opportunities.

Graduate College Support Program (GCSP). GCSP is designed to increase the number of graduate students from groups underrepresented in their chosen field of study.

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 demonstrating financial need through a Free Application for Federal Student Aid, 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

COLLEGES

research 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.

Diversity Programs. Diversity Programs are designed to increase the number of graduate students from groups underrepresented in certain fields of study. Students interested in these programs must first go to their respective departments for nomination.

The Social and Academic Mentor (SAM) Program. The 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, promotes the mentee's social and academic integration into graduate school by 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.

All new teaching assistants (TAs) are required by the university and the Arizona Board of Regents to attend the TA Orientation conducted by the Graduate College. Additional professional development forums are held during the academic year and TAs are encouraged to participate.

Workshops for Undergraduate Students Considering Graduate Education. The Graduate College holds workshops to address 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. This office, with the Graduate College, also funds small research grants to support graduate students' thesis and dissertation 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 demonstrate 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* 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/format.

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 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. College offices are open Monday through Friday, from 8 A.M. to 5 P.M. 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 both daytime and evenings. Some courses are taught in compressed formats and some online, 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 individualize their programs of study to fit their own particular career goals.

ORGANIZATION

The Morrison School offers the Master of Science degree in Agribusiness. 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.

GRADUATE PROGRAMS

The M.S. in Agribusiness degree has concentrations in (1) agribusiness management and marketing and (2) 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, access the Web site at www.east.asu.edu/msabr.

ADMISSION REQUIREMENTS

Application to the graduate program in Agribusiness requires further supporting materials pertaining solely to the degree. See "Agribusiness," page 102.

SPECIAL PROGRAMS

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 has laboratories dedicated to food safety and science. Laboratories are avail-

able to students for specific classes and related graduate thesis research.

ADVISING

Advising of graduate students is normally handled by graduate faculty members. 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 can be geared toward supporting their academic progress. All students, whether in a thesis or nonthesis option, must file a program of study.

College of Architecture and Environmental Design

www.asu.edu/caed

Ronald McCoy, M.Arch., Interim Dean

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 that make up the Schools of Architecture, Design, and Planning and Landscape Architecture. Environmental Resource faculty

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 ¹	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 ²	School of Planning and Landscape Architecture

¹ Doctoral courses for these interdisciplinary programs administered by ASU Main are also offered at ASU East.

² Applications are not being accepted at this time.

from 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.

See the "College of Architecture and Environmental Design Graduate Degrees and Majors" table, on this page.

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,](#)" page 84. For application requirements and deadlines of each program, refer to the specific program section within "[Graduate Programs and Courses,](#)" page 99.

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-semester-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 (250 for the computer-based version), from applicants whose native language is not English.

Master of Architecture Degree. 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 applicants with bachelor's degrees in fields unrelated to architecture. The program begins with a 10-week summer program followed by three academic years.

Master of Science Degree 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 Degree. Applicants must hold a baccalaureate degree. 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.

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 higher 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.

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 laboratory 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 30). 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 Olgyay, 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/SOA 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. For information about the graduate program and for undergraduate advising, send e-mail to caed.advising@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.

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.

COLLEGES

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 and the Bachelor of Science in Planning Programs are accredited by the Planning Accreditation Board while the Bachelor of Science in Landscape Architecture program is accredited by the Landscape Architecture Accreditation Board.

W. P. Carey School of Business

wpcarey.asu.edu

PURPOSE

The W. P. Carey School of Business is a professional school that pursues excellence in instruction and research. The pursuit of excellence in programs of instruction implies that the school 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 W. P. Carey School 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 W. P. Carey School 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 W. P. Carey School 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 W. P. Carey School 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 other large public schools of business and

developing a curriculum that incorporates the knowledge, skills, and abilities identified in the mission of the school.

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 school 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 school'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 school'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 W. P. Carey School of Business. The school offers the traditional full-time program, an Executive M.B.A. program, an evening 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.

See the “W. P. Carey School of Business Graduate Degrees and Majors” table, page 61.

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 Lan-

W. P. Carey School 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. Ph.D.	Accountancy, computer information systems, finance, health services research, ¹ management, marketing, supply chain management	W. P. Carey School of Business W. P. Carey School 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.	Community health practice, ³ health administration and policy	School of Health Administration and Policy
Statistics ⁴	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 concentration is administered by the College of Nursing.

⁴ This program is administered by the Graduate College.

guage is required of international applicants whose native language is not English.

SPECIAL PROGRAMS

Concurrent and Dual Degree Programs. The W. P. Carey School 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 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 W. P. Carey School of Business also offers dual degree programs with the Graduate School of Commerce in Toulouse, France; Carlos III University of Madrid in Spain; Monterrey Institute for Technical and Superior Studies in Mexico City, Mexico; and the Graduate School of Business Administration in Peru. Call 480/965-3332 for more information.

The school also offers the following concurrent 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;
7. M.B.A./M.S. in Economics; and
8. M.B.A./M.Tax.

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 concurrent 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 W. P. Carey School 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.

COLLEGES

Bank One Economic Outlook Center. The Bank One Economic Outlook Center serves as the economic forecasting unit of the school 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 W. P. Carey School 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 W. P. Carey School 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.

SCHOOL FACILITIES

The W. P. Carey School of Business offers one of the most modern and sophisticated environments available for professional graduate study. The school facilities provide attractive and comfortable classrooms, computer systems, study areas, a television studio, modern auditoriums, and a graduate student resource suite. Both mainframe interactive and networked microcomputer facilities, in addition to wireless capabilities, are available to graduate students throughout the two business buildings. See "[Computing Facilities and Services](#)," page 30.

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 wpcarey.mba@asu.edu.

ACCREDITATION

The W. P. Carey School 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 is the academic home for 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 11 undergraduate and three graduate degrees.

East College Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Applied Psychology	M.S.	—	East College
Curriculum and Instruction*	Ph.D.	Exercise and wellness education	Interdisciplinary Committee on Curriculum and Instruction
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	Department of Applied Biological Sciences
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.

ORGANIZATION

East College is organized into eight faculties or departments:

Applied Biological Sciences, Department of Applied Psychology, Faculty of Business Administration, Faculty of Elementary Education, Faculty of Exercise and Wellness, Department of Human Health Studies, Faculty 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, on this page, 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 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

Eugene E. Garcia, Ph.D., Dean

PURPOSE

The College of Education plays an essential role as a member of the ASU, pre K–12, and related private and public sector agents that form a broad-based educational community. Faculty members are dedicated to producing quality scholarship and research that lead to excellence in teaching, professional practice, and the administration of educational institutions.

The mission and purpose of the College of Education is to provide leadership in advancing the theoretical base of education; addressing issues of fundamental importance, particularly in school settings; and promoting the improvement of educational practice. It does so within a coherent, integrated, and collaborative set of strategies emphasizing excellence in scholarship, teaching, and professional development.

This mission can be further articulated into several goals:

1. addressing the challenge of diversity in educational contexts so as to ensure equity and excellence for all students;
2. understanding fundamental literacies (linguistic, cultural, mathematical, scientific, and technological) and how to foster them; and
3. developing and elaborating research in complex social settings in and out of schools and utilizing that research to prepare educational professionals who can respond to the challenges inherent in those settings.

This mission and its related goals now reside in a reinvigorated context where the college and university work together with significant partners in the K–12 sector, as well as with constituents dedicated to the same purposes.

COLLEGES

ORGANIZATION

The College of Education is organized into three divisions. The divisions and their academic programs are listed below.

Division of Curriculum and Instruction

Carlos Julio Ovando, Associate Dean and Director
(ED 426) 480/965-1644
coe.asu.edu/programs

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, universities, government agencies, and public or private organizations. Graduates work as educational leaders, researchers, media and computer specialists, and librarians.

The Division of Curriculum and Instruction offers undergraduate and postbaccalaureate programs that prepare students for Arizona State teacher certification in the following areas: special education, elementary, or secondary education. Programs leading to endorsements in bilingual education and English as a second language are also available. Postbaccalaureate programs are designed for students who have graduated from accredited colleges or universities with majors other than education. In some instances, 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, language and literacy, mathematics education, 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, English as a second language, Indian education, language and literacy, mathematics education, science education, and social studies education. Application to the elementary education and secondary education concentrations are not being accepted at this time.

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/programs

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, political, socially and culturally diverse, and intellectual contexts in this country and abroad.

Four basic emphases exist within the division's programs. One strand focuses on the administration and policies of educational practices from preschool through secondary education. A second strand focuses on the administration and policies of postsecondary education. A third strand focuses on social and philosophical foundations, and a fourth strand focuses on interdisciplinary policy studies in 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, quantitative, and critical theory 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/programs

Program Areas

Counseling
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. See the "College of Education Graduate Degrees and Majors" table, page 66. 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.

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, or access the Web site at www.asu.edu/educ/sceed. For more information about the Center for Indian Education, call 480/965-6292, or access the Web site at coe.asu.edu/cie.

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 the following areas: early childhood education, elementary education, multilingual/multicultural education, secondary education, and special education. (Special education students must qualify for, and be concurrently admitted to, a master's degree program in Special Education. For more information, call 480/965-4602.) For more information on postbaccalaureate programs, visit the Office of Student Services in EDB L1-13, or call 480/965-5555. Endorsements that are added to middle-grade endorsement teaching certificates are available in bilingual education, educating the gifted, English as a second language, library science, middle school education, and reading. Programs that prepare students for certification by the state as a school counselor are offered by the Counselor Education Program. Programs that prepare students for certification by the state as a supervisor, principal, or superintendent are offered by the Division of Educational Leadership and Policy Studies. See "Educational Leadership and Policy Studies," page 186.

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

COLLEGES

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 at ASU East.

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 a wide range of issues, including anxiety, depression, personal relationships, and career development. Counseling is conducted by graduate students in counseling and counseling psychology under the supervision of licensed psychologists. For more information, call 480/965-5067, or access the Web site at coe.asu.edu/ctc.

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 and language policy issues, assessment, curriculum, and commercialism in schools. EPSL disseminates its analyses and reports to policy makers and educators and the public. It provides high quality research through four specialization units and an online journal.

EPSL houses two research units: (1) the Commercialism in Education Research Unit, which is the only national academic research center dedicated to schoolhouse commercialism, and (2) the Education Policy Research Unit, 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 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. Postbaccalaureate students pursuing their teaching certification are advised by the Office of Student Services in EDB L1-13. Call 480/965-5555 to schedule an appointment.

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 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 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
 Harrington Department of Bioengineering

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

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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 conduct 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.

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 W. P. Carey School 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 Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET) is a collaborative 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

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.	—	Harrington 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.

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 construction 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 197, 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.

See the “College of Engineering and Applied Sciences Graduate Degrees and Majors” table, on this page.

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

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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 in the 21st century.

ORGANIZATION

The college houses the School of Art, the Department of Dance, the School of Music, the Department of Theatre, the ASU 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.

See the "[Herberger College of Fine Arts Graduate Degrees and Majors](#)" table, page 71.

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.

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.

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

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

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

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.

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 ASU 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 ASU 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 30.

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 holds formal memberships in the National Association of Schools of Music.

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 Trumbell 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.).

Concurrent 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,” on this page, 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

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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 college admission 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;
5. employment history or résumé from high school graduation until present; and
6. 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 LSAT score(s) from Law Services.

To be assured consideration, all application materials must be received or postmarked by February 15.

More detailed information about 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
PO 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, and Religious Studies and the School of Art. 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 W. P. Carey School of Business faculty); members of the Department of Chemistry and Biochemistry and the School of Life Sciences 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.

See the "College of Liberal Arts and Sciences Graduate Degrees and Majors" table, page 76.

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 development in several ways, ranging from research activities in water resources, archaeology, and

COLLEGES

College of Liberal Arts and Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Anthropology	M.A. ¹	Archaeology, bioarchaeology, linguistics, 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	School of Life Sciences
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
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
Kinesiology	M.S.	—	Department of Kinesiology
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.	—	School of Life Sciences
Molecular and Cellular Biology	M.S., Ph.D.	—	Interdisciplinary Committee on Molecular and Cellular Biology

¹ Graduate students in the Department of Anthropology and the School of Justice Studies are able to receive a concurrent M.A. degree in Anthropology and M.S. degree in Justice Studies.

² This major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

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

Major	Degree	Concentration	Administered By
Natural Science	M.N.S.	Biology Chemistry Geological sciences Mathematics Microbiology Physics Plant biology	School of Life Sciences Department of Chemistry and Biochemistry Department of Geological Sciences Department of Mathematics and Statistics School of Life Sciences Department of Physics and Astronomy School of Life Sciences
Philosophy	M.A., Ph.D.	—	Department of Philosophy
Physical Education	M.P.E.	—	Department of Kinesiology
Physics	M.S., Ph.D.	—	Department of Physics and Astronomy
Plant Biology ²	M.S., Ph.D.	Ecology, photosynthesis	School of Life Sciences
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, quantitative research methods, social psychology	Department of Psychology
Religious Studies	M.A., Ph.D.	—	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 Science ³	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 Department of Anthropology and the School of Justice Studies are able to receive a concurrent M.A. degree in Anthropology and M.S. degree in Justice Studies.

² This major has formalized concentration(s); other areas of study are available.

³ This program is administered by the Graduate College.

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, such as 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

COLLEGES

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 30.

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 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, 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 strengthen 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, the 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 79. 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 nursing of children and neonatal nursing.

Students may further select a primary or acute focus in nursing of children.

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 mental health.

College of Nursing Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Nursing	M.S. ¹	Adult health nursing, community health nursing, family health nursing, nursing administration, ² parent-child nursing, psychiatric/mental health nursing, women's health	College of Nursing
Public Health ^{1, 3}	M.P.H	Community health practice, health administration and policy ⁴	College of Nursing

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

² Applications are not being accepted at this time.

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

⁴ This concentration is administered by the School of Health Administration and Policy.

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, family health, nursing of children, psychiatric/mental health nursing, 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 310](#).

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.

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 advis-

ing, 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 480/965-2987) 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 Nursing 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 clinical 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 30](#).

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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 both in the evenings and in an intensive format 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.

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. ¹	—	School of Justice Studies
	Ph.D. ²	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.	Nonprofit administration	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

¹ Graduate students in the Department of Anthropology and the School of Justice Studies are able to receive a concurrent M.A. degree in Anthropology and M.S. degree in Justice Studies.

² This program is administered by the Graduate College.

The School of Justice Studies offers a Master of Science degree in Justice Studies and 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, on this page, 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.

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 30.

Broadcast laboratories within the School of Journalism and Mass Communication have in-studio and ENG-EFP

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equipment, and provide facilities for 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 Mechanical and Manufacturing 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 83, 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
Thesis writing course	3
Research	6
Minimum total.....	33

Applied Project Option

Technical area of emphasis.....	15–18
Supporting area	9–12
Research/applied project	3
Research/writing course	3
Minimum total.....	33

A master’s degree candidate forms a supervisory committee, the chair of which is from one of four CTAS depart-

College of Technology and Applied Sciences Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Technology	M.S.Tech.	Aeronautical engineering technology, manufacturing engineering technology, mechanical engineering technology	Department of Mechanical and Manufacturing Engineering Technology
		Aviation human factors, aviation management technology	Department of Aeronautical Management Technology
		Computer systems engineering technology, electronic systems engineering technology, instrumentation and measurement technology, microelectronics engineering technology	Department of Electronics and Computer Engineering Technology
		Environmental technology management, fire service administration, information technology, management of technology	Department of Information and Management Technology
		Global technology and development, security engineering technology	College of Technology and Applied Sciences

ments. 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 Mechanical and Manufacturing Engineering Technology offers concentrations in aeronautical engineering technology, manufacturing engineering technology, and mechanical engineering technology.

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 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 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.)

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

See "[Interdisciplinary Study](#)," page 53.

ADMISSION TO THE GRADUATE COLLEGE

Eligibility

To be eligible for admission to graduate studies, applicants must hold a U.S. bachelor's degree or the equivalent from a regionally accredited institution. A bachelor's degree in the U.S. is considered to be a four year degree which was preceded by 12 years of primary and secondary schoolwork.

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 (equal to 60 semester hours or 90 quarter hours) 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 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.

International Applicants

Applicants who will attend the university while holding F-1 or J-1 visas must meet the regulations of the Bureau of Citizenship and Immigration Services (BCIS), formerly the Immigration and Naturalization Service, in addition to the

requirements 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 the requirements, consulting it often for instructions to follow regarding the submission of 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, 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 BCIS, 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 DS-2019 (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 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 only 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 (neither the original documents nor copies are provided to applicants). 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.

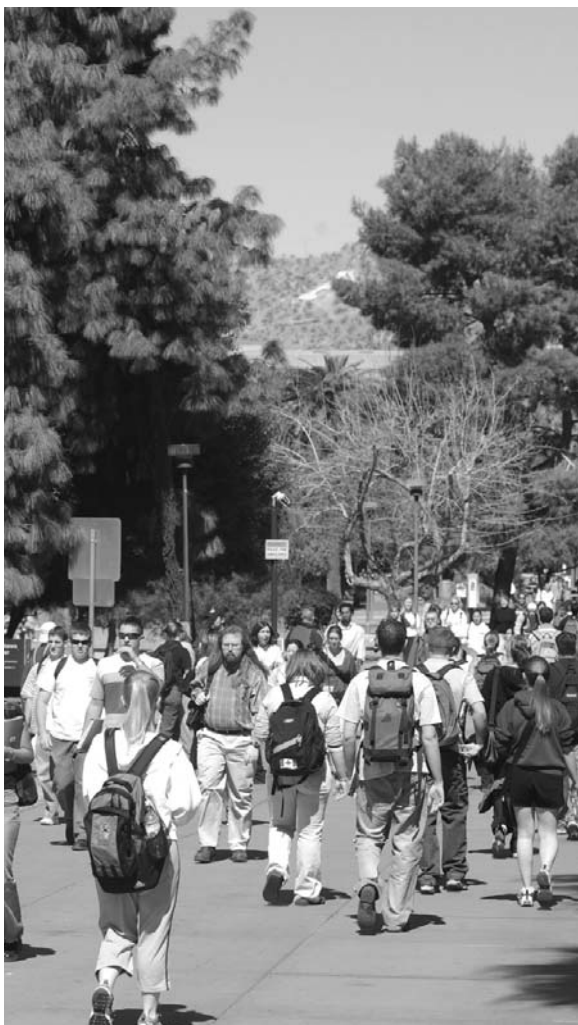
Provisional Admission. A student who does not meet minimum academic standards but has counterbalancing evidence to suggest the potential for success may be admitted on a provisional basis. Provisional admission provides an academic unit with more evidence on which to base its decision. Normally the academic 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

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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.



A view of Cady Mall with "A Mountain" in the background

Tim Trumble photo

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 "[Application Fee](#)," page 84.

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

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 but 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., teaching assistants or students receiving financial assistance. The mark of "X" is recorded for completion of an audited course, unless the instructor determines that the student's participation or attendance has been inadequate, in which case a "W" may be recorded.

Withdrawal Policies and Procedures

Students who find it necessary to withdraw from the university should complete an official withdrawal form, available 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" for disruptive classroom behavior. A student may appeal an instructor-initiated withdrawal to the standards committee of the college in which the course is offered. The decision of the committee is final.

A graduate student who does not enroll for three calendar years is considered withdrawn and must reapply 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.

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, a student may withdraw with a mark of "W" from a course only if the instructor certifies that the student is 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 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 fall and spring semester. 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 semester hours of course work each semester; a third-time (33 percent) assistant or associate for more than 13 semester hours; and a quarter-time (25 percent) assistant or associate for more than 15 semester hours.

All graduate students doing research, working on theses or dissertations, taking comprehensive or final examinations, or using university facilities or faculty time must be registered for a minimum of one 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 Classification Policies and Procedures](#)," page 45, and specific degree requirements for fulfilling residence requirements for other doctoral degree programs.

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
TA/RA*	6 or more hours	—	—
Five-week summer session			
Graduate	3 or more hours	2 hours	1 hour
TA/RA*	2 or more hours	1 hour	—
Eight-week summer session			
Graduate	5 or more hours	3–4 hours	2 or fewer hours

* TA/RA refers to teaching assistants and associates and research assistants and associates.

Enrollment Verification Guidelines. The registrar is responsible for verifying enrollment according to the general guidelines. See the “Enrollment Verification Guidelines for Graduate Students” table, on this page.

GRADUATE COLLEGE DEGREE REQUIREMENTS

Graduate 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.

Grading

The “**Grades**” table below defines grades and gives their values.

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.

A grade of “P” (pass) in a 400-level course may not appear on a program of study. (The grade is not used at the graduate level.) Grades on transfer work or ASU law credit are not included in computing GPAs.

Grades of “D” and “E” cannot be used to meet the requirements for a graduate degree, although they are used to compute the GPAs. A student receiving a grade of “D” or “E” must repeat the course in a regularly scheduled (not an independent study) class if it is to be included in the program of study. However, both the “D” or “E” and the new grade are used to compute GPAs.

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, and 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 as well as in GPA calculations.

University Policy for Student Appeal Procedures on Grades

Informal. The following steps, 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. Students who believe they are victims of retaliation should immediately contact the dean of the college in which the course is offered.

- A. The aggrieved student must first undergo the informal procedure of conferring with the instructor, stating the evidence (if any) and reasons for questioning that the grade received was not given in good faith. The instructor is obliged to review the matter, explain the grading procedure 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 in GPA calculations.

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 (such as *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-level course and reserve the credit for possible use in a future graduate program. The course cannot be used to meet a baccalaureate graduation requirement, however. 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 undergraduate 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 that the student is admitted 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 semester 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.

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.

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

Acceptable academic credits earned at other institutions that are based on a unit of credit different from the ones prescribed by the Arizona Board of Regents are subject to conversion before being transferred to ASU.

Transfer credits must be acceptable toward graduate degrees at the institution where the courses were completed. Only resident graduate courses (at the institution where the courses were completed) with an “A” or “B” grade may be transferred. A course with the grade of pass, credit, or satisfactory may not be transferred.

Graduate College policy does not permit credits used for completion of a degree at another institution to be applied toward completion of a degree of equal or lower level at ASU. In order for these transfer hours to be used toward the completion of an ASU program of study, students must provide evidence that these hours were not counted toward the previous degree.

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. Assistant, associate, and full professors in any academic unit on main campus may serve as members of any supervisory committee at ASU Main.

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 the dean of the Graduate College, former ASU faculty with students completing their degrees may continue to serve as cochairs. At least half of the committee must be faculty from ASU Main.

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 in 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 re-examination but must pass the examination in no more than three attempts.

Theses and Dissertations

The master’s thesis or equivalent is an introduction to research writing. All doctoral degree candidates must submit a dissertation, with the exception of the Doctor of Musical Arts degree in Music (with a concentration in conducting or 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 in the Graduate College and at www.asu.edu/graduate/format on the Web. The student is required to submit 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 are also encouraged to 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 later appear in *Dissertation Abstracts International*.

Application for Graduation

Students should apply for graduation with the Graduation section of the Office of the Registrar no later than the date specified in the “Graduate College Calendar,” found in the *Graduate Catalog*. All fees are payable at that time. Students applying for graduation after the deadline listed in the calendar are required to pay a late fee. At the end of the semester in which a student applies for graduation, the student is officially notified of any requirements the student has 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 refiling 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,” in the *Graduate Catalog*, lists deadlines for the submission of theses and dissertations to the Graduate College, the last day to apply for graduation, the last day to hold an oral defense of a thesis or dissertation, and the last day to submit theses and dissertations to the ASU Bookstore for binding.

Student Responsibility

It is the responsibility of the graduate student to know and observe all procedures and requirements of the Graduate College as defined in the *Graduate Catalog*, the *Schedule of Classes*, and the *Format Manual*. Each student should also be informed about the requirements concerning his or her 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 Executive Vice President and Provost of the University, or as part of the *Student Affairs Policies and Procedures Manual*—STA 104-01, at www.asu.edu/aad/manuals/sta/sta104-01.html on the Web.

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 President for Research and Economic Affairs and on the Web at www.asu.edu/aad/manuals/rsp/rsp111.html.

Policies and Procedures of the Graduate Council Appeals Board

The Graduate Council Appeals Board (GCAB) acts as the appeals body for graduate students seeking redress on academic decisions regarding their graduate program. Before filing an appeal, the graduate student should discuss the situation with the associate dean of the Graduate College to explore resolution of the matter at the unit or college level.

For more information, see the *Graduate Catalog*.

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 Associate-ships. Appointments as teaching or research assistants and associates (TAs and RAs) 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 associate-ships when available.

Note: All teaching and research assistants and associates must enroll for a minimum of six semester hours of appropriate credit 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

GRADUATE STUDIES AT ASU MAIN AND ASU EAST

may enroll for a maximum of three hours during a five-week session or four hours during the eight-week session.

Teaching and research assistants and associates are treated as residents for tuition purposes. To be eligible, TAs and RAs must be 25 percent FTE or more and their first working day must occur before the end of the first five days of instruction during the semester in question. TAs and RAs also receive partial resident tuition waivers/remission, and TAs/RAs at 50 percent FTE are eligible for university-provided student health insurance.

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, resident status, academic level, major field of

study, college of enrollment, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student.

Personally Identifiable Information. *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 ASU ID or 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 appeal 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 President for Research and Economic Affairs;

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 99.

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 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.)

Credit earned at another institution and counted toward completion of a degree at that or another school cannot be used toward a master's degree at ASU. Credit earned toward one degree at ASU also cannot be counted toward completion of another degree at ASU or another institution. Exceptions to this policy are made for established concurrent and dual master's programs that follow university guidelines (see ["Programs Leading to Two Master's Degrees,"](#) page 95).

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 Examination. 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.

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 a minimum of six semester hours devoted to the research and writing of the thesis. Of these six hours, at least one hour must be 599 Thesis. The remaining three hours may be any combination of 592 Research or 599 Thesis, with no more than six total 599 Thesis hours being used. Additional 592 Research credits may be included on the program of study at the discretion of the supervisory committee.

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. The thesis must be submitted to the ASU bookstore for binding. See “*Application for Graduation*,” page 91.

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 94.)

Withdrawal Policy. See “*Withdrawal Policies and Procedures*,” page 87.

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 99.

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. Accordingly, 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 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 87.

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.

Students may not apply credit hours earned for a doctoral degree previously awarded at ASU or another institution toward their current ASU doctoral degree.

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 STUDIES AT ASU MAIN AND ASU EAST

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 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 Examination. 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. Dissertations must be submitted to the ASU bookstore for binding. See “**Application for Graduation,**” page 91.

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.



ASU Research Park

Tim Trumble 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 246.

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

wpcarey.asu.edu/acct

480/965-3631

BA 223

Professors: J.R. Boatsman, Boyd, Christian, Goul, Gupta, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: David, Golen, Hwang, Iyer, Keim, Kulkarni, O’Dell, O’Leary, Regier, Whitecotton

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, W. P. Carey School 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 239), and Master of Taxation (see “[Taxation](#),” page 332) degrees.

The faculty participate in offering the program leading to the Master of Business Administration (see “[Master of](#)

[Business Administration](#),” page 132) 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, computer information systems or 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 at wpcarey.asu.edu/acct.

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	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

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 Examination. A final comprehensive, written examination is required of all candidates.

GRADUATE PROGRAMS AND COURSES

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Management Web site at wpcarey.asu.edu/acct.

ACCOUNTANCY (ACC)

ACC 502 Financial Accounting. (2–4)

once a year

Financial accounting concepts and procedures for external reporting. Prerequisite: M.B.A. degree program student.

ACC 503 Managerial Accounting. (2–4)

once a year

Managerial accounting concepts and procedures for internal reporting. Prerequisite: M.B.A. degree program student.

ACC 511 Taxes and Business Strategy. (1–4)

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. (1–4)

selected semesters

History, structure, environment, regulation, and emerging issues of the accounting profession.

ACC 521 Tax Research. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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 50.

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.

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 and Mixed-Media Information Systems. (3)
once a year

Modern communications protocols for wireless and mobile computing, overview of network and distributed database management systems, overview of storage and multimedia delivery issues, and shared virtual reality technologies. 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 50.

Aerospace Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~mae

480/965-3291

ECG 346

Robert E. Peck, Chair

Professors: Chattopadhyay, 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 94, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "Master of Science in Engineering," page 197, 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 192.

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 Criteria. 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. 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 Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

Research in Aerospace Engineering is aimed at advancing the design and performance of aircraft, helicopters, and space systems. Specific topics being investigated include aeroacoustics; aeroelasticity; airbreathing and space propulsion; aircraft crashworthiness; composite structures; flight dynamics, guidance, and controls; fracture mechanics and fatigue; high-speed aerodynamics; satellite design; structural dynamics and vibrations; and unsteady aerodynamics. State-of-the-art laboratory and computational facilities are available to assist in the development of research skills.

GRADUATE PROGRAMS AND COURSES

More information can be obtained by accessing the department Web site at www.eas.asu.edu/~mae.

COURSES

For courses, see "Mechanical and Aerospace Engineering (MAE)," page 266.

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: Hughner, Manfredo, Schmitz

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 511 Advanced Agribusiness Management	3
AGB 560 Advanced Agribusiness Management Systems	3
AGB 570 Managerial Economics for Agribusiness	3
Total	9

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	
AGB 589 Agribusiness Capstone.....	3
500-level AGB emphasis electives.....	6
Total	9

Thesis Option	
AGB 589 Agribusiness Capstone.....	3
500-level AGB electives.....	6
Total	9

Semester IV

Nonthesis Option	
500-level AGB emphasis or other electives	9
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.

GRADUATE PROGRAMS AND COURSES

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 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.

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 50.

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, Kimbel, Kintigh, Koss-Chioino, Marean, Martin, Marzke, Merbs, Nash, B. Nelson, M. Nelson, Redman, Spielmann, Stark, Williams

Associate Professors: Baker, Falconer, Hegmon, Reed, Rice, Welsh

Assistant Professors: Haenn, Isaac, Jonsson, 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 and museum studies 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.

GRADUATE PROGRAMS AND COURSES

The doctoral program is divided into three phases. The first consists of 24 semester hours of course work and readings, 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 semester 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 94, 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 241.

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. The bioarchaeology concentration can be pursued as part of the archaeology or physical anthropology concentrations. The ASU 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 nondegree 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 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 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 and spring

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.

GRADUATE PROGRAMS AND COURSES

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 50.

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.

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 50.

Architecture

Master's Program

www.asu.edu/caed/SOA

480/965-3536

AED 162

Ron McCoy, Interim Dean

Professors: Hoffman, McCoy, Meunier, Ozel, Rotondi, Underhill, Underwood

Associate Professors: Bryan, Ellin, Hartman, Krolloff, Loope, Spellman, Van Duzer, Zygas

Assistant Professors: Burnette, Caicco, Hejduk, Innes, Kobayashi, Lerum, Murff, Petrucci, Vekstein

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 112, 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 204, 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.

GRADUATE PROGRAMS AND COURSES

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 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 112.

Application Deadline. Priority consideration is given to completed applications received on or before December 31. 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. The school does not allow deferrals.

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 encouraged 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
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

Second Year

Fall

AAD 551 Architectural Management I.....	3
ADE 621 Advanced Architectural Studio III.....	5
ANP 681 Project Development.....	3
Professional elective.....	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

Master of Architecture total	56
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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 to 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

GRADUATE PROGRAMS AND COURSES

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
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* At least one professional elective must be a CAD course or be taken in the area of computers, if the student cannot demonstrate CAD skills.

Comprehensive Examination. 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 School 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 91 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 before 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 204, 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 December 31. Applications for admission received after December 31 are 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.....	11
Area of concentration requirements.....	13
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 performance and climate-responsive architecture* 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 W. P. Carey 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

GRADUATE PROGRAMS AND COURSES

in the architectural administration and management sequence of the program, which have 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 Examination. A final oral examination in defense of the thesis is required.

RESEARCH ACTIVITY

Renata Hejduk is an architectural historian/theorist who concentrates on avant-garde Continental and American post-World War II 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 constraints, 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

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 50.

**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. Prerequisite: 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 50.

**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 50.

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

GRADUATE PROGRAMS AND COURSES

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 50.

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 50.

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 Heating and Cooling. (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: admission to graduate program.

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)

selected semesters

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)

fall

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. Corequisite: ATE 560.

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 50.

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 50.

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, Duncan, Eckert, Erickson, Fahlman, Gillingwater, Hajicek, Kaida, Magenta, Marc, Maxwell, Meissinger, Pile, Pimentel, Pittsley, Risseeuw, Schmidt, Sharer, Stokrocki, Sweeney, Verstegen, White, Young

Associate Professors: Brown, Collins, Gully, Jenkins, McIver, Mesch, Pessler, Schleif, Schoebel, Schutte, Segura, Serwint, Umberger, Wolfthal

Assistant Professors: Newport, Schneider

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 Examination. 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,

GRADUATE PROGRAMS AND COURSES

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 Examination. 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. from 27 to 32 graduate studio semester hours in the major area(s) of concentration;
2. six semester hours of graduate-level art history and three semester hours of other interdisciplinary graduate credit to supplement M.F.A. work (nonstudio courses);
3. nine semester hours of graduate-level studio course work outside of the major area of concentration, of which three semester hours must begin with the ART

prefix and the remaining six semester hours may be outside the School of Art; and

4. 10 to 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 94).

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

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 172.

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 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 Examination. 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 50.

ART EDUCATION (ARE)

ARE 440 Disciplines of Art Education. (3)

fall and spring

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. 2 hours lecture, 2 hours applied practice. Prerequisites: ARS 101, 102.

ARE 470 Teaching Visual Culture. (3)

fall

Explores issues and applications of everyday aesthetics that contain powerful technological, social, and economic factors. Lecture, discussion. 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 Visual Culture Research. (3)

fall

Research on instruction of everyday aesthetics and related issues that contain powerful technological, social, and economic factors. Lecture, discussion.

ARE 520 Issues in Teaching Inquiry in Art. (3)

selected semesters

Issues in teaching and learning through inquiry about artworks using print and electronic reproductions and information.

ARE 525 Research on Art Instruction. (3)

fall

Research methods and assessment of learning in art. Pilot studies on the effects of instruction on learning. Lecture, discussion.

ARE 530 Issues in Teaching Studio Art. (3)

selected semesters

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.

GRADUATE PROGRAMS AND COURSES

ARE 535 Research on Teaching Studio Art. (3)

selected semesters

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)

selected semesters

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 50.

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 434 Art and Visual Culture of 19th Century. (3)

spring

History of European art (all media) from French Revolution to Paris World Fair of 1900. Prerequisites: both ARS 101 and 102 or only instructor approval.

ARS 436 The Artist, War, and Revolution (Versailles to Vietnam). (3)

fall

Critical study of artistic responses to war and revolution in Europe and United States from French Revolution to Vietnam conflict. 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 Jōmon 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.

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 50.

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 Woven Structures II. (3)***fall and spring*

Emphasizes personal expression and continues technical exploration in woven structures. Fee. Prerequisite: ART 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. Fee. 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 Fibers
Fee.
- Fibers and Surface
Fee.
- Print Textiles
Fee.

GRADUATE PROGRAMS AND COURSES

ART 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- 3-Dimensional Fibers
Fee.
- Advanced Surface Design
Fee.
- Fibers and Surface
Fee.
- Multiple Harness Weaving
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 Digital Compositing. (3)

once a year

Fine arts digital compositing of computer animation, video, and video editing of composites with audio. Studio. Fee.

ART 540 Digital Motion Studies. (3)

once a year

Fine arts digital motion studies using computer animation and video. 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:

- Advanced Jewelry
- 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 204.

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 204.

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 204 or instructor approval.

ART 407 View Camera. (3)

fall and spring

View camera and darkroom techniques. Studio, lab. Fee. Prerequisite: ART 204.

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
Fee.

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.

GRADUATE PROGRAMS AND COURSES

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.
- Special Topics in Sculpture

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 50.

Artist Diploma, Post-Bachelor's

See "Post-Bachelor's Artist Diploma," page 277.

Asian Languages and Civilizations— Chinese/Japanese

See "Languages and Literatures," page 246.

Asian Studies

Certificate Program

www.asu.edu/asian

480/965-7179

WHALL 105E

Marie Osterman, Advisor

Graduate students in any discipline may pursue a Certificate in Asian Studies in conjunction with their degree programs. This program is also open to students who already hold graduate degrees or who are admitted as nondegree students. The Graduate Certificate in Asian Studies offers graduate students an interdisciplinary specialization in Asian language and area studies. Students may pursue an East Asian or Southeast Asian track. The certificate requires the completion of 18 seminar hours distributed among a language requirement, core course requirements, electives, and

a thesis or capstone project on a topic related to East Asia or Southeast Asia. Some courses may be applied to both the certificate and the student's degree program. For more information, contact the Asian Studies advisor in the Center for Asian Studies, WHALL 105E, or call 480/965-7179.

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

Regents' Professor: Greeley

Professor: Christiansen

Life Sciences

Associate Professor: Day

Professor: Klopatek

Mathematics and Statistics

Professors: Nicolaenko, Ringhofer

Associate Professors: Gelb, Lopez, Mahalov

Mechanical and Aerospace Engineering

Professors: Boyer, Fernando

Assistant Professor: Calhoun

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, He, Towe

Associate Professors: Abbas, Garcia, Iasemidis, Jung, Massia, Pizziconi, Sweeney, Yamaguchi

Assistant Professors: Caplan, Muthuswamy, Panitch, Vernon

The Bioengineering faculty within the Harrington 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 192, 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.

GRADUATE PROGRAMS AND COURSES

Transition students should contact the associate chair to evaluate the undergraduate transcript.

MASTER OF SCIENCE

See “[Master’s Degrees](#),” page 94, 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 Harrington 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 Examination. 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 Examination. 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 Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

For current information about research activity, access the Harrington 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 physiologic 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 KIN 610.

GRADUATE PROGRAMS AND COURSES

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 50.

Biology

Master's and Doctoral Programs

lifesciences.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, Harrison, Hazel, Hedrick, Lawson, McGaughey, Moore, Pyne, Rutowski, Satterlie, Smith, Walsberg

Associate Professors: Deviche, Fewell, Fouquette, Goldstein, Kumar, Orchinik

Assistant Professors: Anderies, DeNardo, Gerber, Kaye, Kinzig, Laubichler, Newfeld, Rawls, Rosenberg, Sabo, Wilson-Rawls

Research Professors: Davidson, Pearson

Effective July 1, 2003, the Departments of Biology, Microbiology, and Plant Biology merge to become the School of Life Sciences.

The Biology faculty in the School of Life Sciences offer programs leading to the M.S. and Ph.D. degrees in Biology. A concentration in ecology is available, among other areas of study.

Biology faculty collaborate with the Microbiology and Plant Biology faculty in offering the program leading to the Master of Natural Science degree when one of the concentrations is biology (see "**Natural Science**," page 281).

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.

JOINT BACHELOR AND MASTER OF SCIENCE

This program allows students to pursue a joint M.S. degree and B.S. degree in Biology (including those students in the biology and society concentration). Students admitted to the program are concurrently enrolled in both the under-

graduate and graduate programs and are eligible for graduate-level courses and seminars. The students are not eligible for graduate prerequisites, including teaching and research assistantships, related health insurance, financial aid, or graduate award programs until the B.S. degree is complete. (See the *General Catalog* for distribution and credit requirements.) The graduate program requires a minimum of 30 semester hours above the 120 required for the undergraduate degree. Consistent with Graduate College guidelines, no more than six semester hours of 400-level courses may be applied to the M.S. degree. Students follow the guidelines provided in the M.S. summary (see “[Master’s Degrees](#),” page 94). A thesis and final oral examination are required at the same level as students in the regular M.S. program.

Students must be in the B.S. program in Biology with a GPA of 3.40 or greater at time of admission and should have completed 90 semester hours toward the B.S., including at least 16 semester hours in BIO courses, three semester hours of calculus, and 11 semester hours of physical sciences (chemistry or physics preferred).

It is recommended that, by the time of admission, students complete a 300- or 400-level course in the area of the proposed thesis, a biometry or equivalent statistics course, and an upper-division chemistry course.

For more information, call the School of Life Sciences at 480/965-3571.

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. degree program in 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 for-

eign languages if appropriate to the student’s educational objectives.

Comprehensive Examination. 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 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 96.)

Final Examination. A final defense of the dissertation is required. (See “[Open Dissertation Defenses](#),” page 96.)

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

Faculty in the School of Life Sciences perform research encompassing all aspects of life sciences, ranging from functions inside of individual cells to the interaction of units within entire ecosystems. Topics include investigations in areas such as behavior; biology education; cell and molecular biology; computational, statistical and mathematical biology; conservation biology; developmental biology; ecology; evolution; genetics; history and philosophy of biology; neuroscience; and physiology. Faculty and students utilize advanced technology (e.g., confocal microscopes, automated sequencers, etc.) to add to the knowledge base by addressing important fundamental and novel questions and to disseminate this knowledge to a wide audience. For more details, access the departmental Web site at life-sciences.asu.edu/biology.

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. Fee. Prerequisites: both BIO 187 and MAT 117 (or 210) or only instructor approval.

GRADUATE PROGRAMS AND COURSES

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. Fee. 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. Fee. Prerequisite: instructor approval.

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. Mecha-

nisms of intracellular protein trafficking. Prerequisites: BIO 353 (or 360 or its equivalent or ABS 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 50.

Building Design

See "Master of Science in Building Design," page 112.

Business Administration

Master's and Doctoral Programs

School of Accountancy and Information Management

wpcarey.asu.edu/acct

480/965-3631

BA 223

Department of Finance

wpcarey.asu.edu/fin

480/965-3131

BAC 519

Department of Management

wpcarey.asu.edu/mgt

480/965-3431

BA 323

Department of Marketing

wpcarey.asu.edu/mkt

480/965-3621

BAC 400

Department of Supply Chain Management

wpcarey.asu.edu/scm

480/965-6044

BA 318

Charles Christian, Interim Codirector

Robert St. Louis, Interim Codirector

School of Accountancy and Information Management

Professors: J.R. Boatsman, Christian, Goul, Gupta, Johnson, Kaplan, Pany, Pei, Philippakis, Reckers, Roy, Schultz, Smith, St. Louis, Steinbart, Vinze, Wyndelts

Associate Professors: Boyd, David, Golen, Hwang, Iyer, Keim, Kulkarni, O'Dell, O'Leary, Regier, Whitecotton

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

Herbert M. Kaufman, Chair,
Department of Finance

Professors: Booth, Coles, Kaufman, Sushka

Associate Professors: Cesta, Gallinger, Hertzell, Hoffmeister

Assistant Professors: Deli, Griffin, Juergens, Martin, Nardari, Perry

Lecturer: Durham

William H. Glick, Chair,
Department of Management

Professors: Ashforth, Bohlander, Cardy, Glick, Gomez-Mejia, Hershauer, Hitt, Hom, Kinicki, Roberson

Associate Professors: Boyd, Brenenstuhl, Keats, Keller, Moorhead, Olivas, Van Hook

Assistant Professors: Blancero, Koka

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, A. Ostrom, Sinha, Stephens, Walker

Joseph R. Carter, Chair,
Department of Supply Chain Management

Professors: J. Carter, P. Carter, Dooley, Ellram, Guntermann, Hendrick, Jennings, Kirkwood, Pearson, Smeltzer, V. Smith-Daniels

Associate Professors: Brooks, Butler, Callarman, Choi, Davis, Dundas, Keefer, Lock, Lynch, Maltz, Rungtusanatham, Siferd, D. Smith-Daniels, Verdini

The faculty in the W. P. Carey School of Business offer a Ph.D. degree in Business Administration and a Master of Business Administration (M.B.A.) degree offered in full-time, evening, and executive programs.

Other professional master's degrees offered through the school 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 school 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 institu-

tion 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

EDUCATIONAL TESTING SERVICE
ROSEDALE RD
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 full-time, 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 full-time 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 school 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 Examination. All students must successfully complete the comprehensive requirement established by the school of business and Graduate College for the M.B.A. degree. The comprehensive examination is integrated with MGT 589 Strategic Management. Students

passing this course with a grade of "A" or "B" satisfy the comprehensive examination requirement.

Concurrent and Dual Degree Programs. See "Concurrent and Dual Degree Programs," page 61.

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,
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 134.

Research activities in information management encompass areas of theory and application in computer information systems. See "Concentration in Computer Information Systems," page 134.

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

GRADUATE PROGRAMS AND COURSES

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 the written examination 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 demonstrate the ability of the candidate to do independent research of high quality.

Final Examination. 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 Management

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 school of business Web site at wpcarey.asu.edu/grad/phd/phd_ba_concentrations.cfm.

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 Examinations. A written comprehensive examination is required once all course work has been completed. An oral examination after completion of the written examination is also 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 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 school of business Web site at wpcarey.asu.edu/grad/phd/phd_ba_concentrations.cfm.

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 Examinations. A written comprehensive examination is required once all course work has been completed. An oral examination after completion of the written examination is also 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. (2–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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. (1–4)

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 Seminar. (1–12)

fall, spring, summer

FIN 594 Entrepreneurial Finance. (1–4)

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 50.

Department of Management

MASTER OF BUSINESS ADMINISTRATION

The Department of Management participates actively in several master’s and Ph.D. programs, particularly the high technology M.B.A., executive M.B.A., evening M.B.A., and full-time M.B.A. programs. These programs are administered by the school of business. For more information, see “W. P. Carey School of Business,” page 60.

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, operations management, organizational behavior, organizational theory, and strategic management. The faculty’s research and teaching emphasizes corporate governance, high-tech management, knowledge management, quality, process and project management, strategic alliances, value chain analysis, global supply operations, globalization, diversity, small business and entrepreneurship, change management, organizational identity, and human resource management practices in their research, consulting, and teaching. The faculty has distinguished itself with research and publications in premier journals. The department ranks 12th internationally for its

GRADUATE PROGRAMS AND COURSES

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 can be found on the Web at wpcarey.asu.edu/mgt.

General information on the M.B.A. program can be found at wpcarey.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 wpcarey.asu.edu/mgt/degree/phd_program_description.cfm.

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 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 433 Management Decision Analysis. (3)

selected semesters

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. Pre- or corequisite: OPM 450 (recommended as corequisite).

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 ST: International Management) or MGT 300 (or 459).
- Dealership Management. (3)

MGT 502 Organization Theory and Behavior. (2–4)

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.

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. (2–4)

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 50.

OPERATIONS MANAGEMENT (OPM)

OPM 450 Changing Business Processes. (3)

selected semesters

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 50.

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 areas to include seminars in international marketing in Europe and Asia. Topics may include the following:

- Applied International Marketing
- Dealership Management

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. (2-4)

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.

GRADUATE PROGRAMS AND COURSES

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 50.

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 50.

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. (2–4)

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 50.

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.

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 50.

QUANTITATIVE BUSINESS ANALYSIS (QBA)

Department of Supply Chain Management

For more QBA courses, see "Economics."

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.

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

Advanced topics in quantitative business analysis.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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. Prerequisites: both SCM 345 and upper-division standing or only 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 majoring in Supply Chain Management. 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; professional program business student majoring in Supply Chain Management. Pre- or corequisites: SCM 345, 355.

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. Prerequisites: 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. Prerequisite: upper-division standing.

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, 432 (or 440).

SCM 502 Operations and Supply Management. (2–4)*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. (2–4)*once a year*

Management of sourcing, operations, and logistics as an integrated process.

SCM 515 Decision Models for Supply Chain Management. (2–4)*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. (2–4)*once a year*

Selecting, developing, and executing appropriate sourcing strategies and processes.

SCM 532 Supply Chain Cost and Design Issues. (2–4)*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. (2–4)*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. (2–4)*once a year*

Managing the conversion of raw materials to finished goods, including scheduling, work-in-process inventory management, and postponement/customization.

SCM 591 Seminar. (1–12)*fall and spring*

Selected topics in supply chain management.

SCM 791 Doctoral Seminar. (1–12)*once a year*

Advanced topics in supply chain management.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Business Administration**Master's Program**

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**www.eas.asu.edu/~cme

480/965-3313

ECG 202

Subhash Mahajan, Chair**Professors:** Mahajan, Raupp**Associate Professors:** Beaudoin, Beckman, Burrows, Rivera, Sierks**Assistant Professors:** Allen, Dillner, Park, 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 198, 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 315, 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.

GRADUATE PROGRAMS AND COURSES

The faculty also participate in offering the Tri-University Master of Engineering degree program. See “[Master of Engineering](#),” page 192, for program description.

Graduate Record Examination. Graduate Record Examination scores are required from all applicants.

MASTER OF SCIENCE

See “[Master’s Degrees](#),” page 94, 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 Examination. 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 197, for information on the Master of Science in Engineering degree.

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 Examination. 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.

For more information, access the Web site at www.eas.asu.edu/~cme.

CHEMICAL ENGINEERING (CHE)

CHE 433 Modern Separations. (3)

spring

Design of modern separation equipment in chemical engineering other than fractionation. Prerequisites: CHE 334, 342.

CHE 458 Semiconductor Material Processing. (3)

selected semesters

Introduces the processing and characterization of electronic materials for semiconductor applications. Prerequisite: CHE 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 Bioreseparation 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)

spring

Transport phenomena, with emphasis on fluid systems. Prerequisite: transition student with instructor approval.

CHE 502 Introduction to Energy Transport. (3)

fall

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)

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

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)

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)

spring

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)

fall

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).

GRADUATE PROGRAMS AND COURSES

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 50.

concentrations is chemistry (see "Natural Science," page 281), and the interdisciplinary programs, leading to the Ph.D. degrees with majors in Exercise Science (see "Exercise and Wellness," page 212) and the Science and Engineering of Materials (see "Science and Engineering of Materials," page 315).

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 94, 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 to 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 98.)

Final Examination. 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.

Chemistry

Master's and Doctoral Programs

www.asu.edu/clas/chemistry

480/965-4664

PS D102A

George H. Wolf, Assistant Chair for Graduate Studies

Regents' Professors: Angell, Buseck, O'Keeffe, Pettit

Professors: Allen, Birk, Blankenship, Fromme, Fuchs, Gust, Holloway, Kouvetakakis, Lohr, A. Moore, T. Moore, Petuskey, Rose, Shock, Skibo, Steimle, Williams, Woodbury

Associate Professors: Booksh, Hayes, O'Day, Wolf

Assistant Professors: Caudle, Francisco, Ghirlanda, Gould, Matyushov, Richert, Seo, Wachter

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

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 465 Protein and Nucleic Acid Biochemistry. (3)*spring*

Structure and function of proteins and nucleic acids, including protein folding, enzymology, proteomics, DNA/RNA structure, replication, transcription, and genomics. Prerequisite: BCH 461.

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 50.

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.

GRADUATE PROGRAMS AND COURSES

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.

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 50.

Civil Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~civil

480/965-3589

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 192, 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 94, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See "[Master of Science in Engineering](#)," page 197.

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 Examination. 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 design and operation, and (2) pavements and materials. Transportation design and operation covers geometric design of highways, traffic operations, and highway capacity and safety. Pavements and materials focuses on pavement analysis and design, pavement maintenance and rehabilitation, pavement evaluation and management, 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 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 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 474 Transportation Systems Engineering. (3)

fall

Introduces transportation systems and modeling, traffic characteristic analysis, traffic predictions, highway capacity, signal timing, transportation systems management, and transit. Prerequisites: CEE 372; ECE 384.

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.

GRADUATE PROGRAMS AND COURSES

CEE 511 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. Credit is allowed for only CEE 511 or 412. Prerequisites: CEE 351; ECE 351.

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.

CEE 532 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. Credit is allowed for only CEE 532 or 432. Prerequisite: CEE 321.

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)

selected semesters

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)

selected semesters

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 556 Seepage and Earth Dams. (3)*spring*

Transient and steady-state fluid flow through soil, confined and unconfined flow, pore water pressures, and application to earth dams. Prerequisite: CEE 351.

CEE 557 Hazardous Waste: Site Assessment and Mitigation Measures. (3)*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)*selected semesters*

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)*selected semesters*

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)*selected semesters*

Theory and design of biological waste treatment systems. Pollution and environmental assimilation of wastes. Prerequisite: CEE 362.

CEE 563 Environmental Chemistry Laboratory. (3)*selected semesters*

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 564 Contaminant Fate and Transport. (3)*spring*

Fate and transport processes with emphasis on governing equations and parameters relevant to the migration of chemicals in the environment. 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 50.

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

Kory Floyd, Director of the Master's Program

Professors: Alberts, Arnold, Broome, Canary, Carlson, Corman, Guerrero, Jain, Martin, McPhee, Mongeau, Nakayama, Valentine

Associate Professors: Buley, Corey, Davey, De la Garza, Floyd, Mayer, Trethewey

Assistant Professors: Brouwer, Davis, Martinez, Messman, Park-Fuller, Tracy

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.

GRADUATE PROGRAMS AND COURSES

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. a writing sample; and
6. all applicants whose native language is not English must submit TOEFL scores; minimum scores are 600 on the paper and pencil version of this test or 213 on the computer version of this test; the school 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.

Applicants with undergraduate deficiencies must remove them, 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. Descriptions of current program options and requirements are available from the school office, STAUF A412.

RESEARCH ACTIVITY

Both applied and theoretical research are an integral part of the master's and doctoral degree programs in Communi-

cation. 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. Various methodologies are employed, including quantitative methods such as surveys and questionnaires, ethnographic methods such as interviewing and participant observation, and 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 among 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 among 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 among members of different cultures designed to 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.

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*

Topics may include the following:

- Prospectus/Dissertation Practicum. (3)
- Seminar Assistant. (3)

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 50.

Communication

Interdisciplinary Doctoral Program

com.pp.asu.edu/academic/doctorate.html

480/965-5096

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 Professors: Goggin, Miller

Family and Human Development

Professors: Christopher, Fabes

Human Communication

Professors: Alberts, Arnold, Broome, Canary, Carlson,
Corman, Guerrero, Jain, Martin, McPhee, Nakayama,
Valentine

Associate Professors: Buley, Corey, Davey, Floyd, Mayer,
Trethewey

Assistant Professors: Brouwer, Davis, Martinez, Messman,
Park-Fuller, Tracy

Industrial Engineering

Professor: Dooley

Journalism and Mass Communication

Professor: Godfrey

Justice Studies

Regents' Professor: Altheide

Professors: Johnson, Romero

Recreation Management and Tourism

Professor: Allison

Assistant Professor: Leclerc

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 commu-

nication 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). Up to 12 semester hours of research (COM 792) may be taken before admission to candidacy. 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 required to take three semester hours of COM 792 R: Prospectus/Dissertation Practicum and three semester hours of COM 792 R: Seminar Assistant. 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.

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 Examination. 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 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

GRADUATE PROGRAMS AND COURSES

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 Examination. 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

480/965-2374

LL 173D

David Ingram, Chair

Professors: S. Bacon, Dorman, D. Ingram, Sinex, Wilcox

Associate Professor: Liss

Assistant Professors: Azuma, Edgar, Gray

Clinical Professor: Mathy

Clinical Associate Professors: C. Bacon, Brown, Mintz

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, Graduate Record Examination scores, a statement of professional and academic goals not to exceed 200 words, and three letters of recommendation mailed to the Graduate Admissions Office. All materials must be received by Janu-

ary 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 37 semester hours of graduate course work, exclusive of credit for practicum, approved by the supervisory committee, depending on whether the program of study is in audiology or speech-language pathology.

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 must complete 30 or 37 semester hours of course work, depending on whether the program of study is in audiology or speech-language pathology, 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 must complete 33 to 37 semester hours of course work, depending on whether the program of study is audiology or speech-language pathology, 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.

RESEARCH ACTIVITY

The Department of Speech and Hearing Science conducts active research programs, many federally funded, in a broad range of areas of speech, language, and hearing. Specific topics include early intervention studies, normal and disordered language acquisition, adult language disorders, cochlear implants, auditory processing of speech, psychoacoustics, and speech perception. Research interests of individual faculty members may be found on the department's Web site at www.asu.edu/clas/shs.

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)*spring*

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.

GRADUATE PROGRAMS AND COURSES

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.

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)

fall

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 50.

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 274.

Computational Biosciences

Interdisciplinary Master's Program

www.asu.edu/compbiosci

480/965-3951

PS A216

Rosemary Renaut, Director

Participating faculty from the colleges and departments of Chemistry and Biochemistry, Computer Science and Engineering, Health Administration and Policy, Life Sciences, and Mathematics and Statistics offer a program leading to the M.S. degree in Computational Biosciences.

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. Applications are accepted for fall only.

Prerequisites. Requirements include one-year sequences in chemistry and biology, one semester of calculus and differ-

ential equations, a course in data structures and analysis of algorithms, and a course with a substantial programming component. Students deficient in a limited number of courses that can be taken over one summer may be admitted provisionally upon 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. The core program (taken by everyone) is followed by electives designed around the specific interest of the student.

Core Program

CBS 520 Modeling and Computational Biology.....	4
CBS 521 Applications and Complex Problem Solving in Computational Biology.....	4
CBS 530 Introduction to Structural and Molecular Biology.....	4
CBS 584 Internship	6
CBS 598 ST: Experimental Design.....	3
CBS 598 ST: Multivariate Statistical Analysis.....	3

Professional Option

CBS 598 ST: Business Issues and Ethics I.....	3
CBS 598 ST: Business Issues and Ethics II	3

Comprehensive Examinations. None.

Thesis Requirements. None.

Internships and Applied Projects. An internship with either a campus-based research group or a bioinformatics/ biomedical facility approved by ASU, culminating in a written report and 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. Fee. 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. Fee. 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.

CBS 598 Special Topics. (1-4)

selected semesters

Topics may include the following:

- Business Issues and Ethics I. (3)
- Business Issues and Ethics II. (3)
- Experimental Design. (3)
- Multivariate Statistical Analysis. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Computer Science

Master's and Doctoral Programs

cse.asu.edu

480/965-3190

GWC 206

S. Panchanathan, Interim Chair

Professors: Baral, Colbourn, Collofello, Farin, Golshani, Kambhampati, Lee, Lewis, Nielson, Panchanathan, Tsai, J. Urban, S. Urban, Yau

Associate Professors: Bazzi, Bhattacharya, Dasgupta, Dietrich, Faltz, Gupta, Huey, Liu, Miller, O'Grady, Pheaniss, Sen, Xue

Assistant Professors: Cam, Candan, Chatha, Davulcu, Gannod, Richa, Ryu, Sarjoughian, Syrotiuk, 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

GRADUATE PROGRAMS AND COURSES

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 January 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.

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 Examination. 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 January 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 cred-

its (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 Examination. 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 January 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 examination has 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 or SPEAK exam before the comprehensive examination.

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 Examination. 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 databases, multimedia 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.

For more information, access the research section of the Web site at cse.asu.edu.

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, multiprocessing, 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.

GRADUATE PROGRAMS AND COURSES

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.

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 509 Digital Video Processing. (3)

spring

Concepts of digital video compression, video analysis, video indexing, browsing and retrieval, video transmission over networks, video processors, MPEG1, 2, 4, and 7 standards. Lecture, projects. Pre- or corequisite: CSE 408 or 508.

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.

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 535 Mobile Computing. (3)

spring

Mobile networking, mobile information access, adaptive applications, energy-aware systems, location-aware computing, mobile security and privacy. 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 50.



Walter Cronkite's association with the university dates back to 1986. The School of Journalism and Mass Communication bears the name of the legendary news anchor, seen above with ASU Associate Professor Mary-Lou Galician.

Tim Trumble photo

Construction

Master's Program

construction.asu.edu

480/965-3615

SCOB 241

W.W. Badger, Director

Professor: Badger

Associate Professors: Ariaratnam, Bashford, Chasey, Duffy, Ernzen, Kashiwagi, Sawhney, Weber, Wiesel

Assistant Professors: Fiori, Knutson

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.

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, CPC exam. Fee. 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. Prerequisite: CON 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 551 Alternative Project Delivery Methods. (3)*fall*

Design/construction interaction; conceptual estimation and scheduling; the RFQ/RFP process; legal, insurance, risk allocation issues; procurement and selection.

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 50.

Counseling

Master's Program

coe.asu.edu/psyched

480/965-6339

EDB 446

Terence Tracey, Academic Program Leader

Professors: Bernstein, Claiborn, Hackett, Horan, Kerr, Kinnier, McWhirter, Robinson Kurpius, Tracey

Associate Professors: Arciniega, Arredondo, Hood

Assistant Professor: Rayle

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 supported 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.

GRADUATE PROGRAMS AND COURSES

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.

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 163, for research activity.

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 528 School Counseling. (3)

fall, spring, summer

Introduces counseling within multicultural settings. Emphasizes counseling, consultation, and coordination skills needed for schools' comprehensive developmental guidance programs. Lecture, discussion, 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.

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 activities. 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 680 Practicum. (1–12)

selected semesters

CED 684 Internship in Community and/or School Counseling. (3–6)

fall, spring, summer

Prerequisites: CED 680; instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Counseling Psychology

Doctoral Program

coe.asu.edu/psyched

480/965-6339

EDB 446

Richard Kinnier, Training Director

Terence Tracey, Academic Program Leader

Professors: Bernstein, Claiborn, Hackett, Horan, Kerr, Kinnier, McWhirter, Robinson Kurpius, Tracey

Associate Professors: Arciniega, Arredondo, Hood

Assistant Professor: Rayle

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.

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 50.

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: Rayle

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 182, for more information.

RESEARCH ACTIVITY

See "Counseling Psychology," page 163, 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

Melissa Pritchard, Director, Executive Committee

English

Regents' Professors: Dubie, Ríos

Professors: Boyer, Carlson, Goldberg, Hogue, McNally, Rhodes

Associate Professors: Pritchard, Savard

Senior Lecturer: Cook

Theatre

Professors: Bedard, Knapp, Mason

Associate Professors: Edwards, Reyes

Assistant Professor: 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," "Death and Transfiguration," "Poetry as Witness," and "Latino and Latina Theatre."



The John J. Ross-William C. Blakley Law Library Tim Trumble photo

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 201, "Theatre (THE)," page 350, and "Theatre Performance and Production (THP)," page 351.

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

coe.asu.edu/programs

480/965-4602

ED 436

Thomas E. Barone, Interim Director

**Robert B. Rutherford Jr., Associate Director
of Research and Graduate Education**

Professors: Appleton, Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, E. Garcia, Gryder, Guzzetti, Hudelson, Ovando, Piburn, Rutherford, Searfoss, Stahl, Staley, Surbeck, Swadener, Tobin, Zucker

Associate Professors: Anijar, Arias, Benavides, Blumenfeld-Jones, Cohn, Di Gangi, Gomez, McCoy, Middleton, Rader, Smith, Vallejo

Assistant Professors: Baek, Clark, Fischman, Lamorey, MacSwan, Manuelito, Martinez-Roldan, Rolstad, Trujillo, Young

Clinical Associate Professors: P. Garcia, Mathur

Clinical Assistant Professor: Christine

Lecturers: Atkinson, Burstein, Cocchiarella, Devitt, Gérard, Harrison, Kastre, Kortman, Rutowski, Spanias

Academic Professional Senior: Enz

The faculty of the Division of Curriculum and Instruction offer the Master of Arts, Master of Education, and Doctor of 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 172, 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 Initial 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. A concentration in professional studies is available under the M.Ed.

The Ed.D. degree in Curriculum and Instruction offers areas of concentration in bilingual education, curriculum studies, early childhood education, English as a second lan-

guage, Indian education, language and literacy, mathematics education, and social studies education. Applications for the concentrations in elementary education and secondary education are not being accepted at this time.

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 call the Division of Curriculum and Instruction graduate programs office for more information at 480/965-4602.

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 is for students who have com-

pleted a baccalaureate degree with a major other than education. The program offers course work needed to qualify for Arizona teacher certification. ITC programs are offered in early childhood education, elementary education, multilingual/multicultural education, secondary education and special education. Concurrent admission to the M.Ed. program in special education and the ITC program is required for those seeking certification by the State of Arizona. The admission requirement for the ITC in Special Education is waived for applicants 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 94](#), 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 (Ed.D.) 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 183](#), 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.

GRADUATE PROGRAMS AND COURSES

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 578 Student Teaching in the Elementary School. (3–15)

fall and spring

Supervised teaching in the area of specialization. Synthesized experience in curriculum instruction and classroom management in a BLE/ESL setting. Prerequisite: ITC admission.

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 50.

BUSINESS EDUCATION (BUE)

BUE 480 Teaching Business Subjects. (3)

fall and spring

Organization and presentation of appropriate content for business subjects in the secondary school.

BUE 481 Technology in Business and Vocational Education. (3)

fall and spring

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.

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 50.

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 702 Interdisciplinary Research Seminar. (3)

fall and spring

Core research course for students in the interdisciplinary Ph.D. in Curriculum and Instruction program.

DCI 791 Seminar. (1–12)

selected semesters

Topics may include the following:

- Interdisciplinary Research Seminar. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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 50.

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.

GRADUATE PROGRAMS AND COURSES

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.

EED 730 Discourse Analysis in Education. (3)

spring in even years

Survey of issues in and approaches to discourse analysis in educational research, with focus on students' projects using discourse analysis. Lecture, discussion, workshop.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

INDIAN EDUCATION (IED)

IED 410 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. Credit is allowed for only IED 410 or 510.

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. Credit is allowed for only IED 430 or 530.

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. Credit is allowed for only IED 460 or 560.

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. Credit is allowed for only IED 510 or 410.

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. Credit is allowed for only IED 530 or 430.

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. Credit is allowed for only IED 560 or 460.

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 50.

LIBRARY SCIENCE (LIS)

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.

LIS 584 School Library Internship. (1–6)

fall and spring

Prerequisites: LIS 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 50.

READING EDUCATION (RDG)

RDG 481 Reading Practicum. (3)

fall and spring

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 50.

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 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.

GRADUATE PROGRAMS AND COURSES

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 50.

Curriculum and Instruction

Interdisciplinary Doctoral Program

coe.asu.edu/programs

480/965-4602

ED 434

**Robert B. Rutherford Jr., Associate Director
of Research and Graduate Education**

Art

Professors: Erickson, Stokrocki, B. Young

Chemistry and Biochemistry

Professor: Birk

Curriculum and Instruction

Professors: Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, E. Garcia, Guzzetti, Hudelson, 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: Crowley, Edelsky, Lester, Nilsen, Roen

Associate Professors: Goggin, Miller, Nelson

Assistant Professor: Young

Exercise and Wellness (ASU East)

Professors: Burkett, Corbin, Stone

Associate Professor: Swan

Assistant Professors: Phillips, Tudor-Locke

Lecturer: Woodruff

Human Communication

Professor: Arnold

Kinesiology

Professors: Darst, Pangrazi

Life Sciences

Professor: Lawson

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.

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 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.

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 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);

GRADUATE PROGRAMS AND COURSES

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 Examination. 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 disser-

tion 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.



Master of Business Administration students at work in a computer lab

Tim Trumble photo

Dance

Master's Program

herbergercollege.asu.edu/dance

480/965-5029

PEBE 107A

Claudia Murphey, Chair

Professors: Kaplan, Keuter, 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 director, 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 must be written and bound and meet format approval from both the student's supervisory committee and the Graduate College.

Final Examination. An oral defense of the M.F.A. project is required.

DANCE HISTORY (DAH)

DAH 495 Theory and Methods of Dance Research. (3)

spring

Examines modes of inquiry, data gathering techniques, data analysis and representation, prospectus design, and presentation style for dance research studies. Seminar. Prerequisite: instructor approval. Pre- or corequisite: DAH 301 or 302.

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 50.

GRADUATE PROGRAMS AND COURSES

DANCE (DAN)

DAN 500 Research Methods. (1–12)

selected semesters

DAN 510 Dance 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. Fee. Prerequisite: instructor approval.

DAN 522 Sound Design. (2)

spring

Focus on digital recording/editing of audio compositions for choreographic and video projects. Lecture, lab. Fee. 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. Fee.

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 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Hip Hop
- Argentine Tango II
- Ballet II
- Ballet Methodology
- Broadway Dance
- Capoeira
- Collaborative Multimedia Fee.
- Competition/Exhibition
- Competition/Exhibition II
- Competitive International Ballroom II
- Competitive International Ballroom III
- Dance Conditioning
- Dance Education and Technology Fee.
- Integrative Teaching Methods Fee.
- Intermediate Hip Hop
- Intermediate Modern Dance
- International Ballroom
- Irish Dance II
- Jazz III
- Latin Formation Teams
- Latin Salsa II
- Latin Salsa III
- Latin Salsa IV
- Latin/Swing/Ballroom II
- Latin/Swing/Ballroom III
- Latin Team II
- Performance Technology I Fee.
- Performance Technology II Fee.
- Pilates Mat
- Pilates/Yoga
- Swing/Latin/Ballroom III
- Swing Lindy II
- Tap III
- West African Dance II

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 50.

Design

Master's Program

www.asu.edu/caed/SOD/index.htm

480/965-4135

AED 154

Jacques R. Giard, Director

Professors: Brandt, Giard

Associate Professors: Bernardi, Cutler, Johnson, McDermott, Patel, Ratner, Sanft, Witt

Assistant Professors: Bender, Boradkar, Brungart, Herring, McCoy, Rothstein, Schoenhoff, 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 204, for information on this interdisciplinary, college-wide Ph.D. degree program.

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 manage-

ment, 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, books, and participation in conferences.

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 psychology, 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

GRADUATE PROGRAMS AND COURSES

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, Interior 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, an area of study must be identified from the following: design methodology, theory, and criticism; facilities 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. The School of Design does not defer admission.

Application Procedures. Applicants must file separate application materials to both the Graduate College and the School of Design.

School of Design Requirements. Submit the following materials to

SCHOOL OF DESIGN
COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
PO BOX 872105
TEMPE AZ 85287-2105

1. An unofficial copy of all transcripts. (a 3.00 or higher baccalaureate GPA is required for application.)

2. An unofficial copy of TOEFL score. (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 completed statement of intent form which must include the following points (this form is available at www.asu.edu/caed/SOD/index.htm):
 - 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/SOD/index.htm.
 - 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 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 concentration 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 Examination. 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/SOD/index.htm. 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.

Facilities

The College of Architecture and Environmental Design maintains a high-bay research facility, a lighting laboratory, an ethnographic studies laboratory, an extensive shop facility, a human factors laboratory, 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 440 Finding Purpose. (3)

fall and spring

Career orientation in the creative professions, including value clarification, decision making, lifestyle planning, goal setting, and expression of individual talents.

DSC 500 Research Methods. (1–12)

selected semesters

Selection of research problems, analysis of literature, individual investigations, preparing reports, proposal and grant writing. Fee.

DSC 501 Qualitative Research in Design. (3)

spring

Theory and application of qualitative research. Emphasizes using ethnography to identify and specify innovative concepts and strategies. Prerequisites: graduate standing or instructor approval.

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 I
- 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 50.

Economics

Master's and Doctoral Programs

wpcarey.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, Chade, Datta, Reffett, Reiser, Wilson

Senior Lecturer: Roberts

Research Professional: Hill

The faculty in the Department of Economics, W. P. Carey School 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 132), the program leading to the M.S. in Statistics (see “[Master of Science](#),” page 331) and the program leading to the Ph.D. degree in Business Administration (see “[Master of Business Administration](#),” page 132). 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.

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 94, 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 Examination. 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.

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 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 Examination. An oral examination in defense of the dissertation is required.

ECONOMICS (ECN)

ECN 475 Capstone in Economics. (3)

fall and spring

Capstone course integrating several areas in economics. See ECN Note 2. Prerequisites: ECN 313, 314. Pre- or corequisite: ECN 425.

ECN 502 Managerial Economics. (2-4)

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. (2-4)

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. (2-4)

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 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 711 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 712 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 711 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 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 711 or only 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, 711.

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.

GRADUATE PROGRAMS AND COURSES

ECN 711 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 712 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 713 Macroeconomic Analysis II. (3)

spring

Focuses on growth theory, dynamic general equilibrium models, monetary theory, open-economy issues. Prerequisite: ECN 711 or instructor approval.

ECN 714 Microeconomic Analysis II. (3)

spring

General equilibrium, welfare economics, production, and capital theory. Prerequisite: ECN 712 or instructor approval.

ECN 725 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 726 Econometrics II. (3)

fall

Estimation and inference of qualitative and limited dependent variable models as well as general multiple equation models. Prerequisite: ECN 725 or instructor approval.

ECN 727 Econometrics III. (3)

spring

Generalized method of moment estimation, estimation with censored and truncated samples, nonlinear models, panel-data models, econometrics of nonstationarities. Prerequisite: ECN 726 or instructor approval.

ECN 770 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.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

QUANTITATIVE BUSINESS ANALYSIS (QBA)

Department of Economics

For more QBA courses, see "Department of Supply Chain Management" under "Business Administration."

QBA 502 Managerial Decision Analysis. (2–4)

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. (2–4)

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 50.

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. See individual program listings in this catalog for more information.

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 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 184, 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 attended 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 for 792 Research and 799 Dissertation. 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 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.

GRADUATE PROGRAMS AND COURSES

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.” See “College of Education (COE),” on this page. 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 50.

Educational Administration and Supervision

Master’s and Doctoral Programs

coe.asu.edu/programs

480/965-6357

ED 120

**Kay Hartwell Hunnicutt, Academic Program Coordinator,
D.E.L.T.A. Doctorate**

**L. Dean Webb, Academic Program Coordinator,
M.Ed. and Ph.D. in Educational Administration
and Supervision**

Donna Macey, Internship Coordinator and Certification

Professors: González, Norton, Turner, Webb, Wiley

Associate Professors: Danzig, Hunnicutt

Assistant Professor: Read

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. Graduate course work leading to Arizona certification for principal, supervisor of instruction, and the superintendency is also available through the program.

Students interested in the Ph.D. degree with a field of study encompassing educational administration should refer to “[Educational Leadership and Policy Studies](#),” page 186. See also “[Doctor of Philosophy](#),” page 96, for general information on the Ph.D. degree.

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. and Ph.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. For core courses, see specific program requirements. A set of research courses is required for the Ed.D. degree.

MASTER OF EDUCATION

See “[Master of Education](#),” page 182, for general information on the Master of Education degree.

DOCTOR OF EDUCATION

See “**Doctor of Education,**” page 183, for general information on the Doctor of Education degree.

RESEARCH ACTIVITY

Faculty research includes the study of economics and financing of education, competency performance, administrator preparation, roles and characteristics of school administrators, educational demographics, equity in leadership, administrative decision processes, evaluation of teaching performance, evaluation of administrative performance, community education, effects of legislative budget limitations, personnel administration communications, alternative school programs, policy formation, planning, and school board problems.

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 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 School, Family, and Community Connections. (3)

selected semesters

Provides deeper understandings of the nature of community in American life, and of connections between schools, families, and communities.

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 Education in Global Contexts. (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 685. Credit is allowed for only EDA 685 or SPF 685. Prerequisite: admission to doctoral program in education or instructor approval.

EDA 691 Seminar. (1–12)

selected semesters

Topics may include the following:

- Cultural Diversity in Educational Administration. (3)

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.

GRADUATE PROGRAMS AND COURSES

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. Prerequisites: EDA 544, 571; 30 semester hours in educational administration; admission to doctoral program in education.

EDA 791 Seminar. (1–12)

selected semesters

Topics may include the following:

- Curricular and Instructional Leadership. (3)
- Economics and Finance of Schools. (3)
- Evaluation and Assessment of School Change. (3)
- Research on Teaching. (3)

EDA 792 Research. (1–12)

selected semesters

EDA 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 50.

Educational Administration and Supervision

Master's Program

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/programs

480/965-6357

ED 120

Gene V Glass, Academic Program Coordinator

Regents' Professor: Berliner

Professors: Appleton, Barone, Fenske, Glass, González, Hanson, Molnar, Norton, Smith, Tobin, Turner, Valverde, Webb, Wiley

Associate Professors: Danzig, Hunnicutt, Margolis

Assistant Professors: Moses, Read

Research Professor: de los Santos

PROGRAM OVERVIEW

The Division of Educational Leadership and Policy Studies offers a Ph.D. in Educational Leadership and Policy Studies that emphasizes methods of policy analysis and provides for specializations in particular disciplines. Education policy studies deal with the entire process by which society derives, institutes, evaluates, and modifies the rules, both stated and unspoken, by which the educational system runs. Doctoral students receive course work and practical experiences in a variety of special contexts, including higher education, elementary and secondary schools, and education-governing bodies. The faculty seeks to train persons who will teach or pursue policy studies in school districts, government agencies, and universities. Admissions information and forms for this and other graduate programs are available online.

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 office, in 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 with a master's degree in a related discipline and with credit for between 24 and 30 semester hours of graduate course work are expected to earn a total of 84 semester hours past the B.A., including the transferred master's hours; of these 84 semester hours, 54 must be earned at ASU. Of the 54 semester hours at ASU, 24 must be earned in research or dissertation. A typical student's course of study would take the following form:

Policy Studies Core. At the heart of the Ph.D. program are 12 semester hours of course work on the foundations of policy studies.

SPF 591 S: Foundations of Inquiry	3
SPF 791 S: Pro-Seminar*	3
Choose one diversity course	3
EDA 691 S: Cultural Diversity in Educational Administration (3)	
HED 691 S: Cultural Diversity in Education (3)	
SPF 598 ST: Education of Women (3)	
Choose one organizational theory course	3
HED 688 Organizational Theory (3)	
SPF 622 Organizational Theory (3)	
<hr/>	
Total	12

* This course must be taken in the first year.

Research Methods. Students gain expertise in many approaches to research, evaluation, and policy analysis. A wide variety of courses, both inside and outside the College of Education, is available to deepen a student's competence and research emphasis. The particular courses should be chosen in consultation with the student's program committee. A total of 12 semester hours is required in research methods.

COE 502 Introduction to Quantitative Research	3
COE 503 Introduction to Qualitative Research	3
Research electives	6
<hr/>	
Total	12

Specialty Studies. Students complete at least 12 semester hours (approved by the student's program committee) in an area of special interest: educational administration and supervision, higher education, policy analysis, social foundations, or research and evaluation methods.

Recommended Courses for the Ph.D. Specialization in Educational Administration and Supervision

EDA 573 Human Resources Administration	3
EDA 611 Educational Policy and the Law.....	3
EDA 624 Organizational Development and Management of Schools.....	3
EDA 645 Leadership Development for Education Leaders	3
EDA 648 School Community Policy Issues	3
EDA 675 Politics of Education	3
EDA 677 Foundations of Educational Reform Movements	3
EDA 685 Education in Global Contexts	3
EDA 711 Administrative Leadership	3
EDA 791 S: Curricular and Instructional Leadership	3
EDA 791 S: Economics and Finance of Schools	3
EDA 791 S: Evaluation and Assessment of School Change.....	3
EDA 791 S: Research on Teaching	3

Recommended Courses for the Ph.D. Specialization in Higher Education

HED 510 Introduction to Higher Education	3
HED 602 Institutional Research/Strategic Planning	3
HED 611 Curriculum and Instruction	3
HED 687 Governance, Coordination, and External Influences	3
HED 689 Leadership in Higher Education	3
HED 691 S: Critical Policy Issues in Higher Education.....	3
HED 691 S: Special Policy Issues	3

Total hours for specialty studies vary depending on specialization.

Practicum. Students must earn three semester hours of credit for a supervised practicum. The setting must be other than the student's normal workplace, and the experience should lead to a written report.

Research and Thesis. Each Ph.D. candidate is required by the Graduate College to complete at least 24 semester hours of credit in research and dissertation work. A minimum of 24 semester hours should be completed after comprehensive exams.

Research and Thesis

Choose from the following for research requirement	6-12
EDA 792 Research (3)	
HED 792 Research (3)	
SPF 792 Research (3)	
Choose from the following for dissertation requirement	6-12
EDA 799 Dissertation (3)	
SPF 799 Dissertation (3)	

Minimum total

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.

GRADUATE PROGRAMS AND COURSES

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.

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.

Final Examination. A final oral examination in defense of the dissertation is required.

COURSES

For courses, see "Educational Administration and Supervision (EDA)," page 185, "Higher and Postsecondary Education (HED)," page 229, and "Social and Philosophical Foundations (SPF)," page 317.

Educational Psychology

Master's and Doctoral Programs

coe.asu.edu/psyched

480/965-3384

EDB 302

Samuel B. Green, Academic Program Leader

Regents' Professor: Berliner

Professors: Barona, Blanchard, Glass, Green, Krus, Nelsen, Santos de Barona, Smith, Strom

Associate Professors: Behrens, Moore, Stafford, Wodrich

Assistant Professors: Brem, Gorin, Husman, Ladd, Nakagawa, Thompson

Clinical Assistant Professor: Stamm

The faculty in the Division of Psychology in Education offer graduate programs leading to the M.A., M.Ed., and Ph.D. degrees in Educational Psychology. In the Ph.D. program, concentrations are available in learning; lifespan developmental psychology; measurement, statistics, and methodological studies; and school psychology.

Students applying for admission to these programs should submit scores on the Graduate Record Examination (GRE). Applicants to the M.Ed. may substitute a Miller Analogies Test score.

MASTER OF EDUCATION

The M.Ed. 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 182, 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, statistics, and methodological studies. All applicants must submit scores on the GRE. These M.A. areas of Educational 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 94, for general requirements.

DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Psychology offers areas of study in learning; lifespan developmental psychology; measurement, statistics, and methodological studies; 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.

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. The school psychology concentration is accredited by the American Psychological Association and approved by the National Association of School Psychologists. 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 pre-school and family literacy programs, social and moral development, peer relations, and intergenerational relationships. Research in methodology includes quantitative and qualitative methodology, program evaluation, testing practices, and testing with computers.

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 equivalent course as determined by the program.

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 equivalent course as determined by the program.

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. Prerequisite: EDP 552 or equivalent course as determined by the program.

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.

GRADUATE PROGRAMS AND COURSES

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 equivalent course as determined by the program.

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 equivalent course as determined by the program.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Educational Technology

Master's and Doctoral Programs

coe.asu.edu/psyched

480/965-3384

EDB 302

Wilhelmina Savenye, Academic Program Leader

Professors: Bitter, Klein, Sullivan

Associate Professor: Savenye

Assistant Professors: Atkinson, Julian

Clinical Assistant Professor: Igoe

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 or college faculty, instructional designers or evaluators in academic and business settings, or training managers in corporate environments. Employment opportunities for master's degree graduates include positions as educational technologists in schools, community colleges, and universities; and as training specialists in business and industry.

Applicants for admission to the Ph.D. degree program in Educational Technology must submit scores for the Graduate Record Examination (GRE). M.Ed. program applicants must submit scores for either the GRE or the Miller Analogies Test. All application materials should be received at least three months before 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 the bachelor's degree, which includes 18 semester hours of required courses and 12 semester hours of electives. For a complete description of the M.Ed. program in Educational Technology, access the Web site at coe.asu.edu/psyched. For general requirements, see "Master of Education," page 182.

DOCTOR OF PHILOSOPHY

In addition to its content focus on instructional systems and on applications of educational technology, the Educational Technology doctoral program also has a strong research emphasis. Students participate in research courses and practica that lead to conference presentations and journal publications. Each Ph.D. student must meet a research-related publication requirement during the program.

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.

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. Prerequisite: Educational Technology major.

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 50.

Electrical Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~eee

480/965-3590

ENGRC 555

Joseph C. Palais, Director of Graduate Studies

Regents' Professors: Balanis, Ferry, Heydt

Professors: Backus, Crouch, 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, Tepedelenioglu, Vasileska, 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 315, 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 94, for general information.

GRADUATE PROGRAMS AND COURSES

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 197, 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 Examination. Every student must pass a qualifying examination consisting of a short research paper and an oral presentation of the research. The examination 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 Examination. 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 and microwave circuits, electronic circuits and mixed-signal integrated circuit design, power engineering, signal processing and communication systems, 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.

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.

Electromagnetics and Microwave Circuits. 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. Fiber optics: communications, active and passive components, and networks.

Electronic Circuits and Mixed-Signal Integrated Circuit Design. Research topics include digital and analog circuits, mixed-signal and radio-frequency integrated circuits (RFIC) design, integration of analog/digital components, design of wireless transceivers, system on a chip, VLSI design, lower-power system design, communication circuits, Phase-Lock Loop (PLL), data converters, filter design, switched-capacitor circuits, mixed-signal testing, and related areas. This effort is further enhanced by the newly established National Science Foundation (NSF) Center, Connection One. Connection One is an NSF/industry/university cooperative research center, which focuses on communication circuits and systems. The mixed-signal research efforts are strongly supported by its industrial members. The center is engaged in new, up-to-the-minute research projects that enable inte-

gration of many devices into one small package. This is accomplished through combining innovative systems and integrated-circuit design techniques.

Power Engineering. Research efforts in power engineering are coordinated through the NSF-sponsored Power Systems Engineering Research Center (PSERC). 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: electric power related software development, real-time control, large network analysis, and neural networks. Power generation: power plant dynamics, modeling, diagnostics, and advanced instrumentation.

Signal Processing and Communications Systems. 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, and optical networking. 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 function devices, lasers, MEMS, microwave devices, and integrated optical devices. 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.

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, 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, Schroedinger 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.

GRADUATE PROGRAMS AND COURSES

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.

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 uninterruptable 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.

GRADUATE PROGRAMS AND COURSES

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- or 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 50.

Elementary Education

Postbaccalaureate Program

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 50.

Elementary Education

Master's Program

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 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. Students enrolled in Web-delivered courses may incur a special course fee. For more information, see the M.E. Web site at triuniv.engr.arizona.edu.

The M.E. program offers students the opportunity to identify an engineering emphasis in traditional academic areas of study (electrical engineering, mechanical engineering, for example), nontraditional areas of study (transportation, semiconductor process and manufacturing, for example) or student-initiated areas of study (interdisciplinary).

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 480/965-1724, 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. 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 College.

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, Materials 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

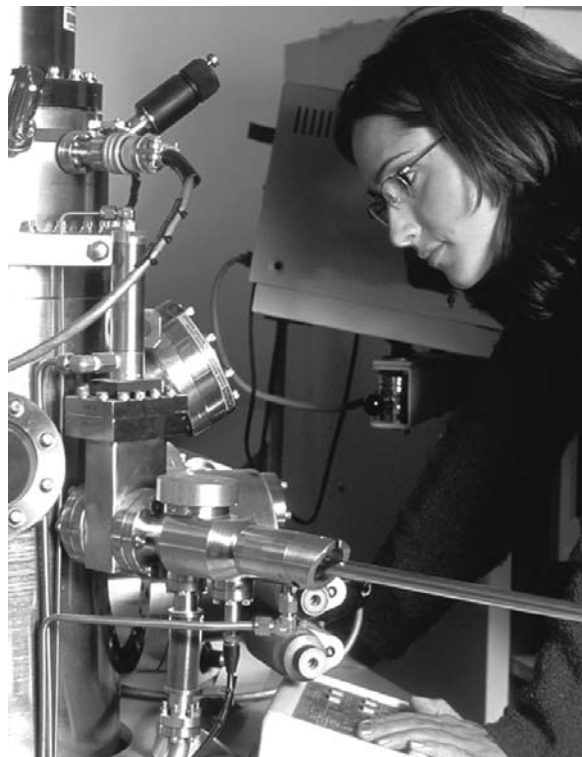
GRADUATE PROGRAMS AND COURSES

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.



Hands-on experience is an important part of the engineering curriculum.

John Phillips photo

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 Examination. 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

www.eas.asu.edu/~cme

480/965-3313

Subhash Mahajan, Chair

Regents' Professor: Mayer

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux, Sieradzki

Associate Professors: Alford, Van Schilfgaarde

Assistant Professor: Chawla

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. For more information, contact the Department of Chemical and Materials Engineering. See "Master's Degrees," page 94, and "Doctor of Philosophy," page 96, for information.

Graduate Record Examination. Graduate Record Examination (GRE) scores are required from all applicants.

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 258.

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 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 50.

English

Master's and Doctoral Programs

www.asu.edu/clas/english/gradstudies/enggrad.htm

480/965-3168

LL 542

Elizabeth R. Horan, Chair

Regents' Professors: Dubie, Ríos

Professors: Adams, Bender, Bjork, Boyer, Brack, Candelaria, Carlson, Crowley, Goldberg, Gutierrez, Helms, Hogue, Honegger, Horan, Kehl, Lester, Lightfoot, Major, A. Nilsen, D. Nilsen, Reyes, Rhodes, Richard, Roen, Sands, Sensibar, Tobin, van Gelderen

Associate Professors: Bates, Bivona, Castle, Chancy, Corse, DeLamotte, M. Goggin, Lussier, Mahoney, McNally, Miller, Nelson, Perry, Pritchard, Ramage, Savard, Schwalm, Tohe, Voaden

Assistant Professors: Blasingame, Fox, Fuse, P. Goggin, Harris, Johnson, Lockard, Milun, Parchesky, Webb Peterson

Senior Lecturers: Cook, Cooper, Duerden, Dugan, Dwyer, Heenan, Norton, Sudol, Wheeler

Lecturers: Binkley, Duttagupta, Pettipiece, Ray, Stancliff

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 182.

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 degree and a 3.00 GPA in courses taken in the major field. 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 a concentration in literature are required to have an undergraduate major in English. Those who do not have a major in

GRADUATE PROGRAMS AND COURSES

English are encouraged to register as nondegree students while they take courses in areas of deficiency as identified by the advisor. Applicants must also 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 in English with concentrations in linguistics and rhetoric and composition may have undergraduate majors in fields such as, but not limited to, anthropology, applied linguistics, cognitive science, communication, comparative languages and literatures, education, English literature, history, law, linguistics, modern languages, philosophy, political science, psychology, religion, rhetoric/composition, sociology, and speech and hearing science. Students should consult with an advisor to determine whether their preparation is deficient in any area. Applicants must also submit three letters of recommendation and a personal statement of aims and purposes. Applicants for the rhetoric and composition concentration must also submit Graduate Record Examination (GRE) general test scores and an academic writing sample. Applicants for the linguistics concentration must show completion of one upper-division course in a linguistics-related field.

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. Applicants must also submit three letters of recommendation and a statement of aims and purposes.

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 Examination. 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 Examination. 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 332.

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; and 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 examination 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 98.) 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 Examination. 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 lan-

guage 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, 3. Prerequisite: 6 hours in literature or instructor approval.

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, 3. 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.

GRADUATE PROGRAMS AND COURSES

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 19th-century authors as Hawthorne, Emerson, Melville, Thoreau, Fuller, Whitman, and Dickinson. May be repeated for credit when topics vary. 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 447 Studies in Postmodernism. (3)

selected semesters

Literary, social, and cultural issues. 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 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. May be repeated for credit when topics vary. 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***ENG 598 Special Topics. (1–4)***selected semesters***ENG 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 50.**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.

GRADUATE PROGRAMS AND COURSES

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 50.



Professor Elly van Gelderen teaching a graduate-level linguistics class

Elizabeth Moreau photo

Environmental Design and Planning

Interdisciplinary Doctoral Program

www.asu.edu/caed/PHD.html

480/965-4620

ARCH 126

K. David Pijawka, Director, Executive Committee

Agribusiness and Resource Management (ASU East)

Professor: Brock

Associate Professors: Green, Miller, Whysong

Architecture

Professor: Ozel

Associate Professors: Bryan, Ellin, Zygas

Assistant Professors: Caicco, Hejduk, Kobayashi, Lerum

Design

Professors: Brandt, Giard

Assistant Professors: Bender, McCoy, Thibeau Catsis

Planning and Landscape Architecture

Professors: Kihl, Lai, Mushkatel, Pijawka

Associate Professors: Cameron, 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.html, 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 macroscale levels of design and planning. The program provides research experi-

ence 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 December 31 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.

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 committee made up of a minimum of three faculty members 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

GRADUATE PROGRAMS AND COURSES

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 Examination. 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. Research topics within the Ph.D. program in Environmental Design and Planning may change during the course of research, either by expanding or narrowing the focus of the topic. For more information about student and faculty research, access the Web site at www.asu.edu/caed/PHD.

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 50.

Environmental Planning

Master's Program

www.asu.edu/caed

480/965-7167

AED 158

Hemalata Dandekar, Director, School of Planning and Landscape Architecture

Professors: Dandekar, Kihl, Lai, Mushkatel, Pijawka

Associate Professors: Cameron, Cook, Guhathakurta, Kim, McSherry, Yabes

Assistant Professors: Crewe, Ewan, Fish Ewan, Musacchio

The mission of the School of Planning and Landscape Architecture is to advance knowledge and skills for the planning and design of healthy, aesthetically rewarding, equitable, and sustainable communities. The school offers opportunities for the integration of urban planning and landscape architecture. The School of Planning and Landscape Architecture offers a 47-semester-hour, accredited, professional, Master of Environmental Planning (M.E.P.) degree. The school also participates in an interdisciplinary college-wide program leading to the Ph.D. degree in Environmental Design and Planning.

MASTER OF ENVIRONMENTAL PLANNING

The Master of Environmental Planning (M.E.P.) is an interdisciplinary, professional degree designed to prepare students for leadership roles in planning within both the public and private sectors and from local to international organizations. The M.E.P. degree is accredited by the Planning Accreditation Board. The curriculum includes a common core of required courses which provides linkage between knowledge and practice, and fundamental theories and skills. The two specializations offered are community and urban development and environmental planning. The community and urban development specialization provides students with knowledge and skills in areas such as housing, economic and community development, public policy analysis, transportation, land use planning, urban design, and historic preservation. The environmental planning specialization provides students with knowledge and skills in such areas as sustainable design, environmental resources, growth management, environmental policy analysis, open space design, and conservation. Specializations provide connections between the School of Planning and Landscape Architecture and the other disciplines in the College of Architecture and Environmental Design and the university. The M.E.P. program offers students a unique opportunity to integrate urban and environmental aspects of planning in rapidly developing metropolitan areas in the demographic

and climatic context of the southwest region of the United States.

Students must take one of the three following options to obtain an integrative experience in research and planning: capstone studio, professional project, or thesis. Practical experience in planning may also be obtained through an optional internship program. In addition to the core faculty, the program is enriched by the 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. The following materials are required by the School of Planning and Landscape Architecture and should be submitted to

GRADUATE COLLEGE
ARIZONA STATE UNIVERSITY
WILSON HALL, ROOM 101
PO BOX 871003
TEMPE AZ 85287-1003

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: community and urban development, or environmental planning (these may include written samples or a portfolio, but are not required); 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. Since most financial aid packages are granted for the fall semester, applicants are strongly encouraged to submit their materials on or before March 15 to the School of Planning and Landscape Architecture and the Graduate College. For spring enrollment, application materials are due on October 15. However, applicants who submit their materials after the semester deadline will be considered on a rolling basis according to space availability.

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.

GRADUATE PROGRAMS AND COURSES

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 either the Capstone Studio, Thesis, or Professional Project	23
Specialization courses	24
Optional internship.....	3
Total	50
Total without internship	47

Students must take required core courses and select an area of specialization. In addition, students must select a capstone studio, professional project, or a thesis option. All students are expected to have taken at least one course in 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 capstone studio, thesis, or professional project is required.

Final Examination. A comprehensive oral examination administered by the supervisory committee and based on the student's thesis or professional project is required of all students electing the thesis or professional project option.

RESEARCH ACTIVITY

Scholarly activities of the School of Planning and Landscape Architecture include community development, environmental planning, housing and urban policy, international research, historical research and preservation, transportation, landscape ecology and design, planning theory and education, and urban-environmental modeling.

Community Development. Studies relate to growth and development of local cities and towns, neighborhood planning, Native American communities, inner city redevelopment, urban-environmental modeling, retirement and leisure communities, and large-scale integrated planning models.

Environmental Planning. Studies relate to growth management, urban ecology, sustainable design, environmental hazards, environmental justice, river corridors, watersheds, riparian areas, wetlands, and environmentally sensitive lands.

Historical Preservation. Studies relate to analysis and documentation of historic neighborhoods, preservation of unique housing stock, and landscape history.

Housing and Urban Policy. Studies relate to affordable housing, sustainable home design, building processes, gender and housing, and retirement communities.

International Planning. Studies relate to the environment and land use along the U.S.-Mexican border, high-technology development, regional growth, and housing and urbanization in Asia and Europe.

The School of Planning and Landscape Architecture participates in the Interdisciplinary Graduate Certificate Programs in Transportation Systems and Geographic Information Science.

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 50.

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.

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 plan-

ning 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 580 Practicum. (1–12)

fall, spring, summer

Topics may include the following:

- Capstone Studio/Workshop. (5)
Comprehensive planning workshop dealing with real community problems. Focuses on integrative real-world planning applications culminating in a professional report.

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 593 Applied Project. (1–12)

fall, spring, summer

Topics may include the following:

- Professional Project. (5)
Applies advanced planning techniques and methodology to a specific, real-world planning issue, with a specified client.

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. (5)

fall, spring, summer

Creative, scholarly work developed from independent inquiry involving a substantial body of original research. 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 50.

Environmental Resources

Master's Program

cactus.east.asu.edu

480/727-1515

CNTR 20

Ward W. Brady, Chair

Professors: Brady, Brock

Associate Professors: Green, Miller, Whysong

The faculty of the Department of Applied Biological Sciences in East College 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.

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.

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.

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. Appli-

cants not meeting these requirements may be considered for admission with deficiencies.

Submit the following separate application materials to

ENVIRONMENTAL RESOURCES PROGRAM
DEPARTMENT OF APPLIED BIOLOGICAL
SCIENCES
EAST COLLEGE
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 Department of Applied Biological Sciences, and the Graduate College on March 15.

For spring enrollment, application materials are due in the Department of Applied Biological Sciences, 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 ABS 550 Vegetation Dynamics, ERS 591 Environmental Resources Seminar, and ABS 551 Advanced Environmental Analysis. Second-year students are required to complete ERS 691 Seminar in the fall semester. Students can complete ABS 485 GIS in Natural Resources or ABS 586 Remote Sensing in Environmental Resources (or an approved substitute if the student has previously taken both ABS 485 and 586) 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 Examination. None.

Thesis Requirements. A thesis is required.

Final Examination. 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 East College.

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.”

APPLIED BIOLOGICAL SCIENCES (ABS)

ABS 402 Vegetation and Wildlife Measurement. (3)

spring

Vegetation inventory, sampling, monitoring, and evaluation. Methods of estimating wildlife populations, activity, and home ranges. Lecture, lab, 1 weekend field trip. Prerequisites: ABS 207, 350, 370.

ABS 425 Soil Classification and Management. (3)

selected semesters

Principles of soil genesis, morphology, and classification. Presents management and conservation practices. Prerequisite: ABS 225 (or its equivalent).

ABS 430 Watershed Management. (3)

selected semesters

Hydrologic, physical, biological, and ecological principles applied to watershed management. Impact of ecosystem manipulations on water yield and quality. Lecture, 1 weekend field trip. Prerequisite: ABS 225.

ABS 433 Riparian and Wetland Ecology. (3)

selected semesters

Functions and components of riparian and wetland ecosystems and the management of these systems. Lecture, field trips. Prerequisite: ABS 370.

ABS 434 Soil Ecology. (3)

selected semesters

Soils viewed in an ecosystem context, soil-plant relationships, nutrient budgets, and abiotic factors that influence soil processes. Lecture, lab, field trips. Prerequisites: ABS 225, 226, 370.

ABS 435 Ecological Modeling. (3)

fall

Simulation modeling as a tool to study ecological processes and human impact on ecosystems and organisms. Lecture, lab. Prerequisites: ABS 350, 370.

ABS 440 Ecological Restoration Techniques. (3)

fall

Techniques for ecological restoration, riparian and wetland restoration, and monitoring restoration success. Prerequisites: ABS 370, 380.

ABS 441 Ecological Restoration Practicum. (1)

fall

Field experience in the evaluation and monitoring of implemented ecological restoration projects. Lab, field trips. Fee. Pre- or corequisite: ABS 440.

ABS 460 Organic Gardening. (3)

fall

Applies principles and practices of organic gardening in the low desert, including environmental impacts of modern food production. 1 hour lecture, 3 hours lab. Fee. Prerequisite: ABS 260.

ABS 462 Greenhouse/Nursery Management. (4)

spring

Greenhouse structures, environment, and nursery operations. Includes irrigation, nutrition, and other principles relative to production of nursery crops. 1 hour lecture, 3 hours lab. Fee. Prerequisite: ABS 260.

ABS 463 Sports and Recreational Turf. (3)

fall

Maintenance and operation of large areas such as golf courses, athletic fields, and park areas. 2 hours lecture, 3 hours lab. Prerequisite: ABS 260 (or its equivalent).

ABS 465 Senior Enterprise Project. (3)

fall and spring

Selection and completion of an urban horticulture project with faculty advisor approval related to the field of study. Prerequisite: senior standing.

ABS 470 Mammalogy. (3)

fall

Classification and biology of mammals, emphasizes North America. Pre- or corequisite: ABS 355.

ABS 471 Ornithology. (3)

spring

Classification and biology of birds, emphasizing North America. Lecture, lab, field trips. Fee. Prerequisite: ABS 355.

ABS 475 Habitat Management for Small Wildlife. (3)

fall

Habitat management considerations and practices for small game and nongame wildlife species in North America. Lecture, field trips. Fee. Prerequisites: ABS 370, 376, 380.

ABS 476 Big Game Habitat Management. (3)

spring

Habitat management considerations and practices for big game wildlife species in North America. 2 hours lecture, 3 hours lab. Prerequisites: ABS 370, 376. Pre- or corequisite: ABS 402.

ABS 480 Ecosystem Management and Planning. (3)

selected semesters

Principles of ecosystem management, with emphasis on economic and policy constraints on the planning process. Risk assessment and management. Lecture, 1 weekend field trip. Prerequisite: senior standing or instructor approval.

ABS 481 Riparian and Wetland Restoration. (3)

fall

Principles and problems in the restoration of degraded riparian and wetland ecosystems. Construction of wetlands. Prerequisites: ABS 433, 440.

ABS 482 Ecology and Planning for Restoration. (3)

spring

Ecological principles and resource planning processes applied to the restoration of degraded landscapes. Prerequisites: ABS 225, 372, 440.

ABS 483 Restoration Planning Practicum. (2)

spring

Field experience in ecological restoration techniques, selection of mitigation techniques, and implementation planning. Lab, extended field trip over spring break. Fee. Pre- or corequisite: ABS 482.

ABS 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: ABS 350 (or its equivalent).

ABS 540 Plant Responses to Environmental Stresses. (3)

selected semesters

Reaction of plants to environmental stresses: aerial pollutants, fire, herbivores, floods, mechanical treatments, pesticides, and soil amendments. Lecture, 1 weekend field trip. Prerequisite: ABS 370 (or its equivalent).

ABS 550 Vegetation Dynamics. (3)

fall

Dynamics of vegetation linking physiological, population, and community ecology. Collection and analysis of vegetation data. Lecture, discussion, field trips. Prerequisites: ABS 350 and 370 (or their equivalents).

ABS 551 Advanced Environmental Analysis. (4)

selected semesters

Advanced statistical procedures and experimental design for the biological sciences. Techniques for analyzing data that do not meet statistical assumptions. Lecture, lab. Prerequisite: ABS 350 (or its equivalent).

GRADUATE PROGRAMS AND COURSES

ABS 553 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. Prerequisite: ABS 370 (or its equivalent).

ABS 560 Dynamic Spatial Modeling. (3)

selected semesters

Simulation modeling of landscapes, animal populations, and ecological processes in space and time. May use modeling tools on computer clusters. 2 hours lecture, 3 hours lab. Prerequisites: ABS 485; 6 hours in ecological studies.

ABS 570 Advanced Animal Nutrition. (4)

selected semesters

Metabolic and physiological interactions of nutrients in wild and domesticated animals consuming natural feeds. Lecture, lab. Prerequisites: BIO 188 and CHM 101 (or their equivalents).

ABS 586 Remote Sensing in Environmental Resources. (4)

selected semesters

Principles and application of remote sensing technologies in natural resource management using computerized data from aerial photography and satellite imagery. Lecture, lab. Prerequisite: ABS 485 (or its equivalent).

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

ENVIRONMENTAL RESOURCES (ERS)

ERS 500 Research Methods. (1–12)

selected semesters

ERS 580 Practicum. (1–12)

selected semesters

ERS 584 Internship. (1–12)

selected semesters

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 50.

Exercise and Wellness

Master's Program

www.east.asu.edu/ecollege/wellness

480/727-1945

CLRB 102

William J. Stone, Chair

Professors: Burkett, Corbin, Stone

Associate Professor: Swan

Assistant Professors: Adams, 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 172.

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 from 12 to 15 semester hours of research course work (EXW 500, 501, 591, 599), and from 15 to 18 semester hours of EXW graduate concentration courses. 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 Examination. 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

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)

fall

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 444 Epidemiology. (3)

spring

Introduces epidemiological concepts and research literature, including physical activity, nutrition, tobacco, alcohol, injury prevention, and safe sex. Prerequisites: EXW 300, 310, 320. Pre- or corequisites: EXW 325, 350.

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 538 Obesity, Exercise, and Health. (3)

spring

Critically examines scientific and medical evidence concerning obesity, exercise, and health across the life span.

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 635 Aging and Physical Activity. (3)

spring

Examines and discusses the theoretical and applied health-related research on physical activity and aging.

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.

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 50.

Exercise Science

Interdisciplinary Doctoral Program

spe.la.asu.edu/ExScPhD.htm

480/965-9580

PEBE 107B

**Richard N. Hinrichs, Interim Director,
Executive Committee**

Anthropology

Professor: Marzke

Bioengineering

Associate Professors: He, Sweeney, Yamaguchi

Kinesiology

Regents' Professor: Landers

Professors: Krahenbuhl, Matt, Stelmach

Associate Professors: Hinrichs, Morgan, Treasure, Willis

Assistant Professors: Etnier, Huey, Ringenbach, Santello

Life Sciences

Professors: Hazel, Satterlie

Associate Professor: Harrison

Psychology

Professors: Karoly, Linder

Associate Professor: McBeath

Assistant Professors: E. Amazeen, P. Amazeen

Psychology in Education

Professor: Glass

The Committee on Exercise Science offers an interdisciplinary graduate program leading to the Ph.D. degree in Exercise Science. The committee sets guidelines and supervises programs of study. One of the unique features of this interdisciplinary program is that, because it uses 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 committee is composed of members from the various academic units listed above. 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 program that integrates graduate courses from a variety of academic units to provide a sound foundation for research leading to a dissertation. 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 Examination. A final oral examination in defense of the dissertation is required. The candidate must take the final oral examination 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.

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, Ladd, Martin, Roosa

Associate Professors: Dumka, Madden-Derdich, Wilson

Assistant Professors: Hanish, Heard, Liu, Spinrad, Updegraff, Valiente

Senior Lecturers: Bodman, Weigand

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, quantitative, and analytical 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; or FAS 580 or equivalent with the approval of the Graduate Committee.

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 are 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 are also required.

Thesis Requirements. A thesis is required.

Final Examination. 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 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.

GRADUATE PROGRAMS AND COURSES

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 50.

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 50.

Family Science

Doctoral Program

www.asu.edu/clas/fhd

480/965-6978

COWDN 106

Richard A. Fabes, Chair

Professors: Christopher, Fabes, Griffin, Ladd, Martin, Roosa

Associate Professors: Dumka, Madden-Derdich, Wilson

Assistant Professors: Hanish, Heard, Liu, Spinrad, Updegraff, Valiente

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 mem-

bers 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. Postbaccalaureate students complete a Master's-in-Passing before advancing to their doctoral studies. 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 Examination. 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

The CFA prefix is used by the Herberger College of Fine Arts for general or interdisciplinary courses.

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

Topics may include the following:

- Basic Concepts of Digital Signal Processing and Programming for Artists. (3)

spring

Introduces the basic concepts behind the functioning of existing, widely used digital arts/media tools. Covers basic DSP concepts generic to all such tools (time-frequency relationships, basic signal theory [such as representational models, quantization, filtering, compression]). Concepts embellished using standard image/video/audio manipulation tools.

- Interdisciplinary Digital Media and Performance I. (3)

fall

Survey, lecture, and lab exposure to the uses of technology as an essential part of interdisciplinary art and the principles of collaborative art making through collaboration between creative artists and technologists. Open to all students in the Herberger College of Fine Arts. Prerequisite: instructor approval.

- Interdisciplinary Digital Media and Performance II. (3)

spring

Survey, lecture, and lab exposure to the uses of technology as an essential part of interdisciplinary art and the principles of collaborative art making through collaboration between creative artists and technologists. Open to all students in the Herberger College of Fine Arts. Prerequisite: instructor approval.

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 50.

French

See "Languages and Literatures," page 246.

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

Life Sciences

Professor: Klopatek

Associate Professor: Briggs

Planning and Landscape Architecture

Associate Professor: Guhathakurta

Assistant Professor: Musacchio

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, Keys, 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 focus on 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 182, 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 Introduction to Cartography and Georepresentation 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 Contemporary Geographic Thought
2. GCU 585 Advanced Research Methods in Geography, and
3. 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.

Research and Field Examination. The Department of Geography requires Ph.D. students to pass a two-week research and 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.

GRADUATE PROGRAMS AND COURSES

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.

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 trips. 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)

selected semesters

Examines the biophysical and social features of Southeast Asian nations and peoples. Prerequisite: GCU 326 or instructor approval.

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. Fee. 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. Fee. Prerequisite: MAT 119.

GCU 496 Geographic Research Methods. (3)

fall and spring

Scientific techniques used in geographic research. Fee. Prerequisites: GCU 495; GPH 371, 491.

GCU 515 Human Migration. (3)

selected semesters

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 50.

PHYSICAL GEOGRAPHY (GPH)

GPH 401 Topics in Physical Geography. (1–3)

selected semesters

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. Fee. 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)

once a year

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. Fee. 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. Fee. 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. Fee. 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)

selected semesters

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)

selected semesters

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. Fee. 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 50.

Geological Sciences

Master's and Doctoral Programs

geology.asu.edu

480/965-5081

PS F686

Simon M. Peacock, Chair

Regents' Professors: Buseck, Greeley

Professors: Burt, Christensen, Farmer, Fink, Holloway, Knauth, Peacock, Reynolds, Shock, Stump, Tyburczy, Williams

Associate Professors: Arrowsmith, Leshin, Sharp

Assistant Professors: Clarke, 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 182, 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 281, 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.

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.

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 Examination. 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.

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 Examination. 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 Examination. 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 applica-

tion 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, Physics and Astronomy, and the School of Life Sciences. 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 (≤ 1.7 Å resolution), EELS and EDS chemical analysis; and 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.

GRADUATE PROGRAMS AND COURSES

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.

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 430 Paleontology. (3)

fall

Introduces concepts and analytical techniques in biogeology, paleobiology, paleoecology, and paleoenvironmental reconstruction from the fossil record. 2 hours lecture, 3 hours lab. Fee. Prerequisites: both GLG 102 and MAT 270 (or 290) or only instructor approval.

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 50.

German

See "Languages and Literatures," page 246.

Gerontology

Interdisciplinary Certificate Program

www.west.asu.edu/chs/grn

602/543-6642

FAB S121

Richard Gitelson, Director

ASU Main and East Faculty

Anthropology

Professor: Carr

Design

Associate Professor: Cutler

Economics

Professor: Hogan

English

Professor: Kehl

Exercise and Wellness (ASU East)

Professor: Corbin

Associate Professor: Swan

Assistant Professor: Phillips

Geography

Associate Professor: McHugh

Health Administration and Policy

Professor: Schneller

History

Professor: Gratton

Human Communication

Professor: Arnold

Kinesiology

Regents' Professor: Landers

Professor: Stelmach

Assistant Professor: Etnier

Marketing

Associate Professor: Stephens

Music

Professor: Crowe

Assistant Professor: Rio

GRADUATE PROGRAMS AND COURSES

Nursing

Professor: Komnenich
Associate Professors: Killeen, McCarthy

Nutrition (ASU East)

Professor: Vaughan

Psychology

Professors: Karoly, Okun, Reich, Sadalla, Zautra
Associate Professor: Leshowitz

Psychology in Education

Professor: Strom

Sociology

Professors: Kronenfeld, Kulis
Associate Professors: Keith, Miller-Loessi, Sullivan

ASU West Faculty

Communication Studies

Professor: V. Waldron
Associate Professors: Di Mare, Kelley

Education

Associate Professor: Achilles

Gerontology

Lecturer: K. Waldron

Recreation and Tourism Management

Professors: Gitelson, Knopf, Searle

Social and Behavioral Sciences

Professors: McGovern, Náñez
Assistant Professors: Burlison, Carter
Senior Lecturer: Luken

Social Work

Associate Professor: Fitzpatrick
Assistant Professor: McCabe

A university-wide interdisciplinary, 21-semester-hour Certificate in Gerontology may be earned by graduate students who wish to study the psychological, sociological, biological, and 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 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 Undergraduate Special Topics. (3)

fall and spring

GRN 498 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 50.

Health Services Administration

Master's Program

wpcarey.asu.edu/mba/day_mhsa/mhsa_info.cfm

480/965-7778

BA 318

Jeffrey R. Wilson, Interim Director

Professors: Baldwin, Forsyth, Johnson, Kirkman-Liff, Schneller

Assistant Professor: Rivers

The faculty in the School of Health Administration and Policy, W. P. Carey School of Business, offer a graduate program leading to the Master of Health Services Administration degree. This degree is offered only in conjunction with the M.B.A.

MASTER OF HEALTH SERVICES ADMINISTRATION

The 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 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 M.B.A. curriculum, a series of eight M.H.S.A. courses, a summer internship, and one of the 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 health services administration successfully. All students must take the GMAT. For more information, call 609/921-9000, send e-mail to etsinfo@etsinfo.org, or write

EDUCATIONAL TESTING SERVICE
ROSEDALE ROAD
PRINCETON NJ 08541-6108

Students must apply separately to the 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 M.B.A./M.H.S.A. program begins in early June, preference for admission and financial assistance is given to applicants applying by 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 M.H.S.A. are available by calling 480/965-7778, accessing the Web site at wpcarey.asu.edu/mba/asu_mba_day.cfm, sending e-mail to asuhap@asu.edu, or writing

SCHOOL OF HEALTH ADMINISTRATION AND
POLICY
W. P. CAREY SCHOOL OF BUSINESS
ARIZONA STATE UNIVERSITY
PO BOX 874506
TEMPE AZ 85287-4506

Program of Study. The program of study for the concurrent 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 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.

Comprehensive Examination. All students must successfully complete the integrative seminar, which meets the comprehensive requirement established by the W. P. Carey School 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.

GRADUATE PROGRAMS AND COURSES

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 50.

Higher and Postsecondary Education

Master's and Doctoral Programs

coe.asu.edu/elps/highed.php

480/965-6357

ED 120

**Gary R. Hanson, Academic Program Coordinator,
M.Ed. in Higher and Postsecondary Education**

**Caroline Turner, Academic Program Coordinator,
Ed.D. in Higher and Postsecondary Education**

Professors: Fenske, Hanson, Turner, Valverde, Webb

Associate Professors: Hunnicutt, Rund, Wilkinson

Assistant Professor: Moses

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 186. See “[Doctor of Philosophy](#),” page 96, for information on the Ph.D. degree.

Admissions information and forms for this and other programs are available online.

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 182.

DOCTOR OF EDUCATION

Applicants for admission to the Doctor of Education program must submit scores on the GRE.

See “[Doctor of Education](#),” page 183, for information on the Doctor of Education degree.

RESEARCH ACTIVITY

Faculty members in higher education are conducting research on a variety of significant topics according to their areas of special research interest. These areas include student access, retention of underrepresented students, student financial assistance, marketing/institutional advancement in higher education, faculty development of women of color, organizational influences on community college faculty teaching practices, Hispanic studies, legal aspects of higher education, and policy analysis.

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.

HED 691 Seminar. (1–12)

selected semesters

Topics may include the following:

- Critical Policy Issues in Higher Education. (3)
- Cultural Diversity in Education. (3)
- Special Policy Issues. (3)

HED 792 Research. (1–12)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 50.

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, Gratton, Green, Lavrin, MacKinnon, Rosales, Simpson, Stowe, Tillman, Trennert, Warnicke

Associate Professors: Barnes, Carroll, El Hamel, Gray, Gullett, Longley, Powers, Rush, Samuelson, Smith, Soergel, Stoner, Thompson, Thornton, VanderMeer, Warren-Findley, Wright

Assistant Professors: Kaplan, Koopmans, Manchester, Pitti, Wilson

Senior Instructional Professional: Luey

AFFILIATED FACULTY

Art

Associate Professor: Brown

Chicana and Chicano Studies

Associate Professor: Escobar

Humanities

Assistant Professor: Taylor

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 94, 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 recommenda-

tion 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," on this page. 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:

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. At least three of the 24 semester hours must be in HST 591 Seminar (in the major field of study).
4. 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, 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. 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, defended, and approved by a thesis committee. Candidates must supply bound copies of the thesis that will be placed in Hayden Library and in the Department of History.

Final Examination. 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 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 nine semester hours must be in research seminars (HST 591); and
4. 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

GRADUATE PROGRAMS AND COURSES

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 comprehensive 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 Examination. 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 applications, 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 applications 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 314, 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

1920s 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.

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.

GRADUATE PROGRAMS AND COURSES

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 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)

selected semesters

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)

selected semesters

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)

selected semesters

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)

fall and spring

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 50.

History and Theory of Art

See “Ph.D. in History and Theory of Art,” page 119.

Humanities

Interdisciplinary Master’s Program

www.asu.edu/clas/humanities

480/965-6747

LL 641

Peter Lehman, Director

Humanities

Professors: Kugelmass, Lehman

Associate Professor: Privateer

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 sub-

stance 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 submit 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

GRADUATE PROGRAMS AND COURSES

complete the thesis in the fourth semester. A final oral defense of the thesis is required.

Faculty Research Interests. Social and intellectual history; film studies; 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; 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 50.

Indian Law

See "Indian Legal Program," page 73.

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, Shunk, Wolfe, Ye

Associate Professors: Anderson-Rowland, Carlyle, Fowler, Mackulak, Moor, Mou, Roberts, Villalobos

Assistant Professors: Gel, Kulahci, Wu

Lecturers: Borrer, Pfund

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.

All students applying for one of the master's or doctoral degree programs must 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 94, for general requirements.

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 197, 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 192.

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 upon completion of 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.

GRADUATE PROGRAMS AND COURSES

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 queuing 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)
- Engineering Approaches to Information Systems Security. (3)
- Enterprise Internet/Intranet. (3)
- Introduction to Rapid Prototyping. (3)
- Mechatronics. (3)
- 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.

Information Management

Master’s Program

wpcarey.asu.edu/acct

480/965-3631

BA 223

Charles Christian, Interim Codirector

Robert St. Louis, Interim Codirector

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, O’Dell, O’Leary, Regier, Whitecotton

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, W. P. Carey School of Business, offer specialized professional programs leading to the Master of Science degree in Information Management, Master of

Accountancy and Information Systems degree (see “**Accountancy and Information Systems,**” page 99), and Master of Taxation degree (see “**Taxation,**” page 332).

The faculty also participate in the programs leading to the Master of Business Administration (see “**Master of Business Administration,**” page 132) and Ph.D. degree in Business Administration (see “**Doctor of Philosophy,**” page 133).

For more information, access the school’s Web site at wpcarey.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 computer information systems/management, systems development, business consulting, professional accounting, 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 wpcarey.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 the following courses:

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 and Mixed-Media Information Systems	3
CIS 593	Applied Project	3

Course Load. Students are limited to 12 hours per trimester.

Foreign Language Requirements. None.

Thesis Requirements. None.

Final Examination. For the M.S. degree in Information Management, all students must successfully complete the comprehensive requirement established by the School of Accountancy and Information Management and the Graduate College. The comprehensive requirement may take the

GRADUATE PROGRAMS AND COURSES

form of a final written examination or may be integrated into the applied project, depending on the program of study.

RESEARCH ACTIVITY

For current information about research activity, access the School of Accountancy and Information Systems Web site at wpcarey.asu.edu/acct.

COURSES

For courses, see "Accountancy (ACC)," page 100, and "Computer Information Systems (CIS)," page 100.

Interdisciplinary Studies

Master's Program

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, Haynes, Hepburn, Johnson, Jurik, Lauderdale, Provine, Romero, Schneider, Walker, Zatz

Associate Professors: Bortner, Lujan, Menjivar, Riding In

Assistant Professors: Adelman, Hanson, Lopez, Milun

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 242.

MASTER OF SCIENCE

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, applicants must submit Graduate Record Examination (GRE) scores or their Law School Admission Test (LSAT) score; a one- or two-page statement outlining their educational and career goals related to Justice Studies and their 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. 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 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.

GRADUATE PROGRAMS AND COURSES

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 50.

Justice Studies

Interdisciplinary Doctoral Program

www.asu.edu/copp/justice

480/965-7685

WILSN 370

John M. Johnson, Director

Administration of Justice (ASU West)

Associate Professor: Haarr

Anthropology

Professor: Brandt

Chicana and Chicano Studies

Associate Professor: Escobar

Curriculum and Instruction

Professor: Edelsky

English

Professor: Sands

History

Professors: Davis, Fuchs

Human Communication

Professors: Carlson, Nakayama

Associate Professors: Corey, Trethewey

Humanities

Assistant Professor: Baker

Justice Studies

Regents' Professor: Altheide

Professors: Cavender, Haynes, Hepburn, Johnson, Jurik,

Lauderdale, Provine, Romero, Schneider, Walker, Zatz

Associate Professors: Bortner, Lujan, Menjivar, Riding In

Assistant Professors: Adelman, Hanson, Lopez

Languages and Literatures

Regents' Professor: Foster

Professor: Baldini

Law

Regents' Professor: Murphy

Professors: Bartels, Lowenthal, Saks, Stanton, Strouse, 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

Public Affairs

Associate Professor: Campbell

Recreation Management and Tourism

Professor: Allison

Associate Professor: Virden

Religious Studies

Associate Professor: Gereboff

Social Work

Professor: Ashford

Sociology

Professors: Kronenfeld, 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, Public Affairs, 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.

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 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 this degree, 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 are not automatically 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 Examination. 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.

GRADUATE PROGRAMS AND COURSES

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 which must be completed in semesters following the one in which the student is advanced to candidacy.

Final Examination. 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 241.

Kinesiology

Master's Programs

www.asu.edu/clas/kines

480/965-9580

PEBE 107B

Daniel M. Landers, Interim Chair

Regents' Professor: Landers

Professors: Darst, Krahenbuhl, Matt, Pangrazi, Stelmach

Associate Professors: Hinrichs, Morgan, Treasure, Willis

Assistant Professors: Etnier, Huey, Ringenbach, Santello

The faculty in the Department of Kinesiology offer graduate programs leading to the M.S. degree in Kinesiology 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 214.

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 166.

MASTER OF SCIENCE

Applicants for the M.S. degree program in Kinesiology 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 submit 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 KIN courses. Required courses with corresponding semester hours include KIN 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 kinesiology (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 Examination. A final oral examination in defense of the thesis is required.

MASTER OF PHYSICAL EDUCATION

The faculty in the Department of Kinesiology 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 apply to the postbaccalaureate/M.P.E. degree. Deficiencies are 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 Examination. A final written comprehensive examination is required.

KINESIOLOGY (KIN)

KIN 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); KIN 200 (or its equivalent).

KIN 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: KIN 335.

KIN 414 Electromyographic Kinesiology. (3)

spring

Muscular contributions to human movement, muscle mechanics, electrophysiological basis, and practical application of electromyography. Lecture, discussion. Fee. Prerequisites: KIN 335, 340; instructor approval.

KIN 421 Human Motor Control. (3)

spring

Focuses on understanding how the human central nervous system controls, regulates, and learns movements. Prerequisite: KIN 345 or instructor approval.

KIN 422 Motor Control in Special Populations. (3)

spring

Discusses principles of motor control theories and related practical applications for certain special developmental populations. Lecture, discussion. Cross-listed as PSY 422. Credit is allowed for only KIN 422 or PSY 422. Prerequisite: KIN 345.

KIN 423 Motor Control and Aging. (3)

spring

Functional and behavioral changes to the motor control system as humans age, how specifically it impacts motor control and learning. Prerequisite: KIN 345 or instructor approval.

KIN 442 Fuel Metabolism. (3)

fall

Discusses current research concerning the metabolism of carbohydrate, fat, and protein during exercise. Credit is allowed for only KIN 442 or 536. Prerequisite: KIN 340 or instructor approval.

KIN 444 Metabolic Adaptations to Exercise Training. (3)

summer

Examines physiologic adaptations to exercise training as they relate to metabolism and tissue functions. Prerequisite: KIN 340.

KIN 445 Exercise Physiology for Children and Adolescents. (3)

spring

Understanding the influence of physical growth and maturation on the development of the functional capacities of the exercising child. Credit is allowed for only KIN 445 or 535. Lecture, discussion. Prerequisite: KIN 340 or 530 or instructor approval.

KIN 452 Exercise Psychology. (3)

spring

Contemporary research and theory as related to human behavior and health in an exercise setting. Prerequisite: KIN 352.

KIN 460 Theory of Strength Training. (3)

fall

Research and theories on developing muscular strength; programs for developing muscular strength. Lecture, discussion. Prerequisites: KIN 335, 340.

KIN 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.

KIN 501 Research Statistics. (3)

spring

Statistical procedures; sampling techniques; exercise testing, exercise prescription, hypothesis testing, and experimental designs as they relate to research publications.

KIN 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. Prerequisite: KIN 340.

KIN 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: KIN 335 or instructor approval.

KIN 512 Biomechanics of the Skeletal System. (3)

fall

Biomechanics of tissues, structures, and major joints of the musculoskeletal system. Discusses injury mechanisms. Lecture, discussion, some labs. Prerequisite: KIN 335 or instructor approval.

KIN 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: KIN 448, 500.

KIN 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: KIN 345, 500, 501.

KIN 522 Exercise Psychology. (3)

spring

Contemporary research and theory as related to human behavior and health in an exercise setting. Lecture, discussion. Prerequisite: KIN 500.

KIN 524 Motivation in Sport and Exercise. (3)

fall

Focuses on various issues in human motivation, identifying basic processes and examining their application in sport, exercise, and physical education.

KIN 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: KIN 340.

KIN 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: KIN 340.

KIN 532 Exercise Biochemistry. (3)

fall

Understanding the basic biochemical principles and enzyme pathways involved in energy transduction during exercise. Lecture, discussion. Prerequisite: KIN 340 or instructor approval.

GRADUATE PROGRAMS AND COURSES

KIN 533 Exercise Endocrinology. (3)

fall

Discusses current research and theory concerning hormonal changes during exercise. Lecture, discussion. Prerequisite: KIN 340 or instructor approval.

KIN 535 Exercise Physiology for Children and Adolescents. (3)

spring

Understanding the influence of physical growth and maturation on the development of the functional capacities of the exercising child. Credit is allowed for only KIN 535 or 445. Lecture, discussion. Prerequisite: KIN 340 or 530 or instructor approval.

KIN 536 Fuel Metabolism. (3)

fall

Discusses current research concerning the metabolism of carbohydrate, fat, and protein during exercise. Credit is allowed for only KIN 536 or 442. Prerequisite: KIN 340 or instructor approval.

KIN 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.

KIN 570 Programs and Special Topics in Adapted Physical Education. (3)

fall and spring

Contemporary adapted, developmental, remedial, and corrective physical education programs; understanding of principles, problems, and recent developments in this area.

KIN 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.

KIN 573 Curriculum and Instruction in Secondary Physical Education. (3)

fall and spring

Current curriculum and instruction practices and research in secondary school physical education. Prerequisite: Kinesiology major or teaching experience.

KIN 576 Physical Education for Elementary School Children. (3)

fall and spring

Current practices and research pertaining to elementary school physical education programs.

KIN 578 Student Teaching in Secondary Schools. (6–12)

fall and spring

Practice of teaching. Relationship of theory and practice in teaching. Fee. Prerequisite: completion of all required course work (or its equivalent) before student teaching.

KIN 599 Thesis. (1–12)

selected semesters

KIN 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: KIN 510 or instructor approval.

KIN 621 Motor Learning/Control. (3)

fall

Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: KIN 521.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 50.

Languages and Literatures

Master's and Doctoral Programs

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LL 440

Deborah N. Losse, Chair

Regents' Professors: Foster, Keller

Professors: Alexander, Baldini, Ballon-Aguirre, Chambers, Croft, Ekmanis, Guntermann, Honegger, Horwath, Losse, Valdivieso, Volek, Wetsel, Williams, Wixted, T. Wong

Associate Professors: Acedera, Candela, Canovas, Choi, Colina, Carlos Garcia-Fernandez, Carmen Garcia-Fernandez, W. Hendrickson, Hernández-G., Lafford, Ossipov, Rees, Reiman, Sanchez, Suwarno, Tompkins, Urioste-Azcorra, Vitullo

Assistant Professors: Cashman, George, Gilfillan, Ginsburg, Gruzinska, Haberman, Orlich, Siegel-Valdez, Tipton

Senior Lecturer: Foard

Lecturers: Cao, S. Hendrickson, Lage, Martinez, Petersen, Poudrier, Shimomura, Stiffel, Walton-Ramirez, E. Wong, Zhang

Instructors: Deal, Le, Oh, Pang

Academic Associate: Glessner

Research Associate Professor: Sipka

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 76.

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 182, for information on the Master of Education degree.

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 Examination. 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 an applied project option 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 Examination. 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 Examination. 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 Examination. A final oral examination is required. This examination covers the subject matter of the dissertation and appropriate field.

UNDERGRADUATE CERTIFICATE IN TRANSLATION

The Department of Languages and Literatures offers an undergraduate certificate in translation. The certificate may be of personal or professional interest to graduate students. For information about this program, refer to the *ASU General Catalog* (accessible on the Web at www.asu.edu/catalog).

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.

Asian Languages and Civilizations Research Activity. Within the two areas of China and Japan, the research activity of the faculty in Asian Languages and Civilizations covers a range of disciplines. These include historical as well as applied linguistics (especially language pedagogy), literary history and theory, and literary translation. Current research of the faculty explores such areas as Japanese sinology, the use and transformation of Chinese characters

GRADUATE PROGRAMS AND COURSES

in Japan, premodern and modern fiction in both China and Japan, and the Chinese tradition of pastime fiction.

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 50.

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 50.

FRENCH (FRE)

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.

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 50.

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 50.

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).

GRADUATE PROGRAMS AND COURSES

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 50.

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 50.

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.

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.

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.

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.



Old Main

Tim Trumble photo

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 583 Latin American Feminist Filmmaking. (3)*selected semesters*

Examines major Latin American films grounded in theories of women's lives. 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 601 Latin American Feminist Cultural Production. (3)*selected semesters*

Latin American feminist theory and studies as viewed through cultural production such as literature, film, photography, art. Seminar. Prerequisite: SPA 545 (or its equivalent).

SPA 691 Figures and Works Seminar. (3)*selected semesters*

Topics may be selected from Spanish and Spanish American literatures.

Law**Doctoral and Certificate Programs**law.asu.edu

480/965-6181

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 Success Program; Tsoisie, Indian Legal Program

Regents' Professors: Kaye, Murphy

Professors: 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, Tsoisie, Tucker, Weinstein, White, Winer, Woodley

Associate Professor: Marchant

Clinical Professors: Dallyn, Dauber

For more information about the College of Law programs, see "College of Law," page 72.

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.

GRADUATE PROGRAMS AND COURSES

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.

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.

GRADUATE PROGRAMS AND COURSES

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 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*. May be repeated for credit for a 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.

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 50.

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

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 academic and 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 February 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 30 or 36 semester hour programs 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. Some first-

semester courses are prerequisites for courses to be taken in subsequent semesters.

Registration. Registration in 500-level courses is limited to students who have been admitted to the M.M.C. program or have approval from the instructor of the class. Nondegree 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.

Programs of Study. The Walter Cronkite School of Journalism and Mass Communication offers three programs of study leading to the M.M.C. degree.

The 45-semester-hour program is 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 skills courses,
4. nine hours of related courses outside the school, and
5. three hours of supervised applied project (MCO 593) credit.

The 36-semester-hour program is for students with undergraduate degrees in 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 related courses outside the school, and
4. three hours of supervised applied project (MCO 593) credit.

The 30-semester-hour program is for students with undergraduate degrees or significant professional experience in areas of mass communication and who choose to write a thesis. Requirements are as follows:

1. 15 hours of core course work,
2. nine hours of a related area outside the school, and
3. six hours of directed thesis (MCO 599).

Foreign Language Requirements. None.

Thesis Requirements. For the 30-semester-hour program only.

Final Examination. 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 for undergraduates: 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 for undergraduates: JMC 301; professional status.

GRADUATE PROGRAMS AND COURSES

JMC 413 Advanced Editing. (3)

fall and spring

Theory and practice of newspaper editing, layout and design, picture and story selection. Fee. Prerequisites for undergraduates: 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. Fee. Prerequisites for undergraduates: JMC 270; 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. Fee. Prerequisites for undergraduates: JMC 270; 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. Prerequisite: JMC 401. Prerequisite for undergraduates: professional status.

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 for undergraduates: JMC 301; professional status.

JMC 425 Online Media. (3)

fall and spring

Focuses on the Internet from the perspective of the journalist—the best way to tell a story using words, photos, video, and audio. Lecture, lab. Fee. Prerequisite: JMC 201 (or its equivalent).

JMC 433 Media Sales and Promotion. (3)

fall and spring

Basics of electronic media marketing practices, including commercial time sales techniques and radio/TV promotion fundamentals. Prerequisites for undergraduates: JMC 200; professional status.

JMC 437 Documentary Production. (3)

fall and spring

Emphasizes individual production projects of the student's own conception and design utilizing studio, field, and postproduction techniques. Prerequisites for undergraduates: JMC 235; professional status.

JMC 440 Magazine Writing. (3)

fall and spring

Writing and marketing magazine articles for publication. Prerequisites for undergraduates: JMC 301; professional status.

JMC 445 Science Writing. (3)

once a year

Develops writing, interviewing, reporting skills, and an understanding of key concepts in science. Lecture, lab. Fee. Prerequisite: student majoring in B.A. in Journalism and Mass Communication or M.M.C. in Mass Communication.

JMC 451 Photojournalism II. (3)

fall and spring

Theory and practice of photojournalism with emphasis on shooting, lighting, and layout for the media. Fee. Prerequisite: JMC 351. Prerequisite for undergraduates: 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. Fee. Prerequisite: JMC 451. Prerequisite for undergraduates: 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. Fee. Prerequisites for undergraduates: JMC 301; professional status.

JMC 470 Depth Reporting. (3)

fall and spring

Introduces strategies for writing in-depth newspaper or magazine articles. Lecture, lab. Fee. Prerequisites for undergraduates: JMC 301; professional status; instructor approval.

JMC 472 Media Management. (3)

fall, spring, summer

Management principles and practices, including organization, procedures, policies, personnel problems, and financial aspects of station management. Pre- or corequisites for undergraduates: JMC 332; professional status.

JMC 475 Television Newscast Production. (3)

fall and spring

Writing, reporting, and production of the television newscast. Prerequisite: instructor approval. Prerequisite for undergraduates: professional status.

JMC 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Online Media
Fee.
- Science Writing
Fee.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

MASS COMMUNICATION (MCO)

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 Media Problems. (3)

fall and spring

Trends and problems of the mass media, emphasizing editorial decisions in the processing of information. Prerequisite: professional status.

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 440 Applied Media Research. (3)

fall and spring

Design, conduct, and analysis of applied media research. Students participate in the Cactus State Poll. Lab setting.

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 453 American Political Film. (3)

fall and spring

Studies the depiction of the American political process, especially the electoral process, through film. Lecture, discussion.

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 464 Media and Politics: The Fourth Estate. (3)*fall and spring*

Understanding and articulation of the place of the press as the Fourth Estate in the political life of the U.S.

MCO 473 Sex, Love, and Romance in the Mass Media. (3)*fall and spring*

The role of the mass media in constructing and/or reinforcing unrealistic mythic and stereotypic images of sex, love, and romance. Lecture, discussion. Prerequisites for nonmajors: 24 hours; 2.00 GPA. Prerequisites for majors: 40 hours; 2.50 GPA.

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. Fee. Prerequisite: acceptance into M.M.C. graduate program or instructor approval.

MCO 503 Press Freedom Theory. (3)*fall*

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*

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.

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. (3)*fall and spring***MCO 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 50.

Materials Engineering

Master's and Doctoral Programswww.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 198, 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.

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.

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 315, for program description).

Graduate Record Examination. Graduate Record Examination scores are required from all applicants.

MASTER OF SCIENCE

For more information, including general requirements, see "Master's Degrees," page 94.

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

GRADUATE PROGRAMS AND COURSES

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 Examination. A final oral examination or equivalent is required in defense of the thesis.

MASTER OF ENGINEERING

The faculty also participate in offering the tri-university Master of Engineering degree program, see “[Master of Engineering—M.E.](#),” page 197.

MASTER OF SCIENCE IN ENGINEERING

See “[Master of Science in Engineering](#),” page 197, 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 Examination. 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.

For more information, access the Web site at www.eas.asu.edu/~cme.

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 elec-

tronic 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).

MSE 550 Advanced Materials Characterization. (3)

fall

Analytical instrumentation for characterization of materials; SEM, SIMS, Auger, analytical TEM, and other advanced research techniques.

MSE 552 Electron Microscopy I. (3)

fall

Kinematical and dynamical electron diffraction and microscopy. Analysis of defect structures and composition of materials using STEM

imaging. Cross-listed as PHY 552/SEM 552. Credit is allowed for only MSE 552 or PHY 552 or SEM 552. Prerequisite: instructor approval.

MSE 553 Electron Microscopy Laboratory I. (3)

fall

Lab support for MSE 552. Cross-listed as PHY 553/SEM 553. Credit is allowed for only MSE 553 or PHY 553 or SEM 553. Pre- or corequisite: MSE 552 or PHY 552 or SEM 552.

MSE 554 Electron Microscopy II. (3)

spring

Determination of structure and composition of materials using high-resolution imaging, convergent beam diffraction, and electron holography. Cross-listed as PHY 554/SEM 554. Credit is allowed for only MSE 554 or PHY 554 or SEM 554. Prerequisite: instructor approval.

MSE 555 Electron Microscopy Laboratory II. (3)

spring

Lab support for MSE 554. Cross-listed as PHY 555/SEM 555. Credit is allowed for only MSE 555 or PHY 555 or SEM 555. Pre- or corequisite: MSE 554 or PHY 554 or SEM 554.

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)

selected semesters

Topics may include the following:

- Composite Materials. (3)
- Computer Simulation in Materials Science. (3)
- Contemporary Issues in Semiconductor Processing and Manufacturing. (3)
- Electronic Thin Films. (3)
- Growth and Processing of Semiconductors. (3)
- Growth and Processing of Semiconductors Laboratory. (1)
- Nanomaterials: Synthesis and Evaluation. (3)
- Vacuum Systems Science and Engineering. (3)

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Materials Science

Interdisciplinary Master's Program

www.asu.edu/graduate/SEM

480/965-2460

PS A323

James B. Adams, Codirector

William T. Petuskey, Codirector

Chemical and Materials Engineering

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux
Associate Professor: Alford

Chemistry and Biochemistry

Regents' Professor: Buseck
Professors: Kouvetakis, Petuskey
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 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. An online application is on the Web at www.asu.edu/graduate. Applicants must satisfy Graduate College requirements, 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:

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 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 remaining semester hours are devoted to seminar, research, and thesis (three semester hours each).

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 316.

Mathematics

Master's and Doctoral Programs

math.ja.asu.edu

480/965-3951

PS A216

Andrew Bremner, Chair

Professors: Armbruster, Bremner, Bustoz, Gardner, Hoppensteadt, Ihrig, Jackiewicz, Kadell, Kowski, Kierstead, Kostelich, Kuang, Kuiper, Lai, Leonard, Lohr, Mittelman, Nicolaenko, Quigg, Renaut, Ringhofer, H.A. Smith, H.L. Smith, Thieme, Young

Associate Professors: Baer, Barcelo, Blount, Carlson, Childress, Farmer, Gelb, Hurlburt, D. Jones, J. Jones, Kurtz, Lopez, Mahalov, McCarter, Moore, Nikitin, Prewitt, Spielberg, Suslov, Taylor, Welfert

Assistant Professors: Czygrinow, Kaliszewski, Oehrtman, Oleson, Zandieh

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 330).

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 182) or Doctor of Education (see “Doctor of Education,” page 183) 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 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.



ASU President Michael Crow talks with members of the University Symphony Orchestra.

Tim Trumble photo

GRADUATE PROGRAMS AND COURSES

See “**Master’s Degrees,**” page 94, 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.

Thesis Requirements. Students can choose a thesis or a nonthesis M.A. degree. For details, contact the Department of Mathematics and Statistics.

Comprehensive Examinations. Written examinations are required for both thesis and nonthesis options—one for the thesis option and two for the nonthesis option.

For more information, contact the Department of Mathematics and Statistics.

Final Examination. For students who choose the thesis option, 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 281). 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 96, 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 96.)

Final Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

With 51 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. Research interests of the Department of Mathematics and Statistics faculty may be seen by accessing the department’s Web site at math.la.asu.edu.

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, floating-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

Linear and nonlinear ordinary differential equations, asymptotic behavior of solutions, stability, existence and uniqueness, limit sets, Poincar-Bendixson theorem. Prerequisites: MAT 242 (or 342 or 343), 274 (or 275), 370 (or 371) (or their equivalents) or instructor approval.

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 242 (or 342 or 343), 274 (or 275 or 475), 370 (or 371) (or their equivalents) or instructor approval.

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 50.

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 50.

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 113 or 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. Prerequisite: MAT 272 (or its equivalent).

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: a combination of MAT 371 and STP 420 and 421 or only instructor approval.

STP 429 Experimental Statistics. (3)

spring

Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and non-parametric 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

Multinormal 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; non-response 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 50.

Mechanical Engineering

Master's and Doctoral Programs

www.eas.asu.edu/~mae

480/965-3291

ECG 346

Robert E. Peck, Chair

Professors: Boyer, Davidson, Fernando, Jankowski, Krajcinovic, Peck, Roy, Shah, Sieradzki, Squires, Tseng, Yao

Associate Professors: Chen, Kuo, McNeill, Phelan, Van Schilfgaarde

Assistant Professors: Calhoun, 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, system dynamics and control, engineering mechanics, and thermal-fluid sciences.

The faculty also offer graduate degree programs in Aerospace Engineering.

All of the graduate programs stress a sound foundation in fundamentals leading to a specialized area of study.

Graduate studies in one of the specialized fields of mechanical engineering prepare students for a professional career in industry, government, or academic institutions.

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 94, for general requirements.

MASTER OF SCIENCE IN ENGINEERING

See “**Master of Science in Engineering,**” page 197, 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 192.

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 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 Criteria. 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 Examination. A final oral examination in defense of the dissertation is required.

RESEARCH ACTIVITY

The department offers a broad range of theoretical and experimental research in mechanical and thermal-fluid systems. In particular, research is done in combustion and emission control; computational fluid dynamics; corrosion; cryogenics; crystallography; damage and fracture mechanics; design automation; electronic cooling; energy conversion and management; engineering informatics; environmental and geophysical fluid dynamics; failure analysis and reliability; heat transfer in complex flows; geometric modeling; hydrodynamic stability; intelligent control; knowledge-based design; mechatronics; micro-/nanoscale transport processes; multidisciplinary optimization; nanomechanics of materials; non-Newtonian fluid mechanics; noise control; pollution monitoring and transport; precision materials processing; robotics; rotor-bearing system design; smart structures; superconductivity; thin film growth; turbulence modeling; and two-phase flow modeling and experiments.

Multidisciplinary research areas include micro-nano systems; modeling and process simulation; energy and environment; and intelligent and adaptive systems. Modern laboratory and computational facilities are available to assist in the development of research skills. For more information, access the department’s Web site at eas.asu.edu/~mae.

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).

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. Lecture, lab. 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 WKB 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.

GRADUATE PROGRAMS AND COURSES

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.

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 50.

Medieval and Renaissance Studies

Interdisciplinary Certificate Programs

www.asu.edu/clas/acmrs

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, 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, Vitullo

Assistant Professor: George

Law

Professors: Brennan, Kader, Rose

Music

Professor: Metz

Associate Professors: Haefer, Holbrook

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

GRADUATE PROGRAMS AND COURSES

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, Chang, Garcia-Pichel, Hoffman, Hogue, Stout

Effective July 1, 2003, the Departments of Biology, Microbiology, and Plant Biology merge to become the School of Life Sciences.

The Microbiology faculty in the School of Life Sciences 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 281).

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 con-

sidered for assistantships and fellowships, completed applications 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 94, 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 Examination. Students are expected to achieve, through 18 semester hours of 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 through the combination of a comprehensive examination, prepared by the student's supervisory committee, and 12 semester hours of formal course work.

Thesis Requirements. A thesis is required.

Final Examination. 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 18 semester 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 96.)

Final Examination. 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.

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)

fall

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)

selected semesters

Biology, classification, and enrichment culture of the nonpathogenic bacteria. 2 hours lecture, 6 hours lab. Fee. Prerequisite: MIC 302.

MIC 484 Internship. (1–12)

fall, spring, summer

Topics may include the following:

- Service Learning Internship. (3)
Fee.

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 the 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:

- Advanced Bacterial Studies
- 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 50.



Kristine Csavina, a doctoral student in bioengineering, attaches electrodes to a student as part of an experiment that evaluates balance changes in the aging process. Tim Trumble photo

Molecular and Cellular Biology

Interdisciplinary Master's and Doctoral Programs

www.asu.edu/mcb

480/965-0743

LSE 411

Robert W. McGaughey, Director

Anthropology

Professor: Williams

Bioengineering

Associate Professor: Massia

Assistant Professor: Panitch

Research Professor: Brophy

Chemical and Materials Engineering

Associate Professor: Sierks

Assistant Professor: Razatos

Chemistry and Biochemistry

Professors: Allen, Blankenship, Gust, Lohr, A. Moore,

T. Moore, Rose, Shock, Skibo, Woodbury

Assistant Professors: Francisco, Wachter

Senior Research Professionals: Brune, Nieman

Kinesiology

Professor: Matt

Life Sciences

Professors: Capco, Chandler, Dowling, Elser, Frasch,

Harrison, Hazel, Hooper, Jacobs, McGaughey, Misra,

Satterlie, Schmidt, Trelease, Vermaas, Webber

Associate Professors: Birge, Chang, Day, Garcia-Pichel,

Goldstein, Hoffman, Hogue, Orchinik, Roberson, Stout,

Stutz

Assistant Professors: Kumar, Newfeld, Rhoads,

Wilson-Rawls

Research Professors: Davidson, Lyubchenko, Pfeiler

Senior Research Scientist: Lobrutto

Associate Research Scientist: Bingham

Assistant Research Professional: Joshi

Physics and Astronomy

Professor: Lindsay

Psychology

Associate Professor: Castaneda

Assistant Professor: Conrad

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 the Department of Chemistry and Biochemistry and the School of Life Sciences, 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 94, 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 Examination. 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 Examination. 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.

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 50.

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.

GRADUATE PROGRAMS AND COURSES

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 50.

Museum Studies

See "Certificate in Museum Studies," page 106.

Music

Master's, Doctoral, and Certificate Programs

[herberger/music](#)

480/965-3371

MUSIC E185

Wayne A. Bailey, Director

Kimberly Marshall, Associate Director for
Graduate Studies

Regents' Professors: Hickman, Pagano

Professors: Bailey, Britton, Cosand, Crowe, DeMars, Doan, Dreyfoos, Hackbarth, Hamilton, Hill, Hoffer, Humphreys, Kliewer-Britton, Koonce, Lockwood, Marohnic, Marshall, Metz, Oldani, Pilafian, Reber, Rogers, Russell, Schildkret, Sellheim, Shinn, Solís, Spring, Stauffer, Sunkett, Swaim, Thompson, Williamson, Wytko

Associate Professors: Buck, Bush, Carpenter, Haefer, Holbrook, Kopta, Lyman, May, Rockmaker, Schuring, Smith, Wilson

Assistant Professors: Bryan, Ericson, Feisst, Landschoot, Lingas, McLin, Meir, Norton, Province, Rio, Schmidt, Sullivan, Swartz

Senior Lecturers: A. Campbell, Shellans

Lecturer: Tongret

Academic Professional: G. 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 (M.M.) 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 94, for general requirements.

Prerequisites. Applicants are expected to have a B.A. degree in Music or the 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.

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 M.M. degree. 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. degree in Music Education, the applicant must have completed all requirements for music teacher certification. Postbaccalaureate 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.

GRADUATE PROGRAMS AND COURSES

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. Vocal performance and vocal performance pedagogy 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

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.

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.

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: conducting, music composition, music education, and 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 associate director for graduate studies 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 to 32 semester hours) of graduate study must be spent in continuous full-time residence at ASU. After the first year (30 to 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 performance and music composition concentrations. Some areas of study within 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 of Music's associate director for graduate studies. 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 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 research paper or 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 conducting concentration requires a conducting recital plus either a dissertation or a series of projects and a research paper. The 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 Examination. The final oral examination in defense of the dissertation or research paper is scheduled by the Graduate College. The examination 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 School of Music's associate director for graduate studies, 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.

GRADUATE PROGRAMS AND COURSES

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 50.

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 50.

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.

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 50.

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: any 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: any graduate music major; instructor approval.

GRADUATE PROGRAMS AND COURSES

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 and spring

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 Sun Devil Singers. (1)

fall and spring

Rehearsal and performance of music for mixed 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 and spring*

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 and spring*

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. Conducting students register for 2 semester hours; all other students register for 4 semester hours. 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 50.

Music Education

See "Music," page 274.

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 individ-

ualized 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.

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 37, 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.

Nursing

Master's and Certificate Programs

nursing.asu.edu

480/965-3948

NUR 444

Karen H. Sousa, Interim Associate Dean
for Graduate Programs and Research

Professors: Durand, Fleury, Komnenich, Mattson, Perry, Thurber

Associate Professors: Alpers, Brillhart, Cesarotti, Dirksen, Ismeurt, Killeen, McCarthy, Ruiz, Sousa

Assistant Professors: McGrath, Pickens, Sehested, Shearer, Tann

Clinical Professor: Bell

Clinical Associate Professors: Armbruster, 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. psychiatric/mental health nursing,
4. family health nursing,
5. parent-child nursing with options in nursing of children (acute or primary focus), 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 mental health.

MASTER OF SCIENCE

See "Master's Degrees," page 94, 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);
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 December 1 for first consideration. If openings are still available, a second admission review is conducted. Applications are due February 15 for this review.

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.

GRADUATE PROGRAMS AND COURSES

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* a 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 optimizing 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. Corequisite: NUR 581.

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. Corequisite: NUR 587.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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 before enrolling in specialty concentration clinical courses. Pre- or corequisite: NUR 551.

NUR 501 Adult Health Assessment 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 506.

NUR 502 Adult Health Theory: Primary. (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. Corequisite: NUR 507.

NUR 503 Management and Maintenance of Adults with Acute Health Alterations: Advanced Theory I. (3)

fall

Emphasizes theoretical research foundations essential for advanced practice involving care of adults with acute episodic alterations in health. Lecture, seminar. Prerequisite: NUR 501. Corequisite: NUR 508.

NUR 504 Management and Maintenance of Adults with Acute Health Alterations: Advanced Theory II. (3)

spring

Second required theory course for acute care nurse practitioner students. Examines acute episodic and common chronic dysfunctions from a theoretical and research perspective. Lecture, lab, seminar, conferences. Prerequisites: NUR 503; instructor approval. Corequisite: NUR 509.

NUR 506 Advanced Nursing Practicum: Adult Health. (2-6)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 501.

NUR 507 Advanced Nursing Practicum: Adult Primary. (2-6)

spring

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 502.

NUR 508 Advanced Nursing Practicum I: Adult Acute. (3)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 503.

NUR 509 Advanced Nursing Practicum II: Adult Acute. (2-6)

spring

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 504.

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. Corequisite: NUR 584.

NUR 515 Parent-Child Nursing: Neonatal Theory I. (4)

fall

Concepts, theories, interventions, and research related to the promotion, management, and maintenance of physical, behavioral, and developmental needs of at-risk newborns and infants and their families. Lecture, lab, seminar, conferences. Prerequisite: NUR 525. Corequisite: NUR 516.

NUR 516 Advanced Nursing Practicum I: Parent-Child Nursing/Neonatal Nursing. (6)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 515.

NUR 517 Advanced Nursing Practicum II: Parent-Child Nursing/Neonatal Nursing. (2-6)

spring

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 518.

NUR 518 Parent-Child Nursing: Neonatal Theory II. (3)

spring

Proactive neonatal theory course focusing on the concepts, theories, and research related to acute and chronic health deviations of neonates and infants. Lecture, lab, seminar, conferences. Prerequisite: NUR 515. Corequisite: NUR 517.

NUR 519 Advanced Nursing Practicum I: Psychiatric/Mental Health Nursing. (4-6)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 522.

NUR 520 Advanced Nursing Practicum II: Psychiatric/Mental Health Nursing. (4–6)*spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 523.

NUR 521 Psychiatric/Mental Health 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 Psychiatric/Mental Health 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. Lecture, seminar, lab. Prerequisites: NUR 521; all core and flexible core courses except thesis/project. Corequisite: NUR 519.

NUR 523 Psychiatric/Mental Health 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. Lecture, seminar, lab. Prerequisites: NUR 522; all core and flexible core courses except thesis/project. Corequisite: NUR 520.

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 529 Advanced Nursing Practicum I: Parent-Child Nursing/Nursing of Children. (2–6)*fall*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 531.

NUR 530 Advanced Nursing Practicum II: Parent-Child Nursing/Nursing of Children. (2–6)*spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 532.

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 529.

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 530.

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 Practicum (Electives).

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 536.

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 537.

NUR 536 Advanced Nursing Practicum I: Women's Health Nursing. (6)*fall*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 534.

NUR 537 Advanced Nursing Practicum II: Women's Health Nursing. (6)*spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 535.

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.

GRADUATE PROGRAMS AND COURSES

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.

NUR 558 Advanced Pediatric Health Assessment. (3)

fall

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. Fee. 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. (3)

selected semesters

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. Prerequisites: NUR 598 ST: Advanced Practice Nursing Role II; 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 568.

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 569.

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 568 Advanced Nursing Practicum I: Family Health Nursing. (6)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 562.

NUR 569 Advanced Nursing Practicum II: Family Health Nursing. (6)

spring

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: NUR 563.

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:

- Clinical Practicum for Advanced Practice Nursing in Pediatric Acute Care I. (6)
Advanced practice clinical practicum focused on attainment of assessment and management skills to provide specialized care to acutely ill children and facilitate their adaptation. Fee. Prerequisite: admission to graduate Nursing program or instructor approval. Corequisite: NUR 598 ST: Principles of Advanced Practice Nursing in Pediatric Acute Care I.
- Clinical Practicum for Advanced Practice Nursing in Pediatric Acute Care II. (6)
Clinical course emphasizing continued development of advanced practice skills in the nursing care of critically ill children and integration of the subroles of the pediatric acute care nurse practitioner. Fee. Prerequisite: admission to graduate Nursing program or instructor approval. Corequisite: NUR 598 ST: Principles of Advanced Practice Nursing in Pediatric Acute Care II.
- Practicum (Electives). (1–4)
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. (2–4)
Fee. Prerequisites: NUR 571, 591.

NUR 581 Advanced Nursing Practicum I: Community Health Nursing. (3)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: CHP 501.

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. Prerequisite: NUR 581 or 587. Corequisite: NUR 510.

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 587 Advanced Nursing Practicum II: Community Health Nursing. (3)

fall

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisite: admission to graduate Nursing program. Corequisite: CHP 502.

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 Practice Nursing Role I. (1)
Must be followed by NUR 598 ST: Advanced Practice Nursing Role II. Pass/fail.
- Advanced Practice Nursing Role II. (1)
A sequential continuation of NUR 598 ST: Advanced Practice Nursing Role I. Pass/fail. Prerequisite: NUR 598 ST: Advanced Practice Nursing Role I.
- Principles of Advanced Practice Nursing in Pediatric Acute Care I. (3)
Advanced practice specialty course analyzing theories and research that guide development of interventions to support the physiological and psychosocial adaptation of critically ill children. Prerequisite: admission to graduate Nursing program or instructor approval. Corequisite: NUR 580 Clinical Practicum for Advanced Practice Nursing in Pediatric Acute Care I.
- Principles of Advanced Practice Nursing in Pediatric Acute Care II. (3)
Second advanced practice specialty course analyzing theories and research that guide evidence-based practice in the clinical management of critically ill children. Prerequisite: admission to graduate Nursing program or instructor approval. Corequisite: NUR 580 Clinical Practicum for Advanced Practice Nursing in Pediatric Acute Care II.
- 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 50.

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, Winham, Woolf**Lecturers:** Dixon, Hall

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, 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 30 semester hours. Required courses are NTR 500 and 501, Research Methods in Nutrition (or equivalent courses, with advisor approval), three to six semester hours of 500-level statistics courses approved by an advisor, six semester hours of thesis/research credit, and six semester hours of nutrition seminars 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

GRADUATE PROGRAMS AND COURSES

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 and phytochemical metabolism, nutrition and exercise, the nutrient intake and status of children and young adults, and the nutritional status of free-living and homebound elderly. Nutrition faculty conduct controlled metabolic feeding studies, 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/ecollege/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. Students may be accepted into the M.S. in Nutrition degree program without being accepted into the Dietetic Internship. A student accepted into the graduate program without receiving acceptance into the Dietetic Internship will be considered for a future internship, if the student so desires. Admission to the Dietetic Internship also requires 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 program is limited to students enrolled in the ASU East Master's Program in Nutrition; computer matching is used to determine the selection of interns. 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 and 341 (or their equivalents). CHM 231 strongly recommended.

NTR 442 Experimental Foods. (3)

selected semesters
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 341 (or their equivalents). CHM 231 strongly recommended.

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. Fee. Prerequisites: NTR 100 (or 241) and 142 (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 I. (3)

fall
Experimental design; overview of data collection techniques; laboratory analyses; statistical methods; development of thesis proposal. Lecture, lab. Fee. Prerequisites: a course each in advanced nutrition, biochemistry, and statistics.

NTR 501 Research Methods in Nutrition II. (3)

spring
Reviews survey, focus group, and epidemiologic research; develops questionnaires; analyzes large data sets. Prerequisite: NTR 500. Pre- or corequisite: graduate-level statistics course.

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)

selected semesters
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)*selected semesters*

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)*fall, spring, summer***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 50.

Performance

See "Music," page 274.

Philosophy

Master's and Doctoral Programs

www.asu.edu/philosophy

480/965-3394

PS A524

Steven Reynolds, Interim 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

Senior Lecturer: Bolton

The faculty in the Department of Philosophy offer a graduate program leading to the M.A. or Ph.D. degree in Philosophy.

MASTER OF ARTS

See "Master's Degrees," page 94, 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 in any areas that require critical, analytical thinking (such as

GRADUATE PROGRAMS AND COURSES

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 Examination. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See "Doctoral Degrees," page 96, 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 consultation 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 50.

Physical Education

See "Master of Physical Education," page 244.

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, Bauer, Bennett, Burstein, Chamberlin, Comfort, Cowley, Doak, Dow, Hester, Lindsay, Menéndez, Page, Ponce, Rez, Ritchie, Sankey, Schmidt, Tillery, Tsen, Tsong, Venables, Windhorst, Wyckoff

Associate Professors: Aannestad, Culbertson, Drucker, Herbots, Marzke, Newman

Assistant Professors: Lebed, Ortiz, 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 or applied physics. Within the physics program, students may pursue a wide range of studies, including an emphasis in astronomy and astrophysics, 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 281) 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 315).

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 182) and Ed.D. (see "Doctor of Education," page 183) 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 94, 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 Examination. 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.

MASTER OF NATURAL SCIENCE

The Master of Natural Science (M.N.S.) degree curriculum provides interdisciplinary graduate training in physics, physical science, or physics education. The degree is especially suited for individuals who desire professional training rather than research training. Designed for flexibility, the curriculum also features individualized professional graduate programs. These programs are well-suited to the backgrounds and goals of students. The major is Natural Science and students are expected to emphasize course work in two or more areas of concentration. The program must be interdisciplinary.

See “[Master’s Degrees](#),” page 94, for general requirements. See “[Natural Science](#),” page 281, for Master’s of Natural Science degrees based in subjects other than physics.

Admission. Prerequisites for admission are the availability of resources for the proposed program and a Department of Physics and Astronomy faculty member designated to serve as a graduate advisor. The submission of scores on the GRE (verbal, quantitative, and analytical) is required of all applicants. To obtain application forms, access the department Web site at phy.asu.edu.

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 Department of Physics and Astronomy. The supervisory committee is formed soon after the student has been admitted to the degree program, and must reflect the interdisciplinary nature of the program. The graduate advisor and the student suggest names of persons to serve on the supervisory committee.

Program of Study. The supervisory committee recommends the program of study, after conferring with the student. A minimum of 30 semester hours is required for the degree. The supervisory committee may require more courses, depending upon the background of the student and the nature of the proposed program. In some cases undergraduate courses may be required to overcome deficiencies. Additional information about the M.N.S. for high school physics teachers is available on the department Web site at phy.asu.edu.

Foreign Language Requirements. None.

Thesis Requirement. A thesis is optional.

Final Examinations. A final written or oral examination, or both, is required. Each examination is administered by the supervisory committee.

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 294.

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 graduate courses are required for all students enrolled in the emphasis in astronomy and astrophysics.

AST 521 Stars and Interstellar Medium I.....	3
AST 522 Stars and Interstellar Medium II	3
AST 523 Stars and Interstellar Medium III	3
AST 531 Galaxies and Cosmology I.....	3
AST 532 Galaxies and Cosmology II.....	3
AST 533 Galaxies and Cosmology III	3

Condensed Matter and Materials Physics. The following courses are required for all students enrolled in the emphasis on condensed matter and materials physics.

GRADUATE PROGRAMS AND COURSES

PHY 511 Materials Physics I.....	3
PHY 512 Materials Physics II.....	3
PHY 576 Quantum Theory I.....	3
PHY 577 Quantum Theory II.....	3
PHY 581 Quantum Theory of Solids I.....	3

Subatomic Physics. The following courses are required for all students enrolled in the emphasis on subatomic physics.

PHY 567 Relativistic Quantum Mechanics and Field Theory.....	3
PHY 568 Particle Physics Phenomenology.....	3
PHY 576 Quantum Theory I.....	3
PHY 577 Quantum Theory II.....	3
Select two of the following three courses.....	6

- PHY 462 Subatomic Physics (3)
- PHY 561 Nuclear Physics (3)
- PHY 569 The Standard Model and Beyond (3)

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
or PHY 576 Quantum Theory I (3)*	—
Total.....	15

* PHY 576 is the first half of a two-course sequence with PHY 577, which is taken in its entirety.

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.

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. Students enrolled in the Ph.D. degree may be awarded the M.S. degree in passing.

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 broad area of current activity in physics, such as:

1. astronomy and astrophysics;
2. atomic and molecular physics;
3. biophysics;
4. condensed matter and materials physics; or
5. subatomic physics.

The area tested is to be chosen by the student at the time of scheduling 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 Examination. 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 521 Stars and Interstellar Medium I. (3)*spring*

Radiative transfer, atomic and molecular properties, stellar atmospheres, line profiles, nonlocal thermodynamic equilibrium, interstellar gas and dust, star formation. Prerequisites: PHY 521, 531, 571 (or its equivalent).

AST 522 Stars and Interstellar Medium II. (3)*fall*

Stellar structure, radiative transport, boundary conditions, equations of state, nuclear reactions, opacity, nucleosynthesis, chemical evolution of the galaxy, stellar evolution. Prerequisite: AST 521 or instructor approval.

AST 523 Stars and Interstellar Medium III. (3)*spring*

Structure of the interstellar medium, gaseous nebulae, recombination theory, ionization fronts and shocks waves, galactic magnetic fields, magnetohydrodynamics, molecular clouds. Prerequisite: AST 522 or instructor approval.

AST 531 Galaxies and Cosmology I. (3)*spring*

Structure and evolution of the Milky Way, stellar properties, populations and associations/clusters, interstellar medium, dark matter. Prerequisites: PHY 521, 531, 571 (or its equivalent).

AST 532 Galaxies and Cosmology II. (3)*fall*

Structure of galaxies and the nearby universe, Hubble sequence, kappa-space, stellar populations, active galaxies, galaxy environments. Prerequisite: AST 531 or instructor approval.

AST 533 Galaxies and Cosmology III. (3)*spring*

Issues in modern cosmology, the distance scale, cosmological parameters, cosmological tests, cosmic background radiation, early universe, galaxy formation and evolution. Prerequisite: AST 532 or instructor approval.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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 50.

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.

GRADUATE PROGRAMS AND COURSES

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 Materials Physics I. (3)

fall

Fundamentals of materials physics: crystal structure, diffraction, elasticity, point defects, dislocations, lattice vibrations, thermal properties, periodic potential, band structure. Credit is allowed for only PHY 481 or 511. Prerequisites: PHY 311, 315.

PHY 482 Materials Physics II. (3)

spring

Electronic behavior of materials: energy bands, electronic properties, metals, semiconductors, insulators, optical properties, magnetic properties, superconductivity, biophysics. Credit is allowed for only PHY 482 or 512. Prerequisite: PHY 481 (or its equivalent).

PHY 498 Pro-Seminar. (1–7)

selected semesters

Topics may include the following:

- Materials Physics II. (3)

PHY 501 Methods of Theoretical Physics. (3)

fall

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)

spring

Continuation of PHY 501. Prerequisite: PHY 501.

PHY 511 Materials Physics I. (3)

fall

Fundamentals of materials physics: crystal structure, diffraction, elasticity, point defects, dislocations, lattice vibrations, thermal properties, periodic potential, band structure. Credit is allowed for only PHY 511 or 481. Prerequisites: PHY 311, 315 (or its equivalent).

PHY 512 Materials Physics II. (3)

spring

Electronic behavior of materials: energy bands, electronic properties, metals, semiconductors, insulators, optical properties, magnetic properties, superconductivity, biophysics. Credit is allowed for only PHY 512 or 482. Prerequisite: PHY 511.

PHY 521 Classical Mechanics. (3)

fall

Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory.

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)

spring

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 552 Electron Microscopy I. (3)

fall

Kinematical and dynamical electron diffraction and microscopy. Analysis of defect structures and composition of materials using STEM imaging. Cross-listed as MSE 552/SEM 552. Credit is allowed for only MSE 552 or PHY 552 or SEM 552. Prerequisite: instructor approval.

PHY 553 Electron Microscopy Laboratory I. (3)

fall

Lab support for PHY 552. Cross-listed as MSE 553/SEM 553. Credit is allowed for only MSE 553 or PHY 553 or SEM 553. Pre- or corequisite: MSE 552 or PHY 552 or SEM 552.

PHY 554 Electron Microscopy II. (3)

spring

Determination of structure and composition of materials using high-resolution imaging, convergent beam diffraction, and electron holography. Cross-listed as MSE 554/SEM 554. Credit is allowed for only MSE 554 or PHY 554 or SEM 554. Prerequisite: instructor approval.

PHY 555 Electron Microscopy Laboratory II. (3)

spring

Lab support for PHY 554. Cross-listed as MSE 555/SEM 555. Credit is allowed for only MSE 555 or PHY 555 or SEM 555. Pre- or corequisite: MSE 554 or PHY 554 or SEM 554.

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.

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)

fall and 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)*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*

Continuation of PHY 576. Prerequisite: PHY 576.

PHY 580 Practicum. (1–12)*selected semesters***PHY 581 Quantum Theory of Solids I. (3)***fall*

Band structure models: pseudopotentials, density functional theory; optical and magnetic response; elementary excitations; transport theory, electron-photon interactions and superconductivity. Prerequisites: PHY 511 (or instructor approval), 576.

PHY 582 Quantum Theory of Solids II. (3)*spring*

Continuation of PHY 581: broken symmetry; phase transitions; disorder, topological defects; nano-structures topics; soft condensed matter and current research. Prerequisites: PHY 511 (or instructor approval), 576. Corequisite: PHY 512 or instructor approval.

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:

- 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. Prerequisite: instructor approval.

- 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. Prerequisite: instructor approval.

- Materials Physics II. (3)
- Surface and Thin Films. (3)

spring

See ASU Online or phy.asu.edu/classes for details. Internet course.

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 50.

Plant Biology

Master's and Doctoral Programs

lsvl.la.asu.edu/plantbiology

480/965-3414

LSE 218

John M. Briggs, Interim Chair

Professors: Arntzen, Backhaus, Frasch, Hooper, Klopatek, Nash, Sommerfeld, Trelease, Vermaas, Webber

Associate Professors: Briggs, Clark, Day, Martin, Mason, 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

Effective July 1, 2003, the Departments of Biology, Microbiology, and Plant Biology merge to become the School of Life Sciences.

The Plant Biology faculty in the School of Life Sciences 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 272).

The faculty participate in the programs leading to the Master of Natural Science (M.N.S.) degree (see "**Natural Science**," page 281) 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 School of Life Sciences for more 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. Applicants should have completed the requirements for an undergraduate major in the plant sciences, biology, or related discipline, with an adequate background in related courses in chemistry, mathematical, and physical sciences.

GRADUATE PROGRAMS AND COURSES

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 Examination. Not required.

Thesis Requirements. A thesis is required.

Final Examination. 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 96.)

Final Examination. 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, an 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

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 50.

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. Fee. 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).

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. Fee. 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. Fee. 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)*fall*

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: ABS 363 or PLB 308.

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.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

Political Science**Master's and Doctoral Programs**www.asu.edu/clas/polisci

480/965-7667

MTC 205

Patrick J. Kenney, Chair

Professors: Ball, Berman, Chaudhuri, Dagger, Jones, Kahn, Kenney, McDonough, McGowan, Simon, Walker, Youngblood

Associate Professors: Ashley, Crittenden, Dantico, Doty, M. Elman, Herrera, Keating, Mitchell, Simhony, Spruyt, Warner

Assistant Professors: Chin, C. Elman, Goren, Hoekstra

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.

GRADUATE PROGRAMS AND COURSES

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 94, 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 Committee who represent each student’s primary and secondary subfields. Students who pass the oral examina-

tion 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 Examinations. 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 Examination. 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

GRADUATE PROGRAMS AND COURSES

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 50.

Post-Bachelor's Artist Diploma

See "Post-Bachelor's Artist Diploma," page 277.

Post-Master's Nurse Practitioner Certificate

For information, see "Nursing," page 282, 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, Neuberger, 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.

NONTERMINAL MASTER'S

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 Examination. A final oral examination in defense of the thesis is required.

DOCTOR OF PHILOSOPHY

See "Doctor of Philosophy," page 96, for general requirements.

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 student's proficiency as an independent investigator. (See "Doctoral Degrees," page 96.)

Final Examination. 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 50.

GRADUATE PROGRAMS AND COURSES

PSYCHOLOGY (SCIENCE AND MATHEMATICS) (PSY)

For more PSY courses, see the list of E PSY courses that follows this list.

M PSY 420 Analysis of Behavior. (3)

selected semesters

Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 290.

M PSY 422 Motor Control in Special Populations. (3)

spring

Discusses principles of motor control theories and related practical applications for certain special developmental populations. Lecture, discussion. Cross-listed as KIN 422. Credit is allowed for only KIN 422 or PSY 422. Prerequisite: KIN 345.

M PSY 424 Genetic Psychology. (3)

spring

Introduces the concepts, methodologies, and findings of behavioral genetics for Psychology majors. Prerequisites: PGS 101; PSY 230, 290.

M PSY 425 Biological Bases of Behavior. (3)

selected semesters

Critical study of physiological psychology; brain mechanisms underlying motivation and learning. Prerequisite: PSY 325.

M 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).

M 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.

M 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.

M 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.

M PSY 501 Supervised Teaching. (4)

fall

Experience in and examination of perspectives on teaching undergraduate psychology. Prerequisites: graduate standing in psychology; instructor approval.

M PSY 506 Survey of Research in Environmental Psychology. (3)

fall

Major topics and paradigms in the study of person-environment relationships. Prerequisite: instructor approval.

M PSY 512 Advanced Learning. (3)

selected semesters

Principles and theories of learning, emphasizing research literature. Prerequisite: instructor approval.

M PSY 524 Advanced Physiological Psychology. (3)

selected semesters

Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite: instructor approval.

M PSY 528 Sensation and Perception. (3)

selected semesters

Principles of sensory and perceptual processes, emphasizing research literature. Prerequisite: instructor approval.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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 other traditions. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

M 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.

M 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.

M PSY 551 Advanced Social Psychology. (3)

fall and spring

Continuation of PSY 550. Prerequisite: PSY 550 or instructor approval.

M 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.

M 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.

M 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.

M 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.

M 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.

M 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.

M PSY 578 Developmental Psychopathology. (3)

selected semesters

Covers major theories and research related to the development of psychological disorders of childhood and adolescence.

M 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.

M 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.

M 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 50.

PSYCHOLOGY (SCIENCE AND MATHEMATICS) (PSY)

The courses listed are offered by only ASU East. For more PSY courses that may be offered by ASU East, see the list of M PSY courses that precedes this list.

E PSY 560 Advances in Theoretical Psychology. (3)

fall

Covers new empirical and theoretical work in psychology with emphasis on its applicability. Prerequisites: PSY 323, 324.

E PSY 561 Methods in Applied Psychology. (3)

fall

Methods in applied settings, including usability testing, prototyping, and use of computers in data collection and analysis. Integrated lecture and lab. Prerequisites: PSY 290, 330 (or 530).

E PSY 562 Advanced Human Factors. (3)

fall

In-depth study of the issues, methods, and findings in industrial and organizational psychology. Prerequisite: PSY 437.

E PSY 563 Advanced Industrial and Organizational Psychology. (3)

spring

In-depth study of the issues, methods, and findings in industrial and organizational psychology. Prerequisite: PSY 440.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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, Crow, J. Denhardt, R. Denhardt, Hall, Lan, Mankin, Perry

Associate Professors: Brown, Campbell, DeGraw

Assistant Professors: McCabe, Peck, Voorhees

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.

GRADUATE PROGRAMS AND 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 is met with a grade of "B" or higher (within the last six years) in such approved courses as PAF 401, POS 401, PSY 230, QBA 221, and SOC 390. Students without an undergraduate course in American government are required to take an approved course such as POS 310, PAF 300 or PAF 340 or to pass the CLEP examination in American government. Competency in computer applications is determined on the basis of a student's academic record and/or work experience.

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.

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.

GRADUATE PROGRAMS AND COURSES

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 50.

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 and Resource Management (ASU East)

Professors: Edwards, Thor

Economics

Professor: Hogan

Geography

Professor: Burns

Health Administration and Policy

Professor: Johnson

Journalism and Mass Communication

Professor: Merrill

Justice Studies

Regents' Professor: Altheide

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, Crow, J. Denhardt,

R. Denhardt, Hall, Lan, Mankin, Perry

Associate Professors: Brown, Campbell

Assistant Professors: McCabe, Peck, Voorhees

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 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 successfully passing 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 chosen areas of specialization. The written examination is 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 Examination. 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 306](#).

Public Health

Master's Program

wpcarey.asu.edu/hap

480/965-7778

BA 318

Christine R. Larsen, ASU Coordinator

The College of Nursing and the School of Health Administration and Policy in the W. P. Carey School 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 public 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 wpcarey.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). Domestic students should submit their application packets by February 1 to the University of Arizona for fall admission. International students should submit their applications to the university by December 1. 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.

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 required to take a college algebra class before starting the program.

Foreign Language Requirements. None.

Comprehensive Examination. 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.

DUAL DEGREE PROGRAMS

M.S. in Nursing/M.P.H. The College of Nursing at ASU offers a dual Master’s of Science/Master’s of Public Health 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 227.

Recreation

Master’s Program

www.asu.edu/copp/recreation

480/965-7291

MOEUR 134

Randy J. Virden, Chair, Department of Recreation Management and Tourism

Carlton Yoshioka, Director, Master’s Program

Professors: Allison, Haley, Yoshioka

Associate Professors: Ashcraft, Sonmez, Teye, Virden

Assistant Professors: Barry, Brown, Guo, Leclerc, Pritchard, Timothy, White

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, all undergraduate transcripts, Graduate Record Examination (or Miller’s Analogy Test) scores, a statement of professional and academic goals, and three letters of recommendation to the Graduate College by March 1 to be considered

for fall admission. 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 33 semester hours including six hours of practicum (REC 580). A signed affiliation agreement is required to be on file with the graduate coordinator before registration. The purpose of the practicum is to provide graduate students with in-depth agency-based professional experiences. The student committee consists 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 500 Research Methods.....	3
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	33

Foreign Language Requirements. None.

Thesis Requirements. A thesis is an option.

GRADUATE PROGRAMS AND COURSES

Final Examination. 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, 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 50.

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, Morrison, Samuelson

Associate Professors: Clay, Fessenden, Gereboff, Moore, Schober, Swanson, Woodward

Assistant Professors: Benn, Damrel, Leon, Park, 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 94, 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 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 religious.studies@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/clar/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., Jonathon 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.

GRADUATE PROGRAMS AND COURSES

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 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

REL 598 Special Topics. (1–4)

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)

REL 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 50.

Renaissance Studies

See "Medieval and Renaissance Studies," page 269.

Scholarly Publishing

Certificate Program

www.asu.edu/clas/history/graduate/area_publishing.html

480/965-5775

SS 235A

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 235A, 480/965-5775.

SCHOLARLY PUBLISHING (PUB)

PUB 501 Introduction to Scholarly Publishing. (3)

once a year

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)

once a year

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)

once a year

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)

once a year

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.

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 50.

Science and Engineering of Materials

Interdisciplinary Doctoral Program

www.asu.edu/graduate/SEM

480/965-2460

PS A323

James B. Adams, Codirector

William T. Petuskey, Codirector

Chemical and Materials Engineering

Professors: Adams, Dey, Krause, Mahajan, Newman, Picraux
Associate Professor: Alford

Chemistry and Biochemistry

Regents' Professor: Buseck
Professors: Kouvetakis, Petuskey
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

Regents' Professor: Smith
Professor: Carpenter
Senior Research Scientists: Crozier, McCartney, McKelvy
Associate Research Scientist: Sharma

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 composing 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 Biochemistry; Electrical Engineering; Mechanical and Aerospace Engineering; and 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 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

GRADUATE PROGRAMS AND COURSES

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 composing 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 specialities 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 Examination. 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 science 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 defines the problem, describes its significance in the field, proposes a method of investigation leading to a solution of the problem, and defends the prob-

lem 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 Examination. 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

Topics may include the following:

- Introduction to Physical Materials. (3)

SEM 552 Electron Microscopy I. (3)

fall

Kinematical and dynamical electron diffraction and microscopy. Analysis of defect structures and composition of materials using STEM imaging. Cross-listed as MSE 552/PHY 552. Credit is allowed for only MSE 552 or PHY 552 or SEM 552. Prerequisite: instructor approval.

SEM 553 Electron Microscopy Laboratory I. (3)

fall

Lab support for SEM 552. Cross-listed as MSE 553/PHY 553. Credit is allowed for only MSE 553 or PHY 553 or SEM 553. Pre- or corequisite: MSE 552 or PHY 552 or SEM 552.

SEM 554 Electron Microscopy II. (3)

spring

Determination of structure and composition of materials using high-resolution imaging, convergent beam diffraction, and electron holography. Cross-listed as MSE 554/PHY 554. Credit is allowed for only MSE 554 or PHY 554 or SEM 554. Prerequisite: instructor approval.

SEM 555 Electron Microscopy Laboratory II. (3)

spring

Lab support for SEM 554. Cross-listed as MSE 555/PHY 555. Credit is allowed for only MSE 555 or PHY 555 or SEM 555. Pre- or corequisite: MSE 554 or PHY 554 or SEM 554.

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 50.

Secondary Education

Master's Program

ASU West offers a Master of Education degree in Secondary Education. For more 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/spf.php

480/965-6357

ED 120

Nicholas Appleton, Academic Program Coordinator

Regents' Professor: Berliner

Professors: Appleton, Barone, Glass, Smith, Webb, Wiley

Associate Professors: Hunnicutt, Margolis

Assistant Professors: Moses, Powers

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 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 in philosophy of education, visual sociology and sociology of education, and education policy.

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.

GRADUATE PROGRAMS AND COURSES

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.

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. Credit is allowed for only SPF 534 or 634.

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 591 Seminar. (1–12)

selected semesters

Topics may include the following:

- Foundations of Inquiry. (3)

SPF 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Education of Women. (3)

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. Credit is allowed for only SPF 634 or 534.

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 Education in Global Contexts. (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 685. Credit is allowed for only EDA 685 or SPF 685. Prerequisite: admission to doctoral program in education 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.

SPF 791 Seminar. (1–12)

selected semesters

Topics may include the following:

- Pro-Seminar. (3)

SPF 792 Research. (1–12)

selected semesters

SPF 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 50.

Social Work

Master's and Doctoral Programs

sww.asu.edu

480/965-3304

WHALL 135

Leslie Leighninger, Director, School of Social Work

Professors: Ashford, Coudroglou, Daley, Figueira-McDonough, LeCroy, Leighninger, MacEachron, Moroney, Segal

Associate Professors: Brzuzy, Gerdes, Gustavsson, Marsiglia, Montero, Nichols, Paz, Risley-Curtiss, Steiner, Stromwall, Waller, Yellow Bird

Assistant Professors: Holley, Holschuh, Hurdle, Larson, Napoli, Okamoto

Academic Professionals: Rountree-Antar, Gonzalez-Santin, Knutson-Woods, Yopez

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 (M.S.W.) degree prepares social workers for advanced direct practice or planning, administration, and community practice. The program is designed to prepare social workers to be capable of responding effectively to the needs of special populations in the Southwest. The M.S.W.

degree program is accredited by the Council on Social Work Education.

Advanced Standing Program

The advanced standing program is a full-time, 36-semester-hour program available in both Tempe and Tucson.

Program of Study. Students must start the program in summer (beginning with the first summer session) and complete a total of three semester hours in each summer session for a total of six hours. The six semester hours of summer courses are available in Tempe only. Students also complete one internship and select one of two concentrations: advanced direct practice or planning, administration, and community practice. The planning, administration, and community practice courses are generally offered in Tempe only.

Summer Session Course Work

SWG 598 ST: Advanced Standing Bridge Seminar.....	3
One required social work course.....	3

The following concentration courses are required:

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.

Application Procedures. Applicants must follow the procedures for admission to the Graduate College (see “Admission to the Graduate College,” page 84). Master’s degree program applicants must have a B.S.W. degree from a Council on Social Work Education accredited program with

at least a 3.50 GPA (on a 4.00 scale) in required upper-division social work courses. A GPA of at least 3.00 (on a 4.00 scale) for the last two years of work leading to the B.S.W. degree is also required. In addition, all applicants are required to successfully complete a course in human biology and statistics before enrolling in the advanced standing program. Applications to the advanced standing program are accepted from November 1 to January 2 preceding the summer session to which the applicant is seeking admission. Applicants admitted to the advanced standing program begin classes in the summer.

All advanced standing program applicants must submit the following to the School of Social Work:

1. a School of Social Work M.S.W. application form;
2. an M.S.W. advanced standing application;
3. a statement of educational and career goals;
4. a professional résumé that includes volunteer and paid work experience;
5. a written case example covering areas specified in the advanced standing application; and
6. three letters of reference.

At least one of the three required references must be from the applicant’s B.S.W. field instructor, or if employed in a social work-related job for two or more years, a recommendation from the applicant’s supervisor. Preference may be given to applicants with professional social work-related employment, and to individuals with less than six years between the granting of their B.S.W. degrees and the current application date. In addition, all applicants must submit the following to the Graduate College:

1. completed Graduate College application form;
2. application fee; and
3. an official transcript of all academic work completed or in progress.

Comprehensive Exam. All students must pass a comprehensive examination administered by the school or complete a thesis before graduation.

Academic Standing and Curriculum Sequencing. 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.

Standard M.S.W. Program

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.

Program of Study. 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

GRADUATE PROGRAMS AND COURSES

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 skills 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.

Application Procedures. Applicants must follow the procedures for admission to the Graduate College (see “Admission to the Graduate College,” page 84). Applications to the standard M.S.W. program are accepted from November 1 to March 1 preceding the fall semester to which the applicant is seeking admission. Applicants admitted to the standard M.S.W. program begin classes in the fall.

All applicants for the standard M.S.W. program must submit to the School of Social Work the following:

1. a School of Social Work M.S.W. application form;
2. a statement of educational and career goals;
3. a professional résumé that includes volunteer and paid work experience; and
4. three letters of reference.

Test scores from either the Graduate Record Exam or the Miller Analogies Test are required only if the applicant’s GPA was below 3.00 (on a 4.00 scale) during his or her junior and senior years. In addition, all applicants must submit to the Graduate College the following:

1. a completed Graduate College application form;
2. the application fee; and
3. an official transcript of all academic work completed or in progress.

The school 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 3 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 minimal 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 the removal of provision status is made by the time the student has completed 12 hours of approved graduate study. The provisional student does not complete 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.

Part-Time Program. Students are admitted each fall to a planned part-time program. Students interested in this option must specifically apply to the part-time program.

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.

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. To be eligible for an exemption from any course, students must have received their B.S.W. degree no more than five years before 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 171 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, before starting the M.S.W. program in the fall, 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 Examination. 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.

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.

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.

GRADUATE PROGRAMS AND COURSES

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 February 1 preceding the fall semester to which the applicant is seeking admission.

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), quanti-

tative/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 Examination. 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 Examination. 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 seventh 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., Lecroy, C.W., and Lortie, K.L. (2001). *Human Behavior in the Social Environment: A Multidimensional Perspective* (second edition).
- Ashford, J.B., Sales, B.D., and LeCroy, C.W. (2001). *Aftercare and Recidivism Prevention*.
- Ashford, J.B., Sales, B.D., and Reid, W.H. (2001). *Political, Legal and Professional Challenges to Treating Offenders with Special Needs*.
- 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*.
- Gustavsson, N.S., and MacEachron, A.E. (2001). *Perspectives on Research-Related Anxieties Among B.S.W. Students: Math, Computer, and Library Anxiety*.
- Holschuh, J., and Segal, S.P., (in progress). Factors Related to Multiplexity in Support Networks of Persons with Severe Mental Illness. In J.A. Levy and B.A. Pescosolido (Ed.), *Social Networks and Health*, Vol. 8, Advances in Medical Sociology. Greenwich, CT: JAI Press.
- Kettner, P.M. (2002). *Achieving Excellence in the Management of Human Service Organizations*.
- Knutson Woods, T. (2002). *Restructuring Autonomy: The Journey from Freestanding to Administratively Subordinate Status*.
- Knutson Woods, T., Blaine, K., and Francisco, L. (2002). *O'odham Himdag as a Source of Strength and Wellness Among the Tohono O'odham of Southern Arizona and Northern Sonora, Mexico*.
- LeCroy, C.W. and Daley, J.M. (2001). *Empowering Adolescent Girls: Examining the Present, Building Skills for the Future with the Go Girls Program*.
- LeCroy, C.W. and Okamoto, S. (2002). *Guidelines for Using Assessment Instruments with Children*.
- Leighninger, L. (2000). *Creating a New Profession: The Beginnings of Social Work Education in the United States*.
- Leighninger, L. and Leighninger, R.D. (2000). *Social Policy in the New Deal*.
- Marcenko, M.O., Kemp, S.P., and Larson, N.C. (2000). *Childhood Experiences of Abuse, Later Substance Use, and Parenting Outcomes Among Low-Income Mothers*.
- Marsiglia, F.F., Holleran, L. and Jackson, K.M. (2000). *Assessing the Impact of Internal and External Resources on School-Based Substance Abuse Prevention*.
- 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*.
- 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*.
- Risley-Curtiss, C., and Kronenfeld, J.J. (2001). Health Care Policies for Children in Out-of-Home Care. *Child Welfare*, LXXX, 325-359.
- Segal, E.A., Gerdes, K.G., and Steiner, S. (2001). *Social Work and Social Welfare in the New Century*.
- Segal, E.A. and Stromwall, L.K. (2000). *Social Work Practice Issues Related to Poverty and Homelessness*.
- Steiner, S., Brzuzy, S., Gerdes, K.E., and Hurdle, D. (2001). *Using Structured Controversy to Teach Diversity Content and Cultural Competence*.
- Stromwall, L.K. (2002). *Is Social Work's Door Open to People Recovering from Psychiatric Disabilities?*
- Stromwall, L.K. (2002). *Mental Health Barriers to Employment for TNF Recipients*.
- Vidal de Haymes, M., Kilty, K.M., and Segal, E.A. (Eds) (2000). *Inequalities, Challenges, and Barriers: Latino Communities in the New Century*.

GRADUATE PROGRAMS AND COURSES

29. Waller, M. (2000). *Addressing Student Writing Problems: Applying Composition Theory to Social Work Education*.

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. Prerequisite: 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 598 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Advanced Standing Bridge Seminar. (3)

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, 641. 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 722 Critical Thought in Social Work. (3)*spring*

Evaluates and reconstructs social work conceptualizations, research, and practice based on various strains of critical theory. Seminar.

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.

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 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 50.

Social Work

Master's Program

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, Hackett, Kronenfeld, Kulis, Thomas, Weitz

Associate Professors: Agadjanian, Benin, Harlan, Jacobson, Keith, Miller-Loessi, Sullivan

Assistant Professors: 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.

Final Examination. 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.

GRADUATE PROGRAMS AND COURSES

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 Examination. A final oral examination in defense of the dissertation is required.

Research Facilities. Department research facilities consist of a survey research laboratory, small groups research laboratory, computer terminals and linkages to the 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 50.

Spanish

See “[Languages and Literatures](#),” page 246.

Special Education

Master's Programs

coe.asu.edu/programs

480/965-4602

ED 434

Professors: Rutherford, Swadener, Zucker

Associate Professors: Cohn, Di Gangi, McCoy

Assistant Professor: Lamorey

Clinical Associate Professor: Mathur

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 172, 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 con-

tent/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 Initial Teacher Certification (ITC) 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. 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.

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.

GRADUATE PROGRAMS AND COURSES

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 50.

Special Education

Master's Program

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

480/965-9136

CSB 280

Julie M. Liss, Director, Executive Committee

English

Professor: Adams

Family and Human Development

Professor: Roosa

Psychology

Professors: Killeen, Somerville

Associate Professors: Goldinger, 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 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

GRADUATE PROGRAMS AND COURSES

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 Examination. 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 153.

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

Assistant Professor: Kulahci

Mathematics and Statistics

Professors: Lohr, Young

Associate Professor: Prewitt

Assistant Professor: Oleson

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 *W. P. Carey School 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 94, 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). The submission of 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 Examination. None.

Thesis Requirements. Either an applied project or a 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.

Final Examination. An oral examination in defense of the applied project or thesis is required.

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.

COURSES

For courses, see “Industrial Engineering (IEE),” page 237, “Quantitative Business Analysis (QBA),” page 138, and “Statistics and Probability (STP),” page 265.

Taxation

Master's Program

wpcarey.asu.edu/acct

480/965-3631

BA 223

Charles Christian, Interim Codirector

Robert St. Louis, Interim Codirector

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, O'Dell, O'Leary, Regier, Whitecotton

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

MASTER OF TAXATION

The faculty in the School of Accountancy and Information Management offer specialized professional programs leading to the Master of Taxation and Master of Accountancy and Information Systems degrees (see "[Accountancy and Information Systems](#)," page 99) and the Master of Science degree in Information Management (see "[Information Management](#)," page 239). The M.Tax. is a specialized degree program designed to equip students with the highly technical and demanding skills required to provide tax and business advice in the private sector and to administer the tax laws in the public sector of the economy. The program prepares students for entry-level positions in taxation and provides graduate-level education for tax professionals who desire to enhance their skills.

The faculty also participate in offering the program leading to the Master of Business Administration degree (see "[Master of Business Administration](#)," page 132) and Ph.D. degree in Business Administration (see "[Doctor of Philosophy](#)," page 133).

For more information on faculty, programs, and courses, access the school's Web site at wpcarey.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. Access the school'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 in graduate-level accounting courses and a minimum of 24 semester hours of resident credit in courses open only to graduate students. A maximum of six hours may be taken outside the W. P. Carey School 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 Examination. 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 wpcarey.asu.edu/acct.

COURSES

For courses, see "[Accountancy \(ACC\)](#)," page 100.

Teaching English as a Second Language

Master's Program

www.asu.edu/clas/english/linguistics

480/965-2563

LL 226C

Elly van Gelderen, 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 (M.TESL) degree. This specialized degree program provides students with the knowledge and the skills necessary to teach English as a second language.

Admission Requirements. Applicants for the M.TESL degree may have undergraduate majors in fields such as, but not limited to, anthropology, applied linguistics, cognitive science, communication, comparative languages and literatures, education, English literature, history, law, linguistics, modern languages, philosophy, political science, psychology, religion, rhetoric/composition, sociology, and speech and hearing science. Students should consult with an advisor to determine whether their preparation is deficient in any area. Applicants must submit three letters of recommendation and a personal statement of aims and purposes. 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 Examination. An oral examination on the applied project is required.

COURSES

For courses, see “[Linguistics \(LIN\)](#),” page 203.

Technology

Master’s Programs

Department of Aeronautical Management Technology

eastair.east.asu.edu

480/727-1381

SIM 205

Department of Electronics and Computer Engineering Technology

www.east.asu.edu/ctas/ecet

480/727-1137

TECH 101

Department of Information and Management Technology

www.east.asu.edu/ctas/imt

480/727-1781

TECH 102

Department of Mechanical and Manufacturing Engineering Technology

www.east.asu.edu/ctas/mmet

480/727-1584

SIM 295

William K. McCurry, Chair,

Department of Aeronautical Management Technology

Professors: Gesell, McCurry

Associate Professors: Jackson, Karp, Turney

Assistant Professor: Pearson

Lecturers: O’Brien, Tripp

Timothy E. Lindquist, Chair,

Department of Electronics and Computer Engineering Technology

Professors: Lindquist, McHenry, Munukutla, Robertson

Associate Professors: Koehnemann, Macia, Millard, Sundararajan, Zeng

Assistant Professor: Gannod

Senior Lecturer: Whitehouse

Thomas E. Schildgen, Chair,

Department of Information and Management Technology

Professors: Duff, Hild, Sadowski, Schildgen

Associate Professors: Grossman, Hirata, Humble, Matson, Olson

GRADUATE PROGRAMS AND COURSES

Assistant Professor: Kime

Senior Lecturer: Wilson

Lecturers: Dolin, Harris, Lestar

**Scott G. Danielson, Chair,
Department of Mechanical and Manufacturing
Engineering Technology**

Professor: Collins

Associate Professors: Biekert, Danielson, Nam, Palmgren, Rajadas, Rogers

Assistant Professor: Post

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 Engineering Technology, and Mechanical and Manufacturing 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 are also evaluated and taken into consideration when determining admission classification.

To be considered for regular admission, a 3.00 GPA or higher, as determined by the department, 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 a supervisory committee. It is designed for flexibility, permitting the student to select a combination of courses in a tech-

nological 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	15-18
Supporting area	6-9
Thesis writing course	3
Research	6
Total	33

Applied Project Option

Technical area of emphasis	15-18
Supporting area	9-12
Research writing course	3
Research/Applied project	3
Total	33

A maximum of nine semester hours of appropriate course work completed before admission may be included in the program of study.

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, and microelectronics engineering technology.

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

The Department of Mechanical and Manufacturing 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 specialization, 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 50.

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 50.

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 Examination. 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 that includes 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.

GRADUATE PROGRAMS AND COURSES

AERONAUTICAL MANAGEMENT TECHNOLOGY (AMT)

AMT Note 1. Flight instruction costs are not included in university tuition and fees.

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 airline 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)

spring

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 50.

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 Mechanical and Manufacturing Engineering Technology.

Admission and Proficiency Requirements. For general admission requirements, see “Admission to the Graduate College,” page 84, and “Technology,” page 333. 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.....	15–18
Supporting area.....	6–9

Research Methods Courses

EET 500 Research/Writing.....	2
EET 591 Graduate Seminar.....	1
EET 592 Research.....	3
or CET 592 Research (3)	
EET 599 Thesis.....	3
or CET 599 Thesis (3)	
<hr/>	<hr/>
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 or CET 592 (three semester hours) and EET 599 or CET 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
or CET 593 Applied Project (3)	
<hr/>	<hr/>
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 333.

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 and interfacing; computer networks; digital testing; computer process control hardware, techniques, and applications; and computer architecture.

Software Systems and Distributed Applications. Studies emphasizing software design and architecture for distributed and Web-based applications; embedded and networked systems; software engineering tools and methods supporting system analysis, project management, and software testing; software systems for limited, wireless, and network enabled devices; reconfigurable Web services and client-server software applications; databases and their application in distributed and Web-based systems.

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 systems, test programming, and failure tolerant design; computer-aided design; analog and digital simulation.

GRADUATE PROGRAMS AND COURSES

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. 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 Object Systems. (3)

spring

Distributed applications with Web services, RMI and CORBA; concepts and frameworks for managing registering, locating and securing distributed object applications. 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 441 Software for Personal Digital Assistants. (3)

fall

Mobile computing using Java's K, Virtual Machine, MIDP for wireless applications; user interfaces, persistent data storage, and networking. Prerequisite: CET 420.

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; EET 310.

CET 458 Digital Computer Networks. (3)

spring

Network hardware and software, topologies, protocols, OSI model, LANs, WANs Internet; basic concepts of packet switching, routing, error controlling. Prerequisites: CET 354; EET 372.

CET 459 Internet Networking Protocols. (3)

fall

Computer networking for application, transmission control and network layers using the Internet protocols as a model; reliability and security. Prerequisites: CET 200 (or 256), 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. Prerequisites: CET 383, 459.

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 540 Internet-Enabled Embedded Devices. (3)

spring

Accessing hardware devices through Internet, including Applets, HTTP, custom byte streams, XML-RPC, SOAP. Building network-based applications that interface hardware. Prerequisite: CET 420.

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 Distributed Applications for Windows Platforms. (3)

fall

Distributed Web-based applications using Windows frameworks such as .NET. Essential components, XML, remoting, Web services, windows services, user interfaces. Prerequisite: CET 420.

CET 557 Microcomputers and Applications. (3)

fall

Applications of small computer systems, mini- and microcomputer hardware and software. Prerequisites: CET 354; CSE 100; 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. (1–3)

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. (1–3)*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. (1–3)*selected semesters***CET 591 Seminar. (1–3)***selected semesters***CET 592 Research. (1–3)***selected semesters***CET 593 Applied Project. (1–3)***selected semesters***CET 594 Conference and Workshop. (1–3)***selected semesters***CET 595 Continuing Registration. (1)***selected semesters***CET 598 Special Topics. (1–4)***selected semesters***CET 599 Thesis. (1–3)***selected semesters*

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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 403 PLCs, Sensors, and Actuators. (3)*spring*

Applications, programming, and troubleshooting using PLCs. Interfacing to motors, sensors, and actuators. Fluid power principles. Lecture, lab, projects. Prerequisite: EET 208 (or equivalent electrical science course).

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. (1–3)*selected semesters***EET 584 Internship. (1–3)***selected semesters***EET 590 Reading and Conference. (1–3)***selected semesters***EET 591 Graduate Seminar. (1–3)***selected semesters***EET 592 Research. (1–3)***selected semesters***EET 593 Applied Project. (1–3)***selected semesters***EET 594 Conference and Workshop. (1–3)***selected semesters***EET 595 Continuing Registration. (1)***selected semesters*

GRADUATE PROGRAMS AND COURSES

EET 598 Special Topics. (1–4)

selected semesters

EET 599 Thesis. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 50.

MICROELECTRONICS ENGINEERING TECHNOLOGY (UET)

UET 411 Layer Deposition Technology. (3)

spring

Fundamentals, applications, and vacuum technology of layer deposition processes used in IC fabrication. Lecture with Web support. Credit is allowed for only UET 411 or 511. Prerequisite: UET 331. Corequisite: UET 417.

UET 416 Dopant Control Technology. (3)

fall

Design and practical realization of charge distribution in microelectronic devices, including ion implantation and diffusion processes. Lecture with Web support. Credit is allowed for only UET 416 or 516. Prerequisite: UET 331. Corequisite: UET 417.

UET 417 Semiconductor Technology Practice. (3)

fall

Lab-based design and execution of safe and effective semiconductor fabrication operations. Lab with Web and simulation support. Prerequisite: UET 331 (or its equivalent). Corequisites: UET 411 and 416 and 424 (or their equivalents).

UET 418 Systems on Silicon. (4)

spring

Factors that drive integration on silicon, including logic, memory, and interfaces. Economics of system-level solutions. Lecture with Web support, lab, practical project. Credit is allowed for only UET 418 or 518. Prerequisite: UET 331.

UET 421 IC Device Characterization. (3)

fall

Design and operation of the major classes of semiconductor devices. Characterization by parameters and their extraction. Future technology trends. Lecture with Web support. Prerequisite: UET 331.

UET 424 Pattern Transfer Technology. (3)

spring

Maskmaking, lithography, and etch processes for integrated circuit fabrication. Lecture with Web support. Prerequisite: UET 331. Corequisite: UET 417.

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 Process Control and Validation. (3)

spring

Statistical process control and its application to IC fabrication. Design, control, and performance validation techniques throughout the manufacturing process. Lecture with Web support. Prerequisite: 300-level statistics course. Corequisite: UET 417.

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 511 Layer Deposition Technology. (3)

spring

Fundamentals, applications, and vacuum technology of layer deposition processes used in IC fabrication. Lecture with Web support. Credit is allowed for only UET 511 or 411. Corequisite: UET 417.

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 Dopant Control Technology. (3)

spring

Design and practical realization of charge distribution in microelectronic devices, including ion implantation and diffusion processes. Lecture with Web support. Credit is allowed for only UET 516 or 416. Prerequisite: UET 331 (or its equivalent). Corequisite: UET 417.

UET 518 Systems on Silicon. (3)

spring

Factors that drive integration on silicon, including logic, memory, and interfaces. Economics of system-level solutions. Lecture with Web support. Credit is allowed for only UET 518 or 418. Prerequisite: UET 305 (or its equivalent). Pre- or corequisite: UET 417.

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. (1–3)

selected semesters

UET 584 Internship. (1–3)

selected semesters

UET 590 Reading and Conference. (1–3)

selected semesters

UET 591 Seminar. (1–3)

selected semesters

UET 592 Research. (1–3)

selected semesters

UET 593 Applied Project. (1–3)

selected semesters

UET 594 Conference and Workshop. (1–3)

selected semesters

UET 595 Continuing Registration. (1)

selected semesters

UET 598 Special Topics. (1–4)

selected semesters

UET 599 Thesis. (1–3)

selected semesters

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see “Omnibus Courses,” page 50.

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 hard-

ware/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 Examination. 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 either a six-semester-hour research block for the applied project option (that includes ITM 549 Research Techniques and Applications and IMC 593 Applied Project) or six hours

of 592 Research and three hours of 599 Thesis for the thesis option. 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 333.

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, industrial training, public policy for fire service, emergency management, fire prevention, and incident command.

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.

GRADUATE PROGRAMS AND COURSES

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.

ETM 524 Integrated Emergency Management. (3)

selected semesters

Theory and practice of comprehensive emergency management. Explores scope and function of Department of Homeland Security. Prerequisites: CHM 101; 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 560 Terrorism and Weapons of Mass Destruction. (3)

selected semesters

Historical evolution of terrorism and weapons of mass destruction. Analyzes current theories and mitigation, preparedness, and response tactics. Prerequisite: MAT 170.

ETM 567 Information Technology in Emergency Management. (3)

selected semesters

Provides theory and application of computer-based programs in emergency management and the use of various emergency modeling programs. Prerequisites: CHM 101; MAT 170.

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 metal tailing and animal waste and replacement of chemical control with biological methods. Lecture, case studies.

ETM 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 50.

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.

FSA 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 50.

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 50.

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, copy-right 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 50.

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)

selected semesters

IMC 590 Reading and Conference. (1–12)

selected semesters

IMC 592 Research. (1–12)

selected semesters

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 50.

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).

GRADUATE PROGRAMS AND COURSES

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.

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 50.

Department of Mechanical and Manufacturing Engineering Technology

The faculty in the Department of Mechanical and Manufacturing Engineering Technology (MMET) 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 program of study options that presuppose a sound technical undergraduate degree. The options are designed to provide 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 teaching 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 emphasis area requirement of 18 semester hours. Careful course 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 education the student receives 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 writing course	3
Research/Thesis	6
Total	33

Applied Project Option

Technical area of emphasis	18
Supporting area	9
Research writing course	3
Research/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 power 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/mmet.

AERONAUTICAL ENGINEERING TECHNOLOGY (AET)

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

GRADUATE PROGRAMS AND COURSES

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 50.

MECHANICAL AND 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.

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)

fall

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 518 Composites Materials Manufacturing. (3)*spring*

Introduces composite materials and associated manufacturing issues, including tooling, processes, and quality control. Related issues, including testing and joining. Lecture, lab. Credit is allowed for only MET 518 or 418. Prerequisite: instructor approval.

MET 571 Waste Minimization and Waste Prevention. (3)*selected semesters*

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 50.

Theatre

Master's and Doctoral Programs

herbergercollege.asu.edu/theatre

480/965-5337

GHALL 232

Professors: Barker, Bedard, Eckard, Giner, Knapp, Mason, Saldaña, Thomson, Wills

Associate Professors: Acker, Edwards, Holloway, Reyes, Riske, Vining

Assistant Professors: Furr-Solomon, Gharavi, 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. Stu-



Cast members perform in a production of *Amahl and the Night Visitors*.

Tim Trumble photo

dents may also pursue an interdisciplinary program in playwriting 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 199).

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 94, 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.

GRADUATE PROGRAMS AND COURSES

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. None.

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.

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 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 94). All course work for the degree must be completed within the six-year time limit.

Foreign Language Requirements. None.

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 generally 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 96.)

Financial Assistance. University scholarships, fellowships, grants, and other forms of financial assistance are available. See “**Financing Graduate Studies,**” page 47, 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 include:

Drama Activities at the Ethical Culture School, 1878–1930, by Virginia Page Tennyson.

An Interrogation of Drama in Colonial Educational Contexts: Three Boys’ Schools in Queensland, Australia, by Janet McDonald.

Longevity and the Secondary Theatre Arts Teacher: A Case Study, by Cynthia Brown.

Mapping the Cultural Geography of Childhood or Constructing the Child in Child Drama: 1950–Present, by Stephani Woodson.

Russian Theatre for Young Audiences and the Changes in Ideological Function with Glasnost and Perestroika, by Manon C. van de Water.

Theorizing Programming for Diversity in Three Professional Theatres for Young Audiences, by Lisa Kramer.

Understanding Two Teachers’ Practices and Their Use of Theatre in the Elementary School Classroom, by Lorenzo Garcia.

GRADUATE PROGRAMS AND COURSES

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. Topics may include the following:

- Film Production Part I
Fee.
- Film Production Part II
Fee.

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 406 American Multicultural Film. (3)

fall and spring

Examines Native, African, Asian, and Latina and Latino American films and film artists in cinema history and production. Internet course. Prerequisite: ENG 102 or 105.

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 Latina and Latino Theatre. (3)

selected semesters

Readings, discussion, video of dramatic literature and production styles of Latina and Latino playwrights and theatre companies in the United States. Prerequisite: ENG 102 or 105.

THE 423 African American Theatre. (3)

fall and spring

Readings, discussion, video of the history and dramatic literature of African American playwrights and theatre companies in the United States. Prerequisite: ENG 102 or 105.

THE 424 Trends in Theatre for Youth. (3)

selected semesters

Surveys the history, literature, and contemporary practices in theatre for youth.

THE 426 Theatre of the Americas. (3)

fall and spring

Selected studies in pre-Columbian theatre forms and texts of the Aztecs, Mayans, Caribbean islands, and North American Indians. Internet course. Prerequisite: ENG 102.

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 494 Special Topics. (1–4)

selected semesters

Topics may include the following:

- Performance Technology I
Fee.

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)

selected semesters

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
- Film Studies
- Performance Technology I
Fee.

THE 691 Seminar. (1–12)

selected semesters

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 50.

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 428 Theatre and the Future. (3)*fall and spring*

Capstone course exploring visions of the future of theatre. Results in a project in creative or scholarly form. Prerequisites: THE 440; senior standing; Theatre major.

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 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 483 Acting: Viewpoints and Composition. (3)*spring*

Training in Anne Bogart's viewpoints and composition techniques; application to rehearsal and performance, and creating new work. Studio. Prerequisite: THP 207 or 285 or written instructor approval.

THP 484 Internship. (1–4)*selected semesters***THP 489 Acting: Career Development. (2)***selected semesters*

Familiarization with the business of acting: self-promotional tools and techniques, marketing strategies, finances, interview skills, and actor unions. Studio. Prerequisites with a grade of "B" or higher: both THP 101 (or 102) and junior (or senior) standing or only written instructor approval.

THP 494 Special Topics. (1–4)*once a year*

Topics may include the following:

- Advanced Screenwriting
- Performance and Technology
- Problems in Directing
- Storytelling
- Student Production Board
- 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.

GRADUATE PROGRAMS AND COURSES

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.

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
- 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 50.

Translation

See "Undergraduate Certificate in Translation," page 247.

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 Professors: Jackson, 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 Seminar	3
TRC 593 Applied Project	3

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 Regulation	3
AMT 525 Airport Planning and Design	3
AMT 527 Airline Management Strategies.....	3

AMT 598 Special Topics	3
CEE 475 Highway Geometric Design.....	3
CEE 512 Pavement Performance and Management.....	3
CEE 515 Properties of Concrete.....	3
CEE 573 Traffic Engineering	3
CEE 598 Special Topics	3
GCU 442 Geographical Analysis of Transportation.....	3
GCU 444 Geographic Studies in Urban Transportation.....	3
GCU 591 Seminar	3
GPH 471 Cartographic Design	3
GPH 494 Special Topics	3
GPH 598 Special Topics	3
PAF 505 Public Policy Analysis	3
PAF 591 Seminar	3
PUP 510 Citizen Participation.....	3
PUP 544 Urban Land Use Planning.....	3
PUP 598 Special Topics	3
PUP 642 Land Economics.....	3

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 50.

Women's Studies

Although the Women's Studies Program does not offer a graduate degree, it is possible to pursue a graduate degree in some existing programs with a thesis or dissertation topic related to women's studies. For more information, contact the Women's Studies academic advisor.

WOMEN'S STUDIES (WST)

WST 598 Special Topics. (1–4)

selected semesters

May be concurrently listed with 400-level courses.

Omnibus Courses. For an explanation of courses offered but not specifically listed in this catalog, see "Omnibus Courses," page 50.

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 Executive 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 assumes responsibility for international visitors who come to work, study, or conduct research on the ASU campuses, and also operates one of the nation's first U.S. Passport Offices located at a state university.

ACADEMIC PROGRAMS

The Department of State-sponsored IIE Open Doors report ranks ASU as one of the nation's top ten institutions in terms of student international mobility. In increasing numbers, students have chosen ASU because of its excellence in undergraduate programs and extensive international study opportunities.

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 200 fall and spring semester and year-long international programs that graduate students may consider for ASU undergraduate resident credit. A number of these programs also offer graduate-level credit. Additionally, IPO manages a number of unique study abroad and exchange opportunities designed specifically for graduate

students. These include dual degree programs and teacher assistantships abroad.

Procedures. Students interested in participating in such programs should contact the International Programs Office in TMPCT 198.

IPO assists students through every stage of planning, preparation, participation, and return from exciting international educational experiences. International Program coordinators 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. 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.

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. Advising sessions are 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.

Summer Sessions

www.asu.edu/summer

Carol Switzer, M.S., Director

PURPOSE

The summer sessions, offering more than 4,000 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. See the “[Graduate College Calendar](#),” [page 18](#), for specific dates.

All ASU Main courses (except some KIN 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 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/summer.

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 nondegree students before enrolling, except continuing students who attend ASU during the previous spring semester. New ASU students admitted for the fall semester following the current summer must process the summer nondegree admission form before enrolling. The submission of transcripts or test scores is not required to attain 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 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/summer.

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 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 22](#).

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 442. For the “ASU West Directory,” see page 452. For the “ASU Extended Campus Directory,” see page 468.

Organization	Location	Telephone	Web Address
Admissions	—	—	—
Graduate	WILSN 101	480/965-6113	www.asu.edu/graduate/admissions
Law	LAW 120	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/SOA
Design, School of	AED 154	480/965-4135	www.asu.edu/caed/SOD
Herberger Center for Design Excellence	ARCH 119	480/965-6693	www.asu.edu/caed/HCDE
Planning and Landscape Architecture, School of	AED 158	480/965-7167	www.asu.edu/caed/SPLA
Arizona Drug and Gang Prevention Resource Center	ASUDC Bldg. D	480/727-5015 1-800-432-2347	www.asu.edu/adgprc
Arizona Prevention Resource Center	ASUDC Bldg. D	480/727-2772 1-800-432-2772	www.azprevention.org
Associated Students of ASU (ASASU)	MU 310	480/965-3161	www.asu.edu/asasu
ASU Alumni Association	MAIN 200	480/965-2586 1-800-258-6687	www.asu.edu/alumni
Administration	MAIN 200	480/965-2086	—
Alumni Publications/ASU Vision Magazine	MAIN 200	480/727-6280	—
Alumni Relations/Campuses, Chapters, and College Associations	MAIN 200	480/965-5275	—
Alumni Travel	MAIN 200	480/965-0099	—
Business Office	MAIN 200	480/965-9357	—
Career Programs	MAIN 200	480/965-5074	—
Membership/Marketing	MAIN 200	480/965-8346	—
Records Department	MAIN 200	480/965-4631	—
Reunions	MAIN 200	480/965-4282	—
Scholarships	MAIN 200	480/965-5275	—
Student Relations	MAIN 200	480/965-7754	—
Sun Devil Advocates (Grassroots Legislative Network)	MAIN 200	480/965-4078	—
ASU West Alumni Programs	FAB S363	602/543-ALUM	www.west.asu.edu/asuwalum
ASU East Alumni Programs	CNTR 20	480/727-1000	www.east.asu.edu
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
West Campus Library	FLHLB	602/543-5717	www.west.asu.edu/library
Bookstore, ASU	BKSTR	480/965-7928	bookstore.asu.edu/index.php

¹ See “ASU East Directory,” page 442.

² See “ASU Extended Campus Directory,” page 468.

³ See “ASU West Directory,” page 452.

Organization	Location	Telephone	Web Address
Business, W. P. Carey School of	BA 109	480/965-4227	www.wpcarey.asu.edu
Accountancy and Information Management, School of	BA 223	480/965-3631	www.wpcarey.asu.edu/acct
Business Administration (M.B.A.)	BA 160	480/965-3332	www.wpcarey.asu.edu/mba
Business Administration (Ph.D.)	BA 151	480/965-3368	www.wpcarey.asu.edu/grad/phd
Economics, Department of	BAC 659	480/965-3531	www.wpcarey.asu.edu/ecn
Finance, Department of	BAC 519	480/965-3131	www.wpcarey.asu.edu/fin
Health Administration and Policy, School of	BA 318	480/965-7778	www.wpcarey.asu.edu/hap
International Business Studies	BA 109	480/965-0596	www.wpcarey.asu.edu/up/ipo.cfm
Management, Department of	BA 323	480/965-3431	www.wpcarey.asu.edu/mgt
Marketing, Department of	BAC 460	480/965-3621	www.wpcarey.asu.edu/mkt
Small Business, Center for the Advancement of	BA 101	480/965-3962	www.wpcarey.asu.edu/up/smallbusiness.cfm
Supply Chain Management, Department of	BA 446	480/965-6044	www.wpcarey.asu.edu/scm
Campus Dining at ASU	—	—	www.asucampusdining.com
Administrative Office	MU 138	480/965-2305	—
Catering Sales Office	MU 182	480/965-6508	—
Meal Plan Sales	MU 189	480/965-3464	—
Career Services	SSV 329	480/965-2350	www.asu.edu/career
Cashiering Services	SSV 244	480/965-7468	fs.asu.edu/office/cashier.asp
Child and Family Services	MU 14C	480/965-9515	www.asu.edu/mu/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
Danforth Chapel	CHAPL	480/965-3570	www.asu.edu/studentlife/danforth
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
Computer Support/Student Computer Lab	EDB 122	480/965-2126	coecs.asu.edu
Curriculum and Instruction, Division of	ED 426	480/965-1644	coe.asu.edu/programs
Curriculum and Instruction, Graduate Program Office	ED 434	480/965-4602	coe.asu.edu/programs
Dean's Office	EDB 104	480/965-3306	coe.asu.edu
Education Policy Studies Laboratory	EDB L1-01	480/965-1886	www.asu.edu/educ/eps1
Educational Leadership and Policy Studies, Division of	ED 120	480/965-6357	coe.asu.edu/programs
Educational Research and Services, Bureau of	ED 140	480/965-3538	bers.asu.edu
Indian Education, Center for	ED 402	480/965-6292	www.ed.asu.edu/cie
Psychology in Education Admissions Information (Recording, Voice Mail)	—	480/965-6420	—

¹ See "ASU East Directory," page 442.

² See "ASU Extended Campus Directory," page 468.

³ See "ASU West Directory," page 452.

ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
Education, College of (continued)			
Psychology in Education, Division of	EDB 302	480/965-3384	coe.asu.edu/programs
Southwest Center for Education Equity and Language Diversity	ED 440	480/965-7134	www.asu.edu/educ/sceed
Student Services, Office of			
Academic Advising	EDB L1-13	480/965-5555	coe.asu.edu/oss
Living and Learning Residential Floor	MANZH	480/965-9706	coe.asu.edu/oss
New Student Recruitment	EDB L1-12	480/965-5555	coe.asu.edu/oss
Professional Field Experiences	EDB L1-14	480/965-6255	coe.asu.edu/pfe
Tutoring and Scholarships	EDB L1-19	480/965-9789	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			
Bioengineering, Harrington 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/ee
Engineering, School of	ECG 105	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	480/965-9696	www.asu.edu/xed
Fine Arts Box Office	FAC	480/965-6447	—
Fine Arts, Herberger College of			
Art, School of	GHALL 132 ART 102	480/965-6536 480/965-3468	herbergercollege.asu.edu herbergercollege.asu.edu/art
Dance, Department of	PEBE 107A	480/965-5029	herbergercollege.asu.edu/dance
Music, School of	MUSIC E185	480/965-3371	music.asu.edu/home.html
Theatre, Department of	GHALL 232	480/965-5337	herbergercollege.asu.edu/theatre
Freshman Year Experience	SSV 176	480/965-6947	www.asu.edu/fye
Gerontology (Certificate)	WHALL 116	480/965-3225	www.asu.edu/graduate/gerontology
Graduate College			
Admissions	WILSN lobby WILSN 101	480/965-3521 480/965-6113	www.asu.edu/graduate www.asu.edu/graduate/admissions
Advising/Referral Office	WILSN lobby	480/965-3521	www.asu.edu/graduate
Financial Assistance	WILSN lobby	480/965-3521	www.asu.edu/graduate/financial
Format Office	WILSN lobby	480/965-3521	www.asu.edu/graduate/format
Graduation Section	SSV 140	480/965-3256	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
Human Resources Customer Service Center	USB	480/965-2701	www.asu.edu/hr

¹ See "ASU East Directory," page 442.

² See "ASU Extended Campus Directory," page 468.

³ See "ASU West Directory," page 452.

Organization	Location	Telephone	Web Address
Information Technology	—	—	www.asu.edu/it
Classroom Support Centers	CPCOM 105	480/965-3342	www.asu.edu/classroomsupport
Computer Accounts Office	CPCOM 202	480/965-1211	www.asu.edu/computeraccounts
Computing Site Hours	—	480/965-6500	www.asu.edu/siteschedules
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/islab
Intergroup Relations Center	SSV 278	480/965-1574	www.asu.edu/provost/intergroup
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	—
John J. Ross–William C. Blakley Law Library	LAWLB	480/965-6141	www.lawlib.asu.edu
Learning Resource Center	SSV 394	480/965-6254	www.asu.edu/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	LSC 226	480/965-3571	lifesciences.asu.edu
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	480/965-5519	www.asu.edu/compbiosci
English, Department of	LL 542	480/965-3168	www.asu.edu/clas/english
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
Kinesiology, Department of	PEBW M212	480/965-3875	www.asu.edu/clas/kines
Languages and Literatures, Department of	LL 440	480/965-6281	www.asu.edu/languages/
Mathematics and Statistics, Department of	PS A216	480/965-3951	math.la.asu.edu
Microbiology	LSC 226	480/965-1457	lifesciences.asu.edu/microbiology
Molecular and Cellular Biology	LSE 441	480/965-0743	ls.la.asu.edu/mcb
Molecular Bioscience and Biotechnology	LSC 226	480/965-3571	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	LSC 226	480/965-3571	lifesciences.asu.edu/plantbiology

¹ See “ASU East Directory,” page 442.

² See “ASU Extended Campus Directory,” page 468.

³ See “ASU West Directory,” page 452.

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Organization	Location	Telephone	Web Address
Liberal Arts and Sciences, College of (continued)			
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			
John J. Ross–William C. Blakley Law Library	LAWLB	480/965-6141	www.lawlib.asu.edu
University Libraries	LIB	480/965-6164	www.asu.edu/libraries
Architecture and Environmental Design Library	AED 153	480/965-6400	www.asu.edu/caed/RESOURCES/ AEDLIBRARY/html/AEDLibrary.htm
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	480/965-7607	www.asu.edu/lib/noble
Reference Questions	—	480/965-4932	www.asu.edu/lib/hayden/ref
Memorial Union			
Administrative Offices	MU Mezzanine	480/965-5310	—
Event and Meeting Services	MU 1st level	480/965-3406	—
Information Desk	MU 1st level	480/965-5728	—
Lost and Found	MU 1st level	480/965-5728	—
Montgomery Computer Lab and Work Room	MU 1st level	480/727-6663	—
Sparky's Den	MU lower level	480/965-3646	—
Multicultural Student Center	SSV 394	480/965-6060	www.asu.edu/studentlife/msc
Nursing, College of			
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 Services Office	NUR 108	480/965-2987	nursing.asu.edu/studentsservices
Operator, University	—	480/965-9011	—
Parents Association (Programs)	SSV 110	480/965-7625	—
Parking and Transit Services	University Towers	480/965-6406	www.asu.edu/dps/pts
Programming and Visual Arts	MU 304	480/965-2255	www.asu.edu/mu/pva
Public Programs, College of			
Advanced Public Executive Program	ASUDC C110	480/965-4006	spa.asu.edu/apep
American Humanics Program	AG 213	480/965-5726	www.asu.edu/copp/recreation/emphasis/ah
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

¹ See "ASU East Directory," page 442.

² See "ASU Extended Campus Directory," page 468.

³ See "ASU West Directory," page 452.

Organization	Location	Telephone	Web Address
Public Programs, College of (continued)			
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 356	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	sww.asu.edu
Urban Inquiry, Center for	AG 320B	480/965-9216	www.asu.edu/copp/urban
Registrar	SSV 144	—	www.asu.edu/registrar
General Information (Recorded)	—	480/965-4747	—
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.)	PSA 323	480/965-2460	www.asu.edu/graduate/SEM
Speech and Hearing Science (Ph.D.)	CSB 146	480/965-9396	www.asu.edu/clas/shs
Statistics (M.S.)	BAC 570	480/965-2671	www.asu.edu/graduate/statistics
Student Accounts	SSV 230	480/965-6341	www.asu.edu/sbs
Student Business Services	ADM A105	480/965-6301	www.asu.edu/sbs
Student Development and Memorial Union	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 Health and Wellness Center	SHS	480/965-3346	www.asu.edu/health
Appointments	—	480/965-3349	—
Fax	—	480/965-8914	—
Insurance	—	480/965-2411	—
Measles Information	—	480/965-1358	—
Student ID (Sun Card)	MU 190	480/965-2273	www.suncard1.com
Student Judicial Affairs	SSV 265	480/965-6547	www.asu.edu/studentlife/judicial
Student Leadership Programs	MU 340	480/965-2255	www.asu.edu/mu/slp
Student Legal Assistance	MU 329	480/965-6307	www.asu.edu/studentlife/legal
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/summer
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
SunDial	—	480/350-1500	www.asu.edu/registrar/registration/intouch.html

¹ See "ASU East Directory," page 442.

² See "ASU Extended Campus Directory," page 468.

³ See "ASU West Directory," page 452.

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Organization	Location	Telephone	Web Address
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	—
Tuition Payment Office	SSV 230	480/965-4347	www.asu.edu/sbs
University Evaluation, Office of	AG 281	480/965-9291	www.asu.edu/oue
University Libraries (See “Libraries,” page 360.)			
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	RITT B132	480/965-9797	www.asu.edu/xed/winter

¹ See “ASU East Directory,” page 442.

² See “ASU Extended Campus Directory,” page 468.

³ See “ASU West Directory,” page 452.

Regents' Professors

The title “regents’ professor” is conferred on selected members of the ASU tenured faculty who have achieved and are sustaining the highest level of distinction by their exceptional contributions to the mission of the university in research or other creative activity and in teaching or professional service.

JOHN ALCOCK

Biology

DAVID L. ALTHEIDE

Justice Studies

C. AUSTEN ANGELL

Chemistry and Biochemistry

CONSTANTINE A. BALANIS

Electrical Engineering

DAVID C. BERLINER

*Educational Leadership and Policy Studies
and Psychology in Education*

PETER R. BUSECK

Chemistry and Biochemistry and Geological Sciences

ROBERT B. CIALDINI

Psychology

GEOFFREY A. CLARK

Anthropology

JOHN M. COWLEY

Physics and Astronomy, Emeritus

NORMAN DUBIE

English

NANCY H. EISENBERG

Psychology

LEROY EYRING

Chemistry and Biochemistry, Emeritus

DAVID K. FERRY

Electrical Engineering

DAVID WILLIAM FOSTER

Spanish

WILLIAM L. GRAF

Geography, Emeritus

RONALD GREELEY

Geological Sciences

GERALD THOMAS HEYDT

Electrical Engineering

DAVID R. HICKMAN

Music

PETER IVERSON

History

DAVID H. KAYE

Law

GARY D. KELLER

Spanish

MARK C. KLETT

Art

RAYMOND W. KULHAVY

Psychology in Education, Emeritus

DANIEL M. LANDERS

Kinesiology

SHENG H. LIN

Chemistry and Biochemistry, Emeritus

JANE MAIENSCHIEIN

Philosophy and Biology

JAMES W. MAYER

*Chemical and Materials Engineering
and Solid State Science*

CARLETON B. MOORE

*Chemistry and Biochemistry and Geological
Sciences, Emeritus*

JEFFRIE G. MURPHY

Law and Philosophy

MICHAEL O'KEEFFE

Chemistry and Biochemistry

CAIO PAGANO

Music

DENNIS J. PALUMBO

Justice Studies, Emeritus

G. ROBERT PETTIT

Chemistry and Biochemistry

ALBERTO ALVARO RÍOS

English

NANCY FELIPE RUSSO

Psychology

DAVID J. SMITH

Physics and Astronomy and Solid State Science

JOHN C.H. SPENCE

Physics and Astronomy

SUMNER G. STARRFIELD

Physics and Astronomy

MARY BETH STEARNS

Physics and Astronomy, Emerita

CHRISTY G. TURNER II

Anthropology

J. BRUCE WAGNER JR.

*Chemistry and Biochemistry and Solid State Science,
Emeritus*

KURT WEISER

Art

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

Abbas, James J. (2002), Associate Professor of Bioengineering; Sc.B., Brown University; M.S., Ph.D., Case Western Reserve University

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), Senior 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), Professor Emerita 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; 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

Agadjanian, Victor (1995), Associate Professor of Sociology; B.A., Moscow State University (Russia); M.S., Ph.D., University of Southern California

Aguilár, 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

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; Interim Dean, 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; Chair, Division of Community Health/Psychosocial Nursing Systems; 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

Anderies, J. Marty (2002), Assistant Professor of Biology; B.S., Colorado School of Mines; M.S., Ph.D., University of British Columbia (Canada)

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), Senior Research Scientist, Mechanical and Aerospace Engineering; 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

Anderson-Rowland, Mary R. (1974), Associate Professor of Industrial Engineering; Associate Dean, Student Affairs; B.A., Hope College; M.S., Ph.D., University of Iowa

Andress, Barbara L. (1972), Professor Emerita of Music; B.A., M.A., Arizona State University



Angell, C. Austen
(1989)

Regents' Professor of Chemistry and Biochemistry; B.S., M.S., Melbourne University (Australia); Ph.D., University of London (United Kingdom)

Anijar, Karen Z. (1998), Associate Professor of Curriculum and Instruction; B.A., Florida State University; M.A., Ph.D., University of North Carolina, Greensboro

Appleton, Nicholas R. (1972), Professor of Curriculum and Instruction and Educational Leadership and Policy Studies; Academic Program Coordinator, Social and Philosophical Foundations; B.A., San Francisco State University; M.A., California State University, Northridge; Ed.D., University of Massachusetts, Amherst

Aranda, Luis (1975), Professor Emeritus of Legal and Ethical Studies; B.M., M.Ed., University of Arizona; J.D., Arizona State University

Arciniega, G. Miguel (1979), Associate Professor of Counselor Education; B.S., M.A., New Mexico State University; Ph.D., University of Arizona

Ariaratnam, Sam (2001), Associate Professor of Construction; B.A.Sc., University of Waterloo (Canada); M.S., Ph.D., University of Illinois, Urbana-Champaign

Arias, M. Beatriz (1989), Associate Professor of Curriculum and Instruction; B.A., M.A., Occidental College; Ph.D., Stanford University

Armbruster, Charlotte (1997), Clinical Associate Professor of Nursing; B.S.N., M.S., Arizona State University

Armbruster, Dieter (1989), Professor of Mathematics and Statistics; Abitur, Zeppelin, Gymnasium (Germany); Diplom, Ph.D., University of Tübingen (Germany)

Armendt, Brad (1989), Associate Professor of Philosophy; B.A., Rice University; Ph.D., University of Illinois, Chicago

Arner, Douglas G. (1959), Professor Emeritus of Philosophy; B.S., Creighton University; M.A., Ph.D., University of Michigan

Arnold, William E. (1973), Professor of Communication; Director, Gerontology Program; B.S., M.A., Northern Illinois University; Ph.D., Pennsylvania State University

Arntzen, Charles J. (2000), Professor of Plant Biology; Florence Ely Nelson Presidential Chair, Plant Biology; B.S., M.S., University of Minnesota; Ph.D., Purdue University

Aronson, Jerome M. (1966), Professor Emeritus of Plant Biology; B.A., Ph.D., University of California, Berkeley

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Arredondo, Patricia (1999), Associate Professor of Psychology in Education; B.S., Kent State University; Ed.M., Boston College; Ed.D., Boston University

Arreola, Daniel (1990), Professor of Geography; B.A., University of California, Los Angeles; M.A., California State University, Hayward; Ph.D., University of California, Los Angeles

Arrowsmith, J. Ramon (1995), Associate Professor of Geological Sciences; B.A., Whittier College; Ph.D., Stanford University

Arterian, Hannah R. (1979), Professor Emerita of Law; B.A., Elmira College; J.D., University of Iowa

Ashbrook, Mark (2000), Lecturer of Mathematics and Statistics; B.S., M.S., University of Illinois; M.A., University of Kansas

Ashcraft, Robert F. (1995), Associate Professor of Recreation Management and Tourism; Director, Center for Nonprofit Leadership and Management; B.A., University of Arizona; M.A., Northern Arizona University; Ph.D., Arizona State University

Ashford, Jose B. (1984), Professor of Social Work; B.A., Loyola University, New Orleans; M.S.W., Ohio State University; Ph.D., Bowling Green State University

Ashforth, Blake (1996), Professor of Management; B.Comm., Ph.D., University of Toronto (Canada)

Ashley, Richard (1981), Associate Professor of Political Science; B.A., University of California, Santa Barbara; M.A., Ph.D., Massachusetts Institute of Technology

Askland, Andrew (1999), Director, Center for the Study of Law, Science, and Technology; A.B., Holy Cross College; B.S., University of Maryland; M.A., University of Colorado; J.D., University of Maryland; Ph.D., University of Colorado

Atkinson, Laura (2002), Lecturer of Curriculum and Instruction; B.A., Saint Edward's University; M.S., University of Wisconsin, Madison

Atkinson, Robert K. (2002), Assistant Professor of Psychology in Education; B.A., California State University, Chico; M.S., Ph.D., University of Wisconsin, Madison

Atsumi, Takayori P. (1968), Professor Emeritus of Music; B.F.A., Kunitachi Music College (Japan); M.M., New England Conservatory of Music

Augsburg, Tanya (1997), Lecturer of Interdisciplinary Studies; B.A., New York University; M.A., Ph.D., Emory University

Aulerich, Christopher E. (1989), Faculty Associate, Del E. Webb School of Construction

Axelrod, Morris (1972), Professor Emeritus of Sociology; B.A., Ph.D., University of Michigan

Axford, Roger W. (1975), Professor Emeritus of Curriculum and Instruction; B.A., Nebraska Wesleyan University; M.A., Ph.D., University of Chicago

Ayyanar, Raja (2000), Assistant Professor of Electrical Engineering; B.E., P.S.G. College of Technology (India); M.S., Indian Institute of Science (India); Ph.D., University of Minnesota

Azuma, Tamiko (1998), Assistant Professor of Speech and Hearing Science; B.A., University of California, Santa Cruz; M.A., Ph.D., Arizona State University

B

Backhaus, Ralph A. (1977), Professor of Plant Biology; B.S., Rutgers, The State University of New Jersey; M.S., Ph.D., University of California, Davis

Backus, Charles E. (1968), Professor of Electrical Engineering; Provost, ASU East; Vice President, ASU; B.S.M.E., Ohio University; M.S., Ph.D., University of Arizona

Bacon, Catherine K. (1990), Clinical Associate Professor of Speech and Hearing Science; B.A., University of California, Santa Barbara; M.A., University of Minnesota

Bacon, Sid P. (1988), Professor of Speech and Hearing Science; B.G.S., M.A., University of Kansas; Ph.D., University of Minnesota, Twin Cities

Bacon, Thomas (1993), Professor Emeritus of Music; B.S., Oakland University

Badger, William W. (1985), Professor of Construction; Director, Del E. Webb School of Construction; B.S.M.E., Auburn University; M.S.C.E., Oklahoma State University; Ph.D., Iowa State University

Baek, Jae-Meen (2001), Assistant Professor of Curriculum and Instruction; B.S., Ewha Women's University (South Korea); M.S., Ph.D., University of Wisconsin, Madison

Baer, Steven M. (1988), Associate Professor of Mathematics and Statistics; B.S., M.S., Ph.D., University of Illinois

Bagwell, Marilyn (1972), Professor Emerita of Nursing; B.S.N., University of California, Los Angeles; M.A., Arizona State University; Ph.D., Texas Woman's University

Bahr, Donald M. (1967), Professor of Anthropology; A.B., M.A., Ph.D., Harvard University

Baier, Leslie (1995), Adjunct Professor of Microbiology; B.A., Lawrence University; Ph.D., University of Michigan

Bailey, James E. (1974), Professor Emeritus of Industrial Engineering; B.S.I.E., M.S.I.E., Ph.D., Wayne State University

Bailey, Wayne A. (2000), Professor of Music; Director, School of Music; B.M.E., Iowa State University; M.M., University of Michigan; D.M.A., University of Colorado

Baker, Aaron (1992), Assistant Professor of Interdisciplinary Humanities; B.A., Hobart College; M.A., Ph.D., Indiana University

Baker, Brenda J. (1998), Associate Professor of Anthropology; B.A., Northwestern University; M.A., Ph.D., University of Massachusetts, Amherst

Baker, Dale R. (1989), Professor of Curriculum and Instruction; B.A., University of Oklahoma; M.A.T., Trenton State College; Ed.D., Rutgers, The State University of New Jersey

Baker, Marc A. (1988), Adjunct Faculty of Plant Biology; B.A., San Jose State University; M.A., Humboldt State University; Ph.D., Arizona State University

Baker, Virgil R. (1966), Professor Emeritus of Geography; B.S., M.S., University of Nebraska; Ph.D., University of Utah



Balanis, Constantine A.

(1983)

Regents' Professor of Electrical Engineering; B.S.E.E., Virginia Polytechnic Institute and State University; M.E.E., University of Virginia; Ph.D., Ohio State University

Balasubramanian, Krishnan (1980), Professor Emeritus of Chemistry; M.Sc., Birla Institute of Technology Science, India; M.A., Ph.D., Johns Hopkins University

Baldini, Pier Raimondo (1978), Professor of Italian; B.A., San Francisco State University; M.A., University of British Columbia (Canada); Ph.D., University of California, Los Angeles

Baldwin, Marjorie L. (2002), Professor of Health Administration and Policy; B.S., State University College, Oswego; M.A., Ph.D., Syracuse University

- Ball, Terence** (1998), Professor of Political Science; B.A., University of California, Santa Cruz; M.A., Ph.D., University of California, Berkeley
- Balling, Robert C.** (1987), Professor of Geography; Director, Climatology Laboratory; A.B., Wittenberg University; M.A., Bowling Green State University; Ph.D., University of Oklahoma
- Ballon-Aguirre, Enrique** (1992), Professor of Spanish; Bachiller en Letras, Bachiller en Derecho, University of Arequipa (Peru); Doctor en Literatura, National University of San Marcos (Peru); Doctorat en Études Iberiques, University of Paris III (France)
- Baral, Chitta** (1999), Professor of Computer Science and Engineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., University of Maryland, College Park
- Barcelo, Héléne** (1990), Associate Professor of Mathematics and Statistics; Ms.C., University of Quebec (Canada); Ph.D., University of California, San Diego
- Bardewyck, Loretta A.** (1957), Professor Emerita of Nursing; Dean Emerita, College of Nursing; P.H.N., B.S., University of Minnesota, Twin Cities; M.S., Cornell University
- Bardrick, Richard A.** (1956), Professor Emeritus of Psychology; A.B., Ph.D., University of California, Los Angeles
- Barker, David** (1983), Professor of Theatre; B.S.E., Duquesne University; M.F.A., Rutgers, The State University of New Jersey
- Barkley, Margaret V.** (1963), Professor Emerita of Family and Human Development; B.S., Millikin University; M.S., Ed.D., University of Illinois
- Barkson, Joseph A.** (1958), Professor Emeritus of Engineering; B.S.E.E., University of Michigan; M.S., Ph.D., University of Illinois
- Barlow, Richard B.** (1964), Professor Emeritus of History; B.A., M.A., Ph.D., University of Pennsylvania
- Barnard, John P.** (1991), Learning Resources Specialist Emeritus; B.S., State University of New York; M.Ed., Ph.D., Arizona State University
- Barnes, Andrew** (1996), Associate Professor of History; B.A., Wesleyan University; M.A., Ph.D., Princeton University
- Barona, Andrés** (1986), Professor of Psychology in Education; B.S., M.Ed., Texas A&M University; Ph.D., University of Texas, Austin
- Barone, Thomas E.** (1990), Professor of Curriculum and Instruction and Educational Leadership and Policy Studies; Interim Director, Division of Curriculum and Instruction; B.A., Loyola University, New Orleans; M.A., University of New Orleans; Ed.D., Stanford University
- Barratt, Mark** (2002), Assistant Professor of Supply Chain Management; B.A., University of Greenwich (United Kingdom); Ph.D., Cranfield School of Management (United Kingdom)
- Barrera, Manuel** (1977), Professor of Psychology; B.S., University of Wisconsin, Eau Claire; M.A., Ph.D., University of Oregon
- Barrett, Marianne** (1994), Associate Professor of Journalism and Mass Communication; B.S., Kutztown University; M.P.S., Syracuse University; Ph.D., Michigan State University
- Barroll-Aschaffenburg, Rayna** (1980), Professor Emerita of Music; B.M., University of Texas; D.M.A., University of Maryland, College Park
- Barry, Rebecca E.** (2002), Assistant Professor of Recreation Management and Tourism; B.A., University of Utah; M.A., Middlebury College; Ph.D., University of Utah
- Bartels, Robert D.** (1981), Professor of Law; B.A., University of Michigan; J.D., Stanford University
- Bartlett, Mark** (2000), Associate Law Librarian; B.A., University of New Brunswick (Canada); M.L.I.S., Dalhousie University (Canada)
- Barto, Michelle** (1999), Lecturer of Speech and Hearing Science; B.A., M.Ed., Arizona State University
- Barton, C. Michael** (1987), Professor of Anthropology; Collections Administrator; B.A., University of Kansas; M.A., Ph.D., University of Arizona
- Barton, John L.** (1994), Senior Lecturer of Psychology; B.A., University of Nebraska, Lincoln; M.A., Ph.D., Arizona State University
- Bartz, Donna** (1968), Professor Emerita of Theatre; B.F.A., M.A., University of Colorado
- Bashford, Howard H.** (1997), Associate Professor of Construction; B.S., M.S., University of Wyoming; Ph.D., Brigham Young University
- Batalden, Stephen K.** (1976), Professor of History; Coordinator of Russian, East European Studies Consortium; B.A., Augsburg College; M.A., Ph.D., University of Minnesota
- Bates, Dawn W.** (1989), Associate Professor of English; B.A., Ph.D., University of Washington
- Bates, Mary** (1996), Professor of Art; B.F.A., Colorado State University; M.F.A., Indiana University
- Baty, Wayne M.** (1962), Professor Emeritus of General Business; B.S., Southwest Missouri State College; M.A., Northwestern University; Ph.D., University of Southern California
- Bauer, Ernst** (1990), Distinguished Research Professor of Physics and Astronomy; Diplom., Dr. rer. nat., University of Munich (Germany)
- Bauer, Richard** (2000), Lecturer of Chemistry and Biochemistry; B.S., Saginaw Valley State University; M.S., Ph.D., Purdue University
- Bazzi, Rida** (1996), Associate Professor of Computer Science and Engineering; B.E., American University of Beirut (Lebanon); M.S., Ph.D., Georgia Institute of Technology
- Beals, Stephen P.** (1996), Adjunct Professor of Speech and Hearing Science; B.S., Calvin College; M.D., Wayne State University College of Medicine
- Beardmore, Gary D.** (1979), Associate Research Technologist of Geological Sciences; B.A., Arizona State University
- Beattie, Donald** (2001), Assistant Professor of Military Science; B.S., Buffalo State College; M.A.E., University of Colorado, Boulder
- Beaudoin, Stephen P.** (1995), Associate Professor of Chemical Engineering; B.S., Massachusetts Institute of Technology; M.S., University of Texas, Austin; Ph.D., North Carolina State University
- Beck, Lasca** (1984), Professor Emerita of Nursing; B.S.N., Texas Woman's University; M.S., Texas A&M University, Commerce
- Beckman, James R.** (1980), Associate Professor of Chemical Engineering; Associate Chair for Department of Chemical and Materials Engineering; B.S., M.S., University of Wisconsin; Ph.D., University of Arizona
- Bedard, Roger L.** (1990), Evelyn Smith Family Endowed Professor of Theatre; B.A., University of Northern Iowa; M.F.A., University of Oregon; Ph.D., University of Kansas

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Bedient, Jack D. (1963), Professor Emeritus of Mathematics and Statistics; A.B., Albion College; M.B.S., Ed.D., University of Colorado

Bedworth, David D. (1963), Professor Emeritus of Industrial Engineering; B.S.I.E., Lamar College of Technology; M.S.I.E., Ph.D., Purdue University

Beggs, Donald (1999), Lecturer of the Barrett Honors College; Faculty Chair, the Barrett Honors College; A.B., University of California, Berkeley; Ph.D., University of California, Santa Cruz

Behrens, John T. (1994), Associate Professor of Psychology in Education; B.A., University of Notre Dame; M.A., Ph.D., Arizona State University

Bell, George H. (1976–82; 1989), Librarian, Noble Science Reference Services; B.A., William Paterson College; M.L.S., Pratt Institute

Bell, James W. (1966), Professor Emeritus of Curriculum and Instruction; B.A., Washburn University of Topeka; M.Ed., Ed.D., University of Kansas

Bell, John E. (1965), Professor Emeritus of Curriculum and Instruction; B.S., University of Nebraska, Lincoln; M.A., Ed.D., University of Wyoming

Bell, Mary E. (1970), Professor Emerita of Education; B.S., Indiana State Teachers College; M.S., Butler University; Ed.D., Indiana University, Bloomington

Bell, Shirley (1988), Clinical Professor of Nursing; B.S.N., University of Cincinnati; M.S.N., Wayne State University; Ed.D., West Virginia University

Bellamy, Lynn (1976), Professor Emeritus of Chemical Engineering; B.S., Texas A&M University; M.S., Ph.D., Tulane University

Belok, Michael V. (1959), Professor Emeritus of Education; B.S., Indiana University, Bloomington; M.A., Arizona State University; Ph.D., University of Southern California

Benavides, Alfredo H. (1988), Associate Professor of Curriculum and Instruction; B.A., Texas A&I University; M.A., Ph.D., Michigan State University

Bender, Bert A. (1971), Professor of English; B.A., University of Washington; Ph.D., University of California, Irvine

Bender, Diane (2002), Assistant Professor of Design; B.A., M.A., Ph.D., Michigan State University

Bender, Gordon L. (1953), Professor Emeritus of Biology; B.S., Iowa State College; M.S., University of Wisconsin; Ph.D., University of Illinois

Bender, Paul (1984), Professor of Law; A.B., LL.B., Harvard University

Benin, David B. (1970), Professor Emeritus of Physics and Astronomy; A.B., Cornell University; M.A., Ph.D., University of Rochester

Benin, Mary B. (1979), Associate Professor of Sociology; B.A., Vanderbilt University; M.A., Ph.D., University of Nebraska, Lincoln

Benn, James A. (2001), Assistant Professor of Religious Studies; B.A., University of Cambridge (England); M.A., University of London (England); Ph.D., University of California, Los Angeles

Bennett, Peter A. (1984), Professor of Physics and Astronomy; B.A., University of Minnesota, Duluth; Ph.D., University of Wisconsin, Madison

Benzinger, Robert P. (1970), Professor Emeritus of Design; B.S.M.E., University of Wisconsin, Madison; M.A.E., Chrysler Institute of Engineering

Berch, Michael A. (1969), Professor of Law; B.A., J.D., Columbia University

Berens, Michael E. (1995), Adjunct Faculty of Biology; B.S., Arizona State University; Ph.D., University of Arizona



Berliner, David C.
(1987)

Regents' Professor of Educational Leadership and Policy Studies and Psychology in Education; B.A., University of California, Los Angeles; M.A., California State University, Los Angeles; Ph.D., Stanford University

Berman, David R. (1966), Professor of Political Science; B.A., Rockford College; M.A., Ph.D., American University

Berman, Neil S. (1964), Professor Emeritus of Chemical Engineering; B.S., University of Wisconsin; M.S., M.A., Ph.D., University of Texas

Bernard, Stephen Z. (1994), Faculty Associate of Construction; B.S., Arizona State University

Bernardi, Jose (1995), Associate Professor of Design; B.Arch., National University of Cordoba; M.S., University of Cincinnati

Bernardini, Wesley (2002), Adjunct Professor of Anthropology; B.A., University of Virginia; M.A., Ph.D., Arizona State University

Bernstein, Bianca L. (1987), Professor of Counseling Psychology and Counselor Education; Dean (on-leave), Graduate College; B.A., University of California, Berkeley; M.Ed., Ph.D., University of California, Santa Barbara

Bertelsen, Wendle R. (1964), Professor Emeritus of Architecture; B.Arch., University of Michigan; M.Arch., University of Arizona

Bess, Vicki (1994), Adjunct Faculty of Microbiology; M.S., Arizona State University

Betz, M. Austin (1974), Professor Emeritus of Education; B.S., Lock Haven State College; M.Ed., Pennsylvania State University; M.A.T., Brown University; M.A., Ph.D., University of Illinois

Betz, Mathew J. III (1961), Professor Emeritus of Civil Engineering; B.S., M.S., Ph.D., Northwestern University

Bhattacharya, Sourav (1996), Associate Professor of Computer Science and Engineering; B.E., Jadavpur University (India); M.Tech., Indian Institute of Technology (India); M.S., University of Southwestern Louisiana; Ph.D., University of Minnesota

Bhattacharya, Sudipto (2003), Professor of Finance; B.S., University of Delhi (India); Postgraduate Diploma, Indian Institute of Management (India); Ph.D., Massachusetts Institute of Technology

Biblarz, Dora (1980), Librarian Emerita; B.A., M.L.S., University of California, Los Angeles; M.A., University of California, Davis

Bickford, William B. (1966), Professor Emeritus of Engineering; B.S., M.S., Kansas State University; Ph.D., University of Illinois

Bieber, Allen L. (1963), Professor Emeritus of Chemistry and Biochemistry; Director, Interdisciplinary Committee on Molecular and Cellular Biology; B.S., M.S., North Dakota State University; Ph.D., Oregon State University

Bingham, Scott (1989), Associate Research Scientist of Plant Biology; B.S., Brown University; Ph.D., Brandeis University

Binkley, Roberta A. (2001), Lecturer of English; B.A., Colorado State University; M.A., Ph.D., University of Arizona

Bird, Jonathan Paul (1997), Associate Professor of Electrical Engineering; B.S., D.Phil., University of Sussex (United Kingdom)

- Birge, Edward A.** (1972), Associate Professor of Microbiology; Codirector, Molecular Biosciences and Biotechnology Program; B.A., Ph.D., University of Wisconsin, Madison
- Birk, James P.** (1973), Professor of Chemistry and Biochemistry; B.A., Saint John's University; Ph.D., Iowa State University
- Birtcher, Craig R.** (1987), Associate Research Professional, Electrical Engineering; B.S.E., M.S., Arizona State University
- Bitner, Mary Jo** (1987), ATT Professor of Marketing; B.A., M.B.A., Ph.D., University of Washington
- Bitter, Gary G.** (1970), Professor of Curriculum and Instruction and Psychology in Education; B.S., Kansas State University; M.A., Kansas State Teachers College; Ph.D., University of Denver
- Bivona, Daniel** (1996), Associate Professor of English; Associate Dean, Academic Programs, College of Liberal Arts and Sciences; B.A., University of Connecticut; M.A., Northeastern University; Ph.D., Brown University
- Bjork, Robert E.** (1983), Professor of English; Director, Arizona Center for Medieval and Renaissance Studies; B.A., Pomona College; M.A., Ph.D., University of California, Los Angeles
- Blackham, Garth J.** (1962), Professor Emeritus of Counselor of Education; B.S., M.S., Utah State University; Ph.D., Cornell University
- Blackledge, Vernon O.** (1969), Professor Emeritus of Computer Science and Engineering; B.S.E.E., University of Illinois; M.S.E.E., University of Santa Clara; Ph.D., Arizona State University
- Blackman, William C.** (1988), Research Professional Emeritus, Center for Environmental Studies; B.S., M.S., University of Missouri; M.P.A., University of Southern California; D.P.A., University of Colorado
- Blackson, Thomas** (1995), Associate Professor of Philosophy; B.A., DePauw University; Ph.D., University of Massachusetts
- Blakemore, Arthur E.** (1979), Professor of Economics; Chair, Department of Economics; B.S., M.A., University of Detroit; Ph.D., Southern Illinois University, Carbondale
- Blancero, Donna** (1993), Assistant Professor of Management; B.S., College of Old Westbury; M.S., New York Institute of Technology; Ph.D., Cornell University
- Blanchard, Jay S.** (1988), Professor of Psychology in Education; M.S.T., Drake University; Ph.D., University of Georgia
- Blankenship, Robert E.** (1985), Professor of Chemistry and Biochemistry; Chair, Department of Chemistry and Biochemistry; B.S., Nebraska Wesleyan College; Ph.D., University of California, Berkeley
- Blasingame, James B. Jr.** (2000), Assistant Professor of English; B.A., University of Northern Iowa; M.Ed., Drake University; Ph.D., University of Kansas, Lawrence
- Blasko, Vincent J.** (1980), Associate Professor of Marketing; B.S., M.B.A., Arizona State University; Ph.D., University of Texas, Austin
- Bloom, Irene** (1997), Lecturer of Mathematics and Statistics; B.A., M.S., University of Miami
- Blouin, Deborah K.** (1971), Associate Librarian, Hayden Reference Services; B.A., Cedar Crest College; M.L.S., State University of New York, Albany
- Blount, Douglas J.** (1990), Associate Professor of Mathematics and Statistics; B.S., M.S., Ph.D., University of Wisconsin, Madison
- Blumenfeld-Jones, Donald** (1990), Associate Professor of Curriculum and Instruction; B.A., Rutgers, The State University of New Jersey; M.F.A., Ed.D., University of North Carolina, Greensboro
- Boatsman, James R.** (1986), Peat Marwick Professor of Accountancy; B.S., M.S., Oklahoma State University; Ph.D., University of Texas, Austin
- Boatsman, Joyce L.** (1996), Lecturer of Accountancy and Information Management; B.S., Oklahoma State University; M.Tax., Arizona State University
- Bodell, Leonard S.** (1992), Adjunct Professor of Anthropology; B.A., Hobart and William Smith Colleges; M.D., New York Upstate Medical Center
- Bodman, Denise** (1996), Senior Lecturer of Family and Human Development; B.S., M.S., Arizona State University
- Bogardus, Clifton** (1992), Adjunct Professor of Biology; M.D., University of Rochester
- Bogart, Quentin J.** (1970), Professor Emeritus of Educational Leadership and Policy Studies; B.A., M.S., Fort Hayes State College; Ph.D., University of Texas, Austin
- Boggs, Lohnie J.** (1959–65; 1966), Professor Emeritus of General Business; B.S., M.S., Ph.D., Ohio State University
- Bohlander, George W.** (1977), Professor of Management; B.A., San Francisco State College; M.B.A., University of Southern California; Ph.D., University of California, Los Angeles
- Bohman, Herbert M.** (1964), Professor Emeritus of Legal and Ethical Studies; B.A., B.S., Drake University; M.B.A., J.D., Indiana University
- Bolin, Robert** (1997), Professor of Sociology; B.A., Ph.D., University of Colorado
- Bolton, Cynthia J.** (1997), Senior Lecturer of Philosophy; B.G.S., University of Michigan; M.A., Ph.D., Michigan State University
- Bonanni, Domenico** (1997), Assistant Librarian, Hayden Reference Services; B.A., University of Alberta (Canada); B.A., Arizona State University; M.L.I.S., Dalhousie University (Canada)
- Bontemps, Arna Alexander** (2001), Associate Professor of African American Studies; B.A., Fisk University; M.A., Atlanta University; Ph.D., University of Illinois
- Booksh, Karl S.** (1996), Associate Professor of Chemistry and Biochemistry; B.S., University of Alaska; Ph.D., University of Washington
- Booth, James R.** (1980), Professor of Finance; B.S., M.A., Ph.D., University of Alabama
- Boradkar, Prasad** (2000), Assistant Professor of Design; B.E., Maharaja Sayajirao University, Baroda (India); M.Des., Industrial Design Centre, Bombay (India); M.A., Ohio State University, Columbus
- Borgo, Philip E.** (1967), Professor Emeritus of Civil Engineering; B.S.C.E., University of Cincinnati; M.S., Ohio State University
- Borovansky, Vladimir R.** (1968), Librarian, Collection Development; M.L.S., Ph.D., Charles University, Prague (Czechoslovakia)
- Borrer, Connie M.** (2000), Lecturer of Industrial Engineering; B.S., M.S., Southern Illinois University, Edwardsville; Ph.D., Arizona State University
- Bortner, Peg** (1979), Associate Professor of Justice Studies; Director, Center for Urban Inquiry; B.A., Edinboro State College; M.A., Ohio University; Ph.D., Washington University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Bossen, Karen** (1997), Assistant Instructional Professional of Recreation Management; B.A., Washington State University; M.Ed., Northern Arizona University
- Boswell, Jacquelyn** (1982), Professor Emerita of Music; B.M.E., Murray State University; M.M.E., Louisiana State University; Ed.D., University of Illinois
- Boulin Johnson, Leanor** (1987), Associate Professor of African American Studies; Director, African American Studies Program; B.S., East Tennessee State University; M.S., Ph.D., Purdue University
- Bowers, Charles O.** (1948), Professor Emeritus of Music; B.S., Southeast Missouri State College; M.M., D.M.A., University of Rochester
- Boyd, Brian** (1996), Associate Professor of Management; Director, M.B.A. High Technology Program; B.S., Suffolk University; M.A., University of Connecticut; Ph.D., University of Southern California
- Boyd, James H.** (1976), Professor Emeritus of Accountancy and Information Management; B.B.A., Texas Christian University; M.S., Northeastern University; Ph.D., University of Texas, Austin; C.P.A., Texas
- Boyd, Thomas A.** (2002), Lecturer of Computer Science and Engineering; B.A., Illinois State University; M.S., Ph.D., Arizona State University
- Boyer, Don L.** (1988), Professor of Mechanical and Aerospace Engineering; B.S., Rensselaer Polytechnic Institute; Ph.D., Johns Hopkins University
- Boyer, Jay M.** (1976), Professor of English; B.A., Saint Louis University; M.A., Ph.D., State University of New York, Buffalo
- Boyes, William J.** (1974), Professor of Economics; B.S., Idaho State University; Ph.D., Claremont Graduate School
- Boylan, Amy Cooper** (1986), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.S.W., M.C., Arizona State University
- Boyle, Bernard M.** (1969), Professor Emeritus of Architecture; B.Arch., University of Sydney (Australia); M.Arch., M.A., Ph.D., Yale University
- Brack, O M Jr.** (1973), Professor of English; B.A., M.A., Baylor University; Ph.D., University of Texas, Austin
- Brada, Josef C.** (1978), Professor of Economics; Director, International Business Studies; B.S., M.A., Tufts University; Ph.D., University of Minnesota, Twin Cities
- Bramlett-Solomon, Sharon** (1986), Associate Professor of Journalism and Mass Communication; B.A., M.A., Memphis State University; Ph.D., Indiana University, Bloomington
- Brandon, Tedd A.** (1981), Senior Research Professional of Bioengineering; Director, Animal Care Facility; B.S., University of California, Davis
- Brandt, Beverly K.** (1987), Professor of Design; B.F.A., University of Michigan; M.A., Michigan State University; Ph.D., Boston University
- Brandt, Elizabeth A.** (1974), Professor of Anthropology; B.A., Florida State University; M.A., Ph.D., Southern Methodist University
- Branstetter, Ellamae** (1967), Professor Emerita of Nursing; B.S., St. Louis University; M.P.H., University of Minnesota, Twin Cities; Ph.D., University of Chicago
- 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; Director, Southwest Center for Environmental Research and Policy; 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, 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; Interim Chair, 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
- Brillhart, Barbara** (1996), Associate Professor of Nursing; B.S.N., M.S.N., California State University, Los Angeles; Ph.D., Texas Woman's University
- Brink, Jean R.** (1974), Professor Emerita 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
- 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
- Brooks, Talbot** (2001), Assistant Academic Professional of Geography; Network Administrator; B.S., Rochester Institute of Technology; M.S., Arizona State University
- 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
- Brouwer, Daniel C.** (2000), Assistant Professor of Communication; B.Sc., Ohio University; M.A., Ph.D., Northwestern University
- Brown, Alan R.** (1968), Associate Professor of Education; B.A., M.A., California State University, Los Angeles; Ph.D., University of Texas, Austin

Brown, Brent W. (1972), Associate Professor of Public Affairs; B.A., Brigham Young University; M.A., Arizona State University; Ph.D., University of Illinois

Brown, Claudia (1998), Associate Professor of Art and History; Director, Center for Asian Studies; B.A., M.A., M.Phil., Ph.D., University of Kansas

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

Brown, Stephen W. (1974), Professor of Marketing; Edward M. Carson Chair of Services Marketing; Director, Center for Services Leadership; B.S., M.B.A., Ph.D., Arizona State University

Brown, Theodore M. (1963), Professor Emeritus of Chemistry and Biochemistry; B.S., M.S., University of Toledo; Ph.D., Iowa State University

Brown, Theresa (2000), Faculty Associate of Nursing; B.S.N., Arizona State University

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), Senior 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

Brungart, Jennifer (2002), Assistant Professor of Design; B.S., University of Cincinnati; M.G.D., North Carolina State University

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

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 Kinesiology; B.S., Springfield College; M.S., University of Illinois; Ed.D., Arizona State University

Brzuzy, 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

Buck, Nancy (2002), Associate Professor of Music; B.M., Oberlin College; M.M., The Cleveland Institute of Music

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

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

Burgoyne, Edward E. (1951), Professor Emeritus of Chemistry and Biochemistry; B.S., Utah State University; M.S., Ph.D., University of Wisconsin, Madison

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 Emerita; 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

Burstein, David (1982), Professor of Physics and Astronomy; B.A., Wesleyan University; Ph.D., University of California, Santa Cruz

Burstein, Karen (1998), Lecturer of Curriculum and Instruction; B.A.E., M.A., Ph.D., Arizona State University

Burt, Donald M. (1974), Professor of Geological Sciences; A.B., Princeton University; A.M., Ph.D., Harvard University

Burton, Dora (1976), Professor Emerita of Russian; M.D., First Leningrad and Kazan Medical Institute (Russia); M.A., Ph.D., University of Washington

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



Buseck, Peter R.
(1963)

Regents' Professor of Chemistry and Biochemistry and Geological Sciences; B.A., Antioch College; M.A., Ph.D., Columbia University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Bush, Jeffrey E. (1997), Associate Professor of Music Education; B.M., M.M., Northern Illinois University, De Kalb; Ph.D., University of Arizona

Bustoz, Joaquin (1975), Professor of Mathematics and Statistics; Director, SUMS Institute; B.A., M.A., Ph.D., Arizona State University

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

Butler-Diaz, Jacqueline (1997), Adjunct Professor of Anthropology; B.A., B.S., M.A., Arizona State University

C

Cabianca, William A. (1967), Professor Emeritus of Counselor Education; B.Ed., Gonzaga University; M.Ed., Ph.D., Washington State University

Cady, Linell E. (1983), Professor of Religious Studies; Interim Dean, College of Liberal Arts and Sciences; B.A., Newton College; M.T.S., Th.D., Harvard University

Cafarella, Robert J. (1991), Faculty Associate of Planning and Landscape Architecture; B.S., Northeastern University; M.U.P., New York University

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 Supply Chain 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, Andrew (2002), Senior Lecturer of Music; B.A., B.M., Oberlin College; M.M., Indiana University; D.M.A., University of Michigan

Campbell, Gary L. (1997), Associate 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

Canary, Daniel J. (1999), Professor of Communication; B.A., 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

Canouts, Veletta (2002), Adjunct Professor of Anthropology; B.A., Michigan State University; M.A., University of North Carolina, Chapel Hill; Ph.D., Southern Illinois University, Carbondale

Canovas, Frédéric (1999), Associate 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

Canright, James E. (1964), Professor Emeritus of Plant Biology; B.A., Miami University; A.M., Ph.D., Harvard University

Cao, Weiguo (2002), Lecturer of Chinese; B.A., Judan University (China); M.A., University of Wisconsin

Capco, David G. (1984), Professor of Biology; B.S., Edinboro State College; M.S., University of Houston; Ph.D., University of Texas, Austin

Caplan, Michael R. (2002), Assistant Professor of Bioengineering; B.A., B.S., University of Texas, Austin; Ph.D., Massachusetts Institute of Technology

Cardy, Robert L. (1988), Professor of Management; B.S., Central Michigan University; Ph.D., Virginia Polytechnic Institute and State University

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), Associate 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 of Solid State Science; B.S., M.S., Ph.D., University of California, Berkeley

Carr, Christopher (1985), Professor of Anthropology; B.A., University of Illinois; M.A., Ph.D., University of Michigan

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
- Case, James L.** (1969), Professor Emeritus of Speech and Hearing Science; B.S., Weber State College; M.S., Ph.D., University of Utah
- 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
- Cavanaugh, Carolyn J.** (1996), Academic Associate of Psychology; A.B., Duke University; Ph.D., Arizona State University
- 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
- Cayer, N. Joseph** (1980), Professor of Public Affairs; B.A., M.P.A., University of Colorado; Ph.D., University of Massachusetts, Amherst
- Cervený, Randall S.** (1986), Professor of Geography; B.S., M.A., Ph.D., University of Nebraska, Lincoln
- Cesarotti, Evelyn L.** (1992), Associate Professor of Nursing; B.S.N., University of West Florida; M.S., Ph.D., University of Arizona
- 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), Associate 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
- Chamberland, Bertrand L.** (1995), Adjunct Professor of Chemistry and Biochemistry; B.A., St. Anselm's College; Ph.D., University of Pennsylvania
- 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
- Chancy, Myriam** (1997), Associate Professor of English; B.A., University of Manitoba (Canada); M.A., Dalhousie University (Canada); Ph.D., University of Iowa
- 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), Associate 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
- 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
- Chase, Marcelle P.** (1983), Law Librarian Emeritus; M.L.S., Ball State University; J.D., University of Brussels (Belgium)
- 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, Joyotpal** (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

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Chen, Stanley S. (1967), Professor Emeritus of Engineering; Diploma, Taipei Institute of Technology (Taiwan); M.S., Ohio University; Ph.D., University of Wisconsin, Madison

Chen, Yinong (2001), Lecturer of Computer Science and Engineering; B.S., M.S., Chongqing University (China); Ph.D., University of Karlsruhe (Germany)

Chenoweth, Timothy (1996), Assistant Professor of Computer Information Systems; B.S., U.S. Coast Guard Academy; M.B.A., Ph.D., Washington State University

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, Writing Center; 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, Hyaewool (1998), Associate 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 Supply Chain Management; A.B., University of California, Berkeley; Ph.D., University of Michigan

Chong, Herbert M., Major (2002), Professor of Military Science; Chair, Department of Military Science; B.S., West Texas A&M University; M.S., Kansas State University

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), Edgar and Helen Korrick Presidential 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; Interim Codirector, School of Accountancy and Information Management; B.B.A., University of Georgia; J.D., University of Virginia; Ph.D., University of Georgia

Christie, James F. (1988), Professor of Curriculum and Instruction; B.A., University of California, Berkeley; M.A., Syracuse University; Ph.D., Claremont Graduate School

Christine, Carol J. (1998), Clinical Assistant Professor of Curriculum and Instruction; B.A., M.A., Arizona State University; Ph.D., University of Arizona

Christopher, F. Scott (1986), Professor of Family and Human Development; B.S., M.S., University of Nebraska; Ph.D., Oregon State University

Chubrich, Robert E. (1971), Professor Emeritus of Speech and Hearing Science; B.A., Grinnell College; M.A., Indiana University, Bloomington; Ph.D., State University of New York, Buffalo

Church, Kathleen K. (1969), Professor of Biology; Vice Provost; B.S., M.A., University of Utah; Ph.D., University of California, Berkeley



Cialdini, Robert B.
(1971)

Regents' Professor of Psychology; B.S., University of Wisconsin, Milwaukee; M.A., Ph.D., University of North Carolina, Chapel Hill

Cichacz, Zbigniew A. (1989), Associate Research Professor, Cancer Research Institute; M.Sc., Ph.D., Institute of Organic and Physical Chemistry (Poland)

Claiborn, Charles D. (1990), Professor of Counseling Psychology and Counselor Education; A.B., University of Missouri; M.A., Ohio State University; Ph.D., University of Missouri

Clark, Doug (2002), Assistant Professor of Curriculum and Instruction; B.A., University of North Carolina, Chapel Hill; M.A., Stanford University; Ph.D., University of California, Berkeley



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

Clarke, Amanda B. (2003), Assistant Professor of Geological Sciences; B.S., B.A., University of Notre Dame; Ph.D., The Pennsylvania State University

Clay, J. Eugene (1993), Associate Professor of Religious Studies; A.B., A.M., Ph.D., University of Chicago

Clewlow, Paul J. (1988), Faculty Research Associate, Cancer Research Institute; B.S., University of Leicester (United Kingdom); Ph.D., University College (United Kingdom)

Clinton, Robert N. (2001), Professor of Law; B.A., University of Michigan; J.D., University of Chicago

Clothier, Ronald R. (1955), Professor Emeritus of Biology; A.B., Fresno State College; M.A., Montana State University; Ph.D., University of New Mexico

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

Cocchiarella, Martha (1998), Lecturer of Curriculum and Instruction; B.A., M.Ed., Ph.D., Arizona State University

Cochran, Douglas (1989), Associate Professor of Electrical Engineering; M.A., University of California, San Diego; Ph.D., Harvard University

- Cochran, Jeffery K.** (1984), Professor of Industrial Engineering; B.S.E., M.S.N.E., M.S.I.E., Ph.D., Purdue University
- Cocke, Robert D.** (1983), Professor of Art; B.F.A., University of Arizona; M.F.A., University of Iowa
- Codell, Julie F.** (1991), Professor of Art; A.B., Vassar College; M.A., University of Michigan; M.A., Ph.D., Indiana University
- Coghlan, William A.** (1990), Adjunct Associate Professor of Chemical Engineering; B.S., Montana College of Mineral Science and Technology; M.S., Ph.D., Stanford University
- Cohen, Herbert G.** (1978), Professor Emeritus of Curriculum and Instruction; B.S., Muhlenberg College; M.A., Hofstra University; Ph.D., University of Iowa
- Cohen, Stewart M.** (1989), Professor of Philosophy; B.A., Wayne State University; M.A., University of California, Santa Barbara; Ph.D., University of Arizona
- Cohn, Sanford J.** (1979), Associate Professor of Curriculum and Instruction; B.A., M.Ed., Ph.D., Johns Hopkins University
- Colbert, Charles R.** (1998), Academic Associate of American Indian Studies; B.S., Northeastern Oklahoma State University; M.A., Ed.D., Arizona State University
- Colbourn, Charles J.** (2001), Professor of Computer Science and Engineering; B.Sc., University of Toronto (Canada); M.Math, University of Waterloo (Canada); Ph.D., University of Toronto (Canada)
- Colby, Arthur L.** (1965), Professor Emeritus of English; B.A., University of Massachusetts, Amherst; M.A., Ph.D., University of North Carolina, Chapel Hill
- Coles, Jeffrey L.** (1994), Professor of Finance; B.A., Pomona College; Ph.D., Stanford University
- Colina, Sonia** (1997), Associate Professor of Spanish; B.A., University of Compostela (Spain); M.A., Southern Illinois University, Carbondale; M.A., State University of New York, Binghamton; Ph.D., University of Illinois, Urbana-Champaign
- Collins, Daniel L.** (1989), Associate Professor of Art; B.A., University of California, Davis; M.A., Stanford University; M.F.A., University of California, Los Angeles
- Collins, James P.** (1975), Professor of Biology; Chair, Department of Biology; B.S., Manhattan College; M.S., Ph.D., University of Michigan
- Collins, Scott L.** (2002), Adjunct Professor of Plant Biology; B.A., Wittenberg University; M.S., Miami University; Ph.D., University of Oklahoma
- Collofello, James S.** (1979), Professor of Computer Science and Engineering; Associate Chair for Undergraduate Programs, Department of Computer Science and Engineering; B.S., M.S., Northern Illinois University; Ph.D., Northwestern University
- Comeaux, Malcolm L.** (1969), Professor Emeritus of Geography; B.A., University of Southwestern Louisiana; M.A., Southern Illinois University, Carbondale; Ph.D., Louisiana State University, Baton Rouge
- Comfort, Joseph R.** (1981), Professor of Physics and Astronomy; A.B., Ripon College; M.S., Ph.D., Yale University
- Comprix, Joseph** (2000), Assistant Professor of Accountancy and Information Management; B.S., Ohio State University; Ph.D., University of Illinois, Urbana-Champaign
- Congdon, Justin D.** (2000), Adjunct Professor of Biology; B.S., M.S., California State Polytechnic University; Ph.D., Arizona State University
- Conrad, Cheryl D.** (1997), Assistant Professor of Psychology; B.S., University of California, Irvine; Ph.D., University of Illinois, Urbana-Champaign
- Conrow, Jane A.** (1968), Associate Dean, Library Services; B.A., M.L.S., Indiana University, Bloomington
- Cook, Edward A.** (1985), Associate Professor of Planning and Landscape Architecture; B.S.L.A., Washington State University; M.L.A., Utah State University; Ph.D., Wageningen University (Netherlands)
- Cook, Paul** (1987), Senior Lecturer of English; B.A., Northern Arizona University; M.A., Arizona State University; Ph.D., University of Utah
- Cook, Phil A.** (1963), Professor Emeritus of Education; B.A., Southwestern Oklahoma State College; M.A., Colorado State College; Ed.D., University of Kansas
- Cook, Suzanne M.** (1974), Professor Emerita of Management; B.B.A., M.B.A., D.B.A., Texas Tech University
- Coombs, Toni** (2002), Lecturer of Mathematics and Statistics; B.S., M.S., Arizona State University
- Cooper, Allene** (1997), Senior Lecturer of English; B.A., M.A., University of Utah; Ph.D., Arizona State University
- Coor, Lattie F.** (1990), Professor of Public Affairs; President Emeritus, Arizona State University; A.B., Northern Arizona University; M.A., Ph.D., Washington University
- Corder, Brice W.** (1971), Professor Emeritus of Kinesiology; B.A., Lynchburg College; M.Ed., Ed.D., Temple University
- Corey, Constance H.** (1973), Librarian Emerita; B.A., Denison University; M.L.S., University of Arizona; M.B.A., Arizona State University
- Corey, Frederick C.** (1987), Associate Professor of Communication; Associate Dean, College of Public Programs; B.S., Central Michigan University; M.S., Southern Illinois University, Carbondale; Ph.D., University of Arizona
- Corman, Steven R.** (1987), Professor of Communication; B.S., Illinois State University; M.A., Ph.D., University of Illinois
- Corse, Taylor** (1989), Associate Professor of English; B.A., Florida State University; M.A., University of Michigan; Ph.D., University of Florida
- Cosand, Walter A.** (1976), Professor of Music; B.M., M.M., University of Rochester
- Cota-Cárdenas, Margarita** (1981), Professor Emerita of Spanish; B.A., California State University, Turlock; M.A., University of California, Davis; Ph.D., University of Arizona
- Couch, Sanford C.** (1962), Professor Emeritus of Russian; B.A., M.A., Ph.D., University of Wisconsin, Madison
- Coudert, Allison** (1989), Professor of Religious Studies; B.A., Vassar College; Ph.D., University of London (United Kingdom)
- Coudroglou, Alik** (1971), Professor of Social Work; B.A., College of Saint Benedict; M.S.W., University of Minnesota, Twin Cities; D.S.W., Columbia University
- Coughlin, John Kevin** (1994), Academic Associate, Division of Undergraduate Academic Services; B.A. (History), B.A. (Religious Studies), M.C., Arizona State University
- Coursen, Jerry** (1987), Adjunct Associate Professor of Bioengineering; B.S., M.S., Arizona State University; Ph.D., University of Arizona
- Cowgill, George L.** (1990), Professor of Anthropology; A.M., University of Chicago; Ph.D., Harvard University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Cowley, Anne P. (1983), Professor of Physics and Astronomy; B.A., Wellesley College; M.S., Ph.D., University of Michigan



Cowley, John M.

(1969)

Regents' and Galvin Professor Emeritus of Physics and Astronomy; B.S., M.S., D.Sc., University of Adelaide (Australia); Ph.D., Massachusetts Institute of Technology

Cox, Ronnie R. (1987), Clinical Associate Professor of African American Studies and Military Science; B.S., Fayetteville University; M.S., University of North Carolina; Ph.D., University of Tennessee

Craft, John E. (1973), Professor of Journalism and Mass Communication; B.F.A., M.A., Ph.D., Ohio University

Crafts-Brandner, Steven (1996), Adjunct Faculty of Plant Biology; B.S., Western Kentucky University; M.S., Ph.D., University of Illinois

Crawford, John E. (1980), Professor Emeritus of Communication; B.A., Nebraska Wesleyan University; M.A., Sacramento State College; Ph.D., University of Southern California

Creath, J. Richard (1974), Professor of Philosophy; B.A., Knox College; M.A. (Philosophy), M.A. (History and Philosophy of Science), Ph.D., University of Pittsburgh

Creighton, Judith M. (1967), Professor Emerita of Family and Human Development; B.S., University of Arizona; M.S., M.C., Arizona State University; Ph.D., University of Arizona

Crewe, Katherine (1998), Assistant Professor of Planning and Landscape Architecture; B.A., Rhodes University (South Africa); M.L.A., University of California, Berkeley; Ph.D., University of Massachusetts, Amherst

Crittenden, W. Jackson (1988), Associate Professor of Political Science; B.A., Tufts University; M.Ed., Harvard University; D.Phil., University of Oxford (United Kingdom)

Crocker, Nancy (1996), Academic Associate, Division of Undergraduate Academic Services; Assistant Director, Science and Math Outreach; B.A., M.A., Ph.D., Michigan State University

Croft, Lee B. (1973), Professor of Russian; B.S., Arizona State University; M.A., University of Arizona; Ph.D., Cornell University

Cronin, John R. (1966), Professor Emeritus of Chemistry and Biochemistry; B.A., College of Wooster; Ph.D., University of Colorado

Cronkite, Walter (1986), Professor of Journalism and Mass Communication

Cross, James (1986), Adjunct Professor of Art; B.A., University of California, Los Angeles

Crouch, Peter E. (1985), Professor of Electrical Engineering; Dean, College of Engineering and Applied Sciences; B.S., M.S., University of Warwick (United Kingdom); Ph.D., Harvard University

Crow, Michael M. (2002), Professor of Public Affairs; President, Arizona State University; B.A., Iowa State University; Ph.D., Syracuse University

Crowder, Troy F. (1970), Professor Emeritus of Journalism and Mass Communication; B.A., University of South Dakota; M.A., University of Iowa

Crowe, Barbara J. (1981), Professor of Music; Director, Music Therapy; B.M., M.M., Michigan State University

Crowley, Sharon (1998), Professor of English; B.A., M.A., University of Nebraska, Lincoln; Ph.D., University of Northern Colorado

Crozier, Peter A. (1987), Senior Research Scientist, Center for Solid State Science; B.Sc., Ph.D., University of Glasgow (United Kingdom)

Culbertson, Robert J. (1991), Associate Professor of Physics and Astronomy; B.S., Kent State University; Ph.D., Pennsylvania State University, University Park

Curran, Mark (1968), Professor Emeritus of Spanish and Portuguese; B.S., Rockhurst College; Ph.D., Saint Louis University

Cutler, Lorraine M. (1991), Associate Professor of Design; Associate Dean, College of Architecture and Environmental Design; B.A., B.F.A., Arizona State University; M.A., University of Phoenix

Cvorovic, Jelena (2002), Adjunct Professor of Anthropology; B.A., M.A., Belgrade University of Philosophy (Serbia); Ph.D., Arizona State University

Czygrinow, Andrzej M. (1999), Assistant Professor of Mathematics and Statistics; M.S., Adam Mickiewicz University (Poland); M.S., Ph.D., Emory University

D

D'Andrea, Frank L. (1972), Professor Emeritus of Music; B.A., M.A., Ed.D., Columbia University

D'Angelo, Frank J. (1970), Professor Emeritus of English; B.S., Loyola University, New Orleans; M.A., Tulane University; Ph.D., University of Nebraska, Lincoln

Daane, Calvin J. (1963), Professor Emeritus of Counselor Education; B.S., University of Wisconsin, Madison; M.A., Columbia University; Ed.D., Indiana University, Bloomington

Dagger, Richard K. (1976), Professor of Political Science; B.A., University of Missouri, St. Louis; Ph.D., University of Minnesota, Twin Cities

Dahl, Jeannine (1989), Professor Emerita of Nursing; B.S., University of Kansas; M.A., Ed.D., University of Northern Colorado

Dahl, Richard C. (1966), Professor Emeritus of Law; B.A., B.L.S., University of California, Berkeley; J.D., Catholic University of America

Daley, J. Michael (1978), Professor of Social Work; B.S., Spring Hill College; M.S.W., Saint Louis University; M.S., University of Pittsburgh; Ph.D., Tulane University

Dalgleish, Donald D. (1962), Professor Emeritus of Military Science; B.A., Carleton College; M.A., Columbia University; Ph.D., University of Colorado

Dallyn, Selwyn L. (1983), Clinical Professor of Law; B.A., Graceland College; J.D., University of Iowa

Dalton, Kevin Andrew (1994), Senior Lecturer of the Barrett Honors College; B.A., Columbia University; M.Phil., University of Oxford (United Kingdom); Ph.D., University of Virginia

Damrel, David W. (2000), Assistant Professor of Religious Studies; B.A., B.J., M.A., University of Texas, Austin; Ph.D., Duke University

Dandekar, Hemalata (2002), Professor of Planning and Landscape Architecture; Director, School of Planning and Landscape Architecture; B.Arch., University of Bombay (India); M.Arch., University of Michigan; Ph.D., University of California, Los Angeles

- Daniel, Norman E.** (1970), Professor Emeritus of Supply Chain Management; B.S., M.S., University of Tennessee, Knoxville; Ph.D., Indiana University
- Dantico, Marilyn** (1981), Associate Professor of Political Science; B.A., University of Illinois; M.A., Ph.D., Florida State University
- Danzig, Arnold B.** (2001), Associate Professor of Educational Leadership and Policy Studies; B.A., State University of New York; M.A., Ph.D., University of Maryland
- Darling, J. Andrew** (2001), Adjunct Professor of Anthropology; B.A., Swarthmore College; M.A., Ph.D., University of Michigan
- Darst, Paul W.** (1976), Professor of Kinesiology; B.S., M.S., University of Akron; Ph.D., Ohio State University
- Dasgupta, Partha** (1991), Associate Professor of Computer Science and Engineering; B.Tech., M.Tech., Indian Institute of Technology (India); Ph.D., State University of New York, Stony Brook
- Datta, Manjira** (1995), Associate Professor of Economics; B.A., M.A., Jadavpur University (India); Ph.D., Cornell University
- Dauber, M. Robert** (1990), Clinical Professor of Law; B.A., University of California, Berkeley; J.D., Arizona State University
- Dauten, Joel J.** (1960), Professor Emeritus of Finance; B.S., M.S., Washington University; Ph.D., University of Iowa
- Davey, William G.** (1976), Associate Professor of Communication; Director, International Programs; B.A., Pennsylvania State University; M.A., Columbia University; Ph.D., Indiana University, Bloomington
- David, Julie Smith** (1995), Associate Professor of Accountancy and Information Management; B.A., M.B.A., Ph.D., Michigan State University
- Davidson, Elizabeth T.** (1986), Research Professor of Biology; B.S., Mount Union College; M.S., Ph.D., Ohio State University
- Davidson, Joseph K.** (1973), Professor of Engineering; B.M.E., M.Sc., Ph.D., Ohio State University
- Davila, Eduardo** (1998), Lecturer of Management; B.S., University of Illinois, Urbana-Champaign; M.B.A., Arizona State University
- Davis, Frank S.** (1978), Senior Research Professional of Chemistry and Biochemistry; B.S.E., Arizona State University
- Davis, George R.** (1980), Professor Emeritus of Electrical Engineering; B.S.E.E., M.S., University of Illinois; Ph.D., University of Arizona
- Davis, Joseph M.** (1975), Associate Professor of Real Estate; B.S., University of South Carolina; M.B.A., Texas A&M University; Ph.D., University of Georgia
- Davis, Kirsten** (2001), Legal Writing Instructor; B.A., J.D., Ohio State University
- Davis, Mary C.** (1994), Associate Professor of Psychology; B.S., University of Idaho; M.S., Ph.D., University of Pittsburgh
- Davis, Olga Idriss** (1998), Assistant Professor of Communication; B.S., University of Redlands; M.A., Ph.D., University of Nebraska, Lincoln
- Davis, Robert E.** (1959), Professor Emeritus of Communication; B.A., M.A., Ph.D., University of Illinois
- Davis, Thomas J.** (1996), Professor of History; A.B., Fordham University; M.A., Ph.D., Columbia University; J.D., State University of New York, Buffalo
- Davulcu, Hasan** (2002), Assistant Professor of Computer Science and Engineering; B.S., Middle East Technical University (Turkey); M.S., Ph.D., State University of New York, Stony Brook
- Day, Thomas** (1995), Associate Professor of Plant Biology; B.S., Colorado State University; M.S., University of Idaho; Ph.D., Colorado State University
- de Jesús, Melinda L.** (1999), Assistant Professor of Asian Pacific American Studies; B.A., Lehigh University; M.A., University of York (United Kingdom); Ph.D., University of California, Santa Cruz
- de los Santos, Alfredo** (1999), Research Professor, Division of Educational Leadership and Policy Studies; B.A., M.L.S., Ph.D., University of Texas, Austin
- de Marneffe, Peter** (1989), Associate Professor of Philosophy; B.A., University of Massachusetts, Amherst; Ph.D., Harvard University
- Deach, Dorothy F.** (1967), Professor Emerita of Kinesiology; B.S., M.S., University of Illinois; Ph.D., University of Michigan
- Deal, Clarice** (1996), Instructor of Portuguese; B.A., Saint Marensse Organization of Education and Culture, São Paulo (Brazil); M.Ed., Arizona State University
- Dean, Arthur G.** (1971), Professor Emeritus of Industrial Engineering; B.A., M.S., Texas Tech University; Ph.D., Texas A&M University
- Debenport, Sylvia** (1978), Professor Emerita of Music; B.M.E., B.M., M.M., Indiana University, Bloomington
- DeFato, Rosalinda** (1970), Librarian; Team Leader, Hayden Reference Services; B.A., Saint John's University; M.L.S., University of California, Los Angeles
- DeGraftenreid, Don** (1990), Senior Research Administrator, Center for Advanced Research in Transportation; Manager, Technical Transportation Program; B.S.C.E., New Mexico State University
- DeGraw, Bette F.** (1986), Administrative Professional, College of Extended Education; Associate Professor of Public Affairs; Dean, College of Extended Education; Director, Downtown Center; B.A., Thiel College; M.S.W., Rutgers, The State University of New Jersey; Ph.D., Arizona State University
- DeLamotte, Eugenia** (1997), Associate Professor of English; A.B., Duke University; B.A., M.A., University of Oxford (United Kingdom); M.A., Ph.D., Harvard University
- De la Garza, Sarah Amira** (2002), Associate Professor of Communication; B.S., North Texas State University; M.A., State University of New York, Buffalo; Ph.D., University of Texas, Austin
- Deli, Daniel N.** (2001), Assistant Professor of Finance; B.A., University of Illinois; M.S., University of Illinois; Ph.D., Arizona State University
- DeLibero, Joseph** (1996), Senior Lecturer of Computer Science and Engineering; B.S., Iona College; M.S., Purdue University
- Dellheim, Charles J.** (1980), Professor Emeritus of History; B.A., Harpur College; M.A., Ph.D., Yale University
- DeLusé, Stephanie R.** (1993), Lecturer of Interdisciplinary Studies; B.S., M.A., Ph.D., Arizona State University
- DeMars, James R.** (1981), Professor of Music; B.A., Macalester College; M.A., Ph.D., University of Minnesota, Twin Cities
- DeMassa, Thomas A.** (1966), Professor Emeritus of Electrical Engineering; B.S.E.E., M.S.E.E., Ph.D., University of Michigan
- Demirkan, Haluk** (2002), Assistant Professor of Accountancy and Information Management; B.S., Istanbul Technical University (Turkey); M.S., Ph.D., University of Florida
- DeNardo, Dale** (1998), Assistant Professor of Biology; B.S., D.V.M., University of California, Davis; Ph.D., University of California, Berkeley

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Denhardt, Janet Vinzant** (1995), Professor of Public Affairs; B.A., Washington State University; M.P.A., D.P.A., University of Southern California
- Denhardt, Robert** (1999), Professor of Public Affairs; B.A., Western Kentucky University; M.A., Ph.D., University of Kentucky
- DeSerpa, Allan C.** (1975), Professor of Economics; B.A., University of Santa Clara; Ph.D., University of California, Santa Barbara
- Detrie, Thomas** (1984), Professor Emeritus of Design; B.F.A., M.F.A., Louisiana Tech University
- Deviche, Pierre** (1999), Associate Professor of Biology; B.S., Ph.D., University of Liege (Belgium)
- Devitt, Dan** (2002), Lecturer of Curriculum and Instruction; B.A., M.A., Ph.D., State University of New York, Buffalo
- Devlin, John** (1998), Assistant Professor of Philosophy; B.A., University of Toronto (Canada); Ph.D., University of Michigan
- Dey, Sandwip** (1987), Professor of Materials Engineering; B.Tech., Banares Hindu University (India); M.S., Ph.D., Alfred University
- Dezelsky, Thomas L.** (1968), Professor Emeritus of Kinesiology; B.S., Central Michigan University; M.A., University of Michigan; H.S.D., Indiana University, Bloomington
- Di Adamo, Barbara A.** (1999), Academic Associate, Division of Undergraduate Academic Services; B.A., William Paterson University; M.A., Sonoma State University
- Di Gangi, Samuel** (1990), Associate Professor of Curriculum and Instruction; B.A., University of Pittsburgh; M.Ed., Ph.D., Arizona State University
- Diaz, Rodolfo E.** (2001), Associate Professor of Electrical Engineering; B.S., Yale University; M.S., Ph.D., University of California, Los Angeles
- Dickerson, Sherry S.** (1986), Faculty Associate of Public Affairs; B.S., Lamar University; M.P.A., Arizona State University
- Dierig, David A.** (1996), Adjunct Faculty of Plant Biology; B.S., M.S., Arizona State University; Ph.D., University of Arizona
- Dietrich, Suzanne Wagner** (1988), Associate Professor of Computer Science and Engineering; B.S., M.S., Ph.D., State University of New York, Stony Brook
- Dillner, Ann M.** (2001), Assistant Professor of Chemical Engineering and Civil and Environmental Engineering; B.S., Southern Methodist University; M.S., Stanford University; Ph.D., University of Illinois, Urbana-Champaign
- Dirksen, Shannon Ruff** (1996), Associate Professor of Nursing; B.S.N., Arizona State University; M.S., Ph.D., University of Arizona
- Ditsworth, Richard L.** (1959), Professor Emeritus of Engineering; B.S., M.S., Iowa State College; Ph.D., Michigan State University
- Dittert, Alfred E. Jr.** (1967), Professor Emeritus of Anthropology; B.A., M.A., University of New Mexico; Ph.D., University of Arizona
- Doak, R. Bruce** (1991), Professor of Physics and Astronomy; B.S., Cornell University; M.S., Ph.D., Massachusetts Institute of Technology
- Doan, Jerry** (1979), Professor of Music; B.M.E., M.M., North Texas State University; D.M.A., University of Michigan
- Doane, Winifred W.** (1977), Professor Emerita of Biology; B.S., Hunter College; M.S., University of Wisconsin; Ph.D., Yale University
- Doebler, Bettie Anne** (1971), Professor Emerita of English; B.A., M.A., Duke University; Ph.D., University of Wisconsin, Madison
- Doelle, William H.** (2001), Adjunct Professor of Anthropology; B.A., University of Michigan; M.A., Ph.D., University of Arizona
- Doherty, Brian** (2002), Associate Librarian; Head, Music Library; B.A., Westminster Choir College; M.A., M.L.S., Rutgers, The State University of New Jersey, New Brunswick
- Doig, Stephen** (1996), Professor of Journalism and Mass Communication; B.A., Dartmouth
- Dollin, Michael** (1989), Faculty Associate of Planning and Landscape Architecture; Coordinator, Joint Urban Design Studio; Urban Designer, Joint Urban Design Studio; B.L.A., University of Arizona
- Donelson, Kenneth L.** (1965), Professor Emeritus of English; B.A., M.A., Ph.D., University of Iowa
- Dooley, Kevin** (1997), Professor of Industrial Engineering and Supply Chain Management; B.S., M.S., Ph.D., University of Illinois, Urbana-Champaign
- Dorman, Michael F.** (1976), Professor of Speech and Hearing Science; B.S., University of Washington; M.A., Hollins College; Ph.D., University of Connecticut
- Dorn, Ronald I.** (1988), Professor of Geography; A.B., M.A., University of California, Berkeley; Ph.D., University of California, Los Angeles
- Doty, Roxanne L.** (1990), Associate Professor of Political Science; B.S., M.A., Arizona State University; Ph.D., University of Minnesota, Twin Cities
- Doubek, Dennis L.** (1976), Senior Research Professional, Cancer Research Institute; B.S., University of Arizona; Ph.D., University of Illinois
- Dow, John** (1990), Professor of Physics and Astronomy; B.S., University of Notre Dame; Ph.D., University of Rochester
- Dowling, Karen** (1996), Assistant Professor of Computer Information Systems; B.A., University of Michigan; M.S., Ph.D., Arizona State University
- Dowling, Thomas E.** (1988), Professor of Biology; B.S., University of Michigan; Ph.D., Wayne State University
- Downs, Catherine A.** (1983), Clinical Professor of Clinical Laboratory Sciences; B.S., Arizona State University; M.A., Central Michigan University
- Downs, Floyd L.** (1988), Lecturer of Mathematics and Statistics; A.B., Harvard University; M.A., Columbia University
- Doyel, David E.** (1985), Adjunct Professor of Anthropology; B.A., University of Arizona; M.A., Ph.D., California State University, Chico
- Doyle, Donald P.** (1962), Professor Emeritus of Theatre; B.A., Arizona State University; M.A., Northwestern University; Ph.D., University of Minnesota, Twin Cities
- Doyle, Roy P.** (1959), Professor Emeritus of Curriculum and Instruction; B.A., Arizona State University; M.A., Ed.D., Columbia University
- Drake, Jackson M.** (1974), Professor Emeritus of Education; B.S., M.S., Southern Illinois University, Carbondale; Ed.D., Columbia University
- Dreyfoos, Dale** (1994), Professor of Music; B.M., Florida State University; M.M., University of Texas, Austin
- Driscoll, Michael F.** (1971), Professor Emeritus of Mathematics and Statistics; B.A., Saint John's University; M.S., Ph.D., University of Arizona

Droopad, Ravindranath (1989), Associate Research Scientist, Center for Solid State Electronics Research; Ph.D. Imperial College, University of London (United Kingdom)

Drucker, Jeffery S. (2000), Associate Professor of Physics and Astronomy; B.A., University of California, Irvine; Ph.D., University of California, Santa Barbara

Duane, Drake D. (1987), Adjunct Professor of Speech and Hearing Science; A.B., University of Michigan; M.D., Wayne State University



Dubie, Norman
(1978)

Regents' Professor of English; B.A., Goddard College; M.F.A., University of Iowa

Dudek, Leona M. (1960), Professor Emerita of Education; B.Ed., National College of Education; M.A., Arizona State University

Duerden, Sarah J. (1998), Senior Lecturer of English; B.A., University of Sheffield (United Kingdom); M.A., Ph.D., Arizona State University

Duffy, Dennis M. (1977), Associate Professor of Construction; B.S., M.S., Ph.D., University of Arizona

Dugan, Jeanne (1994), Senior Lecturer of English; B.A., University of Michigan; M.A., Ph.D., Arizona State University

Duman, Tolga (1998), Assistant Professor of Electrical Engineering; B.S., Bilkent University (Turkey); M.S., Ph.D., Northeastern University

Dumka, Larry E. (1991), Associate Professor of Family and Human Development; B.A., University of Manitoba (Canada); M.A., Simon Fraser University (Canada); Ph.D., Purdue University

Duncan, Anne (2001), Assistant Professor of Interdisciplinary Humanities and Women's Studies; B.A., Swarthmore College; M.A., Ph.D., University of Pennsylvania

Duncan, Kate C. (1991), Professor of Art; B.A., M.A., University of New Mexico; Ph.D., University of Washington

Dundas, Mary Jane (1975), Associate Professor of Legal and Ethical Studies; B.A., California State University, Long Beach; J.D., Loyola Marymount University

Durand, Barbara A. (1992), Professor of Nursing; Dean, College of Nursing; B.S., College of Saint Teresa; M.S., University of California, San Francisco; Ed.D., University of San Francisco

Durham, Gregory R. (2000), Lecturer of Finance; B.S., Montana State University; M.B.A., University of Texas; Ph.D., Arizona State University

Durrenberger, Robert W. (1971), Professor Emeritus of Geography; B.S., Moorhead State College; B.S., California Institute of Technology; M.S., University of Wisconsin, Madison; Ph.D., University of California, Los Angeles

Duttagupta, Chitralekha (2001), Lecturer of English; B.A., Calcutta University; M.A., Jadavpur University (India); M.T.E.S.L., Arizona State University; Ph.D., Jadavpur University (India); Ph.D., Arizona State University

Duvernay, Jennifer (2000), Assistant Librarian, Noble Science Reference Services; B.S., Carroll College; M.L.S., University of North Carolina, Chapel Hill

Dwyer, Karen (1994), Senior Lecturer of English; B.A., Lamar University; M.A., Ph.D., Purdue University

E

Eck, Roger (1970), Professor Emeritus of Computer Information Systems; B.S.Ch.E., Clarkson College of Technology; M.B.A., University of New Mexico; Ph.D., Tulane University

Eckard, Bonnie (1996), Professor of Theatre; B.F.A., University of Illinois; M.A., University of Arizona; Ph.D., University of Denver

Eckert, Thomas W. (1971), Professor of Art; B.A., M.F.A., Arizona State University

Edelsky, Carol (1976), Professor of Curriculum and Instruction; B.S., University of Cincinnati; Ph.D., University of New Mexico, Albuquerque

Eder, James F. Jr. (1975), Professor of Anthropology; Director, Program for Southeast Asian Studies; B.S., California Institute of Technology; M.A., Ph.D., University of California, Santa Barbara

Edgar, Julia (2002), Assistant Professor of Speech and Hearing Science; B.A., Valparaiso University; M.A., University of Kansas; Ph.D., University of Minnesota

Edsall, Robert M. (2000), Assistant Professor of Geography; B.A., Kenyon College; M.S., Ph.D., Pennsylvania State University

Edwards, Andrew (1994), Academic Associate, Division of Undergraduate Academic Services; B.A., Northwestern University; M.S.E., Indiana University, Bloomington

Edwards, Gus (1988), Associate Professor of Theatre

Edwards, John L. (1964), Professor Emeritus of Curriculum and Instruction; B.A., Ball State University; M.A., Ed.D., Arizona State University

Eeds, Maryann H. (1975), Professor Emerita of Curriculum and Instruction; B.A., California State University, Sacramento; Ph.D., University of Oregon



Eisenberg, Nancy H.
(1976)

Regents' Professor of Psychology; B.A., University of Michigan; M.A., Ph.D., University of California, Berkeley

Ekmanis, Rolfs (1963), Professor of Russian; B.A., M.A., University of Wisconsin, Madison; Ph.D., Indiana University, Bloomington

El Hamel, Chouki (2002), Associate Professor of History; B.A., University of Muhammad I of Oujda (Morocco); M.A., Ph.D., University of Paris Pantheon-Sorbonne (France)

El-Sharawy, El-Badawy (1989), Associate Professor of Electrical Engineering; B.S.E., M.S.E., Mansoura University (Egypt); Ph.D., University of Massachusetts, Amherst

Ellin, Nan (1998), Associate Professor of Architecture; B.A., Bryn Mawr College; M.A., Ph.D., Columbia University

Elliott, Charles S. (1989), Professor Emeritus of Industrial Engineering; B.M.E., General Motors Institute; M.S., Indiana University, Bloomington; Ph.D., Michigan State University

Ellis, Andrew W. (1998), Assistant Professor of Geography; B.A., M.S., Ph.D., University of Delaware

Ellis, Robert H. (1962), Professor Emeritus of Journalism and Mass Communication; B.A., Arizona State University; M.A., Case Western Reserve University

Ellman, Ira Mark (1978), Professor of Law; B.A., Reed College; M.A., University of Illinois; J.D., University of California, Berkeley

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Ellram, Lisa M. (1990), Professor of Supply Chain Management; B.S.B., M.B.A., University of Minnesota, Twin Cities; Ph.D., Ohio State University

Ellsworth, Kevin H. (1995), Lecturer of Interdisciplinary Studies; Assistant Director, Bachelor of Interdisciplinary Studies; B.A., M.A., Brigham Young University; Ph.D., Arizona State University

Ellsworth, Lola M. (1938), Professor Emerita of Family and Human Development; B.S., Brigham Young University; M.A., Columbia University

Elman, Colin (1998), Assistant Professor of Political Science; B.A., Nottingham University (United Kingdom); M.A., Ph.D., Columbia University

Elman, Miriam Fendius (1995), Associate Professor of Political Science; B.A., M.A., Hebrew University; Ph.D., Columbia University

Elmore, James W. (1949), Professor Emeritus of Planning and Landscape Architecture; A.B., University of Nebraska; M.S., Columbia University

Elser, James J. (1990), Professor of Biology; B.S., University of Notre Dame; M.S., University of Tennessee, Knoxville; Ph.D., University of California, Davis

Elser, Monica M. (1996), Academic Associate, Education Liaison; B.S., University of Notre Dame; M.S., University of Tennessee, Knoxville; M.Ed., Arizona State University

Enz, Billie J. (1990), Academic Professional Senior of Curriculum and Instruction; Associate Director for Professional Development and Induction, Division of Curriculum and Instruction; M.A., Ph.D., Arizona State University

Erickson, Mary L. (1990), Professor of Art; B.F.A., University of Illinois; M.A., Ph.D., Ohio State University

Ericson, John Q. (2001), Assistant Professor of Music; B.M., Emporia State University; M.M., Eastman School of Music; D.M.A., Indiana University

Ernzen, James J. (1996), Associate Professor of Construction; B.S., M.S., University of Notre Dame; Ph.D., University of Texas, Austin

Escobar, Edward J. (1993), Associate Professor of Chicana and Chicano Studies and History; B.A., California State University, Dominguez Hills; M.A., Ph.D., University of California, Riverside

Etnier, Jennifer L. (1998), Assistant Professor of Kinesiology; B.S., University of Tennessee, Knoxville; M.A., University of North Carolina, Chapel Hill; Ph.D., Arizona State University

Etter, Patricia A. (1988), Archivist, Archives and Manuscripts; B.A., California State University, Long Beach; M.L.S., University of Arizona

Evans, Donovan L. (1966), Professor Emeritus of Engineering; Director, Center for Research on Education in Science, Mathematics, Engineering, and Technology; B.S.M.E., University of Cincinnati; Ph.D., Northwestern University

Evans, John X. (1964), Professor Emeritus of English; B.A., Holy Cross College; M.A., Ph.D., Yale University

Eveland, Charles (1974), Professor Emeritus of Health Administration and Policy; B.S., University of Maryland; M.S., Baylor University; Ph.D., University of Michigan

Ewan, Joseph (1994), Assistant Professor of Planning and Landscape Architecture; B.S.D., Arizona State University; M.L.A., University of California, Berkeley

Ewing, Alison (1993), Law Librarian, Circulation/Reference; B.A., M.L.S., University of Michigan



Eyring, LeRoy

(1961)

Regents' Professor Emeritus of Chemistry and Biochemistry; B.S., University of Arizona; Ph.D., University of California, Berkeley

F

Faas, Larry A. (1967), Professor Emeritus of Curriculum and Instruction; B.S., Iowa State University; M.A., Colorado State College; Ed.D., Utah State University

Fabes, Richard A. (1983), Professor of Family and Human Development; Chair, Department of Family and Human Development; B.A., University of Colorado; M.S., Ph.D., Oklahoma State University

Fabricius, William (1990), Associate Professor of Psychology; B.A., Boston College; M.S., Wheelock College; Ph.D., University of Michigan

Facinelli, Diane A. (1993), Senior Lecturer of the Barrett Honors College; B.A., M.A., Ph.D., Arizona State University

Faeth, Stanley H. (1980), Professor of Biology; B.S., M.S., University of Cincinnati; Ph.D., Florida State University

Fafitis, Apostolos (1984), Associate Professor of Civil and Environmental Engineering; B.S.E., Aristotelion University of Thessaloniki (Greece); M.Eng., South Dakota School of Mines and Technology; Ph.D., Northwestern University

Fahlman, Betsy (1988), Professor of Art; B.A., Mount Holyoke College; M.A., Ph.D., University of Delaware

Faith, Roger L. (1981), Professor of Economics; B.A., St. Mary's College of California; M.A., Ph.D., University of California, Los Angeles

Falconer, Steven E. (1989), Associate Professor of Anthropology; B.A., Washington State University; M.A., Ph.D., University of Arizona

Fall, Patricia L. (1989), Associate Professor of Geography; B.A., Prescott College; M.S., Ph.D., University of Arizona

Faltis, Christian J. (1991), Professor of Curriculum and Instruction; B.A., San Francisco State University; M.A., San Jose State University; M.A., Ph.D., Stanford University

Faltz, Leonard M. (1979), Associate Professor of Computer Science and Engineering; B.S., City University of New York; M.S., Harvard University; Ph.D., University of California, Berkeley

Fargotstein, Barbara P. (1988), Clinical Associate Professor of Nursing; B.S., B.S.N., Arizona State University; M.N., University of California, Los Angeles

Farin, Gerald (1987), Professor of Computer Science and Engineering; B.A., M.A., Ph.D., University of Braunschweig (Germany)

Farmer, Frank D. (1970), Associate Professor of Mathematics and Statistics; B.A., M.A., University of California, Riverside; Ph.D., University of Washington

Farmer, Jack D. (1998), Professor of Geological Sciences; B.A., California State University, Chico; M.S., University of Kansas; Ph.D., University of California, Davis

Farnsworth, Bill (1999), Faculty Associate of Nursing; B.S.N., University of Massachusetts; M.S.N., University of Evansville

Fausel, Donald F. (1969), Professor Emeritus of Social Work; A.B., S.T.B., S.T.L., Saint Mary's University; M.S.W., Fordham University; D.S.W., Columbia University

Fearon, Harold E. (1961), Professor Emeritus of Purchasing Management; B.S., M.B.A., Indiana University; Ph.D., Michigan State University

Fehr, Fred S. (1971), Professor Emeritus of Psychology; B.S., University of Wisconsin, Madison; M.A., Ph.D., Washington University

Feisst, Sabine (2002), Assistant Professor of Music; M.M., Conservatory of Music, Frankfurt (Germany); Ph.D., Free University of Berlin (Germany)

Feldhaus, Anne (1981), Professor of Religious Studies; B.A., Manhattanville College; Ph.D., University of Pennsylvania

Feldstein, Alan (1970), Professor Emeritus of Mathematics and Statistics; B.A., Arizona State University; Ph.D., University of California, Los Angeles

Feller, Joseph M. (1987), Professor of Law; B.A., Harvard University; Ph.D., University of California, Berkeley; J.D., Harvard University

Fenske, Robert H. (1974), Professor of Educational Leadership and Policy Studies; B.S., M.S., Ph.D., University of Wisconsin, Madison

Fernando, Harindra (1984), Professor of Mechanical and Aerospace Engineering; Director, Center for Environmental Fluid Dynamics; B.Sc., University of Sri Lanka (Sri Lanka); M.A., Ph.D., Johns Hopkins University

Ferrall, J. Eleanor (1969), Librarian Emerita, Reference Service; A.B., Heidelberg College; M.A., Arizona State University

Ferraro, Kathleen J. (1982), Associate Professor of Women's Studies; Director, Women's Studies Program; B.A., Case Western Reserve University; M.A., Ph.D., Arizona State University

Ferris, Jean (1985), Professor Emerita of Music; B.M., University of Michigan; M.A., Arizona State University



Ferry, David K.
(1983)

Regents' Professor of Electrical Engineering; B.S.E.E., M.S.E.E., Texas Technological College; Ph.D., University of Texas, Austin

Fessenden, Tracy (1994), Associate Professor of Religious Studies; B.A., Yale University; Ph.D., University of Virginia

Fewell, Jennifer H. (1993), Associate Professor of Biology; B.A., Cornell University; M.A., Ph.D., University of Colorado

Figueira-McDonough, Josephina (1990), Professor of Justice Studies and Social Work; B.S., University of Lisbon (Portugal); M.S.W., Ph.D., University of Michigan

Finch, A. Joyce (1965), Professor Emerita of Nursing; B.S.N., Augustana College; M.S., University of Colorado; Ph.D., University of Texas, Austin

Findler, Nicholas V. (1982), Professor Emeritus of Computer Science and Engineering; B.Eng., Ph.D., Budapest University for Technical Sciences (Hungary)

Fine, Robert (1997), Senior Lecturer of Sociology; B.A., Boston University; M.A., University of Chicago; Ph.D., New York University

Finer, Neal (1977), Professor Emeritus of Curriculum and Instruction; B.A., University of Houston; M.A., University of the Americas (Mexico); Ph.D., University of Texas, Austin

Fink, Jonathan (1982), Professor of Geological Sciences; Vice President for Research and Economic Affairs; B.A., Colby College; Ph.D., Stanford University

Fiori, Christine (2001), Assistant Professor of Construction; B.S., M.S., Ph.D., Drexel University

Firestone, Melvin M. (1968), Professor Emeritus of Anthropology; B.A., University of New Mexico; M.A., Ph.D., University of Washington

Fischer, Timothy P., Major (2000), Assistant Professor of Military Science; B.B.A., University of Wisconsin

Fischman, Gustavo E. (1999), Assistant Professor of Curriculum and Instruction; B.A., University of Buenos Aires (Argentina); M.A., Ph.D., University of California, Los Angeles

Fish Ewan, Rebecca (1994), Assistant Professor of Planning and Landscape Architecture; B.A., M.L.A., University of California, Berkeley

Fisher, Marvin M. (1958), Professor Emeritus of English; A.B., A.M., Wayne University; Ph.D., University of Minnesota, Twin Cities

Fisher, Stuart G. (1976), Professor of Biology; B.S., M.A., Wake Forest College; Ph.D., Dartmouth College

Fisk, R. Leighton (1979), Adjunct Professor of Bioengineering; B.S., M.S., Ph.D., University of Alberta (Canada)

Fitch, Frank W. (1997), Adjunct Faculty of Microbiology; M.S., M.D., Ph.D., University of Chicago

Fitch, Gregory W. (1974), Professor of Philosophy; B.A., Western Washington State College; M.A., Ph.D., University of Massachusetts, Amherst

Fitzgerald, Mary (1998), Assistant Professor of Dance; B.A., University of Maine; M.F.A., Arizona State University

Flaherty, Richard E. (1978), Professor Emeritus of Accountancy and Information Management; B.S., M.S., Ph.D., University of Kansas; C.P.A., Kansas

Fleming, Robert C. (1974), Professor Emeritus of Music; Director Emeritus, Sun Devil Marching Band; B.S., Indiana University of Pennsylvania; M.F.A., Carnegie Mellon University; Ph.D., Southern Illinois University, Carbondale

Fleury, Julie (2001), Hanner Professor of Nursing; B.S.N., Northern Arizona University; M.S., Ph.D., University of Arizona

Flores, Alfinio (1992), Professor of Curriculum and Instruction; B.S., M.S., National University of Mexico (Mexico); Ph.D., Ohio State University

Florschuetz, Leon W. (1964), Professor Emeritus of Engineering; B.S., M.S., Ph.D., University of Illinois

Floyd, Kory (2000), Associate Professor of Communication; B.A., Western Washington University; M.A., University of Washington; Ph.D., University of Arizona

Flys, Michael (1975), Professor Emeritus of Spanish; Licenciado en Filosofía y Letras, Doctor en Filosofía y Letras, University of Madrid (Spain)

Foard, Fumiko (1990), Senior Lecturer of Japanese; B.A., Keio Gijuku University (Japan); M.A., Arizona State University

Foard, James (1977), Professor of Religious Studies; B.A., College of Wooster; M.A., Ph.D., Stanford University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Foote, Joe S. (2000), Professor of Journalism and Mass Communication; Director, Walter Cronkite School of Journalism and Mass Communication; B.A., M.A., University of Oklahoma; Ph.D., University of Texas, Austin

Forsyth, Ben R. (1992), Professor of Health Administration and Policy; Senior Executive Assistant to the President; M.D., New York University



Foster, David William
(1964)

Regents' Professor of Spanish; B.A., M.A., Ph.D., University of Washington

Foster, Joyce (1972), Professor Emerita of Zoology; B.A., M.A., DePauw University; Ph.D., Arizona State University

Foster, Michael S. (2001), Adjunct Professor of Anthropology; B.A., Colorado State University; M.A., Ph.D., University of Colorado, Boulder

Fouch, Matthew (2001), Assistant Professor of Geological Sciences; B.A., Pomona College; Sc.M., Ph.D., Brown University

Fouquette, Martin J. Jr. (1965), Associate Professor of Biology; B.A., M.A., Ph.D., University of Texas, Austin

Fowler, John W. (1995), Associate Professor of Industrial Engineering; B.S., M.S., Ph.D., Texas A&M University

Fox, Cora V. (2001), Assistant Professor of English; B.A., Grinnell College; M.A., University of Wisconsin, Madison

Fox, Peter (1990), Professor of Civil and Environmental Engineering; B.S., M.S., Ph.D., University of Illinois

Fox, Steven, MSG (2000), Instructor of Military Science; A.A., Central Texas College

Francisco, Wilson A. (1999), Assistant Professor of Chemistry and Biochemistry; B.S., University of Puerto Rico (Puerto Rico); Ph.D., Texas A&M University

Frasch, Wayne D. (1989), Professor of Plant Biology; B.A., Hope College; Ph.D., University of Kentucky

Freeman, Donald J. (1989), Professor Emeritus of Education; B.A., Grinnell College; M.A., Ph.D., Michigan State University

French, Peter A. (2000), Professor of Philosophy; Director, Lincoln Center for Applied Ethics; B.A., Gettysburg College; M.A., University of Southern California, Los Angeles; Ph.D., University of Miami, Coral Gables

Freund, John E. (1957), Professor Emeritus of Mathematics and Statistics; B.A., M.A., University of California, Los Angeles; Ph.D., University of Pittsburgh

Fritzemeyer, Joseph R. (1973), Professor Emeritus of Accounting and Information Management; B.B.A., Baylor University; M.B.A., D.B.A., Indiana University; C.P.A., Texas

Fromme, Petra (2002), Professor of Chemistry and Biochemistry; M.S., Free University of Berlin (Germany); Ph.D., Technical University of Berlin (Germany)

Fronske, Jeanne (1975), Professor of Art; B.A., B.F.A., DePauw University; M.F.A., Ohio State University, Newark

Frost, Melvin Jesse (1965), Professor Emeritus of Geography; B.S., Arizona State University; M.S., Brigham Young University; Ph.D., University of Florida

Frost, Michael D. (1995), Faculty Associate of Construction; B.S., M.S., Arizona State University

Fry, Harold (1958), Professor Emeritus of Engineering; B.S., Colorado State University; M.E., University of Wyoming; M.S., University of Colorado

Fry, Jana (1995), Faculty Associate of Planning and Landscape Architecture; University Geographic Information Systems Coordinator; B.A., University of Denver; M.E.P., Arizona State University

Fry, Warren D. (1974), Learning Resources Specialist Emeritus; B.A., University of Northern Iowa; M.A., Arizona State University

Fuchs, Jacob (1951), Professor of Chemistry and Biochemistry; B.A., New York University; M.S., Ph.D., University of Illinois

Fuchs, Rachel G. (1983), Professor of History; B.A., M.A., Boston University; Ph.D., Indiana University

Fulginiti, Laura C. (1998), Adjunct Professor of Anthropology; B.A., Colorado College; M.A., Ph.D., University of Arizona

Fullerton, Bill J. (1958), Professor Emeritus of Education; B.S., Northwestern Oklahoma State College; M.A., Ed.D., University of Oklahoma

Fullinwider, S. Pendleton (1967), Professor Emeritus of History; B.S., United States Naval Academy; M.S., Ph.D., University of Wisconsin, Madison

Funk, C. Joel (2000), Adjunct Professor of Biology; B.S., Tabor College; M.S., Ph.D., Kansas State University

Furnish, Dale Beck (1970), Professor of Law; A.B., Grinnell College; J.D., University of Iowa; LL.M., University of Michigan

Furr-Soloman, Connie (2001), Assistant Professor of Theatre; B.A., University of North Carolina, Charlotte; M.F.A., University of Tennessee, Knoxville

Fuse, Montye (1997), Assistant Professor of English; B.A., California State University, Long Beach; M.A., Ph.D., University of California, Berkeley

G

Gaffney, Philip D. (1957), Professor Emeritus of Education; B.S., Northern Illinois State University; M.A., Ph.D., State University of Iowa

Gaines, Sylvia W. (1972), Professor Emerita of Anthropology; B.A., M.A., Ph.D., Arizona State University

Gale, Betty J. (1982), Professor Emerita of Nursing; B.S.N., M.S., Arizona State University; D.N.Sc., University of San Diego

Galician, Mary-Lou (1983), Associate Professor of Journalism and Mass Communication; B.A., Long Island University, Brooklyn; M.S., Syracuse University; Ed.D., Memphis State University

Gallinger, George W. (1977), Associate Professor of Finance; B.A., Waterloo Lutheran University (Canada); M.B.A., York University (Canada); Ph.D., Purdue University

Gammage, Grady Jr. (1990), Faculty Associate of Planning and Landscape Architecture; B.A., Occidental College; J.D., Stanford University

Gannod, Gerald C. (1998), Assistant Professor of Computer Science and Engineering; B.Sc., M.Sc., Ph.D., Michigan State University

Garcia, Antonio A. (1989), Associate Professor of Bioengineering; B.S., Rutgers, The State University of New Jersey; Ph.D., University of California, Berkeley

Garcia, Eugene E. (2002), Professor of Curriculum and Instruction; Dean, College of Education; B.S., University of Utah; M.A., Ph.D., University of Kansas

- Garcia, Peter J.** (2001), Assistant Professor of Chicana and Chicano Studies; B.M.E., University of New Mexico; M.M., Ph.D., University of Texas, Austin
- Garcia, Phyllis M.** (1992), Clinical Associate Professor of Curriculum and Instruction; B.A., University of Southern Colorado; M.A., Adams State College; Ed.D., University of Northern Colorado
- Garcia-Fernández, Carlos** (1990), Associate Professor of Spanish; M.A., University Pontifica of Salamanca (Spain); M.A., Ph.D., University of California, Davis
- Garcia-Fernández, Carmen** (2001), Associate Professor of Spanish; B.A., Teacher's Training College for Women (Peru); M.A., University of Kansas; Ph.D., Georgetown University
- Garcia-Pichel, Ferran** (1999), Associate Professor of Microbiology; B.S., M.S., Autonomous University of Barcelona, Bellaterra (Spain); Ph.D., University of Oregon
- Gardner, Carl L.** (1994), Professor of Mathematics and Statistics; B.A., Duke University; Ph.D., Massachusetts Institute of Technology
- Garnero, Edward** (1999), Assistant Professor of Geological Sciences; A.B., University of California, Berkeley; Ph.D., California Institute of Technology
- Garrison, Eleanor** (1973), Professor Emerita of Nursing; B.S.N., M.S.N., Wayne State University
- Garrity, Marjorie L.** (1975), Professor Emerita of Nursing; B.S., University of Bridgeport; M.S., Case Western Reserve University
- Gasowski, Ronald Edward** (1971), Professor Emeritus of Art; B.S.D., University of Michigan; M.F.A., University of Washington
- Geiger, Karen** (1996), Lecturer of Accountancy and Information Management; B.S., University of Nevada; M.S., Arizona State University
- Gel, Esma S.** (2000), Assistant Professor of Industrial Engineering; B.S., Orta Dogu Technical University (Turkey); M.S., Ph.D., Northwestern University
- Gelb, Anne** (1998), Associate Professor of Mathematics and Statistics; B.S., University of California, Los Angeles; Sc.M., Ph.D., Brown University
- Gentrup, William F.** (1991), Associate Research Administrator, Arizona Center for Medieval and Renaissance Studies; B.A., M.A., Ph.D., Arizona State University
- George, Lisa** (1999), Assistant Professor of Classics; B.A., Vassar College; M.A., Bryn Mawr College; M.A., San Francisco State University; Ph.D., Bryn Mawr College
- Gérard, Maureen** (2002), Lecturer of Curriculum and Instruction; B.A., University of New Mexico, Albuquerque; M.A., Ph.D., Arizona State University
- Gerber, Leah R.** (2001), Assistant Professor of Biology; B.S., Mills College; M.M.A., Ph.D., University of Washington
- Gerdes, Karen E.** (1995), Associate Professor of Social Work; B.S., Florida State University; M.S.W., Brigham Young University; Ph.D., Florida State University
- Gereboff, Joel D.** (1978), Associate Professor of Religious Studies; Chair, Department of Religious Studies; B.A., New York University; Ph.D., Brown University
- Gerlach, Vernon S.** (1963), Professor Emeritus of Education; B.A., Wayne State University; M.A., University of Minnesota, Twin Cities; Ed.D., Arizona State University
- Gharavi, Lance** (2001), Assistant Professor of Theatre; B.F.A., Drake University; M.A., Ph.D., University of Kansas, Lawrence
- Ghirlanda, Giovanna** (2002), Assistant Professor of Chemistry and Biochemistry; Laurea, Ph.D., University of Padua (Italy)
- Giard, Jacques** (1998), Professor of Design; Director, School of Design; Dip.Des., IAA, Montreal (Canada); H.Dip.Des., Birmingham Polytechnic (United Kingdom); Ph.D., Concordia University (Canada)
- Gibbs, W.R.** (1987), Adjunct Professor of Physics and Astronomy; B.S., M.A., University of Texas; Ph.D., Rice University
- Gibney, John** (1992), Adjunct Professor of Bioengineering; B.S., St. Peter's College; M.D., New Jersey College of Medicine
- Gieschen, Donald W.** (1959), Professor Emeritus of Philosophy; B.S., Northwestern University; M.A., Ph.D., University of Minnesota, Twin Cities
- Giffin, Frederick C.** (1967), Professor Emeritus of History; B.A., Denison University; M.A., Ph.D., Emory University
- Gilfillan, Daniel D.** (2002), Assistant Professor of German; B.A., M.A., University of Vermont; Ph.D., University of Oregon
- Gill, George A.** (1966), Professor Emeritus of Education; B.S., M.A., Arizona State University
- Gillingwater, Denis** (1973), Professor of Art; B.F.A., M.F.A., University of Cincinnati
- Giner, Oscar** (1998), Professor of Theatre; Director, Performance Program; B.A., M.F.A., D.F.A., Yale University
- Ginsburg, Shai** (2001), Assistant Professor of Hebrew; B.A., M.A., Hebrew University (Israel); Ph.D., University of Michigan
- Gisolo, Margaret** (1954), Professor Emerita of Dance; B.S., Indiana State University, Terre Haute; M.A., New York University
- Glass, Gene** (1986), Professor of Educational Leadership and Policy Studies and Psychology in Education; Academic Program Coordinator, Educational Leadership and Policy Studies; B.A., University of Nebraska; M.S., Ph.D., University of Wisconsin
- Glau, Gregory R.** (1994), Associate Instructional Professional of English; Director, Writing Programs; B.A., University of Arizona; M.A., Northern Arizona University; Ph.D., University of Arizona
- Glaunsinger, William S.** (1972), Professor Emeritus of Chemistry and Biochemistry; B.S., Miami University; Ph.D., Cornell University
- Glessner, Beth A.** (1995), Academic Associate of Languages and Literatures; Undergraduate Academic Advisor; B.A., Grove City College; M.A., Ph.D., Pennsylvania State University
- Glick, Jennifer E.** (2000), Assistant Professor of Sociology; B.A., Pennsylvania State University; M.A., Ph.D., University of Texas, Austin
- Glick, Milton D.** (1991), Professor of Chemistry and Biochemistry; Executive Vice President and Provost of the University; A.B., Augusta College; Ph.D., University of Wisconsin, Madison
- Glick, Paul C.** (1982), Adjunct Professor of Sociology; B.A., DePauw University; M.A., Ph.D., University of Wisconsin, Madison
- Glick, William H.** (1995), Professor of Management; Chair, Department of Management; A.B., University of Michigan; Ph.D., University of California, Berkeley
- Glidden-Tracey, Cynthia** (1999), Clinical Assistant Professor of Psychology in Education; A.B., A.M., Ph.D., University of Illinois
- Gober, Patricia A.** (1975), Professor of Geography; B.S., University of Wisconsin, Whitewater; M.A., Ph.D., Ohio State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Godfrey, Donald G. (1988), Professor of Journalism and Mass Communication; B.S., Weber State College; M.S., University of Oregon; Ph.D., University of Washington

Goggin, Maureen Daly (1994), Associate Professor of English; B.S., M.A., Northeastern University; Ph.D., Carnegie Mellon University

Goggin, Peter N. (1995), Assistant Professor of English; B.S., M.A., Northeastern University; Ph.D., Indiana University of Pennsylvania

Goldberg, Beckian Fritz (1990), Professor of English; B.A., M.A., Arizona State University; M.F.A., Vermont College

Goldinger, Stephen D. (1992), Associate Professor of Psychology; B.A., Ph.D., Indiana University, Bloomington

Goldman, Donald (2001), Senior Lecturer of Accountancy and Information Management; B.S., Arizona State University; B.A., University of Illinois

Goldstein, Elliott S. (1974), Associate Professor of Biology; B.S., University of Hartford; M.S., Ph.D., University of Minnesota, Twin Cities

Golen, Steven P. (1984), Associate Professor of Accountancy and Information Management; B.S., M.A., Western Kentucky University; Ph.D., Arizona State University

Golshani, Forouzan (1984), Professor of Computer Science and Engineering; B.S., Arya Mehr University of Technology (Iran); M.S., Ph.D., University of Warwick (United Kingdom)

Gomez, Reynaldo A. (1980), Associate Professor of Curriculum and Instruction; B.A., Southwest Texas State University; M.Ed., Stephen F. Austin State University; Ph.D., Pennsylvania State University

Gomez-Mejia, Luis R. (1989), Professor of Management; B.A., M.A., Ph.D., University of Minnesota, Twin Cities

Gonzales, Nancy A. (1992), Associate Professor of Psychology; B.S., Arizona State University; M.S., Ph.D., University of Washington

González, Josué M. (1998), Professor of Educational Leadership and Policy Studies; Director, Southwest Center for Education Equity and Language Diversity; B.A., M.A., Texas A&I University, Kingsville; Ed.D., University of Massachusetts, Amherst

Gonzalez-Santin, Edwin (1979), Senior Instructional Professional of Social Work; B.A., Cameron State College; M.S.W., Arizona State University

Goo, Benjamin (1955), Professor Emeritus of Art; B.F.A., University of Iowa; M.F.A., Cranbrook Academy of Art

Gooding, Elmer R. (1967), Professor of Economics; B.S., McPherson College; M.A., Ph.D., University of Kansas

Goodnick, Stephen M. (1996), Professor of Electrical Engineering; Chair, Department of Electrical Engineering; B.S., Trinity University; M.S., Ph.D., Colorado State University

Gordon, Leonard (1967), Professor Emeritus of Sociology; B.A., Wayne State University; M.A., University of Michigan; Ph.D., Wayne State University

Gordon, Rena J. (1983), Adjunct Professor of Geography; B.S., Wayne State University; M.A., Ph.D., Arizona State University

Goren, Paul (2001), Assistant Professor of Political Science; B.S., Carnegie Mellon University; M.A., Ph.D., University of Pittsburgh

Gorin, Joanna S. (2002), Assistant Professor of Psychology in Education; B.A., University of California, Los Angeles; M.A., University of Texas, Austin; Ph.D., University of Kansas

Gorman, Robert (2001), Professor of Law; A.B., LL.B., Harvard University

Gorur, Ravi S. (1987), Professor of Electrical Engineering; B.S., Bangalore University (India); M.S., Indian Institute of Science (India); Ph.D., University of Windsor (Canada)

Goul, Kenneth Michael (1985), Professor of Accountancy and Information Management; Director, Information Technology; B.S., M.B.A., Ph.D., Oregon State University

Gould, Ian R. (1998), Assistant Professor of Chemistry and Biochemistry; B.S., Ph.D., University of Manchester (United Kingdom)

Gourley, David R. (1967), Professor Emeritus of Marketing; B.S., Miami University; M.B.A., University of Toledo; D.B.A., Indiana University

Goyer, Robert S. (1981), Professor Emeritus of Communication; B.A., DePauw University; M.A., Miami University; Ph.D., Ohio State University

Grace, Edward E. (1963), Professor Emeritus of Mathematics and Statistics; B.S., Ph.D., University of North Carolina



Graf, William L.
(1978)

Regents' Professor Emeritus of Geography; B.A., M.Sc., Ph.D., University of Wisconsin, Madison

Gratton, Brian J. (1983), Professor of History; B.A., University of New Mexico; Ph.D., Boston University

Gray, Shelley (2001), Assistant Professor of Speech and Hearing Science; B.S., M.S., Ph.D., University of Arizona

Gray, Susan E. (1991), Associate Professor of History; A.B., Earlham College; M.A., Ph.D., University of Chicago

Greathouse, Betty M. (1997), Professor Emerita of Curriculum and Instruction; B.A., M.A., Ph.D., Arizona State University



Greeley, Ronald
(1977)

Regents' Professor of Geological Sciences; B.S., M.S., Mississippi State University; Ph.D., University of Missouri, Rolla

Green, Gregory (2001), Academic Associate, University Libraries, Collection Development; B.A., Brigham Young University; M.A., University of California, Berkeley

Green, James L. (1967), Professor Emeritus of English; B.A., M.A., University of Kansas; Ph.D., University of Nevada, Reno

Green, Jennifer L. (1991), Adjunct Professor of Chemistry and Biochemistry; B.Sc., Ph.D., University of Sydney (Australia)

Green, Mary E. (1967), Professor Emerita of English; B.A., Queens College; M.A., Saint John's University; Ph.D., University of Chicago

Green, Monica (2002), Professor of History; B.A., Barnard College; M.A., Ph.D., Princeton University

Green, Samuel B. (2000), Professor of Educational Psychology; Academic Program Leader, Educational Psychology; B.A., West Virginia University; M.S., Marquette University; Ph.D., University of Georgia

- Greenberg, Edward A.** (1996), Associate Research Scientist for Nursing; B.A., University of California, Los Angeles; Ph.D., Arizona State University
- Greeneich, Edwin W.** (1982), Associate Professor of Electrical Engineering; B.S.E.E., M.S.E.E., Ph.D., University of California, Berkeley
- Greensfelder, Kirk B.** (2001), Assistant Professor of Aerospace Studies; Assistant Department Head, Department of Aerospace Studies; B.S., Miami University; M.B.A., University of South Dakota; M.S., Golden Gate University
- Greenspan, Ruth L.** (1997), Adjunct Professor of Anthropology; B.A., Carleton College; M.A., Ph.D., University of Oregon
- Greives, Thomas L.** (1997), Assistant Librarian, Hayden Reference Services; B.A., Purdue University; M.A., University of Southern California; M.L.S., Indiana University; A.B.D., University of Chicago
- Grey, Betsy J.** (1987), Professor of Law; B.A., Barnard College; J.D., Georgetown University
- Grier, Marvin** (1957), Professor Emeritus of Kinesiology; B.A., Wisconsin State College, La Crosse; M.A., New York University
- Griffin, John M.** (1997), Assistant Professor of Finance; B.A., Baylor University; M.S., Texas A&M University; Ph.D., Ohio State University
- Griffin, William A.** (1988), Professor of Family and Human Development; B.A., Auburn University; M.S., Virginia Polytechnic and State University; Ph.D., Texas Tech University
- Griffith, LeRoy H.** (1958), Professor Emeritus of Education; B.S., M.S., Drake University; Ph.D., University of Iowa
- Griffiths Nagy, Sandra I.** (1982), Academic Associate, Division of Undergraduate Academic Services; Assistant Director, Writing Across the Curriculum Program; B.Ed., M.A., Ph.D., Arizona State University.
- Grigsby, J. Eugene** (1966), Professor Emeritus of Art; A.B., Morehouse College; M.A., Ohio State University; Ph.D., New York University
- Grimm, Nancy B.** (1990), Professor of Biology; B.A., Hampshire College; M.S., Ph.D., Arizona State University
- Grinder, Robert E.** (1973), Professor Emeritus of Education; B.S., University of California, Berkeley; Ed.D., Harvard University
- Grobe, Edwin P.** (1957), Professor Emeritus of French; A.B., William Jewell College; M.A., Ph.D., Indiana University, Bloomington
- Grondin, Robert O.** (1983), Associate Professor of Electrical Engineering; Director, Student Academic Services, College of Engineering and Applied Sciences; B.S., M.S., Ph.D., University of Michigan
- Gross, Douglas R.** (1968), Professor Emeritus of Counselor Education; B.A., M.A., Western Michigan University; Ph.D., University of Wisconsin, Madison
- Grossman, Louis H.** (1966), Professor Emeritus of Management; B.A., University of Michigan; M.B.A., Ph.D., Michigan State University
- Groy, Thomas L.** (1983), Associate Research Professional of Chemistry and Biochemistry; B.S., Adams State College; Ph.D., Arizona State University
- Gruzinska, Aleksandra** (1973), Assistant Professor of French; B.A., M.A., State University of New York, Buffalo; Ph.D., Pennsylvania State University
- Gryder, Robert** (1959–63; 1964), Professor of Curriculum and Instruction; B.A., Northwestern State University; M.Ed., Louisiana State University; Ed.D., University of North Dakota
- Guerin, Sanford M.** (1984), Professor of Law; B.S., Boston University; J.D., University of San Francisco; LL.M., New York University
- Guerrero, Laura** (1996), Professor of Communication; B.A., M.A., San Diego State University; Ph.D., University of Arizona
- Guhathakurta, Subhrajit** (1994), Associate Professor of Planning and Landscape Architecture; B.Arch., Jadavpur University (India); M.C.R.P., Iowa State University; Ph.D., University of California, Berkeley
- Guilbeau, Eric J.** (1977), Olin Endowed Professor of Bioengineering; Chair, Harrington Department of Bioengineering; B.S., M.S., Ph.D., Louisiana Tech University
- Guinouard, Donald E.** (1966), Professor Emeritus of Counselor Education; B.S., M.S., Montana State College; Ed.D., Washington State University
- Guleserian, Theodore** (1971), Associate Professor of Philosophy; B.A., University of California, Riverside; Ph.D., Yale University
- Gullett, Gayle** (1993), Associate Professor of History; B.A., M.A., Loma Linda University; Ph.D., University of California, Riverside
- Gully, Anthony Lacy** (1972), Associate Professor of Art; B.A., University of California, Riverside; M.A., University of California, Berkeley; Ph.D., Stanford University
- Guntermann, Gail** (1977), Professor of Spanish; B.S., University of Montana; M.A., University of New Mexico; Ph.D., Ohio State University
- Guntermann, Karl L.** (1982), Professor of Real Estate; A.B., Knox College; M.B.A., D.B.A., Indiana University
- Guo, Chao** (2002), Assistant Professor of Recreation Management and Tourism; B.A., M.A., Renmin University of China (China); Ph.D., University of Southern California
- Gupta, Sandeep Kumar** (2001), Associate Professor of Computer Science and Engineering; B.Tech, Banaras Hindu University (India); M.Tech, Indian Institute of Technology (India); M.S., Ph.D., Ohio State University
- Gupta, Sanjay** (1990), Professor of Accountancy and Information Management; B.Com., Bombay University (India); B.Laws, Calcutta University (India); M.S.A., Bowling Green State University; Ph.D., Michigan State University; C.P.A., Ohio
- Gust, J. Devens** (1975), Professor of Chemistry and Biochemistry; B.S., Stanford University; M.S., Ph.D., Princeton University
- Gust, Tracey** (2002), Lecturer of Mathematics and Statistics; B.S., Abilene Christian University; M.S., Arizona State University
- Gustavsson, Nora S.** (1994), Associate Professor of Social Work; A.B., M.S.W., City University of New York; Ph.D., University of Southern California
- Guthrie, David W., Col.** (2003), Professor of Aerospace Studies; Chair, Department of Aerospace Studies; B.S., Bemidji State University; M.S., Troy State University
- Gutiérrez, Guadalupe** (1999), Assistant Professor of Chicana and Chicano Studies; B.S., California State University, Northridge; M.A., Ph.D., University of Michigan, Ann Arbor
- Gutierrez, Nancy A.** (1985), Professor of English; Associate Dean, Administration and Personnel, College of Liberal Arts and Sciences; B.A., Denison University; M.A., Ph.D., University of Chicago

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Guzzetti, Barbara J. (1988), Professor of Curriculum and Instruction; B.S., M.S., Northern Illinois University; Ph.D., University of Colorado

Gwinner, Robert F. (1970), Professor Emeritus of Marketing; B.S., University of Southern Mississippi; M.B.A., Ph.D., University of Arkansas

H

Haberman, Donald C. (1967), Professor Emeritus of English; B.A., Rutgers, The State University of New Jersey; M.A., Ph.D., Yale University

Haberman, Lidia W. (1967), Assistant Professor of Latin; B.A., Bryn Mawr College; M.A., Yale University

Hackbarth, Glenn A. (1976), Professor of Music; B.M., University of Wisconsin, Madison; M.M., D.M.A., University of Illinois

Hackett, Edward J. (1998), Professor of Sociology; B.A., Colgate University; M.A., Ph.D., Cornell University

Hackett, Gail (1988), Professor of Counseling Psychology and Counselor Education; Vice Provost; B.A., M.Ed., Ph.D., Pennsylvania State University

Hadley, Neil F. (1966), Professor Emeritus of Biology; B.A., Eastern Michigan University; Ph.D., University of Colorado

Haefler, J. Richard (1976), Associate Professor of Music; B.M., Ohio State University; M.M., University of Arizona; Ph.D., University of Illinois

Haenn, Nora M. (1999), Assistant Professor of Anthropology; B.A., Fordham University; M.A., Ph.D., Indiana University, Bloomington

Haussler, Alice M. (1997), Adjunct Professor of Anthropology; B.A., University of Pennsylvania; M.A., Ph.D., Arizona State University

Haggerson, Nelson L. (1961–63; 1964), Professor Emeritus of Curriculum and Instruction; B.A., Vanderbilt University; M.S., New Mexico Western College, Silver City; Ph.D., Claremont Graduate School

Hagler, Debra (1996), Clinical Associate Professor of Nursing; B.S.N., New Mexico State University; M.S., University of Arizona

Hajicek, James (1976), Professor of Art; B.F.A., Kansas City Art Institute; M.F.A., University of New Mexico

Hakac, John (1966), Professor Emeritus of English; A.B., Centre College; M.A., Ph.D., University of Texas, Austin

Haley, Arthur J. (1976), Professor of Recreation Management and Tourism; B.A., Stonehill College; M.Ed., Springfield College; Ph.D., Texas A&M University

Hall, John S. (1973), Professor of Public Affairs; B.A., M.A., San Diego State University; Ph.D., University of Oregon

Halverson, Roy K. (1988), Professor Emeritus of Journalism and Mass Communication; B.S., M.S., University of Wisconsin, Madison; Ph.D., University of Illinois

Hamilton, Robert (1980), Professor of Music; B.M., Indiana University, Bloomington; M.M., Catholic University of America

Hammond, Philip C. (1996), Adjunct Professor of Anthropology; B.A., Drew University; M.A., Ph.D., Yale University

Hanish, Laura (1997), Assistant Professor of Family and Human Development; B.S., Arizona State University; M.A., Ph.D., University of Illinois, Chicago

Hanna, Albert Lyle (1967), Professor Emeritus of Music; B.M., University of Cincinnati; Ph.D., Indiana University, Bloomington

Hanson, Gary (1999), Professor of Educational Leadership and Policy Studies; Academic Program Coordinator, M.Ed. in Higher and Postsecondary Education; B.A., M.A., Ph.D., University of Minnesota

Hanson, Randel D. (1999), Assistant Professor of Justice Studies; B.A., Ph.D., University of Minnesota

Hanson, Roland C. (1966), Professor Emeritus of Physics and Astronomy; B.S., Michigan College of Mining and Technology; M.S., Ph.D., University of Illinois

Happel, Stephen K. (1975), Professor of Economics; B.A., University of Missouri; M.A., Ph.D., Duke University

Hardert, Ronald A. (1966), Professor Emeritus of Sociology; A.B., M.A., University of Cincinnati; Ph.D., Indiana University, Bloomington

Hardt, Annabelle (1968), Professor Emerita of Curriculum and Instruction; B.A., Southwestern University; M.A., Cornell University; Ph.D., University of Texas, Austin

Haried, Andrew A. (1969), Professor Emeritus of Accountancy and Information Management; B.A., Hastings College; M.A.S., Ph.D., University of Illinois; C.P.A., Arizona, Illinois, North Carolina

Harlan, Sharon L. (1998), Associate Professor of Sociology; B.A., Northeastern University; M.A., Ph.D., Cornell University

Harrington, Rodney E. (1992), Professor Emeritus of Microbiology; A.B., University of South Dakota; Ph.D., University of Washington

Harris, Jerry D. (1972), Professor Emeritus of Educational Psychology; B.S., Illinois State University; Ph.D., University of Minnesota, Twin Cities

Harris, Joseph (1963), Professor Emeritus of Chemistry and Biochemistry; B.S., University of Maryland; M.A., Ph.D., Johns Hopkins University

Harris, Kathryn M. (1965), Assistant Professor of English; B.A., M.A., Arizona State University

Harris, Mark (1980), Professor Emeritus of English; B.A., M.A., University of Denver; Ph.D., University of Minnesota, Twin Cities

Harris, Walter Jr. (1980), Professor Emeritus of Music; B.S., Knoxville College; M.M., Ph.D., University of Minnesota, Twin Cities

Harrison, Jon F. (1990), Professor of Biology; B.S., University of Toronto (Canada); M.S., University of Pittsburgh; Ph.D., University of Colorado

Harrison, Marsha (2000), Lecturer of Curriculum and Instruction; B.A., M.Ed., Ph.D., Arizona State University

Hartman, Thomas S. (1990), Associate Professor of Architecture; D.P.L.G., Paris School of Beaux Arts (France)

Hassett, Matthew J. (1966), Professor Emeritus of Mathematics and Statistics; B.S., Fordham University; M.S., Ph.D., Rutgers, The State University of New Jersey

Hastings, Vernon L. (1973), Professor Emeritus of Construction; B.S.M.E., University of Nebraska; M.S.I.E., Oklahoma A&M University

Hatfield, Mary M. (1988), Professor Emerita of Curriculum and Instruction; B.S., M.S., Ph.D., University of Kansas

Hawkey, Diane E. (2002), Adjunct Professor of Anthropology; B.A., M.A., Ph.D., Arizona State University

Hawkos, Lise J. (1981), Associate Museum Professional, Slide Collection, School of Art; B.A., United States International University; M.A., University of Wisconsin, Madison

- Hayes, Colleen** (1998), Lecturer of Computer Information Systems; B.S., M.B.A., Arizona State University
- Hayes, Mark** (1996), Associate Professor of Chemistry and Biochemistry; B.A., Humboldt State University; Ph.D., Pennsylvania State University
- Haygood, Robert C.** (1970), Professor Emeritus of Psychology; B.S., University of Illinois; M.S., Ph.D., University of Utah
- Haynes, Peter** (1975), Professor of Justice Studies; B.S., University of Southampton (United Kingdom); M.A., Ph.D., University of Toronto (Canada)
- Hazel, Jeffrey R.** (1975), Professor of Biology; B.A., College of Wooster; M.S., Ph.D., University of Illinois
- He, Jiping** (1994), Professor of Bioengineering; B.S., Huazhong University of Science and Technology, Wuhan (China); M.S., Ph.D., University of Maryland
- He, Leping** (2003), Assistant Librarian, Technical Services; B.A., East China Normal University (China); M.L.S., Emporia State University
- Head, K. Brad** (2002), Assistant Professor of Aerospace Studies; B.S., United States Air Force Academy
- Heard, Holly** (2002), Assistant Professor of Family and Human Development and Sociology; B.A., University of Notre Dame; M.A., Pennsylvania State University; Ph.D., University of North Carolina, Chapel Hill
- Hedrick, Philip W.** (1992), Professor of Biology; B.A., Hanover College; M.S., Ph.D., University of Minnesota
- Heenan, Katherine L.** (1998), Senior Lecturer of English; B.A., California State University, Chico; M.A., Ph.D., University of Connecticut, Storrs
- Heff, Patricia M.** (1987), Associate Professor of Family and Human Development; B.S., M.Ed., Iowa State University; Ph.D., Oklahoma State University
- Hegmon, Michelle** (1995), Associate Professor of Anthropology; B.A., University of Virginia; M.A., Ph.D., University of Michigan
- Heier, William D.** (1966), Professor Emeritus of Management; B.S., University of Maryland; M.A., George Washington University; Ph.D., American University
- Hejduk, Renata** (1999), Assistant Professor of Architecture; B.A., Barnard College; M.A., Tufts University
- Heller, Jules** (1976), Professor Emeritus of Art; Dean Emeritus, Herberger College of Fine Arts; B.A., Arizona State University; M.A., Columbia University; Ph.D., University of Southern California
- Helms, Loyce Randel** (1976), Professor of English; B.A., University of California, Riverside; Ph.D., University of Washington
- Helmstadter, Gerald C.** (1959), Professor Emeritus of Education; B.S., M.S., Iowa State University; Ph.D., University of Minnesota, Twin Cities
- Helton, Jon C.** (1973), Professor Emeritus of Mathematics and Statistics; B.S., Southwest Texas State College; M.A., Ph.D., University of Texas, Austin
- Hembree, Gary G.** (1986), Senior Research Scientist of Physics and Astronomy; B.A., University of California, San Diego; Ph.D., Arizona State University
- Henderson, Mark** (1984), Professor of Industrial Engineering; B.S.M.E., M.S.M.E., Ph.D., Purdue University
- Hendrick, Thomas E.** (1984), Professor of Supply Chain Management; B.S., M.B.A., University of Washington; Ph.D., University of Oregon
- Hendrickson, Lester E.** (1968), Professor Emeritus of Materials Science and Engineering; B.S., M.S., Michigan Technological University; Ph.D., University of Illinois
- Hendrickson, Suzanne B.** (1990), Lecturer of French; B.S., M.A., Louisiana State University, Baton Rouge; Ph.D., Washington University, St. Louis
- Hendrickson, William L.** (1976), Associate Professor of French; B.A., Arizona State University; M.A., University of Kansas; Ph.D., Princeton University
- Henkel, Ray** (1966), Professor Emeritus of Geography; B.S., Arizona State University; M.S., Ph.D., University of Wisconsin, Madison
- Hennington, Jo Ann** (1975), Professor Emerita of Management Communication; B.A., M.B.A., Ed.D., Arizona State University
- Henry, Joseph** (1988), Professor Emeritus of Engineering; B.S., West Virginia University; M.S., Ph.D., University of Michigan
- Hepburn, John R.** (1984), Professor of Justice Studies; B.A., Butler University; M.S., University of Kentucky; Ph.D., University of Iowa
- Hepworth, Dean H.** (1990), Professor Emeritus of Social Work; B.S., M.S.W., Ph.D., University of Utah
- Herald, Cherry L.** (1973), Research Professor, Cancer Research Institute; Associate Director, Cancer Research Institute; B.S., M.S., Ph.D., Arizona State University
- Herald, Delbert L.** (1973), Research Professor, Cancer Research Institute; B.A., University of Colorado; Ph.D., Arizona State University
- Herbots, Nicole** (1991), Associate Professor of Physics and Astronomy; Engineering Degree, Ph.D., Catholic University of Louvain (Belgium)
- Herman, George R.** (1956), Professor Emeritus of English; M.A., University of Kansas
- Herman, Richard M.** (1992), Research Professor of Bioengineering; B.S., Case Western Reserve University; M.B., B.Ch., B.A.O., Queen's University Faculty of Medicine (United Kingdom)
- Hernandez, Armand P.** (1974), Professor Emeritus of Justice Studies; B.A., M.A., San Jose State University; Ed.D., University of Southern California
- Hernández-G., Manuel de Jesús** (1992), Associate Professor of Spanish; B.A., University of California, San Diego; M.A., Ph.D., Stanford University
- Herrera, Richard** (1989), Associate Professor of Political Science; B.A., M.A., Saint Mary's University; Ph.D., University of California, Santa Barbara
- Herrera, Tamara** (2002), Professor of Legal Writing; B.A., Grinnell College; J.D., University of Nebraska
- Herring, Donald E.** (1999), Assistant Professor of Design; B.A., American University; B.S.D., M.S.D., Arizona State University
- Herrington, Scott S.** (1981), Librarian; Head, Library Instruction, Systems, and Technology (LIST); B.A., State University of New York, Plattsburgh; M.L.S., University of Tennessee; Ph.D., Arizona State University
- Hershauer, James C.** (1969), Professor of Management; B.S., Purdue University; M.B.A., D.B.A., Indiana University, Bloomington

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Hertzell, Michael G. (1987), Professor of Finance; B.A., M.B.A., M.S., University of Rochester; Ph.D., University of Oregon

Hervig, Richard L. (1981), Senior Research Scientist, Center for Solid State Science; B.S., University of Iowa; Ph.D., University of Chicago

Hestenes, David O. (1966), Professor Emeritus of Physics and Astronomy; B.A., Pacific Lutheran College; M.A., Ph.D., University of California, Los Angeles

Hester, John J. "Jeff" (1991), Professor of Physics and Astronomy; B.A., M.S., Ph.D., Rice University



Heydt, Gerald Thomas
(1995)

Regents' Professor of Electrical Engineering; Director, Center for Advanced Control of Energy and Power Systems; B.S.E.E., Cooper Union University; M.S.E.E., Ph.D., Purdue University

Heywood, William M. (1997), Adjunct Faculty of Design; B.F.A., Minneapolis College of Art and Design; M.S., Arizona State University; Ph.D., Fielding Institute



Hickman, David R.
(1982)

Regents' Professor of Music; B.M., University of Colorado; M.M., Wichita State University

Higgins, Norman C. (1968), Professor Emeritus of Educational Media and Computers; B.S., Central Missouri State College; M.S., Ph.D., Syracuse University

Higgins, Walter T. Jr. (1967), Professor of Electrical Engineering; B.E.E., Manhattan College; M.S., Ph.D., University of Arizona

Hill, Gary W. (1999), Professor of Music; Director of Bands; B.M.E., M.M., University of Michigan

Hill, James Brett (2002), Adjunct Professor of Anthropology; B.A., University of Colorado, Boulder; M.A., Ph.D., Arizona State University

Hinds, David S. (2002), Assistant Professor of African American Studies; B.A., University of the District of Columbia; M.A., Ph.D., Howard University

Hinks, Robert W. (1981), Associate Professor of Civil and Environmental Engineering; B.Sc., University of Wales (United Kingdom); M.S.E., M.A., Ph.D., Princeton University

Hinrichs, Richard N. (1987), Associate Professor of Kinesiology; A.B., Oberlin College; M.A., University of Iowa; Ph.D., Pennsylvania State University

Hirleman, Edwin D. Jr. (1977), Professor Emeritus of Mechanical and Aerospace Engineering; B.S.M.E., M.S.M.E., Ph.D., Purdue University

Hitt, Michael (2000), Professor and Weatherup/Overby Chair in Executive Leadership; B.B.A., M.B.A., Texas Tech University; Ph.D., University of Colorado

Hoekstra, Valerie (2002), Assistant Professor of Political Science; B.A., California State University, Long Beach; M.A., Ph.D., State University of New York, Stony Brook

Hoffer, Warren W. (1972), Professor of Music; B.M., M.M., University of Wisconsin, Madison

Hoffman, Dan (1999), Professor of Architecture; B.Arch., Cooper Union

Hoffman, Dennis L. (1979), Professor of Economics; Associate Dean, Graduate Programs, W. P. Carey School of Business; B.S., Grand Valley State University; M.A., Ph.D., Michigan State University

Hoffman, Steven A. (1985), Associate Professor of Microbiology; B.A., Clark University; M.A., Ph.D., University of Colorado

Hoffmeister, J. Ronald (1983), Associate Professor of Finance; B.S., Millikin University; M.S., Ph.D., University of Illinois

Hogan, Fiona (1984), Assistant Research Professor, Cancer Research Institute; B.Sc., M.Sc., Ph.D., University College, Dublin (Ireland)

Hogan, Timothy D. (1970), Professor of Economics; Director, Center for Business Research; Director, L. William Seidman Research Institute; A.B., University of California, Berkeley; M.A., University of California, Davis; Ph.D., Virginia Polytechnic Institute and State University

Hogg, Gary L. (1995), Professor of Industrial Engineering; Chair, Department of Industrial Engineering; B.S., Texas A&M University; M.S., Ph.D., University of Texas, Austin

Hogue, Brenda (2002), Associate Professor of Microbiology; B.A., Mississippi University; M.Ed., Duke University; Ph.D., University of Tennessee

Hogue, Cynthia (2003), Maxine and Jonathan Marshall Professor of English; B.A., Oberlin College; M.A.H., State University of New York, Buffalo; Ph.D., University of Arizona

Hokin, Jeanne (1997), Senior Lecturer of Art; B.A., Ph.D., University of California, Santa Barbara

Holbert, Keith E. (1989), Associate Professor of Electrical Engineering; B.S., M.S., Ph.D., University of Tennessee

Holbrook, Amy K. (1975), Associate Professor of Music; B.A., M.A., Mills College; Ph.D., University of Washington

Holley, Lynn C. (2000), Assistant Professor of Social Work; B.A., M.S.S.W., University of Tennessee, Knoxville; Ph.D., University of Washington

Holloway, Allen Jr. (1992), Adjunct Professor of Bioengineering; B.A., Yale University; M.D., Harvard University

Holloway, John R. (1969), Professor of Chemistry and Biochemistry and Geological Sciences; B.S., University of Oregon; Ph.D., Pennsylvania State University

Holloway, Victoria (1995), Associate Professor of Theatre; B.A., Boise State University

Holschuh, Jane (2000), Assistant Professor of Social Work; B.A., M.S.W., Ph.D., University of California, Berkeley

Holway, James (1993), Faculty Associate of Planning and Landscape Architecture; B.A., Cornell University; M.R.P., Ph.D., University of North Carolina, Chapel Hill

Hom, Peter W. (1984), Professor of Management; B.A., New York University; M.A., University of California, Berkeley; Ph.D., University of Illinois

Homa, Donald L. (1975), Professor of Psychology; B.S., University of Iowa; M.S., Ph.D., University of Wisconsin, Madison

Homer, Judith (1998), Clinical Associate Professor of Counseling Psychology and Counselor Education; Director, Counselor Training Center; B.A., M.S., Ph.D., University of Oklahoma

Honegger, Gitta (2001), Professor of German, Theatre, and Women's Studies; Chair, Department of Theatre; Ph.D., University of Vienna (Austria)

- Hoober, J. Kenneth** (1991), Professor of Plant Biology; Director, Molecular Biosciences and Biotechnology Program; B.A., Goshen College; M.S., Ph.D., University of Michigan
- Hood, Stafford** (1992), Associate Professor of Counselor Education; B.A., M.S., University of Wisconsin, Whitewater; Ph.D., University of Illinois
- Hoover, Helene M.** (1957), Professor Emerita of Family and Human Development; B.S., M.S., Louisiana State University; Ed.D., Oklahoma State University
- Hope, Diane** (1997), Assistant Research Professor of Biology; B.S., University of London (United Kingdom); M.S., Ph.D., University of Aberdeen (United Kingdom)
- Hopkins, Paul T. Jr., Capt.** (2001), Assistant Professor of Military Science; B.S., Wheaton College
- Hoppensteadt, Frank C.** (1995), Professor of Mathematics and Statistics and Electrical Engineering; B.A., Butler University; M.S., Ph.D., University of Wisconsin, Madison
- Horan, Elizabeth R.** (1989), Professor of English; Chair, Department of English; B.A., Barnard College; Ph.D., University of California, Santa Cruz
- Horan, John J.** (1985), Professor of Counseling Psychology and Counselor Education; A.B., M.A., University of Detroit; Ph.D., Michigan State University
- Horwath, Peter** (1973), Professor of German; Abitur, Realgymnasium, Landshut (Germany); B.A., M.A., Indiana University, Bloomington; Ph.D., University of Michigan
- Hotelling, Katsuko T.** (1991), Associate Librarian, Technical Services Department; B.A., M.A., University of North Carolina, Chapel Hill; M.A., University of Oregon
- Houston, Sandra L.** (1984), Professor of Civil and Environmental Engineering; Chair, Department of Civil and Environmental Engineering; B.S., University of Oklahoma; M.S.C.E., University of New Mexico; Ph.D., University of California, Berkeley
- Houston, William N.** (1984), Professor of Civil and Environmental Engineering; Professional Degree in Geological Engineering, Colorado School of Mines; M.S.C.E., Ph.D., University of California, Berkeley
- Howard, Pamela** (1996), Lecturer of Speech and Hearing Science; B.A., M.A., California State University, Fresno
- Howell, Susan** (2001), Adjunct Professor of Anthropology; B.A., San Jose State University; M.A., Ph.D., Arizona State University
- Howells, Edmund G.** (1960), Professor Emeritus of Philosophy; B.A., University of Utah; M.A., University of Michigan; M.A., Middlebury College; Ph.D., Stanford University
- Hrabe, David P.** (2002), Assistant Professor of Nursing; Director, Continuing and Extended Education, College of Nursing; B.S.N., Fort Hays State University; M.S., Arizona State University; Ph.D., University of Arizona
- Hu, Qiang** (2001), Assistant Research Professor of Plant Biology; B.S., Hubei University (China); M.S., Institute of Hydrobiology, Chinese Academy of Sciences (China); Ph.D., Ben-Gurion University of the Negev (Israel)
- Hubbard, Paul G.** (1950), Professor Emeritus of History; A.B., Wabash College; M.A., Ph.D., University of Illinois
- Hubele, Norma F.** (1984), Professor of Industrial Engineering; B.S., University of Massachusetts; M.S., Ph.D., Rensselaer Polytechnic Institute
- Hudak, Thomas** (1988), Professor of Anthropology; B.A., M.A., University of Wisconsin, Madison; Ph.D., University of Michigan
- Hudelson, Sarah J.** (1989), Professor of Curriculum and Instruction; Associate Dean, Academic Programs and Personnel; B.A., College of Wooster; M.A., Ph.D., University of Texas, Austin
- Huey, Ben M.** (1979), Associate Professor of Computer Science and Engineering; Associate Dean, Planning and Administration; B.S., Harding College; M.S., Ph.D., University of Arizona
- Huey, Kimberly A.** (2001), Assistant Professor of Kinesiology; B.S., Seattle Pacific University; M.S., University of Arizona; Ph.D., University of California, San Diego
- Huff, Robert A.** (1985), Professor Emeritus of Education; B.A., University of Kansas; M.A., University of Missouri, Kansas City; Ed.D., University of Oregon
- Hui, Joseph Y.** (1999), Professor of Electrical Engineering; B.S., M.S., Ph.D., Massachusetts Institute of Technology
- Huizingh, William** (1959), Professor Emeritus of Accountancy and Information Management; B.S.B.A., M.B.A., University of Denver; Ph.D., University of Michigan; C.P.A., Arizona, Colorado
- Humphrey, Ted** (1966), Professor of Philosophy; Dean, the Barrett Honors College; A.B., M.A., University of California, Riverside; Ph.D., University of California, San Diego
- Humphreys, Jere T.** (1987), Professor of Music; B.M., University of Mississippi; M.M., Florida State University; Ph.D., University of Michigan
- Hunnicutt, Kay Hartwell** (1975), Associate Professor of Educational Leadership and Policy Studies; Assistant Director, Division of Educational Leadership and Policy Studies; Academic Program Coordinator, DELTA Doctorate; B.S., M.A., Murray State University; Ph.D., Southern Illinois University, Carbondale; J.D., Arizona State University
- Hunter, Betty A.** (1966), Professor Emerita of Family and Human Development; B.S., M.Ed., University of North Carolina, Greensboro
- Hunter, Gary K.** (1999), Assistant Professor of Marketing; B.S., United States Military Academy; M.B.A., University of Tennessee; Ph.D., University of North Carolina
- Hunter, Sue** (1999), Assistant Librarian, Hayden Reference Services; B.A., McMaster University (Canada); M.L.S., Dalhousie University (Canada)
- Huntington, Virginia R.** (1962), Professor Emerita of Accountancy and Information Management; B.A., M.B.A., University of Kansas; Ph.D., University of Texas; C.P.A., Arizona, Missouri
- Hurdle, Donna E.** (1997), Assistant Professor of Social Work; B.A., Susquehanna University; M.S.W., University of Maryland, Baltimore; Ph.D., University of South Carolina, Columbia
- Hurlbert, Glenn** (1990), Associate Professor of Mathematics and Statistics; Associate Chair, Undergraduate Studies; B.S., Wake Forest University; M.Sc., State University of New York, Stony Brook; Ph.D., Rutgers, The State University of New Jersey
- Husman, Jenefer** (2002), Assistant Professor of Psychology in Education; B.S., Evergreen State College, Olympia; M.A., Ph.D., University of Texas, Austin
- Huss, Gary** (1998), Senior Research Scientist of Geological Sciences; B.A., Rice University; M.S., University of New Mexico; Ph.D., University of Minnesota
- Huston, Gerald D.** (1962), Professor Emeritus of Accountancy and Information Management; B.S.C., M.A., Ph.D., University of Iowa
- Hutt, Michael D.** (1982), Davis Distinguished Professor of Marketing; B.B.A., M.B.A., Ohio University; Ph.D., Michigan State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Hwang, Yuhchang (1995), Associate Professor of Accountancy and Information Management; B.A., Fu-Jen Catholic University (Taiwan); M.S., National Cheng-Chi University (Taiwan); Ph.D., University of California, Berkeley

I

Iasemidis, Leon D. (2000), Associate Professor of Bioengineering; B.S., National Technical University of Athens (Greece); M.S., Ph.D., University of Michigan

Idso, Sherwood J.B. (1984), Adjunct Professor of Geography and Plant Biology; Research Physicist, U.S.D.A. Agricultural Research Service; B.S., M.S., Ph.D., University of Minnesota

Igoe, Ann Reid (1999), Clinical Assistant Professor of Psychology in Education; B.S., Grand Canyon University; M.A., Ph.D., Arizona State University

Ihrig, Edwin (1979), Professor of Mathematics and Statistics; B.S., M.A., University of Maryland; Ph.D., University of Toronto (Canada)

Imdieke, LeRoy (1968), Professor Emeritus of Accountancy and Information Management; B.S., Valley City State College; M.A., University of North Dakota; Ph.D., University of Illinois; C.P.A., Illinois

Ingram, David (1998), Professor of Speech and Hearing Science; Chair, Department of Speech and Hearing Science; B.S., Georgetown University; Ph.D., Stanford University

Ingram, Kelly D. (1998), Clinical Assistant Professor of Speech and Hearing Science; B.A., University of British Columbia (Canada); M.S., Purdue University

Innes, Matthew (2001), Assistant Professor of Architecture; B.Eng., Sheffield City Polytechnic (United Kingdom); M.S., University of Cambridge (United Kingdom)

Inskeep, Gordon C. (1968), Professor Emeritus of Management; B.Ch.E., Ohio State University; Ph.D., Columbia University

Irvine, Daniel E. (1995), Lecturer of Theatre; B.F.A., M.F.A., University of North Carolina, Chapel Hill

Isaac, Gwyneira (2002), Assistant Professor of Anthropology; B.F.A., University of Michigan; M.P., Ph.D., Oxford University (United Kingdom)

Ismeurt, Robert L. (1989), Associate Professor of Nursing; B.S.N., Florida State University; M.S., Arizona State University; Ph.D., University of Texas, Austin

Isom, Matthew (1996), Senior Lecturer of Mathematics and Statistics; Director of First-Year Mathematics and Statistics; B.A., Humboldt State University; M.A., Ph.D., University of Northern Colorado

Itule, Bruce D. (1985), Clinical Professor of Journalism and Mass Communication; B.A., University of Arizona; M.A., University of Colorado



Iverson, Peter
(1986)

Regents' Professor of History; B.A., Carleton College; M.A., Ph.D., University of Wisconsin, Madison

Iyer, Govind (1998), Associate Professor of Accountancy and Information Management; B.S., University of Bombay (India); M.Tx., Ph.D., Georgia State University

J

Jackiewicz, Elzbieta (1994), Lecturer of Mathematics and Statistics; M.Sc., University of Gdansk (Poland)

Jackiewicz, Zdzislaw (1987), Professor of Mathematics and Statistics; M.S., Technical University of Gdansk (Poland); M.S., Ph.D., University of Gdansk (Poland)

Jacks, Mary L. (1955), Professor Emerita of Business Administration; B.A., M.A., Arizona State University; C.P.S., Arizona

Jackson Hall, Cheryl (2002), Lecturer of Interdisciplinary Studies; B.A., University of Massachusetts; M.A., University of Montana; Ph.D., University of California, San Francisco

Jackson, Donald W. Jr. (1972), Professor of Marketing; B.A., Albion College; M.B.A., Ph.D., Michigan State University

Jackson, Marvin R. Jr. (1962), Professor Emeritus of Economics; B.S., M.A., University of Colorado; Ph.D., University of California, Berkeley

Jackson, Naomi M. (1995), Associate Professor of Dance; B.A., McGill University (Canada); M.A., University of Surrey (United Kingdom); Ph.D., New York University

Jacob, Richard J. (1963), Professor Emeritus of Physics and Astronomy; B.S., Ph.D., University of Utah

Jacobowitz, Ronald (1970), Professor Emeritus of Mathematics and Statistics; B.A., City College of New York; M.S., University of Chicago; Ph.D., Princeton University

Jacobs, Bertram L. (1985), Professor of Microbiology; Director, Interdisciplinary Committee for Molecular and Cellular Biology; B.S., Rutgers, The State University of New Jersey; Ph.D., University of California, Berkeley

Jacobs, H. Donald (1972), Professor Emeritus of Curriculum and Instruction; Director, Reading Clinic; B.A.Ed., M.A.Ed., Central Washington State College; D.Ed., University of Oregon

Jacobson, Arthur (1956), Professor Emeritus of Art; B.S., M.S., University of Wisconsin, Madison; Ph.D., University of Minnesota, Twin Cities

Jacobson, David (1992), Associate Professor of Sociology; B.A., Hebrew University of Jerusalem, (Israel); M.S., London School of Economics (United Kingdom); Ph.D., Princeton University

Jacobson, Dean L. (1974), Professor Emeritus of Materials Science and Engineering; B.S., M.S., University of Notre Dame; Ph.D., University of California, Los Angeles

Jacobson, Diana L. (1996), Faculty Associate of Nursing; B.S.N., University of Arizona; M.S., Arizona State University

Jain, Nemi C. (1976), Professor of Communication; B.S., M.S., Agra University (India); Ph.D., Michigan State University

Jakob, John H. (1960), Professor Emeritus of Architecture; B.Arch., Ohio State University; M.S.Arch., Columbia University

James, Melissa A., SSG (2000), Instructor of Military Science

James, Steven R. (1996), Adjunct Professor of Anthropology; B.A., University of California, Berkeley; M.A., University of Utah; Ph.D., Arizona State University

Jankowski, Daniel F. (1964), Professor of Mechanical and Aerospace Engineering; B.S.E., M.S.E., Ph.D., University of Michigan

Janssen, James G. (1968), Professor Emeritus of English; B.A., M.A., Marquette University; Ph.D., University of Wisconsin, Madison

Jarvis, Cheryl Burke (2000), Assistant Professor of Marketing; B.S., M.S., Texas A&M University; Ph.D., Indiana University

- Jasper, Marcia A.** (1976–86; 1993), Clinical Associate Professor of Nursing; B.S.N., St. Olaf College; M.S., Arizona State University
- Jay, William (Bill)** (1974), Professor Emeritus of Art; Diploma, Institute of Incorporated Photographers, Berkshire College of Art (United Kingdom); Final Diploma, City and Guilds of The London Institute, Berkshire College of Art (United Kingdom); M.A., M.F.A., University of New Mexico
- Jeans, Franklyn** (2002), Director, Communications, College of Law; B.S., California State Polytechnical College; M.S., Columbia University; J.D., Arizona State University
- Jelinek, James** (1953), Professor Emeritus of Education; B.S., University of Illinois; M.A., Northwestern University; Ed.D., Indiana University, Bloomington
- Jenkins, William** (1979), Associate Professor of Art; B.A., Saint Lawrence University; M.F.A., State University of New York, Buffalo
- Jennings, Marianne M.** (1977), Professor of Legal and Ethical Studies; B.S., J.D., Brigham Young University
- Jiang, Nan** (2000), Associate Research Scientist of Physics and Astronomy; B.Sc., Jilin University (China); M.S., Chinese Science Academy (China); Ph.D., University of Birmingham (United Kingdom)
- Joehnk, Michael D.** (1982), Professor Emeritus of Finance; B.S., University of Arizona; M.B.A., Arizona State University; Ph.D., University of Arizona
- Joganic, Edward F.** (1996), Adjunct Professor of Speech and Hearing Science; B.S., M.S., M.D., University of Arizona
- Johannes, Tricia** (1998), Faculty Associate of Design; B.S.D., Arizona State University
- Johanson, Donald C.** (1997), Professor of Anthropology; Director, Institute of Human Origins; B.A., University of Illinois, Urbana-Champaign; M.A., Ph.D., University of Chicago
- Johnson, Alan P.** (1967), Professor Emeritus of English; B.A., Amherst College; M.A., University of Michigan; Ph.D., University of Minnesota, Twin Cities
- Johnson, Douglas A.** (1974), Professor of Accountancy and Information Management; B.B.A., Ph.D., University of Texas; C.P.A., Texas
- Johnson, John M.** (1972), Professor of Justice Studies; B.A., Indiana University, Bloomington; M.A., San Diego State College; Ph.D., University of California, San Diego
- Johnson, Linda Nelson** (1985), Associate Professor of Design; B.A., M.A., Iowa State University
- Johnson, Marysia** (1997), Assistant Professor of English; B.A., Saint Francis College, Brooklyn; M.A., Monterey Institute of International Studies; Ph.D., Georgetown University
- Johnson, Paul C.** (1994), Associate Professor of Civil and Environmental Engineering; Interim Associate Dean, Research; B.S., University of California, Davis; M.A., Ph.D., Princeton University
- Johnson, Penelope M.** (1995), Clinical Assistant Professor of Nursing; B.S., University of Colorado; M.S., Arizona State University
- Johnson, Robert A.** (1999), Adjunct Professor of Biology; B.S., M.S., University of Illinois, Urbana-Champaign; Ph.D., Arizona State University
- Johnson, Roy M.** (1952–53; 1955), Professor Emeritus of Microbiology; A.B., M.S., University of Chicago; Ph.D., University of New Mexico
- Johnson, Wendee** (1990), Clinical Associate Professor of Nursing; B.S.N., Gustavus Adolphus College; M.S.N., University of Pennsylvania
- Johnson, William G.** (1990), Professor of Health Administration and Policy; B.S., University of Pennsylvania; M.A., Temple University; Ph.D., Rutgers, The State University of New Jersey
- Johnson, William S.** (1990), Executive Director, Division of Undergraduate Academic Services; B.A., Washington State University; M.S., Iowa State University; Ph.D., University of Southern California
- Johnston, Hubert** (1986), Clinical Associate Professional of Social Work; B.S., Cheyney State College; M.A., Central Michigan University; Ph.D., Cornell University
- Jones, Austin E.** (1968), Professor Emeritus of Psychology; B.A., University of Illinois; M.S., Purdue University; Ph.D., University of Rochester
- Jones, Don** (1996), Associate Professor of Mathematics and Statistics; B.S., M.S., Georgia Institute of Technology; Ph.D., University of California, Irvine
- Jones, Elizabeth E. K.** (1996), Lecturer of Mathematics and Statistics; B.S., M.A., University of Texas; Ph.D., Arizona State University
- Jones, Jennifer** (1999), Adjunct Professor of Anthropology; B.A., State University of New York, Binghamton; Ph.D., Arizona State University
- Jones, John** (1990), Associate Professor of Mathematics and Statistics; A.B., University of California, Berkeley; Ph.D., Harvard University
- Jones, Marion K.** (1970), Professor Emerita of Dance; B.A., Wayne State University; M.A., Arizona State University
- Jones, Owen D.** (1994), Professor of Law; B.A., Amherst College; J.D., Yale University
- Jones, Ruth S.** (1981), Professor of Political Science; Vice Provost; B.S., Indiana State University; M.A., Ph.D., Georgetown University
- Jonsson, Hjorleifur** (1999), Assistant Professor of Anthropology; B.A., University of Iceland (Iceland); M.A., University of Iowa; M.A., Ph.D., Cornell University
- Joo, Youngjoong** (2001), Assistant Professor of Electrical Engineering; B.S., M.S., Korea University (South Korea); Ph.D., Georgia Institute of Technology
- Jordan, K. Forbis** (1987), Professor Emeritus of Educational Administration and Supervision; A.B., M.A., Western Kentucky State College; Ed.D., Indiana University
- Joshi, Lokesh** (2000), Assistant Research Professor of Plant Biology; B.S., M.S., University of Rajasthan (India); Ph.D., University of Bath (United Kingdom)
- Joyal, Elaine** (1998), Adjunct Professor of Anthropology; B.A., Antioch College; M.S., Oregon State University; Ph.D., Arizona State University
- Juergens, Jennifer L.** (2001), Assistant Professor of Finance; B.S., Ph.D., The Pennsylvania State University
- Julian, Marti F.** (2001), Assistant Professor of Educational Technology; B.S., Northern Arizona University; M.Ed., Ph.D., University of Virginia
- Jung, Ranu** (2002), Associate Professor of Bioengineering; B.Tech., Regional Engineering College, Warangal, Andhra Pradesh (India); M.S., Ph.D., Case Western Reserve University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Jurik, Nancy (1981), Professor of Justice Studies; B.A., M.A., Southern Methodist University; Ph.D., University of California, Santa Barbara

Justus, Jerry T. (1968), Professor Emeritus of Biology; B.A., Franklin College; M.A., Ph.D., Indiana University, Bloomington

Juvet, Richard S. Jr. (1970), Professor Emeritus of Chemistry and Biochemistry; B.S., Ph.D., University of California, Los Angeles

K

Kadell, Kevin (1981), Professor of Mathematics and Statistics; B.A., California State University, Sacramento; M.A., University of Maryland; Ph.D., Pennsylvania State University

Kader, David (1979), Professor of Law; B.A., California State University, Fresno; J.D., University of Washington; LL.M., University of London (United Kingdom)

Kagy, Virginia L. (1947), Professor Emerita of Family and Human Development; B.A., Drake University; M.S., Iowa State University; Ph.D., Johns Hopkins University

Kahn, B. Winston (1966), Professor Emeritus of History; B.A., National Taiwan University (Taiwan); M.A., University of Minnesota, Twin Cities; Ph.D., University of Pennsylvania

Kahn, Kim (1989), Professor of Political Science; A.B., M.A., Ph.D., University of Michigan

Kaida, Tamarra (1980), Professor of Art; B.A., Goddard College; M.F.A., State University of New York, Buffalo

Kajikawa, William M. (1937), Professor Emeritus of Kinesiology; B.A., M.A., Arizona State University

Kaliszewski, Steven (1998), Assistant Professor of Mathematics and Statistics; B.A., St. Olaf College; M.A., Ph.D., Dartmouth College

Kaloush, Kamil E. (2001), Assistant Professor of Civil and Environmental Engineering; B.S., M.S., Ohio State University; Ph.D., Arizona State University

Kambhampati, Subbarao (1991), Professor of Computer Science and Engineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., University of Maryland, College Park

Kaminsky, Elijah Ben-Zion (1962), Professor Emeritus of Political Science; A.B., A.M., Ph.D., Harvard University

Kaminsky, Selina K. (1988), Librarian Emerita; B.Ed., University of Miami; M.A.L.S., University of Denver

Kaplan, Catherine (2001), Assistant Professor of History; B.A., Amherst College; M.A., Ph.D., University of Michigan

Kaplan, Jonathan (2001), Adjunct Professor of Anthropology; B.A., Bard College; M.Phil., Ph.D., Yale University

Kaplan, Robert G. (1984), Professor of Dance; B.M.E., University of Hartford; M.M., Arizona State University

Kaplan, Steven (1981), Professor of Accountancy and Information Management; B.S., Arizona State University; M.A.S., Ph.D., University of Illinois

Karady, George (1986), Professor of Electrical Engineering; Salt River Project Chair; Diploma, Technical University, Budapest (Hungary); Candidate of Technical Sciences, Hungarian Academy of Science (Hungary); Ph.D., Budapest University for Technical Sciences (Hungary)

Karam, Lina (1995), Associate Professor of Electrical Engineering; B.E., American University of Beirut (Lebanon); M.S., Ph.D., Georgia Institute of Technology

Karcher, Timothy (1989), Associate Research Professional, Center for Solid State Science; B.Sc., M.Sc., University of Wisconsin, Milwaukee

Karjala, Dennis S. (1978), Professor of Law; B.S.E., Princeton University; M.S., Ph.D., University of Illinois; J.D., University of California, Berkeley

Karnes, Thomas L. (1968), Professor Emeritus of History; A.B., Colorado University; A.M., Ph.D., Stanford University

Karoly, Paul (1982), Professor of Psychology; B.A., City College of New York; Ph.D., University of Rochester

Kashiwagi, Dean T. (1992), Associate Professor of Construction; B.S., University of Hawaii, Manoa; M.S., Ph.D., Arizona State University

Kastenbaum, Beatrice (1982), Clinical Associate Professor of Nursing; B.S.N., University of Michigan; M.S.N., Wayne State University

Kastenbaum, Robert J. (1981), Professor Emeritus of Gerontology and Communication; B.A., Long Beach State College; Ph.D., University of Southern California

Kastre, Norma (2001), Lecturer of Curriculum and Instruction; B.A., M.A., Ph.D., Arizona State University

Katz, Richard C. (1990), Adjunct Professor of Speech and Hearing Science; B.A., M.A., University of Massachusetts; Ph.D., University of Florida

Katzman, Elaine Menter (1983), Professor Emerita of Nursing; B.S., M.S., Ph.D., Syracuse University

Kaufman, Herbert M. (1973), Professor of Finance; Chair, Department of Finance; B.A., State University of New York, Binghamton; Ph.D., Pennsylvania State University

Kaufman, Irving (1965), Professor Emeritus of Electrical Engineering; B.E., Vanderbilt University; M.S., Ph.D., University of Illinois

Kaufmann, William B. (1968), Professor Emeritus of Physics and Astronomy; A.B., M.A., Ph.D., University of California, Berkeley

Kawski, Matthias (1988), Professor of Mathematics and Statistics; Ph.D., University of Colorado



Kaye, David H.

(1976)

Regents' Professor of Law; B.S., Massachusetts Institute of Technology; M.A., Harvard University; J.D., Yale University

Kaye, Jason P. (2002), Assistant Professor of Biology; B.A., University of Virginia; M.S., Northern Arizona University; Ph.D., Colorado State University

Kazilek, Charles J. (1985), Senior Research Professional of Biology; B.F.A., M.N.S., Arizona State University

Kazmier, Leonard J. (1965), Professor Emeritus of Economics; B.A., M.A., Wayne State University; Ph.D., Ohio State University

Kearney, James R. III (1968), Professor Emeritus of History; B.A., Pomona College; M.A., Washington University; Ph.D., University of Wisconsin, Madison

Keating, Thomas (1972), Associate Professor of Political Science; B.A., M.A., California State University, Sacramento; M.P.A., Ph.D., Indiana University

Keats, Barbara W. (1984), Associate Professor of Management; B.A., Louisiana Technical University; M.S., Northeast Louisiana University; Ph.D., Oklahoma State University

Keats, J. Bert (1984), Professor Emeritus of Industrial Engineering; B.S.I.E., Lehigh University; M.S., Ph.D., Florida State University; Ph.D., Oklahoma State University

Keefer, Donald L. (1987), Associate Professor of Supply Chain Management; B.S., Carnegie Mellon University; M.S., Stanford University; M.S., Ph.D., University of Michigan

Kehl, Delmar G. (1965), Professor of English; B.A., Bob Jones University; M.S., University of Wisconsin, Madison; Ph.D., University of Southern California

Keim, Gerald (2001), Clinical Professor of Executive Education; B.S., University of Delaware; M.A., Ph.D., Virginia Polytechnic Institute and State University

Keim, Robert T. (1979), Associate Professor of Computer Information Systems; B.S., M.B.A., Ph.D., University of Pittsburgh

Keith, Susan (1967), Assistant Professor of Journalism and Mass Communication; B.S., University of Montevallo; M.A., University of South Florida; Ph.D., University of North Carolina

Keith, Verna M. (1990), Associate Professor of Sociology; Chair, Department of Sociology; B.S., University of Central Arkansas; M.A., Ph.D., University of Kentucky



Keller, Gary D.
(1986)

Regents' Professor of Spanish; Director, Hispanic Research Center; B.A., University of the Americas (Mexico); M.A., New School for Social Research; M.A., Ph.D., Columbia University

Keller, Thomas (1980), Associate Professor of Management; B.Ed., M.Ed., Ed.Spec., Ed.D., University of Toledo

Kellgren, Gary (2000), Lecturer of Mathematics and Statistics; B.S., Allegheny College; M.S., Southern Illinois University

Kelly, Janice M. (1982), Academic Associate, Division of Undergraduate Academic Services; Director, Academic Community Engagement Services; B.A., M.F.A., Arizona State University

Kelly, John B. (1962), Professor Emeritus of Mathematics and Statistics; B.A., Columbia University; Ph.D., Massachusetts Institute of Technology

Kelly, Richard W. (1965), Professor Emeritus of Electrical Engineering; B.S.E., M.S.E., Ph.D., University of Iowa

Kelly, Rob Roy (1983), Faculty Associate of Design; Professor Emeritus of Art; B.F.A., Minneapolis School of Art; M.F.A., Yale University

Kennedy, Thomas D. (1974), Professor Emeritus of Justice Studies; B.A., Tulane University; M.A., Ph.D., Louisiana State University, Baton Rouge

Kenney, Janet W. (1988), Professor Emerita of Nursing; B.S., Alfred University; M.S., Boston University; Ph.D., State University of New York, Buffalo

Kenney, Patrick (1986), Professor of Political Science; Chair, Department of Political Science; B.A., M.A.P.A., Ph.D., University of Iowa

Kenrick, Douglas T. (1980), Professor of Psychology; B.A., Dowling College; M.A., Ph.D., Arizona State University

Kerr, Barbara A. (1990), Professor of Counselor Education and Counseling Psychology; A.B., University of Missouri; M.A., Ohio State University; Ph.D., University of Missouri

Kettner, Peter M. (1979), Professor Emeritus of Social Work; B.A., Valparaiso University; M.S.W., Washington University; D.S.W., University of Southern California

Keuter, Clifford D. (1988), Professor of Dance

Kevane, Clement J. (1956), Professor Emeritus of Physics and Astronomy; B.S., Ph.D., Iowa State University

Keys, Eric G. (2002), Assistant Professor of Geography; B.A., Macalester College; M.A., University of Texas, Austin; Ph.D., Clark University

Khoo, Siek-Toon (1997), Assistant Professor of Psychology; B.Sc., University of Canterbury (New Zealand); M.Ed.St., Monash University (Australia); Ph.D., University of California, Los Angeles

Kiaei, Sayfe (2001), Professor of Electrical Engineering; Interim Director, Telecommunications Research Center; B.S.E.E., M.S., Ph.D., Washington State University

Kierstead, Henry A. (1988), Professor of Mathematics and Statistics; B.A., M.A., Ph.D., University of California, San Diego

Kiesow, Milton A. (1957), Professor Emeritus of Education; B.S., University of Wisconsin; M.A., Ph.D., University of Nebraska, Lincoln

Kihl, Mary (1996), Professor of Planning and Landscape Architecture; Associate Dean, College of Architecture and Environmental Design; Director, Herberger Center for Design Excellence; A.B., Juniata College; M.U.R.P., University of Pittsburgh; M.A., University of Michigan; Ph.D., Pennsylvania State University

Killeen, Mary (1982–84; 1986), Associate Professor of Nursing; Associate Dean, Undergraduate Programs and Extended Education, College of Nursing; B.S.N., M.S., Arizona State University; Ph.D., University of Texas, Austin

Killeen, Peter R. (1968), Professor of Psychology; B.S., Michigan State University; Ph.D., Harvard University

Kim, Bruce (2000), Associate Professor of Electrical Engineering; B.S., University of California, Irvine; M.S., University of Arizona; Ph.D., Georgia Institute of Technology

Kim, Dongrin (2001), Lecturer of Mathematics and Statistics; B.S.E.E., University of California, San Diego; M.S.E.E., University of California, Los Angeles; M.A., California State University, Los Angeles; M.A., Ph.D., University of Southern California

Kim, Joochul (1980), Associate Professor of Planning and Landscape Architecture; B.A., University of California, Berkeley; M.U.P., Ph.D., University of Michigan

Kimball, Bruce A. (1988), Adjunct Professor of Plant Biology; B.S., University of Minnesota; M.S., Iowa State University; Ph.D., Cornell University

Kimbel, William H. (1997), Professor of Anthropology; Science Director, Institute of Human Origins; B.A., Case Western Reserve University; Ph.D., Kent State University

Kimler, Stephen J. (1967), Professor Emeritus of Education; B.Ed., Milwaukee State Teachers College; M.Ed., Marquette University; Ed.D., Arizona State University

King, Tracy (1998), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University

Kingston, Jerry L. (1969), Professor of Economics; ICA Faculty Representative; B.A.E., Wayne State College; M.S., Colorado State University; Ph.D., Pennsylvania State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Knicki, Angelo J. (1982), Professor of Management; B.B.A., M.B.A., D.B.A., Kent State University

Kinnier, Richard T. (1982), Professor of Counseling Psychology and Counselor Education; Training Director, Counseling Psychology; B.A., Boston College; Ed.M., Columbia University; Ph.D., Stanford University

Kintigh, Keith W. (1987), Professor of Anthropology; A.B., M.S., Stanford University; Ph.D., University of Michigan

Kinzig, Ann P. (1998), Assistant Professor of Biology; B.S., University of Illinois, Urbana-Champaign; M.S., Ph.D., University of California, Berkeley

Kirk, Dwayne (2000), Adjunct Professor of Plant Biology; B.S., University of Queensland (Australia)

Kirkman-Liff, Bradford L. (1981), Professor of Health Administration and Policy; B.S., M.S., Carnegie Mellon University; Dr.P.H., University of North Carolina, Chapel Hill

Kirkwood, Craig W. (1983), Professor of Supply Chain Management; S.B., S.M., E.E., Ph.D., Massachusetts Institute of Technology

Klann, Margaret L. (1945), Professor Emerita Kinesiology; B.S., University of Illinois; M.A., University of Northern Colorado

Klein, James D. (1988), Professor of Educational Technology; B.A., Florida Atlantic University; M.S., Ph.D., Florida State University

Kleinfeld, Gerald R. (1962), Professor Emeritus of History; B.A., New York University; M.A., University of Michigan; Ph.D., New York University



Klett, Mark C.
(1982)

Regents' Professor of Art; B.S., Saint Lawrence University; M.F.A., State University of New York, Buffalo

Kliwer-Britton, Darleen (1975), Professor of Music; B.M.E., Bethany College; M.M., Wichita State University

Klock, John W. (1960), Professor Emeritus of Civil Engineering; B.E., University of Southern California; M.S., Ph.D., University of California, Berkeley

Klopatek, Jeffrey M. (1981), Professor of Plant Biology; B.S., M.S., University of Wisconsin, Milwaukee; Ph.D., Oklahoma University

Knapp, Margaret M. (1990), Professor of Theatre; Associate Dean, Research and Administration, Herberger College of Fine Arts; B.A., LeMoyne College; M.A., Ph.D., City University of New York

Knaupp, Jonathan E. (1970), Professor Emeritus of Elementary Education; B.S., Oregon State University; M.A., Ph.D., University of Illinois

Knauth, L. Paul (1979), Professor of Geological Sciences; B.A., University of Chicago; Ph.D., California Institute of Technology

Knight, Donald O. (1981), Professor Emeritus of Industrial Engineering; B.E.E., Marquette University; M.S.E., Ph.D., Arizona State University

Knight, George P. (1986), Professor of Psychology; B.A., Macalester College; M.A., Ph.D., University of California, Riverside

Knight, John Costain (1965–68; 1997), Associate Research Professor, Cancer Research Institute; B.Sc., Ph.D., University of Liverpool (United Kingdom)

Knipping, Uwe Fred (1988), Associate Research Professional of Physics and Astronomy; B.Sc., University of Cologne (Germany)

Knowlton, John F. (1964), Professor Emeritus of Spanish; B.A., Lewis and Clark College; M.A., Ph.D., University of Oregon

Knox, Robert L. (1963), Professor Emeritus of Economics; B.S., M.S., Oklahoma State University; Ph.D., University of North Carolina

Knudsen, Frances S. (1964), Professor Emerita of Nursing; B.S., University of Arizona; M.S., University of Colorado; Ph.D., Arizona State University

Knutson, Kraig (1997), Assistant Professor of Construction; B.S., M.S., Ph.D., Arizona State University

Knutson-Woods, Teri (1997), Academic Professional of Social Work; B.A., Grand Canyon University; M.S.W., Arizona State University

Kobayashi, Yoshihiro (2001), Assistant Professor of Architecture; B.Arch., M.Arch., Waseda University (Japan); Ph.D., University of California, Los Angeles

Kobes, Bernard W. (1986), Associate Professor of Philosophy; B.A., Calvin College; M.A., Ph.D., University of California, Los Angeles

Koblitz, Ann Hibner (1998), Professor of Women's Studies; A.B., Princeton University; Ph.D., Boston University

Koeneman, James B. (1984), Adjunct Professor of Bioengineering; B.S., University of Minnesota; M.S., Ph.D., Case Western Reserve University

Koerner, Kurt J. (1993), Faculty Associate of Construction; B.S., U.S. Air Force Academy; M.S., Golden Gate University

Koka, Balaji (1999), Assistant Professor of Management; B.E., Madurai Kamaraj University (India); M.B.A., Indian Institute of Management, Calcutta (India); Ph.D., University of Pittsburgh

Kolossa, Katalin (1994), Senior Lecturer of Mathematics and Statistics; B.A., Eötvös University (Hungary); M.A., Ph.D., Arizona State University

Kommenich, Pauline (1984), Professor of Nursing; B.S., Stanford University; M.N., University of Washington; M.A., Ph.D., University of Arizona

Konjevod, Goran (2000), Assistant Professor of Computer Science and Engineering; B.Sc., University of Zagreb (Croatia); M.Sc., Ph.D., Carnegie Mellon University

Konomos, Philip J. (1991), Associate Learning Research Specialist, Library Instruction, Systems, and Technology; B.S., M.Ed., Arizona State University

Koonce, Frank W. (1978), Professor of Music; B.M., North Carolina School of the Arts; M.M., Southern Methodist University

Koopmans, Rachel (2001), Assistant Professor of History; B.A., Calvin College; M.A., Northwestern University; M.A., Ph.D., University of Notre Dame

Kopta, Anne Elgar (1999), Associate Professor of Music

Kortman, Sharon A. (1998), Lecturer of Curriculum and Instruction; B.A., M.Ed., Ed.D., Arizona State University

Koshinsky, Deborah H. (2000), Associate Librarian; Head, Architecture and Environmental Design Library; B.A., Ohio State University; M.L.I.S., Simmons College

Koss-Chioino, Joan D. (1992), Professor of Anthropology; B.F.A., Temple University; M.A., Ph.D., University of Pennsylvania

Kostelich, Eric (1989), Professor of Mathematics and Statistics; B.S., University of North Carolina; M.S., Ph.D., University of Maryland, College Park

Kouvetakis, John (1992), Professor of Chemistry and Biochemistry; B.S., Ph.D., University of California, Berkeley

Kozacik, Dorothy Piercey (1968), Professor Emerita of Education; B.A., College of St. Francis; M.A., Arizona State University; Ph.D., University of Arizona

Kozicki, Michael (1986), Professor of Electrical Engineering; B.S., Ph.D., University of Edinburgh (United Kingdom)

Krahenbuhl, Gary S. (1973), Professor of Kinesiology; B.S., M.S., Northern Illinois University; Ed.D., University of Northern Colorado

Krajcinovic, Dusan (1989), Professor of Engineering; B.Sc., M.Sc., University of Belgrade (Yugoslavia); Ph.D., Northwestern University

Krause, Daniel R. (2000), Associate Professor of Supply Chain Management; B.A., Fort Lewis College; M.B.A., Ph.D., Arizona State University

Krause, Stephen J. (1981), Professor of Materials Science and Engineering; Associate Chair for Materials Science and Engineering; B.S., Northwestern University; M.S., Illinois Institute of Technology; Ph.D., University of Michigan

Kreitner, Robert J. III (1975), Professor Emeritus of Management; B.S., M.B.A., University of Nebraska, Omaha; Ph.D., University of Nebraska, Lincoln

Krinsley, David (1976), Professor Emeritus of Geological Sciences; Ph.B., S.B., S.M., Ph.D., University of Chicago

Kroelinger, Michael D. (1980), Professor Emeritus of Design; B.S., University of Alabama; M.S., Ph.D., University of Tennessee, Knoxville

Kroloff, Reed A. (1987), Associate Professor of Architecture; B.A., Yale University; M.Arch., University of Texas, Austin

Kronenfeld, Jennie J. (1990), Professor of Sociology; B.A., University of North Carolina, Chapel Hill; M.A., Ph.D., Brown University

Kronengold, Eric A. (1970), Professor Emeritus of Art; B.A., M.A., San Francisco State University

Krueger, Janelle (1984), Professor Emerita of Nursing; Dean Emerita, College of Nursing; B.S., M.S., Ph.D., University of Colorado

Krus, David J. (1975), Professor of Psychology in Education; B.A., M.A., Charles University; Ph.D., University of Minnesota, Twin Cities

Krzys, Katherine J. (1990), Associate Archivist, Department of Archives and Manuscripts; B.A., California State University, Hayward; M.F.A., Arizona State University

Kuang, Yang (1988), Professor of Mathematics and Statistics; B.S., University of Science and Technology (China); Ph.D., University of Alberta (Canada)

Kuby, Lauren H. (1995), Academic Associate, Communications Manager; B.A., University of Chicago; M.A., Arizona State University

Kuby, Michael (1988), Associate Professor of Geography; B.A., University of Chicago; Ph.D., Boston University

Kuester, James L. (1969), Professor Emeritus of Chemical Engineering; B.S., University of Texas, Austin; M.E., Ph.D., Texas A&M University

Kugelmass, Jack (1998), Professor of Interdisciplinary Humanities; B.A., McGill University (Canada); M.A., Ph.D., New School for Social Research

Kuiper, Hendrik J. (1971), Professor of Mathematics and Statistics; B.S., University of Wisconsin, Milwaukee; M.S., M.A., Ph.D., University of Wisconsin, Madison

Kulahci, Murat (2002), Assistant Professor of Industrial Engineering; B.S., Bogazici University (Turkey); M.E., Illinois Institute of Technology; M.S., Ph.D., University of Wisconsin, Madison



Kulhavy, Raymond W.
(1971)

Regents' Professor Emeritus of Psychology in Education; B.A., M.A., California State College, San Diego; Ph.D., University of Illinois

Kulis, Stephen (1984), Professor of Sociology; B.A., George Washington University; M.A., Ph.D., Columbia University

Kulkarni, Uday R. (1988), Associate Professor of Computer Information Systems; B.Tech., Indian Institute of Technology (India); M.B.A., Indian Institute of Management, Calcutta (India); Ph.D., University of Wisconsin, Milwaukee

Kumar, Ajith (1991), Professor of Marketing; B.S., Indian Institute of Technology (India); Postgraduate Diploma, Indian Institute of Management (India); Ph.D., University of Massachusetts

Kumar, Sudhir (1998), Associate Professor of Biology; B.S., M.S., Birla Institute of Technology and Science (India); Ph.D., Pennsylvania State University

Kuo, Chen-Yuan (1986), Associate Professor of Engineering; B.S., National Taiwan University (Taiwan); M.S., Northwestern University; Ph.D., University of California, Berkeley

Kurtz, Lynn C. (1967), Associate Professor of Mathematics and Statistics; B.S., South Dakota School of Mines and Technology; M.S., Ph.D., University of Utah

Kwazoski, Michael A., Capt. (2003), Assistant Professor of Aerospace Studies; B.A., Bloomsburg University; M.B.A., St. Mary's University

L

La Valley, Mary (2000), Faculty Associate of Nursing; B.A., Rhode Island College; M.S., Northeastern University

Laananen, David (1983), Professor Emeritus of Mechanical and Aerospace Engineering; B.S., Worcester Polytechnic Institute; M.S., Ph.D., Northeastern University

Ladd, Becky (2001), Assistant Professor of Educational Psychology; B.A., San Diego State University; M.S., Ph.D., University of Illinois, Urbana-Champaign

Ladd, Gary W. (2001), Professor of Family and Human Development; B.A., Grove City College; M.S., Alfred University; Ed.D., University of Rochester

Laetz, Hans G. (1964), Professor Emeritus of German; B.A., University of California, Berkeley; M.A., Ph.D., Stanford University

LaFaro, Lydia E. (1988), Librarian, Hayden Reference Services; B.S., Georgetown University; M.L.S., Emory University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Lafford, Barbara (1980), Associate Professor of Spanish; Associate Dean, College of Extended Education; B.A., Middlebury College; M.A., Ph.D., Cornell University

Lafford, Peter A. (1989), Associate Research Professional of Languages and Literatures; Director, Language Computing Laboratory; B.A., Cornell University; M.A., Arizona State University; M.A., Middlebury College

Lage, Chiara (1998), Lecturer of Italian; G.A. Farina, Teacher's College, Vicenza (Italy); Laurea, University of Study of Urbino (Italy)

Lai, Richard T. (1973), Professor of Planning and Landscape Architecture; A.B., M.F.A., Princeton University; Ph.D., University of Pennsylvania

Lai, Ying-Cheng (1999), Professor of Mathematics and Statistics and Electrical Engineering; B.S., M.S., Zhejiang University (China); Ph.D., University of Maryland, College Park

Lamorey, Suzanne G. (1998), Assistant Professor of Curriculum and Instruction; B.A., University of California, Berkeley; M.S., Arizona State University; Ph.D., University of Oregon

Lan, Zhiyong (1991), Professor of Public Affairs; B.A., Nanjing University (China); M.P.A. North Carolina State University, Raleigh; Ph.D., Syracuse University

Landeira, Ricardo L. (1962), Professor Emeritus of Spanish; Bachiller Universitario, University of Santiago (Spain); Maestro Nacional, Normal School of Santiago (Spain); Ph.D., University of Colorado



Landers, Daniel M.
(1981)

Regents' Professor of Kinesiology; Interim Chair, Department of Kinesiology; B.A., San Jose State College; M.S., Ph.D., University of Illinois

Landers, Donna M. (1988), Senior Lecturer of Kinesiology; Undergraduate Advisor; B.S., State University of New York, Brockport; M.S., University of Washington

Landrum, Leslie R. (1986), Herbarium Curator of Plant Biology; B.S., Syracuse University; M.S., Ph.D., University of Michigan

Landschoot, Thomas (2001), Assistant Professor of Music; M.M., Conservatory of Music, Antwerp (Belgium); M.M., University of Michigan; Artist Diploma, Indiana University; Artist Diploma, Conservatory of Music, Maastricht (Netherlands)

Laner, Mary R. (1976), Professor Emerita of Sociology; A.B., University of Chicago; M.A., University of New Mexico; Ph.D., Virginia Polytechnic Institute and State University

Langdon, Debra Seaman (2000), Senior Lecturer of Supply Chain Management; Recruitment Director; B.A., Loretto Heights College; M.B.A., University of Denver

Langland, Jeff (1995), Assistant Research Professor of Microbiology; B.S., Ph.D., Arizona State University

Lanyon, Richard I. (1975), Professor of Psychology; B.E., University of Adelaide (Australia); M.A., Ph.D., University of Iowa

Larimer, John W. (1969), Professor Emeritus of Geological Sciences; B.A., M.S., Ph.D., Lehigh University

Larson, Nancy C. (1999), Assistant Professor of Social Work; B.A. Human Services, Western Washington University; M.S.W., Ph.D., University of Washington

Larson-Bennett, Donna Rae (1972), Law Librarian Emerita; B.A., M.A.L.S., University of Michigan

Lastovicka, John L. (1992), Professor of Marketing; B.S., M.S., Ph.D., University of Illinois

Lattouf, Mirna (1998), Lecturer of Interdisciplinary Studies; 401 Coordinator, Division of Undergraduate Academic Services; B.A., Rutgers, The State University of New Jersey; M.A., New York University; Ph.D., University of Arizona

Laubichler, Manfred (2001), Assistant Professor of Biology; M.Sc., University of Vienna (Austria); M.Phil., Yale University; M.A., Princeton University; Ph.D., Yale University; Ph.D., Princeton University

Lauderdale, Pat (1981), Professor of Justice Studies; B.A., University of Oklahoma; M.A., University of Texas, Austin; M.A., Ph.D., Stanford University

Lavrin, Asuncion (1995), Professor of History; B.A., University of Havana; M.A., Radcliffe College; Ph.D., Harvard University

Lawson, Anton E. (1977), Professor of Biology; B.S., University of Arizona; M.A., University of Oregon; Ph.D., University of Oklahoma

Le, Thuy-Kim Pham (1997), Instructor of Vietnamese; B.A., Saigon University (Vietnam); B.A., M.Ed., Arizona State University

Leathers, Chester R. (1957), Professor Emeritus of Microbiology; B.S., Eastern Illinois University; M.S., Ph.D., University of Michigan

Lebed, Richard F. (2000), Assistant Professor of Physics and Astronomy; B.S., Michigan State University; M.A., Ph.D., University of California, Berkeley

Leclerc, Denis (1994), Assistant Professor of Recreation Management and Tourism; B.S., M.A., University of Upper Normandy (France); M.S., Ph.D., Arizona State University

LeCroy, Craig (1984), Professor of Social Work; B.S.W., San Jose State University; M.S.W., Western Michigan University; Ph.D., University of Wisconsin

Lee, Deanna (2001), Assistant Professor of Accountancy and Information Management; B.S., University of Pennsylvania; Ph.D., University of Illinois

Lee, James J. (1995), Adjunct Faculty of Microbiology; B.S., State University of New York, Stony Brook; Ph.D., California Institute of Technology

Lee, Nancy A. (1995), Adjunct Faculty of Microbiology; B.S., Memphis State University; Ph.D., Cornell University

Lee, Tae-woo (1993), Associate Professor of Mechanical and Aerospace Engineering; B.S., Ohio State University; M.S.E., Ph.D., University of Michigan

Lee, Yann-Hang (2000), Professor of Computer Science and Engineering; B.S., National Cheng Kung University (Taiwan); M.S., Rensselaer Polytechnic Institute; Ph.D., University of Michigan

Lefevre, Mary Anne (1990), Clinical Assistant Professor of Clinical Laboratory Sciences; B.S., Arizona State University; M.A., Central Michigan University

Lehman, James P. (1985), Associate Research Professional of Chemistry and Biochemistry; B.S., M.S., Miami University; Ph.D., University of Cincinnati

Lehman, Peter (1999), Professor of Interdisciplinary Humanities; Director, Interdisciplinary Humanities Program; B.S., M.A., Ph.D., University of Wisconsin, Madison

Leibold, Anne M. (1977), Librarian Emerita; M.A., University of Paris (France)

Leigh, Frederic A. (1979), Senior Administrative Professional and Clinical Professor of Journalism and Mass Communication; B.A., University of South Dakota; M.A., University of Iowa; Ed.D., Arizona State University

Leighninger, Leslie (2000), Professor of Social Work; Director, School of Social Work; B.A., Oberlin College; M.S.W., Syracuse University; D.S.W., University of California, Berkeley

Leinenweber, Kurt (1994), Assistant Research Professional of Chemistry and Biochemistry; B.S., Brown University; Ph.D., Princeton University

Lemery, Kathryn (2001), Assistant Professor of Psychology; B.A., University of Oregon; M.S., Ph.D., University of Wisconsin, Madison

Lentz, Richard G. (1985), Associate Professor of Journalism and Mass Communication; A.B., University of North Alabama; M.A., Southern Illinois University, Carbondale; Ph.D., University of Iowa

Leon, Luis Daniel (1999), Assistant Professor of Religious Studies; A.B., University of California, Berkeley; M.T.S., Harvard University; Ph.D., University of California, Santa Barbara

Leonard, Donald J. (1974), Professor Emeritus of Management Communication; B.S., M.B.A., Nicholls State University; Ph.D., Louisiana State University

Leonard, Philip A. (1968), Professor of Mathematics and Statistics; A.B., Boston College; M.A., Ph.D., Pennsylvania State University

Leong, Karen (1999), Assistant Professor of Women's Studies; A.B., M.A., Ph.D., University of California, Berkeley

Lersch, Judy (1999), Faculty Associate of Nursing; B.S.N., University of Arizona; M.Ed., Northern Arizona University; M.S., Arizona State University

Lerum, Vidar (2000), Assistant Professor of Architecture; B.Arch., Norwegian Institute of Technology, Trondheim (Norway); M.S., Arizona State University; Ph.D., Norwegian University of Science and Technology, Trondheim (Norway)

Leshin, Laurie (1998), Associate Professor of Geological Sciences; Director, Center for Meteorite Studies; B.S., Arizona State University; M.S., Ph.D., California Institute of Technology

Leshowitz, Barry H. (1970), Associate Professor of Psychology; B.S., M.A., Brooklyn College; Ph.D., City University of New York

Lessard, Elizabeth C. (1969), Professor Emerita of Dance; B.S., Georgia College; M.A., Ph.D., Texas Woman's University

Lester, Neal (1997), Professor of English; B.A., West Georgia College; M.A., Ph.D., Vanderbilt University

Levan, Frederick D. (1965), Professor Emeritus of Educational Administration and Supervision; B.S., M.Ed., Pennsylvania State University; Ed.D., Oklahoma State University

Levine, Gustav (1967), Professor Emeritus of Psychology; B.A., M.A., College of the City of New York; Ph.D., Columbia University

Lewenstein, Suzanne (1997), Academic Associate of Interdisciplinary Studies, Division of Undergraduate Academic Services; B.A., University of Wisconsin, Madison; M.A., Case Western Reserve University; Ph.D., Arizona State University

Lewis, Charles F. (1963), Research Specialist Emeritus, Center for Meteorite Studies; B.A., Adams State College

Lewis, William E. (1965), Professor of Computer Science and Engineering; University Chief Information Officer and Vice Provost for Information Technology; B.S.E., Johns Hopkins University; M.S., Ph.D., Northwestern University

Leyba, Raul L. (1970), Professor Emeritus of Social Work; B.A., Western New Mexico University; M.S.W., University of Denver

Li, Qunying (2001), Assistant Librarian, Collection Development; M.A., Beijing Foreign Studies University (China); M.L.S., University of Alabama

Li, Wei (2001), Assistant Professor of Asian Pacific American Studies and Geography; B.S., Beijing Normal College (China); M.S., Peking University (China); Ph.D., University of Southern California

Liddell, Paul A. (1990), Assistant Research Professional of Chemistry and Biochemistry; B.Sc., Massey University (New Zealand); Ph.D., Arizona State University

Lightfoot, Marjorie J. (1964), Professor of English; B.A., Brown University; M.A., Ph.D., Northwestern University



Lin, Sheng H.
(1965)

Regents' Professor Emeritus of Chemistry and Biochemistry; B.S., M.S., National Taiwan University (Taiwan); Ph.D., University of Utah

Lin, Su (1997), Associate Research Professional of Chemistry and Biochemistry; B.A., Beijing Normal University, (China); Ph.D., University of Rochester

Lind, Amy (1997), Assistant Professor of Women's Studies; B.A., University of California, Santa Cruz; M.R.P., Ph.D., Cornell University

Lindauer, Margaret A. (2002), Adjunct Professor of Anthropology; B.A., M.F.A., Southern Illinois University; Ph.D., Arizona State University

Lindauer, Owen (1989), Adjunct Professor of Anthropology; B.A., State University of New York, Binghamton; M.A., Ph.D., Arizona State University

Linder, Darwyn E. (1972), Professor of Psychology; Chair, Department of Psychology; B.A., Macalester College; Ph.D., University of Minnesota, Twin Cities

Linderman, Earl W. (1966), Professor Emeritus of Art; B.S., State University of New York, Buffalo; M.Ed., Ed.D., Pennsylvania State University

Lindholm Lane, Katherine (2000), Assistant Professor of Dance; B.S., Eastern Michigan University; M.F.A., Arizona State University

Lindly, John M. (1998), Adjunct Professor of Anthropology; B.A., M.A., Ph.D., Arizona State University

Lindquist, Barbara (2001), Lecturer of Interdisciplinary Studies; B.S.W., M.S.W., M.A., Ph.D., University of Wisconsin, Milwaukee

Lindsay, Stuart M. (1978), Professor of Physics and Astronomy; Nadine and Edward Carson Presidential Chair in Physics; B.Sc., Ph.D., University of Manchester (United Kingdom)

Lineberry, Heather S. (1990), Senior Curator, University Art Museum; Associate Museum Professional; B.A., M.A., University of Texas, Austin

Lingas, Alexander (2001), Assistant Professor of Music; B.A., Portland State University; Ph.D., University of British Columbia (Canada)

Link, Denise (2002), Clinical Associate Professor of Nursing; B.S.N., Gwynedd-Mercy College; M.S.N., University of Pennsylvania; D.N.Sc., Widener University

Liskovec, Richard F. (1958), Professor Emeritus of Mathematics and Statistics; B.S., M.A., Kent State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Liss, Julie M.** (1994), Associate Professor of Speech and Hearing Science; B.A., University of Wisconsin, Madison; M.A., University of Denver; Ph.D., University of Wisconsin, Madison
- Littlewood, Mary L.** (1965), Professor Emerita of Kinesiology; B.S., Miami University; M.S., University of Colorado
- Liu, C.H.** (1965), Professor Emeritus of Chemistry and Biochemistry; B.A., Ph.D., University of Illinois
- Liu, Danny D.** (1982), Professor of Engineering; B.S., National Taiwan University (Taiwan); M.S., Georgia Institute of Technology; Ph.D., University of Southampton (United Kingdom)
- Liu, Huan** (2000), Associate Professor of Computer Science and Engineering; B.Eng., Shanghai Jiao Tong University (China); M.Sc., Ph.D., University of Southern California
- Liu, Marjory Bon-Ray** (1973), Professor Emerita of Philosophy; B.M., Alverno College; M.M., University of Southern California; C.Phil., Ph.D., University of California, Los Angeles
- Liu, Xianchen** (2001), Assistant Professor of Family and Human Development; B.A., M.S., Shandong University (China); Ph.D., University of Tokyo (Japan)
- Liu, Zhenquan** (2000), Senior Research Specialist, Center for Solid State Science; B.Sc., M.Sc., Peking University (China); Ph.D., University of Sydney (Australia)
- LoBrutto, Russell** (1991), Senior Research Scientist of Plant Biology; B.A., Cornell University; Ph.D., State University of New York, Buffalo
- Lock, Ethan** (1981), Associate Professor of Legal and Ethical Studies; B.A., University of California, Berkeley; M.B.A., Arizona State University; J.D., University of North Carolina, Chapel Hill
- Lockard, Joe** (2002), Assistant Professor of English; B.A., University of California, Santa Cruz; Ph.D., University of California, Berkeley
- Lockwood, Charles** (2000), Assistant Professor of Anthropology; B.S., Duke University; Ph.D., University of Witwatersrand, Johannesburg (South Africa)
- Lockwood, Ralph G.** (1972), Professor of Music; B.M., Baldwin-Wallace College; M.M., New England Conservatory of Music
- Lohr, Dennis E.** (1979), Professor of Chemistry and Biochemistry; B.S., Beloit College; Ph.D., University of North Carolina, Chapel Hill
- Lohr, Sharon** (1990), Professor of Mathematics and Statistics; B.S., Calvin College; Ph.D., University of Wisconsin, Madison
- Lombardi, Eugene P.** (1957), Professor Emeritus of Music; B.Mus.Ed., Westminster College; M.A., Columbia University; Ed.S., George Peabody College; D.M., Westminster College
- Longley, Kyle** (1995), Associate Professor of History; B.A., Angelo State University; M.A., Texas Technological; Ph.D., University of Kentucky
- Loope, R. Nicholas** (1990), Associate Professor of Architecture; B.Arch., University of Maryland, College Park; M.Arch., Yale University; P.M.D., Harvard University
- Lopez, Juan** (1998), Associate Professor of Mathematics and Statistics; B.Sc., Ph.D., Monash University (Australia)
- Lopez, Vera** (2001), Assistant Professor of Justice Studies; B.A., M.A., Ph.D., University of Texas, Austin
- Losse, Deborah N.** (1973), Professor of French; Chair, Department of Languages and Literatures; B.A., Connecticut College; M.A., Ph.D., University of North Carolina, Chapel Hill
- Lounsbury, John F.** (1969), Professor Emeritus of Geography; B.S., M.S., University of Illinois; Ph.D., Northwestern University
- Loveless, Richard L.** (1991), Professor Emeritus of Art; M.Ed., Pennsylvania State University
- Low, Stuart A.** (1979), Professor of Economics; B.S., M.S., Ph.D., University of Illinois
- Lowe, John W.** (1956), Professor Emeritus of Economics; B.S., Arizona State University; M.S., University of Wisconsin, Madison; Ph.D., University of Florida
- Lowe, Robert W.** (1966), Professor Emeritus of Romance Languages; M.A., Columbia University; Doctorat, University of Paris (France)
- Lowenthal, Gary T.** (1976), Professor of Law; A.B., Harvard College; J.D., University of Chicago
- Luchsinger, Wayne W.** (1966), Professor Emeritus of Chemistry and Biochemistry; B.S., M.S., Ph.D., University of Minnesota, Twin Cities
- Luckingham, Bradford F.** (1971), Professor Emeritus of History; B.S., Northern Arizona University; M.A., University of Missouri, Columbia; Ph.D., University of California, Davis
- Ludemann, Ruth S.** (1984), Professor Emerita of Nursing; B.S.N., Columbia University; M.S.N., Wayne State University; Ph.D., Arizona State University
- Luderer, Gottfried W.R.** (1990), Professor Emeritus of Electrical Engineering; M.S.E.E., Ph.D., Technical University Braunschweig (Germany)
- Ludlow, Elizabeth A.** (1972), Professor Emerita of Nursing; B.S.N., University of New Mexico; M.S., Arizona State University
- Ludwig, Ann** (1979), Professor Emerita of Dance; B.S., North Dakota State University; M.S., University of Kansas
- Luecken, Linda J.** (2000), Assistant Professor of Psychology; B.S., Ohio State University; M.A., University of North Carolina; Ph.D., Duke University
- Luenow, Paul F. Jr.** (1958), Professor Emeritus of Foreign Languages; B.A., M.A., University of Washington; Ph.D., University of New Mexico
- Luey, Beth** (1980), Senior Instructional Professional of History; Director, Scholarly Publishing; B.A., Radcliffe College; A.M., Harvard University
- Lujan, Carol C.** (1987), Associate Professor of Justice Studies; Director, American Indian Studies Program; B.A., M.A.P.A., Ph.D., University of New Mexico
- Lukas, Ronald J.** (1999), Adjunct Professor of Chemistry and Biochemistry; B.S., State University of New York, Cortland; Ph.D., State University of New York, Downstate Medical Center
- Lund, Giuliana** (1997), Assistant Professor of Interdisciplinary Humanities; B.A., Stanford University; M.A., Ph.D., University of Pennsylvania
- Lundgren, Harry R.** (1962), Professor Emeritus of Civil and Environmental Engineering; B.S.C.E., Purdue University; M.S., Arizona State University; Ph.D., Oklahoma State University
- Lundin, Robert F.** (1962), Professor Emeritus of Geological Sciences; B.A., Augustana College; M.S., Ph.D., University of Illinois
- Lussier, Mark S.** (1994), Associate Professor of English; B.A., University of Saint Thomas; M.A., Ph.D., Texas A&M University
- Lyman, Jeffrey** (1996), Associate Professor of Music; B.Mus., Temple University; M.Mus., D.Mus., University of Michigan
- Lynch, David H.** (1976), Associate Professor of Management Communication; B.S., University of Illinois; M.S., Ed.D., Northern Illinois University

Lynch, Jacquelyn (2001), Lecturer of the Barrett Honors College; B.A., Kalamazoo College; M.A., Harvard University; Ph.D., Arizona State University

Lynch, John M. (1994), Lecturer of the Barrett Honors College; B.Sc., Ph.D., University College, Dublin (Ireland)

Lynk, Myles (2000), Professor of Law; Kiewit Foundation Professor of the Legal Profession; A.B., J.D., Harvard University

Lyons, Lucy (1999), Associate Librarian; B.A., San Diego State University, San Diego; M.A., Ohio State University; M.S., Pratt Institute

Lyubchenko, Yuri (1992), Research Professor of Microbiology; M.S., Ph.D., Moscow Institute of Physics and Technology (Russia)

M

Maatta, Robert (1996), Human Resources Assistant, Department of Military Science; B.S., Lake Superior State University

Maccracken, Harriet (1995), Senior Lecturer of Accountancy and Information Management; B.S., Ohio State University; M.A., Arizona State University

MacEachron, Ann (1984), Professor of Social Work; B.A., Cornell University; M.S.W., University of Pittsburgh; Ph.D., Cornell University

Macey, Donna J. (1994), Clinical Associate Professor of Educational Administration and Supervision; Internship Coordinator and Certification, Educational Administration and Supervision; B.A., DePaul University; M.A., St. John's College; M.A., M.S.T., University of Chicago; Ph.D., Northwestern University

MacKinnon, David (1990), Professor of Psychology; B.A., Harvard University; M.A., Ph.D., University of California, Los Angeles

MacKinnon, Stephen R. (1971), Professor of History; B.A., M.A., Yale University; Ph.D., University of California, Davis

Mackulak, Gerald T. (1980), Associate Professor of Industrial Engineering; B.S.I.E., M.S.I.E., Ph.D., Purdue University

MacSwan, Jeff (1998), Assistant Professor of Curriculum and Instruction; B.A., M.A., California State University, Long Beach; Ph.D., University of California, Los Angeles

Madden, Dennis D. (1990), Archivist Emeritus; B.A., Wright State University; M.A., Colorado State University

Madden-Derdich, Debra (1994), Associate Professor of Family and Human Development; B.A., Washington and Jefferson College; M.A., Hollins College; Ph.D., Virginia Polytechnic Institute and State University

Maddox, Robert A. (1993), Adjunct Professor of Geography; B.S., Texas A&M University; M.S., Ph.D., Colorado State University

Magaña, Lisa (1997), Assistant Professor of Chicana and Chicano Studies; B.A., California Polytechnic University; M.A., Ph.D., Claremont Graduate School

Magenta, Muriel (1969), Professor of Art; B.A., Queens College; M.A., M.F.A., Ph.D., Arizona State University

Magers, William D. (1971), Professor Emeritus of Music; B.A., University of California, Santa Barbara; M.M., D.M.A., University of Southern California

Magill, Harry (1984), Professor Emeritus of Accountancy and Information Management; B.S., Miami University; M.S., University of Illinois

Mahajan, Subhash (1997), Professor of Chemical and Materials Engineering; Chair, Department of Chemical and Materials Engineering; B.S., Punjab University (India); B.E., Metallurgy Indian Institute of Science (India); Ph.D., University of California, Berkeley

Mahalov, Alex S. (1991), Associate Professor of Mathematics and Statistics; M.S., Leningrad University (Russia); Ph.D., Cornell University

Mahoney, Dhira B. (1989), Associate Professor of English; B.A., M.A., University of Oxford (United Kingdom); Ph.D., University of California, Santa Barbara



Maienschein, Jane
(1981)

Regents' Professor of Philosophy and Biology;
B.A., Yale University; M.A., Ph.D., Indiana
University, Bloomington

Major, Roy C. (1992), Professor of English; B.A., University of Akron; M.A., University of Arizona; M.A., Ph.D., Ohio State University

Malone, Charles F. (1966), Professor Emeritus of Curriculum and Instruction; B.S., Emporia State University; M.Ed., Ed.D., University of Kansas

Maltz, Arnold B. (1997), Associate Professor of Supply Chain Management; B.S., Trinity College, Hartford; M.A., University of California, Santa Barbara; M.S., Northwestern University; Ph.D., Ohio State University

Mamlouk, Michael S. (1984), Professor of Civil and Environmental Engineering; B.S.C.E., Cairo University (Egypt); M.S.C.E., Ph.D., Purdue University

Manchester, Laurie (2000), Assistant Professor of History; B.A., Wellesley College; M.A., M.Phil., Ph.D., Columbia University

Mandel, Naomi (2000), Assistant Professor of Marketing; A.B., Dartmouth College; M.B.A., Arizona State University; M.I.M., American Graduate School of International Management; Ph.D., University of Pennsylvania

Manelli, Alejandro (1997), Professor of Economics; Licenciatura, National University of Buenos Aires (Argentina); M.A., Ph.D., University of California, Berkeley

Manera, Elizabeth S. (1967), Professor Emerita of Curriculum and Instruction; B.S., M.A., Towson State College; Ed.D., Arizona State University

Mangini, Margaret A. (1990), Director, Bureau of Educational Research and Services; Director, Arizona Educational Information Systems; B.S., M.Ed., Edinboro State College; Ed.D., Arizona State University

Mankin, Lawrence D. (1973), Professor of Public Affairs; B.B.A., City College; M.A., Ph.D., University of Illinois

Manuelito, Kathryn (2001), Assistant Professor of Curriculum and Instruction; B.A., M.A., University of New Mexico, Albuquerque; Ph.D., Arizona State University

Marc, Stephen Smith (1998), Professor of Art; B.A., Pomona College; M.F.A., Temple University

Marchant, Gary E. (1999), Associate Professor of Law; Executive Director, Center for the Study of Law, Science, and Technology; B.Sc., University of British Columbia (Canada); M.P.P., J.D., Harvard University; Ph.D., University of British Columbia (Canada)

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Marean, Curtis W.** (2001), Professor of Anthropology; Research Associate, Institute of Human Origins; B.A., Pennsylvania State University; M.A., Ph.D., University of California, Berkeley
- Margolis, Eric** (1995), Associate Professor of Educational Leadership and Policy Studies; Academic Program Coordinator, Social and Philosophical Foundations of Education; B.A., State University of New York, New Paltz; Ph.D., University of Colorado, Boulder
- Marin, Christine N.** (1985), Associate Archivist, Archives and Manuscripts; B.A., M.A., Arizona State University
- Maris, Mariana** (2000), Lecturer of Mathematics and Statistics; B.S., M.A., Arizona State University
- Markiw, Michael** (1990), Associate Librarian, Technical Services Department; B.A., University of Alberta (Canada); M.L.S., University of Western Ontario (Canada)
- Marks, Pamela** (2002), Lecturer of Chemistry and Biochemistry; B.S., St. Olaf College; M.S., University of Arizona
- Marohnic, Charles S.** (1981), Professor of Music; Director, Jazz Studies; B.A., M.M., University of Miami
- Marrero, Robert** (1998), Adjunct Faculty of Microbiology; B.S., City College of New York; Ph.D., University of Maryland, Baltimore
- Marshall, Kimberly** (1998), Professor of Music; Associate Director for Graduate Studies, School of Music; B.A., University of North Carolina, Chapel Hill; D.Phil., University College, Oxford (United Kingdom)
- Marsiglia, Flavio F.** (1994), Associate Professor of Social Work; B.Law, S.S., M.S.W., University of the Republic (Uruguay); Ph.D., Case Western Reserve University
- Martin, Carol L.** (1988), Professor of Family and Human Development; B.A., University of Georgia; M.S., Rutgers, The State University of New Jersey; Ph.D., University of Georgia
- Martin, Chris A.** (1990), Associate Professor of Plant Biology; B.S., California Polytechnic State University and University of Southern California; M.S., Auburn University; Ph.D., University of Florida
- Martin, J. Spencer** (2000), Assistant Professor of Finance; B.S., M.B.A., University of Texas, Austin; A.M., Ph.D., University of Pennsylvania
- Martin, John F. Jr.** (1966), Professor of Anthropology; B.A., Beloit College; M.A., Ph.D., University of Chicago
- Martin, Judith N.** (1990), Professor of Communication; B.A., Eastern Mennonite College; M.A., Ph.D., Pennsylvania State University
- Martin, Linda J.** (1980), Professor Emerita of Finance; B.A., University of Louisville; M.S., University of Kansas; M.B.A., D.B.A., Louisiana Technological University
- Martin, Scott** (2000), Lecturer of Mathematics and Statistics; B.S., University of Nebraska, Lincoln; M.A., University of Illinois, Springfield
- Martinez, Jacqueline M.** (2000), Assistant Professor of Communication; B.A., California State University, Northridge; M.S., Ph.D., Southern Illinois University
- Martinez, Jeanne L.** (2000), Lecturer of Spanish; B.A., Indiana University, South Bend; M.A.T., Indiana University, Bloomington
- Martinez-Brawley, Emilia E.** (1992), Professor of Social Work; B.A., National University of Tucumán (Argentina); M.S.S., Bryn Mawr College; Ed.D., Temple University
- Martinez-Roldan, Carmen** (2002), Assistant Professor of Curriculum and Instruction; B.A., M.A., University of Puerto Rico, Rio Piedras; Ph.D., University of Arizona
- Marzke, Mary W.** (1978), Professor of Anthropology; B.A., University of California; M.A., Columbia University; Ph.D., University of California, Berkeley
- Marzke, Robert F.** (1969), Associate Professor of Physics and Astronomy; A.B., Princeton University; Ph.D., Columbia University
- Masilamani, Purushothama** (2000), Lecturer of Mathematics and Statistics; B.S., University of Madras (India); M.S., D.A., Adelphi University
- Mason, Bruce B.** (1960), Professor Emeritus of Political Science; B.S., North Texas State College; M.A., Texas Christian University; Ph.D., University of Texas, Austin
- Mason, Hugh S.** (2002), Associate Professor of Plant Biology; B.S., University of Texas, Austin; Ph.D., University of Arizona
- Mason, Marshall W.** (1994), Professor of Theatre; B.S., Northwestern University
- Mass, Diana** (1974), Clinical Professor of Clinical Laboratory Sciences; B.S., University of Texas, Austin; M.S., Central Michigan University
- Massia, Stephen** (1998), Associate Professor of Bioengineering; B.S., Southwestern University; Ph.D., University of Texas
- Matera, Frances R.** (1989), Associate Professor of Journalism and Mass Communication; B.S., Florida International University; M.A., Goddard College; Ph.D., University of Miami
- Matheson, Alan A.** (1967), Professor of Law; B.A., M.S., J.D., University of Utah
- Mathur, Sarup** (2002), Clinical Associate Professor of Curriculum and Instruction; B.A., B.Ed., M.A., M.Ed., Agra University (India); M.Ed., Ph.D., Arizona State University
- Mathy, Pamela A.** (1998), Clinical Professor of Speech and Hearing Science; Director, Clinical Services; B.A., University of Massachusetts; M.A., Washington State University; Ph.D., University of Wisconsin, Madison
- Matt, Kathleen S.** (1987), Professor of Kinesiology; B.A., M.S., University of Delaware; Ph.D., University of Washington
- Matt, Pamela** (1980), Associate Professor of Dance; B.A., University of Washington; M.A., University of Illinois
- Matthias, Judson S.** (1967), Professor Emeritus of Civil and Environmental Engineering; B.S., United States Military Academy; M.S., Oregon State University; Ph.D., Purdue University
- Mattox, John H.** (1995), Adjunct Professor of Biology; B.A., M.D., University of Colorado
- Mattson, Susan** (1993), Professor of Nursing; Chair, Division of Adult Health/Parent-Child Nursing; B.S., M.A., M.S., California State University, Los Angeles; Ph.D., Claremont Graduate University
- Matyushov, Dimitry** (2000), Assistant Professor of Chemistry and Biochemistry; B.S., Moscow Institute of Physics and Technology (Russia); Ph.D., Vienna University of Technology (Austria)
- Maxwell, Katherine Davis** (1996), Faculty Associate of Nursing; B.S., University of Utah; M.S., Arizona State University
- Maxwell, Kathryn** (1988), Professor of Art; B.A., Northwestern University; M.F.A., University of Wisconsin, Madison
- May, Judy** (1986), Associate Professor of Music; M.M., The Juilliard School



Mayer, James W.

(1992)

Regents' Professor of Chemical and Materials Engineering and Solid State Science; B.S., Ph.D., Purdue University

Mayer, Lawrence S. (1983), Professor of Economics; B.S., M.S., Ohio State University; M.D., Associated Medical Schools of the Caribbean; Ph.D., Ohio State University

Mayer, Michael (1978), Associate Professor of Communication; B.A., M.A., University of Wyoming; Ph.D., University of Kansas

Mays, Larry W. (1989), Professor of Civil and Environmental Engineering; B.S., M.S., University of Missouri, Rolla; Ph.D., University of Illinois

McBeath, Michael K. (1998), Associate Professor of Psychology; B.A., Brown University; M.S., University of California, Santa Barbara; Ph.D., Stanford University

McBride, Ingrid (2001), Clinical Assistant Professor of Communication Disorders; B.S., M.S., Arizona State University

McCabe, Barbara (1997), Assistant Professor of Public Affairs; B.A., M.P.A., Florida Atlantic University; Ph.D., Florida State University

McCarter, Joan H. (1961), Associate Professor of Mathematics and Statistics; B.S., M.A., University of Arizona

McCarthy, Marianne (1994), Associate Professor of Nursing; B.S.N., Mount Saint Mary College; M.S.N., Seton Hall University; Ph.D., University of California, San Francisco

McCartney, Martha R. (1989), Senior Research Scientist, Center for Solid State Science; B.S., The Evergreen State College; Ph.D., Arizona State University

McCormack, Brian (2000), Lecturer of Interdisciplinary Studies; B.A., B.S., University of Nebraska, Omaha; B.A., Australian National University (Australia); M.A., Ph.D., Arizona State University

McCoy, Janetta Mitchell (1999), Assistant Professor of Design; B.L.S., St. Edwards University; M.S., Cornell University; Ph.D., University of Wisconsin, Milwaukee

McCoy, Kathleen M. (1976), Associate Professor of Curriculum and Instruction; B.S., University of Portland; M.S., Portland State University; Ph.D., University of Oregon

McCoy, Ronald (1995), Professor of Architecture; Interim Dean, College of Architecture and Environmental Design; Director, School of Architecture; B.S., University of Southern California; M.Arch., Princeton University

McCready, Richard R. (1960), Professor Emeritus of Accountancy and Information Management; B.S., Valley City State Teachers College; M.A., Ed.D., University of Northern Colorado

McDermott, Lauren (1990), Associate Professor of Design; B.F.A., M.F.A., Rochester Institute of Technology

McDonald, Arlys (1970), Librarian Emeritus; B.Mus., St. Mary of the Plains College; M.Mus., University of Illinois

McDonald, John N. (1969), Professor Emeritus of Mathematics and Statistics; A.B., King's College; M.S., Ph.D., Rutgers, The State University of New Jersey

McDonald, Kelly M. (2000), Assistant Instructional Professional of Communication; Director of Forensics; B.A., Pacific Lutheran University; M.A., Ph.D., University of Kansas

McDonough, Peter (1990), Professor of Political Science; B.S., Saint Louis University; Ph.D., University of Michigan

McDowell, John M. (1978), Professor of Economics; B.S., M.S., Ph.D., University of California, Los Angeles

McEwen, Douglas R. (1969), Professor Emeritus of Music; B.S., Bowling Green State University; M.M., Indiana University; Ed.D., University of Northern Colorado

McFarland, Elaine H. (1973), Professor Emerita of Health Science; B.A., Marietta College; M.N., Case Western Reserve University

McGaughy, Robert W. (1971), Professor of Biology; Director of Interdisciplinary Committee for Molecular and Cellular Biology; B.A., Augustana College; M.A., University of Colorado; Ph.D., Boston University

McGaw, Dickinson L. (1968), Professor Emeritus of Public Affairs; B.A., M.A., Ph.D., Indiana University, Bloomington

McGehee, Shelley (1985), Librarian Emerita; B.Mus., Converse College; M.Mus., M.L.S., University of Alabama

McGowan, Patrick J. (1979), Professor of Political Science; B.A., University of the South; M.A., Johns Hopkins University; Ph.D., Northwestern University

McGrath, Jacqueline (1999), Assistant Professor of Nursing; B.S.N., University of Akron; M.S.N., Kent State University; Ph.D., University of Pennsylvania

McGregor, Joan L. (1989), Associate Professor of Philosophy; B.A., University of California, Davis; M.A., Ph.D., University of Arizona

McHugh, Kevin E. (1985), Associate Professor of Geography; B.S., Pennsylvania State University; M.A., Arizona State University; Ph.D., University of Illinois, Urbana-Champaign

McIsaac, Marina Stock (1980), Professor Emerita of Educational Technology; B.A., Pomona College; M.A., Ph.D., University of Wisconsin, Madison

McIver, Beverly (1996), Associate Professor of Art; B.A., North Carolina Central University; M.F.A., University of Pennsylvania

McKelvy, Michael J. (1976), Senior Research Scientist, Center for Solid State Science; B.S., University of California, Berkeley; M.S., Ph.D., Arizona State University

McKenzie, Patrick Bruce (1970), Professor Emeritus of Accountancy and Information Management; B.S., M.S., Kansas State University; Ph.D., Michigan State University

McLaughlin, Ilene (1995), Assistant Librarian, Hayden Reference Services; B.A., Lake Forest College; M.L.S., Simmons College

McLin, Katherine (1997), Assistant Professor of Music; B.M., Oberlin College Conservatory, Ohio; M.M., Indiana University, Bloomington; D.M.A., University of Michigan, Ann Arbor

McMahon, Jeff (2001), Senior Lecturer of Theatre; B.A., State University of New York; M.F.A., Columbia University

McManus, Elizabeth B. (2000), Lecturer of the Barrett Honors College; B.A., M.A., Ph.D., University of Virginia

McMillan, Paul F. (1983), Professor Emeritus of Chemistry and Biochemistry; B.Sc., University of Edinburgh (United Kingdom); Ph.D., Arizona State University

McMillen, Phyllis (2000), Faculty Associate of Nursing; B.S.N., Union College, Lincoln; M.S.N., University of Nebraska Medical Center

McNally, T.M. (1999), Associate Professor of English; B.A., Rockford College; M.F.A., Arizona State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- McNeil, Elizabeth A.** (1998), Academic Associate of English; Academic Advisor; B.A., California State University, Chico; M.F.A., Arizona State University
- McNeill, Barry W.** (1976), Associate Professor of Mechanical Engineering; Vice Chair for Mechanical Engineering; B.S., M.S., Ph.D., Stanford University
- McPhee, Robert D.** (1998), Professor of Communication; B.A., M.A., Ph.D., Michigan State University
- McPheters, Lee R.** (1976), Professor of Economics; Director, Bank One Economic Outlook Center; Associate Dean, Executive and Professional Programs, W. P. Carey School of Business; A.B., San Francisco State University; Ph.D., Virginia Polytechnic Institute and State University
- McSheffrey, Gerald R.** (1982), Professor Emeritus of Architecture; Dipl.Arch., University College, London (United Kingdom); Dipl.C.D., Edinburgh University (United Kingdom)
- McSherry, Laurel** (1991), Associate Professor of Planning and Landscape Architecture; B.S.L.A., Rutgers, The State University of New Jersey; M.L.A.II., Harvard University
- McTaggart, W. Donald** (1971), Professor Emeritus of Geography; M.A., University of St. Andrews (United Kingdom); Ph.D., Australian National University (Australia)
- McWhirter, J. Jeffries** (1970), Professor of Counseling Psychology and Counselor Education; B.A., Saint Martin's College; M.Ed., Oregon State University; M.Ed., Ph.D., University of Oregon
- Mehall, Gregory Lawrence** (1992), Associate Research Professional of Geological Sciences; M.S., Stanford University
- Meir, Baruch I.** (2000), Assistant Professor of Music; B.Mus., M.Mus., Tel Aviv University (Israel); D.M.A., Arizona State University
- Meissinger, Ellen Murray** (1986), Professor of Art; B.F.A., M.F.A., University of North Carolina, Greensboro
- Melichar, Dudley W.** (1974), Professor Emeritus of Justice Studies; B.S., M.S., South Dakota State University; Ed.D., Arizona State University
- Melnick, Robert** (1987), Senior Research Scientist for Public Affairs; Director, Morrison Institute for Public Policy; B.A., Dartmouth College; M.A., Ph.D., Arizona State University
- Melvin, Michael** (1980), Professor of Economics; B.B.A., University of Houston; M.A., San Diego State University; Ph.D., University of California, Los Angeles
- Méndez, José A.** (1980), Professor of Economics; B.A., M.A., University of Texas, Austin; M.A., Ph.D., Southern Methodist University
- Menéndez, José** (1987), Professor of Physics and Astronomy; Licenciado en Física, Balseiro Institute (Argentina); Dr. rer. nat., Stuttgart University (Germany)
- Mengeling, Kristina** (1999), Assistant Law Librarian, Ross-Blakley Law Library; B.A., Northern Illinois University; M.L.S., Rosary College
- Menjivar, Cecilia** (1995), Associate Professor of Justice Studies; B.A., M.S., University of Southern California; Ph.D., University of California, Davis
- Menke, Robert F.** (1947), Professor Emeritus of Education; B.S., Oshkosh State College; M.A., Ph.D., Northwestern University
- Merbs, Charles F.** (1973), Professor of Anthropology; B.S., M.S., Ph.D., University of Wisconsin, Madison
- Merrill, Bruce D.** (1971), Professor of Journalism and Mass Communication; Director, Media Research Program; M.A., Brigham Young University; Ph.D., University of Michigan
- Mesch, Claudia** (2001), Professor of Art; B.A., Yale University, New Haven; M.A., University of California, Los Angeles; Ph.D., University of Chicago
- Messman, Susan J.** (2000), Assistant Professor of Communication; B.A., University of Missouri, Columbia; M.S., Illinois State University; Ph.D., Ohio University
- Metcalf, V. Alonzo** (1971), Professor Emeritus of International Studies; B.S., M.S., University of Arkansas; Ph.D., University of Missouri, Columbia
- Metha, Arlene** (1971), Professor Emerita of Counseling Psychology; B.A., Arizona State University; M.A., Ohio State University; Ph.D., University of Southern California
- Metos, Thomas H.** (1965), Professor Emeritus of Educational Administration and Supervision; B.S., M.S., Ph.D., University of Utah
- Metz, John** (1980), Professor of Music; B.A., M.M., Syracuse University; D.M.A., The Juilliard School
- Meunier, John** (1987), Professor of Architecture; B.Arch., University of Liverpool (United Kingdom); M.Arch., Harvard University; M.A., University of Cambridge (United Kingdom)
- Middleton, James Arthur** (1998), Associate Professor of Curriculum and Instruction; Associate Dean for Research, College of Education; B.A., California State University, Chico; M.S., Ph.D., University of Wisconsin, Madison
- Mignolet, Marc P.** (1987), Professor of Mechanical and Aerospace Engineering; B.S., University of Liege (Belgium); Ph.D., Rice University
- Mikellides, Pavlos G.** (2002), Assistant Professor of Mechanical and Aerospace Engineering; B.S., M.S., Ph.D., Ohio State University
- Miller, Barbara K.** (1976), Professor Emerita of Nursing; B.S.N., M.S.Ed., University of Akron; Ph.D., University of Texas, Austin
- Miller, Donald S.** (1981), Associate Professor of Computer Science and Engineering; B.S., Syracuse University; M.S., Ph.D., University of Southern California
- Miller, Keith D.** (1987), Associate Professor of English; B.A., Texas Christian University; M.A., State University of New York, Albany; Ph.D., Texas Christian University
- Miller, Rosanna** (1974), Librarian Emerita; B.A., M.A., Arizona State University; M.L.S., University of Arizona
- Miller, Susan A.** (2001), Assistant Professor of American Indian Studies; B.A., M.A., University of Oklahoma; Ph.D., University of Nebraska, Lincoln
- Miller, Terri** (1997), Lecturer of Mathematics and Statistics; B.S., M.A., Arizona State University
- Miller-Loessi, Karen A.** (1984), Associate Professor of Sociology; B.A., University of California, Berkeley; M.A., Ph.D., Stanford University
- Mills, Douglas T.** (1993), Faculty Associate of Construction; B.S., Arizona State University
- Millsap, Roger E.** (1997), Professor of Psychology; B.S., University of Washington; M.A., Ph.D., University of California, Berkeley
- Milner, Joe W.** (1967), Professor Emeritus of Journalism and Mass Communication; B.A., East Texas State University; M.A., University of Oklahoma; Ed.D., University of Wyoming

Milun, Kathryn (2000), Assistant Professor of English and Justice Studies; B.A., M.A., Ph.D., University of Minnesota

Mings, Robert C. (1971), Professor Emeritus of Geography; B.S., M.A.T., Indiana University, Bloomington; Ph.D., Ohio State University

Mintz, Sandra L. (1986), Clinical Associate Professor of Speech and Hearing Science; B.A., Indiana University; M.S., University of Arizona

Misra, Rajeev (1991), Professor of Microbiology; B.S., Kanpur University (India); M.S., G.B. Pant University (India); Ph.D., Adelaide University (Australia)

Mitchell, Frederic F. (1961), Professor Emeritus of Education; B.A., M.A., University of Arizona; Ph.D., Columbia University

Mitchell, John (1990), Associate Research Professional of Dance; Director, Dance Multimedia Learning Center; B.M., Webster University, St. Louis; M.M., University of South Florida

Mitchell, Michael J. (1990), Associate Professor of Political Science; B.A., Fordham University; M.A., Ph.D., Indiana University, Bloomington

Mittelmann, Hans Detlef (1982), Professor of Mathematics and Statistics; M.A., University of Mainz (Germany); Ph.D., Habilitation, University of Darmstadt (Germany)

Mobasher, Barzin (1991), Associate Professor of Civil and Environmental Engineering; B.S., University of Wisconsin, Platteville; M.S., Northeastern University; Ph.D., Northwestern University

Mogey, John M. (1987), Adjunct Professor of Sociology; B.A., M.A., D.Sc., Queen's University (United Kingdom)

Mokwa, Michael P. (1979), Professor of Marketing; Chair, Department of Marketing; B.B.A., M.B.A., Ph.D., University of Houston

Molnar, Alex (2001), Professor of Educational Leadership and Policy Studies; Director, Education Policy Studies Laboratory; B.A., North Park College; M.A., Northwestern University; Ph.D., University of Wisconsin, Milwaukee

Monczka, Robert M. (1999), Research Professor of Supply Chain Management; B.A., M.B.A., Ph.D., Michigan State University

Mongeau, Paul A. (2002), Professor of Communication; B.S., M.A., Arizona State University; Ph.D., Michigan State University

Montenegro, Leonard Jose (1986), Senior Research Professional of Mechanical and Aerospace Engineering; B.S., State University of New York, Albany

Montero, Darrel (1979), Associate Professor of Social Work; B.A., California State University, Sacramento; M.A., Ph.D., University of California, Los Angeles

Montgomery, Douglas C. (1988), Professor of Industrial Engineering; B.S.I.E., M.S., Ph.D., Virginia Polytechnic Institute and State University

Montgomery, Eric (1997), Faculty Associate of Design; B.F.A., Arizona State University

Montiel, Miguel (1974), Professor of Chicana and Chicano Studies; Motorola Presidential Professor in Community Revitalization; B.S., University of Arizona; M.S.W., Arizona State University; D.S.W., University of California, Berkeley

Montoya, Janet (1999), Adjunct Professor of Anthropology; B.A., M.A., University of Houston, Clear Lake

Mooney, Elina (1988), Associate Professor of Dance

Moore, William C. (1968), Associate Professor of Industrial Engineering; Associate Chair, Department of Industrial Engineering; B.S., M.S., Washington University; Ph.D., Purdue University

Moore, Ana L. (1989), Professor of Chemistry and Biochemistry; B. of Pharmacy, National University of La Plata (Argentina); M.Sc., Federal University of Rio de Janeiro (Brazil); Ph.D., Texas Tech University



Moore, Carleton B.

(1961)

Regents' Professor Emeritus of Chemistry and Biochemistry and Geological Sciences; B.S., Alfred University; Ph.D., California Institute of Technology

Moore, Diane B. (1980), Librarian, Noble Science Reference Services; B.S., College of William and Mary; M.L.S., University of Wisconsin, Madison

Moore, Elsie G.J. (1981), Associate Professor of Psychology in Education; Director, Division of Psychology in Education; B.A., Elmhurst College; M.A., Ph.D., University of Chicago

Moore, J. Douglas (1969), Associate Professor of Mathematics and Statistics; B.S., M.S., Idaho State University; Ph.D., Syracuse University

Moore, Michael (1982), Professor of Biology; B.A., Indiana University; M.S., Ph.D., University of Washington

Moore, Moses N. (1989), Associate Professor of Religious Studies; B.A., Eckerd College; M.Div., Yale University; M.Phil., Ph.D., Union Theological Seminary

Moore, Patricia (1984), Professor Emerita of Nursing; B.S.N., Loyola University, Chicago; M.S., Catholic University of America; M.P.H., Dr.P.H., Johns Hopkins University

Moore, Patricia A. (2000), Adjunct Faculty of Design; B.F.A., Rochester Institute of Technology; M.A., Columbia University

Moore, Thomas A. (1976), Professor of Chemistry and Biochemistry; B.A., Ph.D., Texas Tech University

Moorhead, Gregory (1978), Associate Professor of Management; B.S.I.E., M.B.A., Ph.D., University of Houston

Mor, Tsafirir (2000), Assistant Research Professor of Plant Biology; B.Sc., M.Sc., Ph.D., Hebrew University of Jerusalem (Israel)

Morgan, Don (2000), Associate Professor of Kinesiology; B.M.E., Northwestern University; M.S., University of Tennessee, Knoxville; Ph.D., Arizona State University

Morgan, Miriam J. (1965), Instructor Emerita of French; Licence-ès-Lettres, University of Paris (France); M.A., Arizona State University

Morgan, Owen W. (1968), Professor Emeritus of Family and Human Development; B.A., Grinnell College; M.A., University of Nebraska, Omaha; Ph.D., University of Nebraska, Lincoln

Morgan, Thais E. (1985), Associate Professor of English; B.A., Smith College; M.A., Ph.D., Brown University

Moroney, Robert M. (1981), Professor of Social Work; A.B., M.S.W., Boston College; M.P.H., Harvard University; Ph.D., Brandeis University

Morrell, Darryl (1988), Associate Professor of Electrical Engineering; B.S., M.S., Ph.D., Brigham Young University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Morris, Brenda C. (1994), Clinical Associate Professor of Nursing; B.S.N., M.S., University of Arizona; Ed.D., Arizona State University

Morris, Donald H. (1962), Professor Emeritus of Anthropology; B.A., Arizona State University; M.A., Ph.D., University of Arizona

Morrison, Kenneth M. (1983), Professor of Religious Studies; B.A., Saint Dunstan's University; M.A., Ph.D., University of Maine

Moses, Michele (2000), Assistant Professor of Educational Leadership and Policy Studies; B.A., University of Virginia; M.Ed., University of Vermont; M.A., Ph.D., University of Colorado

Mossman, Kenneth L. (1990), Professor of Microbiology; Director, Radiation Safety Office; B.S., Wayne State University; M.Ed., University of Maryland, College Park; M.S., Ph.D., University of Tennessee, Knoxville

Mou, Jong-I (1994), Associate Professor of Industrial Engineering; B.S., M.S., University of Wisconsin, Madison; Ph.D., Purdue University

Moulton, Gerald L. (1967), Professor Emeritus of Counselor Education; B.A., Hamline University; M.Ed., Ed.D., University of Oregon

Mowrer, Donald E. (1965), Professor Emeritus of Speech and Hearing Science; B.A., M.A., Florida State University; Ph.D., Arizona State University

Moyer, Joan E. (1971), Professor Emerita of Curriculum and Instruction; B.S., Kutztown State University; M.Ed., Pennsylvania State University; Ph.D., University of Maryland, College Park

Muccino, Julia Catherine (1997), Assistant Professor of Civil and Environmental Engineering; B.C.E., Villanova University; M.S., Ph.D., University of Notre Dame

Mueller-Alexander, Jeanette M. (1989), Librarian, Hayden Reference Services; B.A., Moorhead State University; M.L.S., Indiana University, Bloomington

Mulligan, Donald E. (1985), Professor Emeritus of Construction; B.S.E., M.S.M.E., Arizona State University

Mulvihill, Josepha Anne (1983), Associate Librarian, Hayden Reference Services; B.S., University of Kansas; M.L.S., Emporia State University

Munk, Morton E. (1961), Professor Emeritus of Chemistry and Biochemistry; B.S., Northwestern University; M.S., University of Miami; Ph.D., Wayne State University

Murdough, John M. (1993), Faculty Associate of Construction; B.S., M.B.A., Arizona State University

Murff, Scott (1998), Assistant Professor of Architecture; B.S.D., Clemson University; B.Arch., The Cooper Union

Murphey, Claudia (1996), Professor of Dance; Chair, Department of Dance; B.A., Western College; M.A., George Washington University



Murphy, Jeffrey G.

(1981)

Regents' Professor of Law and Philosophy; B.A., Johns Hopkins University; Ph.D., University of Rochester

Murphy, Juanita F. (1971), Professor Emerita of Nursing; Dean Emerita, College of Nursing; B.A., Oklahoma Baptist University; M.S., Ph.D., Case Western Reserve University

Murphy, Kurt R. (1986), Associate Librarian; Assistant Dean, Personnel, University Libraries; B.S., M.L.S., University of Illinois; M.B.A., Arizona State University

Murranka, Patricia A. (1977), Professor Emerita of Management Communication; B.A., Trenton State College; M.A., Rider College; Ed.D., Utah State University

Murray, Roger N. (1968), Professor Emeritus of English; B.A., B.S., Moorhead State Teachers College; M.A., Stanford University; Ph.D., University of Iowa

Musacchio, Laura (1999), Assistant Professor of Planning and Landscape Architecture; B.L.A., M.L.A., State University of New York; Ph.D., Texas A&M University

Musheno, Michael C. (1977), Professor Emeritus of Justice Studies and Public Affairs; B.A., Lycoming College; M.A., Ph.D., American University

Mushkatel, Alvin H. (1980), Professor of Planning and Landscape Architecture; B.A., Ohio State University; M.S., Ph.D., University of Oregon

Muthuswamy, Jitendran (2000), Assistant Professor of Bioengineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., Rensselaer Polytechnic Institute

Myhajlenko, Stefan (1986), Associate Research Scientist and Associate Director, Center for Solid State Electronics Research; Ph.D., University of Manchester, Victoria (United Kingdom)

Myler, Charles E. Jr. (1968), Professor Emeritus of Real Estate; B.B.A., Loyola University; M.B.A., Harvard University; Ph.D., University of Florida

N

Nagasawa, Richard H. (1969), Professor Emeritus of Sociology; B.A., University of Hawaii, Manoa; M.A., Ph.D., University of Washington

Nagoshi, Craig (1989), Associate Professor of Psychology; B.A., M.A., Ph.D., University of Hawaii, Manoa

Nagrin, Daniel (1982), Professor Emeritus of Dance; B.S., College of the City of New York

Nagy, Bethel (2000), Adjunct Professor of Anthropology; B.A., Arizona State University; M.A., University of Toronto (Canada); Ph.D., Arizona State University

Nagy, John D. (1999), Adjunct Professor of Biology; B.S., Eastern Michigan University; B.S., University of Michigan, Ann Arbor; Ph.D., Arizona State University

Nagy, Sandra Griffiths (1984), Academic Associate, Division of Undergraduate Academic Services; Assistant Director, Writing Across the Curriculum; B.Ed., M.A., Ph.D., Arizona State University

Nakagawa, Kathryn (1996), Assistant Professor of Psychology in Education; B.A., M.A., University of Notre Dame; Ph.D., Northwestern University

Nakamura, Mutsumi (2002), Lecturer of Computer Science and Engineering; B.S., M.S., University of Texas, El Paso; Ph.D., University of Texas, Arlington

Nakayama, Thomas K. (1991), Professor of Communication; Director, Asian Pacific American Studies Program; A.B., Georgia State University; M.A., Ph.D., University of Iowa

Napoli, Maria (1996), Assistant Professor of Social Work; B.A., H.H. Lehman College; M.S.W., Ph.D., New York University

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 Educational Psychology; B.S., University of Wisconsin, Madison; Ph.D., Stanford University
- Nelson, Ben A.** (1995), Professor of Anthropology; B.A., M.A., Florida State University; Ph.D., Southern Illinois University
- Nelson, G. Lynn** (1973), Associate Professor of English; B.A., Kearney State College; Ph.D., University of Nebraska, Lincoln
- Nelson, J. Russell** (1981), Professor Emeritus of Finance; President Emeritus of the University; B.A., Pacific Union College; M.B.A., Ph.D., University of California, Los Angeles
- Nelson, John C.** (1967), Professor Emeritus of Curriculum and Instruction; B.S., M.A., Arizona State University; Ph.D., Vanderbilt University
- Nelson, Kelly** (1999), Lecturer of Interdisciplinary Studies; B.A., Michigan State University; M.S., University of Southern Maine; Ph.D., Brandeis University
- Nelson, Margaret** (1995), Professor of Anthropology; B.A., Occidental College, Los Angeles; Ph.D., University of California, Santa Barbara
- 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
- New, Frances Y.** (1986), Librarian Emerita; B.S., Seattle Pacific University; M.L.S., University of Arizona
- 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
- Newman, Timothy J.** (2002), Associate Professor of Physics and Astronomy; B.A., University of Oxford (United Kingdom); Ph.D., University of Manchester (United Kingdom)
- 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
- Nichols, Renea D.** (1995), Lecturer of Journalism and Mass Communication; B.A., Central Michigan University; M.M.C., Arizona State University
- Nichols Dock, Michelle** (2000), Assistant Museum Professional; Curator of Education, University Art Museum; B.A., New Mexico State University; M.A., Arizona State University
- Nicolaenko, Basil** (1989), Professor of Mathematics and Statistics; M.S., University of Paris (France); Ph.D., University of Michigan
- Niederhelman, Melissa** (1998), Assistant Professor of Design; B.F.A., University of Massachusetts, Dartmouth; M.F.A., Allgemeine Gewerbeschule Basel (Switzerland)
- Nielsen, Michael J.** (1969), Professor Emeritus of Design; B.P.D., North Carolina State University, Raleigh; M.A., Stanford University
- Nielson, Gregory M.** (1970), Professor of Computer Science and Engineering; B.S., M.S., Ph.D., University of Utah
- Nieman, Ronald** (1983), Senior Research Professional of Chemistry and Biochemistry; B.A., University of Colorado; Ph.D., Arizona State University
- Nikitin, Sergey** (1994), Associate Professor of Mathematics and Statistics; M.S., Moscow State University; Ph.D., Academy of Science of Russia, Research Institute of System Studies
- Nilsen, Alleen P.** (1975), Professor of English; B.A., Brigham Young University; M.Ed., American University; Ph.D., University of Iowa
- Nilsen, Don L.F.** (1973), Professor of English; B.A., Brigham Young University; M.A., American University; Ph.D., University of Michigan
- Noreuil, Chad** (2001), Legal Writing Instructor; B.A., J.D., University of Illinois, Urbana-Champaign
- Northey, William T.** (1959), Professor Emeritus of Microbiology; B.A., University of Minnesota, Twin Cities; M.A., Ph.D., University of Kansas
- Norton, Janice** (1998), Senior Lecturer of English; B.A., M.A., University of Tennessee, Knoxville; Ph.D., University of Iowa
- Norton, Kay** (1999), Assistant Professor of Music; B.M.E., M.F.A., University of Georgia; Ph.D., University of Colorado
- Norton, Scott** (1973), Professor of Educational Leadership and Policy Studies; B.S., M.Ed., Ed.D., University of Nebraska, Lincoln
- Nowlis, Stephen** (1996), Associate Professor of Marketing; B.A., Stanford University; M.B.A., University of California, Berkeley; Ph.D., University of California, San Diego
- Nunez, Diane E.** (1995), Clinical Assistant Professor of Nursing; B.S.N., M.S., Arizona State University

O

- O'Brien, Carmen A.** (1959), Professor Emerita of Education; B.A., M.A., Arizona State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

O'Brien, Robin K. (1995), Lecturer of Speech and Hearing Science; B.A., Gallaudet University

O'Connor, Elinor J. (1970), Professor Emerita of Family and Human Development; B.S., St. Catharine College; M.S., University of Iowa

O'Day, Peggy A. (1994), Associate Professor of Chemistry and Biochemistry and Geological Sciences; B.S., University of California, Davis; M.S., Cornell University; Ph.D., Stanford University

O'Dell, Michael A. (1980), Associate Professor of Accountancy and Information Management; B.S., M.B.A., University of California, Los Angeles; Ph.D., University of Texas, Austin; C.P.A., Colorado

O'Donnell, Ed (1999), Assistant Professor of Accountancy and Information Management; B.B.A., Texas A&M University; Ph.D., University of North Texas, Kingsville

O'Grady, Catherine (1991), Professor of Law; Executive Director, Clinical Programs; B.A., University of Michigan; J.D., Arizona State University

O'Grady, E.P. (1977), Associate Professor of Computer Science and Engineering; B.S., St. Louis University; M.S., Ph.D., University of Arizona

O'Haver, Judy (1999), Faculty Associate of Nursing; B.S.N., Niagara University; M.S., Arizona State University

Ó hUallacháin, Breandán (1987), Professor of Geography; Chair, Department of Geography; B.A., National University of Ireland (Ireland); M.A., Indiana University, Bloomington; Ph.D., University of Illinois, Urbana-Champaign



O'Keefe, Michael
(1963)

Regents' Professor of Chemistry and Biochemistry; B.S., Ph.D., University of Bristol (United Kingdom)

O'Leary, Timothy J. (1978), Associate Professor of Computer Information Systems; B.S., Westminster College; M.B.A., D.B.A., Kent State University

O'Sullivan, Peggy (1998), Director, Advanced Public Executive Program; B.S., Northern Arizona University; M.P.A., Arizona State University

Odenkirk, James E. (1967), Professor Emeritus of Kinesiology; B.S., M.A., Ohio State University; Ed.D., Columbia University

Odehahn, Stephen C. (1999), Assistant Research Scientist of Physics and Astronomy; B.S., University of Alabama; M.S., Ph.D., University of Texas, Austin

Odish, Faris (1997), Lecturer of Mathematics and Statistics; B.S., University of Baghdad (Iraq); M.A., Wayne State University

Oehrtman, Michael (2002), Assistant Professor of Mathematics and Statistics; B.S., Oklahoma State University; Ph.D., University of Texas, Austin

Oetting, Edward (1983), Librarian, Hayden Reference Services; B.A., University of Michigan; M.A., University of Illinois; M.S.L.S., Wayne State University

Oh, Young Kyun (1999), Instructor of Korean; B.A., Sogang University Graduate School (South Korea); M.A., University of Wisconsin, Madison

Ohmart, Robert D. (1970), Professor of Biology; B.S., M.S., New Mexico State University; Ph.D., University of Arizona

Ohnersorgen, Michael A. (2002), Adjunct Professor of Anthropology; B.A., University of California, Santa Barbara; M.A., Ph.D., Arizona State University

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

Oldani, Robert W. (1982), Professor of Music; B.A., University of Illinois; M.A., Ph.D., University of Michigan

Oldroyd, Mark, SFC (2000), Instructor of Military Science

Oleson, Jacob (2002), Assistant Professor of Mathematics and Statistics; B.A., Central College; M.A., Ph.D., University of Missouri, Columbia

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

Orlowicz, Connie (2002), Lecturer of Kinesiology; B.A.E., Arizona State University

Ormiston, Michael B. (1984), Professor of Economics; B.S., Michigan State University; M.A., Ph.D., Johns Hopkins University

Ortiz, Luanna G. (2002), Assistant Professor of Physics and Astronomy; B.S., University of New Mexico; M.S., Ph.D., University of Washington

Osmond, Charles Barry (2002), Adjunct Professor of Plant Biology; B.S., M.S., University of New England (Australia); Ph.D., University of Adelaide (Australia)

Ossipov, Helene (1987), Associate Professor of French; B.A., City University of New York; M.A. (French Linguistics), M.A. (Russian Area Studies), Ph.D., Indiana University, Bloomington

Osterhoudt, Robert G. (1976), Professor Emeritus of Kinesiology; B.S., M.S., Pennsylvania State University; Ph.D., University of Illinois

Ostrom, Amy (1996), Associate Professor of Marketing; B.A., Arizona State University; Ph.D., Northwestern University

Ostrom, Lonnie L. (1973), Professor of Marketing; Director, Development, Institutional Advancement; President, Arizona State University Foundation; B.B.A., University of Wisconsin; M.S., Southern Illinois University, Carbondale; Ph.D., University of Alabama

Ovando, Carlos Julio (2001), Professor of Curriculum and Instruction; Associate Dean, Teacher Education; B.A., Goshen College; M.A., M.A.T., Ph.D., Indiana University

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

Ozel, Filiz (1995), Professor of Architecture; Associate Dean, Academic Programs, Graduate College; B.Arch., M.Arch., Middle East Technical University (Turkey); D.Arch., University of Michigan

P

Packer, Merle A. (1959), Professor Emerita of Kinesiology; B.A., M.A., Arizona State University; Ed.D., University of Northern Colorado

Padilla, Peter A. (1997), Assistant Professor of Sociology; B.A., M.A., University of Northern Colorado; Ph.D., Arizona State University



Pagano, Caio
(1986)

Regents' Professor of Music; B.Laws, University of Sao Paulo (Brazil); D.M.A., Catholic University of America

Page, John B. (1969), Professor of Physics and Astronomy; B.S., Ph.D., University of Utah

Palais, Elliot S. (1959-62; 1966), Librarian Emeritus; B.A., Bowdoin College; A.M.L.S., University of Michigan

Palais, Joseph C. (1964), Professor of Electrical Engineering; B.S.E.E., University of Arizona; M.S.E., Ph.D., University of Michigan

Palmer, Michael B. (1998), Lecturer of Psychology; B.A., Arizona State University; M.A., Michigan State University; Ph.D., Arizona State University



Palumbo, Dennis J.
(1983)

Regents' Professor Emeritus of Justice Studies; M.A. (Social Science), M.A. (Political Science), Ph.D., University of Chicago

Pan, George (1995), Professor of Electrical Engineering; B.E., Peking Institute of Petroleum Technology (China); M.S., Ph.D., University of Kansas

Panchanathan, Sethuraman (1997), Professor of Computer Science and Engineering; Interim Chair, Department of Computer Science and Engineering; B.Sc., University of Madras (India); M.Tech., Indian Institute of Technology, Madras (India); Ph.D., University of Ottawa (Canada)

Panchmatia, Bella (1998), Faculty Associate of Nursing; B.S.N., University of Alberta (Canada); M.S.N., University of Wisconsin, Madison

Pang, Patty (1999), Instructor of Chinese; B.A., Tamkang University (Taiwan); M.A., Arizona State University

Pangrazi, Robert P. (1973), Professor of Kinesiology; B.A., M.S., Ph.D., Washington State University

Panitch, Alyssa (1999), Assistant Professor of Bioengineering; B.S., Ph.D., University of Massachusetts

Pany, Kurt J. (1978), Professor of Accountancy and Information Management; B.S.B.A., University of Arizona; M.B.A., University of Minnesota, Twin Cities; Ph.D., University of Illinois; C.P.A., Arizona

Papandreou-Suppappola, Antonia (1999), Assistant Professor of Electrical Engineering; B.S., M.S., Ph.D., University of Rhode Island

Parchesky, Jennifer (2002), Assistant Professor of English and Women's Studies; B.A., Trinity University, San Antonio; Ph.D., Duke University

Park, Chan Beum (2002), Assistant Professor of Chemical and Materials Engineering; B.S., M.S., Ph.D., Pohang University of Science and Technology (South Korea)

Park, Pori (2002), Assistant Professor of Religious Studies; B.A., Sookmyung Women's University (South Korea); M.A., University of Iowa; M.A., California State University, Hayward; Ph.D., University of California, Los Angeles

Parker, Harold E. (1987), Senior Research Technologist, Engineering Computer Services

Park-Fuller, Linda M. (2000), Assistant Professor of Communication and Women's Studies; B.A., University of North Dakota; M.A., University of Missouri, Columbia; Ph.D., University of Texas, Austin

Parkhe, Smita (2001), Assistant Librarian, Technical Services Department; B.S., University of Pune (India); M.L.S., Clarion University of Pennsylvania

Parkinson, Stanley R. (1971), Professor of Psychology; A.B., University of California, Berkeley; M.A., Ph.D., University of California, Davis

Parrish, H. Wayne (1967), Professor Emeritus of Curriculum and Instruction; A.B., San Diego State College; M.Ed., Ed.D., University of Oregon

Parrish, Mila (2000), Assistant Professor of Dance; B.F.A., University of Michigan; M.A., Columbia University; Ph.D., Ohio State University

Pasqualetti, Martin J. (1977), Professor of Geography; B.A., University of California, Berkeley; M.A., Louisiana State University, Baton Rouge; Ph.D., University of California, Riverside

Pastin, H. Mark (1980), Professor Emeritus of Management; B.A., University of Pittsburg; A.M., Ph.D., Harvard University

Patel, Mookesh (1990), Associate Professor of Design; B.F.A., National Institute of Design (India); M.F.A., Rhode Island School of Design

Patten, Duncan T. (1965), Professor Emeritus of Plant Biology; A.B., Amherst College; M.S., University of Massachusetts, Amherst; Ph.D., Duke University

Patterson, Robert A. (1957), Professor Emeritus of Biology; B.S., University of Michigan; Ph.D., Ohio State University

Patterson, Shirley L. (1994), Professor Emerita of Social Work; B.A., North Texas State University; M.A., McCormick Theological Seminary; M.S.W., University of Kansas; Ph.D., University of Wisconsin, Madison

Paulsen, George E. (1959), Professor Emeritus of History; B.A., Hobart College; M.A., Rutgers, The State University of New Jersey; Ph.D., Ohio State University

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

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Peacock, Simon M. (1985), Professor of Geological Sciences; Chair, Department of Geological Sciences; B.S., M.S., Massachusetts Institute of Technology; Ph.D., University of California, Los Angeles

Pearce, Martha V. (1977), Professor Emerita of Technology; B.S., Columbia University; M.S., Boston University; Ed.D., Arizona State University

Pearson, David L. (1988), Research Professor of Biology; B.S., Pacific Lutheran University; M.S., Louisiana State University, Baton Rouge; Ph.D., University of Washington

Pearson, John N. (1981), Professor of Supply Chain Management; B.S., M.B.A., Florida Atlantic University; Ph.D., Georgia State University

Pearson, Nancy B. (1989), Research Specialist of Microbiology; B.A., Earlham College; M.S., Louisiana State University, Baton Rouge

Peccia, Jordan (2001), Assistant Professor of Civil and Environmental Engineering; B.S., M.S., Montana State University, Bozeman; Ph.D., University of Colorado, Boulder

Peck, Laura (2002), Assistant Professor of Public Affairs; B.A., Arizona State University; M.P.A., M.Phil., Ph.D., New York University

Peck, Robert E. (1984), Professor of Engineering; Chair, Department of Mechanical and Aerospace Engineering; B.S., University of California, Berkeley; M.S., Ph.D., University of California, Irvine

Pecuch-Herrero, Marta (1981), Lecturer of Mathematics and Statistics; B.S., University of Buenos Aires (Argentina); Ph.D., University of Chicago

Pei, Ker-Wei (1986), Professor of Accountancy and Information Management; B.A., National Chung-Hsing University (Taiwan); M.A., Southern Illinois University, Carbondale; Ph.D., North Texas State University

Peralta, Pedro D. (1998), Assistant Professor of Engineering; B.S., Simón Bolívar University (Venezuela); M.S., Ph.D., University of Pennsylvania

Perrill, Norman K. (1966), Professor Emeritus of Communication; B.S., M.A., Northwestern University; Ph.D., University of Southern California

Perry, Curtis (1995), Associate Professor of English; B.A., Cornell University; M.A., Ph.D., Harvard University

Perry, Patsy (1985), Professor of Nursing; B.S., Columbia Union College; M.S., University of Colorado; Ph.D., University of Michigan

Perry, R. Tod (1998), Assistant Professor of Finance; B.B.A., University of Notre Dame; J.D., University of Virginia; Ph.D., University of North Carolina, Chapel Hill

Perry, Ronald W. (1983), Professor of Public Affairs; B.Sc., M.A., Arizona State University; Ph.D., University of Washington

Pessler, Anthony J. (1994), Associate Professor of Art; B.F.A., M.A., St. Cloud State University; M.F.A., University of Wisconsin, Madison

Peterman, Gordon G. (1966), Professor Emeritus of Construction; B.S.C.E., University of Iowa

Peters, Kathleen A. (1967), Professor Emerita of Family and Human Development; B.S., M.S., Kansas State University

Petersen, Kenneth J. (2001), Assistant Professor of Supply Chain Management; B.S., University of Alabama; M.B.A., University of Akron; Ph.D., Michigan State University

Petersen, Michael (2001), Assistant Professor of Accountancy and Information Management; B.S., M.B.A., M.ACC., Brigham Young University; Ph.D., University of Iowa

Petersen, Michelle C. (1997), Lecturer of Spanish; B.A., Western Illinois University; M.A., University of Iowa

Peterson, John R. (1963), Professor Emeritus of Architecture; Graduate Coordinator of School of Architecture; B.A., St. Olaf College; B.Arch., University of Minnesota, Twin Cities; M.Arch., Harvard University

Peterson, Ralph (1976), Professor Emeritus of Curriculum and Instruction; B.A., Eastern Washington State College; M.A., Ed.D., Columbia University

Petrucchi, Darren (1998), Assistant Professor of Architecture; B.S.D., Arizona State University; M.Arch., Harvard University

Pettipiece, Deirdre (2002), Lecturer of English; B.A., California State University, San Bernadino; M.A., California State Polytechnic University, Pomona; Ph.D., Arizona State University



Pettit, G. Robert

(1964)

Regents' Professor of Chemistry and Biochemistry; Director, Cancer Research Institute; B.S., Washington State University; M.S., Ph.D., Wayne State University

Pettit, Robin K. (1997), Associate Research Professor, Cancer Research Institute; B.S., University of Arizona; M.S., Washington State University; Ph.D., University of Montana

Petuskey, William T. (1983), Professor of Chemistry and Biochemistry; Codirector, Science and Engineering of Materials; B.S., University of Utah; Sc.D., Massachusetts Institute of Technology

Pfister, A.J. (1991), Distinguished Research Fellow Emeritus of Public Affairs; B.S., J.D., University of Arizona

Pfuhl, Erdwin H. Jr. (1968), Professor Emeritus of Sociology; A.B., Whitman College; A.M., University of Idaho; Ph.D., Washington State University

Pheanis, David C. (1975), Associate Professor of Computer Science and Engineering; B.S., Case Institute of Technology; M.S., Ph.D., Arizona State University

Phelan, Patrick E. (1996), Associate Professor of Mechanical and Aerospace Engineering; B.S., Tulane University; M.S., Massachusetts Institute of Technology; Ph.D., University of California, Berkeley

Philippakis, Andrew S. (1967), Professor of Computer Information Systems; B.S., Gannon College; M.B.A., Ph.D., University of Wisconsin, Madison

Phillips, William W. (1958), Professor Emeritus of History; Ph.B., M.A., University of North Dakota; Ph.D., University of Missouri

Pian, Richard H.J. (1959), Professor Emeritus of Civil Engineering; B.S.C.E., Kung Shang University (China); M.S.E., Ph.D., Cornell University

Piburn, Michael D. (1989), Professor of Curriculum and Instruction; B.S., University of California, Davis; Ph.D., Princeton University

- Pickens, Judith M.** (1987–99; 2000), Assistant Professor of Nursing; B.S.N., Marymount College; M.S., University of Missouri; Ph.D., Arizona State University
- Pickus, David** (1999), Lecturer of the Barrett Honors College; B.A., Lawrence University; M.A., Ph.D., University of Chicago
- Picraux, Thomas** (2001), Professor of Materials Science and Engineering; Executive Director, Materials Science Program; B.S., University of Missouri, Columbia; M.S., Ph.D., California Institute of Technology
- Pierson, Ruth E.** (1990), Academic Associate, Division of Undergraduate Academic Services; B.A., M.Ed., Miami University
- Pigg, Kathleen B.** (1988), Associate Professor of Plant Biology; B.S., M.S., Ohio University; Ph.D., Ohio State University
- Pijawka, K. David** (1982), Professor of Planning and Landscape Architecture; Director, Ph.D. Program in Environmental Design and Planning; B.A., Brock University (Canada); M.A., Ph.D., Clark University
- Pilafian, J. Samuel** (1995), Professor of Music; B.M., University of Miami
- Pile, James** (1971), Professor of Art; B.F.A., M.F.A., University of Nebraska, Lincoln
- Pimentel, David** (1973), Professor of Art; B.S.Ed., Massachusetts College of Art; M.F.A., Rochester Institute of Technology
- Pinckard, Mary-Margaret** (1982), Librarian Emerita; B.S., University of New Hampshire; M.L.S., University of Arizona
- Pinkava, Donald J.** (1964), Professor Emeritus of Plant Biology; B.S., M.S., Ph.D., Ohio State University
- Pitti, Gina-Marie** (2003), Assistant Professor of History; B.A., Yale University; M.A., Ph.D., Stanford University
- Pittman, Anne M.** (1952), Professor Emerita of Kinesiology; B.S., University of Texas, Austin; M.A., New York University; Ed.D., Stanford University
- Pittsley, Janice M.** (1987), Professor of Art; B.F.A., University of North Carolina, Chapel Hill; M.F.A., University of Georgia
- Pizziconi, Vincent B.** (1987), Associate Professor of Bioengineering; B.S., University of Lowell; M.S.E., Ph.D., Arizona State University
- Podlich, William F.** (1949), Professor Emeritus of Education; B.S., Maryland State Teachers College; Ph.D., University of Iowa
- Poe, Jerry B.** (1974), Professor Emeritus of Finance; B.A., Drury College; M.B.A., Washington University; D.B.A., Harvard University
- Pokora, Syndee** (1995), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.F.A., University of Wisconsin, Milwaukee; M.F.A., University of Arizona
- Polenz, G. Donald** (1967), Professor Emeritus of Social Work; B.A., Wartburg College; M.A., University of Iowa; D.S.W., University of Southern California
- Ponce, Fernando A.** (1999), Professor of Physics and Astronomy; B.S., National University of Engineering (Peru); M.S., University of Maryland, College Park; Ph.D., Stanford University
- Popko, Sigmund** (2001), Legal Writing Instructor; B.A., J.D., University of Arizona
- Poudrier, Almirer** (2002), Lecturer of Latin; B.A., Beloit College; M.A., University of Minnesota, Minneapolis; Ph.D., State University of New York, Buffalo
- Poweleit, Christian D.** (1995), Associate Research Professional of Physics and Astronomy; B.A., Thomas Moore College; M.A., Purdue University, West Lafayette; Ph.D., University of Cincinnati
- Powers, Doris C.** (1960), Professor Emerita of English; B.A., Wellesley College; M.A., Occidental College; Ph.D., University of California, Berkeley
- Powers, Jeanne M.** (2001), Assistant Professor of Educational Leadership and Policy Studies; B.A., Tufts University; M.A., University of California, Irvine; Ph.D., University of California, San Diego
- Powers, Karen** (2002), Associate Professor of History; B.A., Herbert H. Lehman College; M.A., Ph.D., New York University
- Prather, Elizabeth M.** (1978), Professor Emerita of Speech and Hearing Science; B.S., University of Nebraska, Lincoln; M.A., Ph.D., University of Iowa
- Pratt, Melvin W.** (1987), Senior Research Technologist, Center for Solid State Electronics Research
- Presson, Clark C.** (1980), Professor of Psychology; B.A., Pomona College; M.S., Ph.D., Columbia University
- Prewitt, Kathryn A.** (1992), Associate Professor of Mathematics and Statistics; B.A., University of Kansas; M.S., Ph.D., University of California, Davis
- Pride, Bill E.** (1997), Lecturer of Kinesiology; B.A., M.A., Arizona State University
- Priest, Janice** (2001), Faculty Associate of Nursing; B.S.N., Weber State University; M.S.N., University of Utah
- Prigatano, George P.** (1993), Adjunct Professor of Speech and Hearing Science; B.S., Loyola University, Los Angeles; M.A., California State University, Long Beach; Ph.D., Bowling Green State University
- Primas, Phyllis J. Krause** (1987), Professor Emerita of Nursing; B.S.N., University of Pennsylvania; M.P.H., Ph.D., University of Pittsburgh
- Pritchard, Mark P.** (1998), Assistant Professor of Recreation Management and Tourism; B.S., M.S., Ph.D., University of Oregon
- Pritchard, Melissa** (1994), Associate Professor of English; B.A., University of California, Santa Barbara; M.A., Western Washington University
- Privateer, Paul** (1991), Associate Professor of Interdisciplinary Humanities; B.A., M.A., California State University, Stanislaus; Ph.D., University of California, Davis
- Provine, Martin** (2002), Assistant Professor of Music; Associate Director of Bands; B.A., Wake Forest University, Winston-Salem; M.M., D.M.A., University of Colorado, Boulder
- Provine, Doris Marie** (2001), Professor of Justice Studies; Director, School of Justice Studies; A.B., University of Chicago; J.D., Ph.D., Cornell University
- Puglia, Mary** (2001), Adjunct Professor of Microbiology; B.S., University of Arizona; M.S., Ph.D., Arizona State University
- Pyne, Stephen J.** (1986), Professor of Biology; B.A., Stanford University; M.A., Ph.D., University of Texas, Austin

Q

- Quay, Ray** (1990), Adjunct Associate Professor of Planning and Landscape Architecture; B.S., Baylor University; M.S.C.R.P., University of Texas, Austin
- Quesada, Eugene R.** (1973), Professor Emeritus of Design; B.A., Arizona State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Quigg, John C. (1981), Professor of Mathematics and Statistics; B.S., M.S., Ph.D., Drexel University

Quinn, Paul M. (1995), Lecturer of Speech and Hearing Science; B.A., California State University, Northridge

R

Rabinovich, Elliot (2001), Assistant Professor of Supply Chain Management; B.S., School of Engineering of Antioquia (Columbia); M.S., Ph.D., University of Maryland

Raby, William (1982), Professor Emeritus of Accountancy and Information Management; B.S., Northwestern University; M.B.A., Ph.D., University of Arizona

Rader, Martha (1975), Associate Professor of Curriculum and Instruction; B.S., M.B.E., University of Mississippi; Ph.D., Kansas State University

Radke, Judith J. (1960), Professor Emerita of French; B.S., M.A., University of Wisconsin, Madison; Ph.D., University of Colorado

Ragan, Donal M. (1967), Professor Emeritus of Geological Sciences; B.A., Occidental College; M.S., University of Southern California; Ph.D., University of Washington

Rajan, Subramaniam D. (1983), Professor of Civil and Environmental Engineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., University of Iowa

Ralston, Mack A. (1956), Professor Emeritus of Education; B.S., M.S., Indiana State University; Ed.D., Indiana University

Ramage, John (1990), Associate Professor of English; B.A., Whitman College; Ph.D., Washington State University

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)

Ramer, Michael, Cpt. (2002), Assistant Professor of Military Science; B.S., DeVry Institute of Technology

Rankin, Robert L. (1971), Associate Professor of Engineering; B.S., University of Texas, El Paso; Ph.D., William Marsh Rice University

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 Vice President for Research and Economic Affairs; 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

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

Rawlett, Kristen (2000), Faculty Associate of Nursing; B.S., Virginia Commonwealth University; M.S.N., University of South Carolina

Rawls, J. Alan (1997), Assistant Professor of Biology; B.S., University of Western Ontario (Canada); Ph.D., Saint Louis University

Ray, Timothy E. (1998), Lecturer of English; B.A., M.A., University of Central Oklahoma; Ph.D., Bowling Green State University

Ray, Tushar (2001), Adjunct Professor of Microbiology; B.S., M.S., Ph.D., University of Calcutta (India)

Ray, William J. (1968), Professor Emeritus of Curriculum and Instruction; B.S., M.S., State University of New York, Buffalo; Ed.D., Wayne State University

Rayle, Andrea Dixon (2002), Assistant Professor of Counseling Psychology; B.A., M.A., University of North Carolina, Charlotte; Ph.D., University of North Carolina, Greensboro

Razatos, Anneta (1999), Assistant Professor of Chemical Engineering; B.S., University of Colorado, Boulder; Ph.D., University of Texas, Austin

Read, Anne-Marie (2002), Assistant Professor of Educational Leadership and Policy Studies; B.A., State University of New York, New Paltz; M.S., State University of New York, Oswego; Ph.D., University of North Carolina, Chapel Hill

Reader, Mark (1967), Professor Emeritus of Political Science; A.B., A.M., Ph.D., University of Michigan

Reber, William (1991), Professor of Music; Director, Music Theatre Program; B.M., M.M., University of Utah; D.M.A., University of Texas, Austin

Reckers, Philip M.J. (1980), Professor of Accountancy and Information Management; B.S., Quincy College; M.B.A., Washington University; Ph.D., University of Illinois

Redman, Betsy J. (1988), Associate Librarian; Team Management, Technical Services Department; B.S., M.L.S., University of Arizona

Redman, Charles L. (1983), Professor of Anthropology; Director, Center for Environmental Studies; B.A., Harvard University; M.A., Ph.D., University of Chicago

Reed, Helen (1985), Professor of Mechanical and Aerospace Engineering; A.B., Goucher College; M.S., Ph.D., Virginia Polytechnic Institute and State University

Reed, Kaye E. (1997), Associate Professor of Anthropology; Research Associate, Institute of Human Origins; B.S., Portland State University; M.A., Ph.D., State University of New York, Stony Brook

Rees, Ellen (1996), Associate Professor of Languages and Literatures; B.A., Evergreen State College; M.A., Ph.D., University of Washington

Reeves, Henry C. (1969), Professor Emeritus of Microbiology; B.S., Franklin and Marshall College; M.A., Ph.D., Vanderbilt University

Reffett, Kevin L. (1995), Associate Professor of Economics; B.B.A., M.A., University of Iowa; Ph.D., Purdue University

Regier, Philip R. (1987), Associate Professor of Accountancy and Information Management; Director, Business Honors Program; Associate Dean, Undergraduate Programs, W. P. Carey School of Business; B.A., St. John's College; Ph.D., University of Illinois

Reich, John W. (1965), Professor of Psychology; B.A., M.S., University of Oklahoma; Ph.D., University of Colorado

Reif, William E. (1970), Professor Emeritus of Management; B.B.A., M.A., Ph.D., University of Iowa

Reiman, Etsuko Obata (1978), Associate Professor of Japanese; B.A., Keio University (Japan); M.A., Seton Hall University; M.A., Ph.D., University of Wisconsin, Madison

Reingen, Peter H. (1982), Davis Distinguished Research Professor of Marketing; B.B.A., Cologne College (Germany); M.B.A., Ph.D., University of Cincinnati

Reiser, Castle O. (1958), Professor Emeritus of Chemical Engineering; B.S., Colorado State University; Pet.E., Colorado School of Mines; Ph.D., University of Wisconsin, Madison

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

Reisslein, Martin (2000), Assistant Professor of Electrical Engineering; M.S., Ph.D., University of Pennsylvania

Renaut, Rosemary (1987), Professor of Mathematics and Statistics; Director, Computational Biosciences Program; B.S., Durham University; Ph.D., University of Cambridge (United Kingdom)

Reuter, Vincent G. (1961), Professor Emeritus of Operations Management; B.S.C., M.A., Ph.D., University of Iowa

Reyes, Angelita (2002), Professor of African American Studies and Women's Studies; B.A., City University of New York; M.A., New York University; Ph.D., University of Iowa

Reyes, Guillermo (1996), Associate Professor of Theatre; B.A., University of California, Los Angeles; M.F.A., University of California, San Diego

Reynolds, Richard (2002), Lecturer of Mathematics and Statistics; B.S., New Mexico Institute of Mining and Technology; M.S., Ph.D., New Mexico State University

Reynolds, Robert D. (1970), Professor Emeritus of Music; B.M., Texas Christian University; M.M., University of Texas, Austin; Ph.D., Ohio State University

Reynolds, Stephen J. (1991), Professor of Geological Sciences; B.S., University of Texas, El Paso; M.S., Ph.D., University of Arizona

Reynolds, Steven L. (1988), Associate Professor of Philosophy; Interim Chair, Department of Philosophy; B.A., University of Chicago; M.A., Ph.D., University of California, Los Angeles

Rez, Peter (1985), Professor of Physics and Astronomy and Solid State Science; B.A., University of Cambridge (United Kingdom); Ph.D., University of Oxford (United Kingdom)

Reznikoff, Sivon C. (1973), Professor Emerita of Design; Certificate, New York School of Interior Design; B.A., University of Southwestern Louisiana; M.A., Louisiana State University, Baton Rouge

Rhoads, David M. (2000), Assistant Professor of Plant Biology; B.S., Pennsylvania State University; Ph.D., Michigan State University

Rhodes, Jewell Parker (1997), Professor of English; B.A., M.A., D.A., Carnegie Mellon University

Ribic, Catherine (2000), Adjunct Professor of Anthropology; B.A., M.A., Ph.D., Arizona State University

Rice, Glen E. (1986), Associate Professor of Anthropology; Director, Office of Cultural Resource Management; B.A., Reed College; M.A., Ph.D., University of Washington

Rice, Warren (1958), Professor Emeritus of Engineering; B.S., M.S., Ph.D., Texas A&M University

Richa, Andrea W. (1998), Assistant Professor of Computer Science and Engineering; B.Sc., M.Sc., Federal University of Rio de Janeiro (Brazil); M.Sc., Ph.D., Carnegie Mellon University

Richard, Thelma Shinn (1975), Professor of English; B.A., Central Connecticut State College; M.A., Ph.D., Purdue University

Richards, Gale L. (1965), Professor Emeritus of Communication; B.A., University of Akron; M.A., Ph.D., University of Iowa

Richards, Mary L. (1978), Professor Emerita of Nursing; B.S.N., M.S., DePaul University; Ph.D., Texas Women's University

Richardson, Deane E. (1970), Professor Emeritus of Kinesiology; B.S., Bradley University; M.A., Ed.D., Stanford University

Richardson, Jeanne (1985), Librarian; Team Leader, Collection Development; B.A., Lawrence University; M.S., M.L.S., Columbia University

Richardson, Richard C. Jr. (1977), Professor Emeritus of Higher Education; B.S., Castleton State College; M.S., Michigan State University; Ph.D., University of Texas, Austin

Richert, Ranko (1999), Assistant Professor of Chemistry and Biochemistry; Ph.D., Philipps University, Marburg (Germany)

Ridenour, Ronda L. (1970), Associate Librarian; Team Management, Technical Services Department; B.A., Arizona State University; M.S.L.S., University of Southern California

Riding In, James (1990), Associate Professor of Justice Studies; B.A., Fort Lewis College; M.A., Ph.D., University of California, Los Angeles

Riggs, Thomas (1998), Lecturer of Speech and Hearing Science; B.S., Metropolitan State College, Denver; M.S., University of Colorado, Boulder

Rigual, Michelle (2001), Assistant Law Librarian; B.A., University of Texas, Austin; M.L.S., J.D., University of Illinois

Rikakis, Thanassis (2001), Professor of Music; Director, Institute for Studies in the Arts; B.A., Ithaca College; M.A., D.M.A., Columbia University

Ringenbach, Shannon D. (1998), Assistant Professor of Kinesiology; B.Pe., M.S., McMaster University (Canada); Ph.D., Purdue University

Ringenoldus, Garrit M. (1989), Instructor of Military Science; B.S., Illinois State University

Ringhofer, Christian (1983), Professor of Mathematics and Statistics; M.A., Ph.D., University of Vienna (Austria)

Rio, Robin (1998), Assistant Professor of Music; B.M., East Carolina University; M.A., New York University



Ríos, Alberto Alvaro

(1982)

Regents' Professor of English; B.A., M.F.A., University of Arizona

Rippon, Stephen (1989), Academic Associate, Division of Undergraduate Academic Services; Director, Academic Success Programs; B.A., M.A., Arizona State University

Riske, Marc C. (1985), Associate Professor of Theatre; B.F.A., North Dakota State University; M.F.A., Ph.D., Wayne State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Risley-Curtiss, Christina** (1992), Associate Professor of Social Work; B.A., University of Connecticut; M.S.S.W., University of Tennessee; Ph.D., University of Maryland, Baltimore
- Risseuw, John L.** (1980), Professor of Art; B.S., M.A., M.F.A., University of Wisconsin, Madison
- Ritchie, Barry G.** (1984), Professor of Physics and Astronomy; Chair, Department of Physics and Astronomy; B.S., Appalachian State University; M.S., Ph.D., University of South Carolina
- Rivera, Daniel E.** (1990), Associate Professor of Chemical Engineering; B.S., University of Rochester; M.S., University of Wisconsin, Madison; Ph.D., California Institute of Technology
- Rivers, Patrick** (1998), Assistant Professor of Health Administration and Policy; B.A., University of Ghana (Ghana); M.B.A., University of Wisconsin, Madison; Ph.D., University of Alabama
- Robbins, Earl R.** (1961), Professor Emeritus of Computer Science; B.S.E.E., Texas Technological College; M.S.E., Ph.D., Arizona State University
- Roberson, Loriann** (1992), Professor of Management; B.A., Ph.D., University of Minnesota, Twin Cities
- Roberson, Robert W.** (1989), Associate Professor of Plant Biology; B.S., M.S., Stephen F. Austin State University; Ph.D., University of Georgia
- Roberts, Carolyn** (1982), Professor Emerita of Nursing; B.S.N., University of Western Ontario (Canada); M.Ed., Columbia University; Ph.D., Wayne State University
- Roberts, Chell A.** (1989), Associate Professor of Industrial Engineering; Associate Chair, Department of Industrial Engineering; B.A., M.S., University of Utah; Ph.D., Virginia Polytechnic Institute and State University
- Roberts, Lauren C.** (1984), Clinical Associate Professor of Clinical Laboratory Sciences; B.S., Saint Norbert College; M.S., University of Illinois
- Roberts, Nancy H.** (1980), Senior Lecturer of Economics; B.A., University of Texas, Arlington; M.S., Ph.D., Arizona State University
- Roberts, Thomas G.** (1970), Professor Emeritus of Curriculum and Instruction; B.A., Wake Forest University; M.A., Ph.D., University of North Carolina, Chapel Hill
- Robertson, Ian G.** (2002), Adjunct Professor of Anthropology; B.A., M.A., University of Calgary (Canada); Ph.D., Arizona State University
- Robinette, Martin** (2000), Adjunct Professor of Speech and Hearing Science; B.S., M.S., University of Utah; Ph.D., Wayne State University
- Robinson, Brent, SFC** (2001), Instructor of Military Science
- Robinson, Dahlia M.** (2000), Assistant Professor of Accountancy and Information Management; B.S., M.S., University of the West Indies (Barbados); M.S., Pennsylvania State University; Ph.D., University of Georgia
- Robinson, Helene M.** (1967), Professor Emerita of Music; B.A., University of Oregon; M.M., Northwestern University
- Robinson Kurpius, Sharon E.** (1978), Professor of Counseling Psychology and Counselor Education; B.S., M.S., University of Wisconsin, LaCrosse; Ph.D., Indiana University, Bloomington
- Rockmaker, Jody** (1997), Associate Professor of Music; B.M., New England Conservatory, Boston; M.F.A., Ph.D., Princeton University
- Rodriguez, Armando** (1990), Associate Professor of Electrical Engineering; B.S., Polytechnic Institute of New York, Brooklyn; M.S., Ph.D., Massachusetts Institute of Technology
- Rody, Joseph** (1994), Senior Lecturer of Mathematics and Statistics; B.S., M.S., University of Akron
- Roe, Sue** (2000), Faculty Associate of Nursing; B.S.N., M.S., University of Arizona; D.P.A., Arizona State University
- Roedel, Ronald J.** (1981), Professor of Electrical Engineering; Associate Dean, Academic Affairs; Director, School of Engineering; Director, Engineering Core and Special Studies; B.S.E., Princeton University; M.S., Ph.D., University of California, Los Angeles
- Roen, Duane** (1995), Professor of English; Director, Center for Learning and Teaching Excellence; B.S., M.S., University of Wisconsin, River Falls; Ph.D., University of Minnesota, Minneapolis
- Rogers, Joseph** (1988), Adjunct Professor of Biology; B.A., Emory University; Ph.D., University of California, San Diego
- Rogers, Rodney** (1987), Professor of Music; B.M., University of Iowa; M.M., Arizona State University; Ph.D., University of Iowa
- Rogerson, Richard** (2001), Rondthaler Professor of Economics; B.Sc., University of Alberta (Canada); Ph.D., University of Minnesota
- Roher, Alex E.** (1997), Adjunct Professor of Biology; M.D., National University of Mexico School of Medicine; Ph.D., University of Cambridge (United Kingdom)
- Rollier, Dwayne A.** (1971), Professor Emeritus of Industrial Engineering; B.S., M.S., Oklahoma State University; Ph.D., Florida State University
- Rollins, George, Major** (2000), Assistant Professor of Military Science; B.A., St. Leo College
- Rolnick, Melissa** (2000), Assistant Professor of Dance; B.F.A., State University of New York, Purchase; M.F.A., Mills College
- Rolstad, Kellie** (1999), Assistant Professor of Curriculum and Instruction; B.A., M.A., Ph.D., University of California, Los Angeles
- Romero, Mary** (1995), Professor of Justice Studies; B.A., Regis College; Ph.D., University of Colorado
- Romeyn, Esther** (1998), Assistant Professor of Interdisciplinary Humanities; B.A., M.A., University of Amsterdam (Netherlands)
- Roosa, Mark W.** (1980), Professor of Family and Human Development; B.S., Ohio State University; M.A., Ph.D., Michigan State University
- Rosa, John P.** (2000), Assistant Professor of Asian Pacific American Studies; B.A., Northwestern University; M.A., Ph.D., University of California, Irvine
- Rosales, F. Arturo** (1980), Professor of History; B.A., Arizona State University; M.A., Stanford University; Ph.D., Indiana University, Bloomington
- Rosdahl, Dana** (1994), Instructor of Nursing; B.S.N., Montana State University; M.S., Arizona State University
- Rose, Jonathan** (1968), Professor of Law; B.A., University of Pennsylvania; LL.B., University of Minnesota, Twin Cities
- Rose, Seth D.** (1976), Professor of Chemistry and Biochemistry; B.S., University of California, Berkeley; Ph.D., University of California, San Diego
- Rosen, Bernice M.** (1986), Instructional Professional Emerita; B.A., Brooklyn College; M.A., New York University

Rosen, Seymour L. (1986), Professor Emeritus of Music; Dean Emeritus, Herberger College of Fine Arts; B.S., The Juilliard School

Rosenberg, Michael (2003), Assistant Professor of Biology; B.A., Northwestern University; Ph.D., State University of New York, Stony Brook

Rosier, Kathlene (2000), Director, Indian Legal Program; B.A., Capital University; J.D., University of Utah

Ross, Katherine B. (2002), Adjunct Professor of Speech and Hearing Science; B.A., University of North Carolina, Chapel Hill; M.S., Ph.D., Vanderbilt University

Rossi, Patrick J. (1967), Professor Emeritus of Psychology; B.S., Saint Mary's College; M.A., San Fernando Valley State College; Ph.D., University of California, Riverside

Rothschild, Mary L. (1975), Professor of History and Women's Studies; B.A., M.A., Ph.D., University of Washington

Rothstein, Paul (1998), Assistant Professor of Design; B.F.A., University of Wisconsin-Stout, Menomonie; M.D., Illinois Institute of Technology

Rotondi, Michael (1999), Professor of Architecture; Dipl. Arch., Southern California Institute of Architecture

Rountree-Antar, Michele (1999), Academic Professional, School of Social Work; Assistant Coordinator of Field Education, School of Social Work; B.A., University of Arizona; M.S.W., Boston University

Roussinov, Dmitri (2001), Assistant Professor of Accountancy and Information Management; B.S., M.S., Moscow Institute of Physics and Technology (Russia); M.A., Indiana University, Bloomington; Ph.D., University of Arizona

Rowe, Casey (2001), Assistant Professor of Accountancy and Information Management; B.S., Northern Arizona University; M.S., San Diego State University; Ph.D., University of Pittsburgh

Rowe, Kenneth L. (1962), Professor Emeritus of Marketing; B.A., M.A., Northern Iowa University; Ph.D., Michigan State University

Roy, Asim (1983), Professor of Computer Information Systems; B.E., Calcutta University (India); M.S., Case Western Reserve University; Ph.D., University of Texas, Austin

Roy, Ramendra P. (1981), Professor of Engineering; B.Sc., University of Calcutta (India); M.S., University of Washington; M.Sc., Ph.D., University of California, Berkeley

Ruch, William A. (1968), Professor Emeritus of Management; B.S., M.B.A., D.B.A., Indiana University, Bloomington

Rucker, Robert (1986), Professor Emeritus of Industrial Engineering; B.S., M.S., University of Miami; M.S., Ph.D., Arizona State University

Ruedemann, Richard (1997), Lecturer of Mathematics and Statistics; B.S., M.A., Arizona State University; Ph.D., University of South Florida

Ruiz, Ester (1986), Associate Professor of Nursing; B.S.N., M.S., Ph.D., Arizona State University

Rummel, John R. (1975), Professor Emeritus of Architecture; B.A., M.S., Stanford University

Rund, James A. (2001), Associate Professor of Educational Leadership and Policy Studies; Interim Vice President for Student Affairs; Associate Vice President for Student Affairs and Dean, Student Development; B.A., Moorehead State University; M.S., North Dakota State University; Ed.D., Arizona State University

Runger, George (1996), Professor of Industrial Engineering; B.S., Cornell University; Ph.D., University of Minnesota

Rungtusanatham, Manus (Johnny) (1998), Associate Professor of Supply Chain Management; Director, W. P. Carey M.B.A. Online Program; B.S., Birmingham-Southern College; Ph.D., University of Minnesota

Ruppé, Carol V. (1962), Librarian Emerita; B.A., University of New Mexico; M.A., University of Denver

Ruppert, K.D. (1976), Research Specialist Emeritus of Geography; B.S.E.E., University of Iowa

Rush, James (1990), Associate Professor of History; Director, Program for Southeast Asian Studies; B.A., Gettysburg College; M.A., Ph.D., Yale University

Russell, Dennis E. (1991), Associate Professor of Journalism and Mass Communication; B.S., M.M.C., Arizona State University; Ph.D., University of Utah

Russell, Paul E. (1967), Professor Emeritus of Electrical Engineering; B.S.E.E., B.S.M.E., New Mexico A&M University; M.S.E.E., Ph.D., University of Wisconsin, Madison; P.E.

Russell, Scott C. (1990), Adjunct Professor of Anthropology; B.A., University of New Mexico; M.A., Ph.D., Arizona State University

Russell, Timothy (1993), Professor of Music; B.M.Ed., Northwestern University; M.A., Ph.D., Ohio State University



Russo, Nancy Felipe
(1985)

Regents' Professor of Psychology; B.A., University of California, Davis; Ph.D., Cornell University

Russomanno, Joseph A. (1994), Associate Professor of Journalism and Mass Communication; B.A., University of Colorado, Denver; M.A., University of Missouri, Columbia; Ph.D., University of Colorado

Rutherford, Robert B. Jr. (1976), Professor of Curriculum and Instruction; Director, Interdisciplinary Ph.D. Program in Curriculum and Instruction; Associate Director of Research and Graduate Education, Division of Curriculum and Instruction; B.S., M.Ed., University of Virginia; Ed.S., Ph.D., Vanderbilt University

Rutowski, Kathleen (2001), Lecturer of Curriculum and Instruction; B.A., University of California, Santa Cruz; M.A., San Francisco State University; Ph.D., Arizona State University

Rutowski, Ronald L. (1976), Professor of Biology; B.A., University of California, Santa Cruz; Ph.D., Cornell University

Ryu, Kyung Dong (2001), Assistant Professor of Computer Science and Engineering; B.S., M.S., Seoul National University (South Korea); M.S., Ph.D., University of Maryland, College Park

S

Sabo, John S. (2001), Assistant Professor of Biology; B.S., University of Notre Dame; M.S., University of Washington; Ph.D., University of California, Berkeley

Sacks, Benjamin (1963), Professor Emeritus of History; B.A., University of New Mexico; M.A., McGill University (Canada); Ph.D., Stanford University

Sackton, Frank J. (1976), Professor Emeritus of Public Affairs; B.S., University of Maryland, College Park; M.P.A., Doctor of Humane Letters, Arizona State University

Sadalla, Edward K. (1974), Professor of Psychology; B.A., University of California, Berkeley; Ph.D., Stanford University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Saenz, Delia S.** (1989), Associate Professor of Psychology; B.A., Pan American University; M.A., Ph.D., Princeton University
- Sager, Harvey M.** (1977), Librarian Emeritus; B.A., San Francisco State College; M.A., California State University, Chico; M.A., University of Denver
- Saks, Michael** (2000), Professor of Law; B.A., B.S., Penn State University; M.S.L., Yale University; M.A., Ph.D., Ohio State University
- Saldaña, Johnny** (1981), Professor of Theatre; B.F.A., M.F.A., University of Texas, Austin
- Salerno, Nicholas A.** (1961), Professor Emeritus of English; B.A., M.A., Arizona State University; Ph.D., Stanford University
- Saltz, Charlene** (2000), Academic Associate, Center for Environmental Studies; Environmental Education Coordinator; B.A., Emory University; M.S., Antioch New England Graduate School
- Salvatore, Joseph Raphael** (1998), Adjunct Faculty of Microbiology; M.D., Autonomous University of Guadalajara (Mexico)
- Salvucci, Michael E.** (1995), Adjunct Faculty of Plant Biology; B.S., Pennsylvania State University; M.S., Ph.D., University of Florida
- Samuelson, Hava Tirosh** (1999), Associate Professor of History; B.A., State University of New York, Stony Brook; Ph.D., Hebrew University of Jerusalem (Israel)
- 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, Complutense University (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
- Sands, Kathleen M.** (1977), Professor of English; B.A., Fort Wright College of the Holy Names; M.A., Ph.D., University of Arizona
- Sanft, Alfred C.** (1990), Associate Professor of Design; B.F.A., Brigham Young University; M.F.A., Basel School of Design (Switzerland)
- 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
- Santanam, Raghu** (1998), Assistant Professor of Computer Information Systems; B.E., National Institute of Engineering (India); M.S., Indian Institute of Technology (India); M.S., Ph.D., State University of New York, Buffalo
- Santello, Marco** (1999), Assistant Professor of Kinesiology; B.Sc., Higher Institute of Physical Education (Italy); M.Phil., Ph.D., University of Birmingham (United Kingdom)
- Santos, Manuel** (1999), Professor of Economics; Licenciatura, Autonomous University of Madrid (Spain); M.A., Ph.D., University of Chicago
- Santos de Barona, Maryann** (1989), Professor of Psychology in Education; B.S., City University of New York; M.A., Ph.D., University of Texas, Austin
- Sargent, Charles S. Jr.** (1971), Professor Emeritus of Geography; B.A., University of Wyoming; M.A., Ph.D., University of California, Berkeley
- Saric, William** (1984), Professor of Engineering; B.S., Illinois Institute of Technology; M.S., University of New Mexico; Ph.D., Illinois Institute of Technology
- Sarjoughian, Hessam S.** (2001), Assistant Professor of Computer Science and Engineering; B.S., Mississippi State University; M.S., Ph.D., University of Arizona
- Sater, Vernon E.** (1962), Professor Emeritus of Chemical Engineering; B.S.Ch.E., M.S.Ch.E., Ph.D., Illinois Institute of Technology
- Satterlie, Richard A.** (1980), Professor of Biology; B.A., Sonoma State University; Ph.D., University of California, Santa Barbara
- Satterthwaite, Lester L. Jr.** (1968), Professor Emeritus of Educational Media and Computers; B.S., M.S., Ed.D., Indiana University, Bloomington
- Sattler, Howard E.** (1967), Professor Emeritus of Education; B.S., M.S., Ph.D., Arizona State University
- Saubolle, Michael** (1995), Adjunct Faculty of Microbiology; B.S., Ph.D., University of California, Davis
- Savage, Nevin W.** (1959), Professor Emeritus of Mathematics and Statistics; B.S., M.A., Pennsylvania State University; Ph.D., University of California, Los Angeles
- Savage, Stephen H.** (1998), Adjunct Professor of Anthropology; B.A., Cincinnati Bible Seminary; M.A., University of South Carolina; Ph.D., Arizona State University
- Savard, Jeannine A.** (1990), Associate Professor of English; B.S., State University of New York, Plattsburg; M.A., University of New Hampshire
- Savenye, Wilhelmina C.** (1991), Associate Professor of Psychology in Education; Academic Program Leader, Educational Technology; B.A., University of Washington; M.Ed., Ph.D., Arizona State University
- Sawhney, Anil** (1999), Associate Professor of Construction; B.S.E., Institution of Engineers (India); M.S., School of Planning and Architecture (India); Ph.D., University of Alberta (Canada)
- Sayles, Judy** (1997), Clinical Assistant Professor of Nursing; B.S.N., University of Michigan; M.S., Arizona State University
- Schabacker, Joseph C.** (1963), Professor Emeritus of Management; B.S., Temple University; M.B.A., Ph.D., University of California, Los Angeles
- Schade, Thomas V.** (1974), Professor Emeritus of Justice Studies; B.A., Hope College; M.A., Ph.D., Western Michigan University
- Schall, Merri H.** (1960-66; 1967), Professor Emerita of Curriculum and Instruction; B.A., Albion College; M.S., Ed.D., Arizona State University
- Schatzki, George** (2000), Professor of Law; A.B., LL.B., LL.M., Harvard University
- Schaumburg, Donald R.** (1953), Professor Emeritus of Art; B.A., College of Arts and Crafts; M.F.A., Claremont Graduate College

- Scheatzle, David G.** (1979), Professor Emeritus of Architecture; B.S., Kent State University; M.S.E., Arizona State University; Arch.D., University of Michigan
- Scheck, Adrienne C.** (1997), Adjunct Professor of Biology; B.A., University of Rochester; Ph.D., Rensselaer Polytechnic Institute
- Scheiner, Georganne** (1983), Associate Professor of Women's Studies; B.A., Ithaca College; M.A., University of Western Ontario (Canada); Ph.D., Arizona State University
- Scheiner, Samuel M.** (2000), Adjunct Professor of Biology; B.S., M.S., Ph.D., University of Chicago
- Schexnayder, Clifford J.** (1994), Professor Emeritus of Construction; B.C.E., M.S.C.E., Georgia Institute of Technology; Ph.D., Purdue University
- Schildkret, David** (2002), Professor of Music; B.A., Rutgers, The State University of New Jersey, New Brunswick; M.M., D.M.A., Indiana University School of Music, Bloomington
- Schlacter, John L.** (1969), Professor of Marketing; B.B.A., Case Western Reserve University; M.B.A., Ph.D., Ohio State University
- Schlee, Edward E.** (1990), Professor of Economics; B.A., North Texas State University; M.S., Ph.D., University of Illinois
- Schleif, Corine** (1988), Associate Professor of Art; B.A., Concordia College; M.A., Washington University; Ph.D., University of Bamberg (Germany)
- Schleifer, Thomas** (2001), Visiting Eminent Scholar of Construction; B.S., M.S., East Carolina University; Ph.D., Heriot-Watt University
- Schmid, Maureen** (1990), Associate Research Scientist; Director, Tandem Translation Project; B.A., Saint Mary's College of Notre Dame; M.A., University of Notre Dame; Ph.D., State University of New York, Buffalo
- Schmidt, Jean M.** (1966), Professor of Microbiology; B.A., M.S., University of Iowa; Ph.D., University of California, Berkeley
- Schmidt, Kevin E.** (1989), Professor of Physics and Astronomy; A.B., Washington University; M.S., Ph.D., University of Illinois
- Schmidt, Margaret** (2001), Assistant Professor of Music; B.M.E., Lawrence University; M.M., State University of New York, Stony Brook; Ph.D., University of Michigan
- Schmidt, Randall B.** (1968), Professor of Art; B.A., Hamline University; M.A., University of New Mexico
- Schmidt, Sherrie** (1990), University Librarian and Dean; B.A., Ohio State University; M.L.S., Emory University
- Schneberger, Lois I.** (1969), Librarian; Head, Preservation; B.A., Viterbo College; M.L.S., Emporia State University
- Schneider, Anne L.** (1989), Professor of Justice Studies; Dean, College of Public Programs; B.A., M.A., Oklahoma State University; Ph.D., Indiana University, Bloomington
- Schneider, Elizabeth** (2002), Assistant Professor of Art; B.A., University of Michigan; B.F.A., Art Institute of Chicago; M.F.A., Mills College
- Schneller, Eugene S.** (1985), Professor of Health Administration and Policy; B.A., Post College; Ph.D., New York University
- Schober, Juliane** (1991), Associate Professor of Religious Studies; B.A., University of Northern Colorado; M.A., Ph.D., University of Illinois
- Schoebel, Henry L.** (1990), Associate Professor of Art; B.F.A., Syracuse University; M.F.A., University of Maryland, College Park
- Schoenhoff, Molly** (2002), Assistant Professor of Design; B.S., University of Cincinnati; M.F.A., Rhode Island School of Design
- Schoenwetter, James** (1967), Professor Emeritus of Anthropology; A.B., University of Chicago; M.S., University of Arizona; Ph.D., Southern Illinois University
- Schroder, Dieter K.** (1981), Professor of Electrical Engineering; Codirector, Center for Low Power Electronics Research; B.S.E.E., M.S.E.E., McGill University (Canada); Ph.D., University of Illinois
- Schroeder, Milton R.** (1969), Professor of Law; B.A., Wesleyan University; J.D., University of Chicago
- Schuback, Gertrud B.** (1966), Professor Emerita of German; B.A., M.A., Arizona State University
- Schultz, Joseph J.** (1983), Professor of Accountancy and Information Management; B.S., M.B.A., Mississippi State University; Ph.D., University of Texas, Austin; C.P.A., Mississippi
- Schuring, Martin** (1992), Associate Professor of Music; B.M., Curtis Institute of Music; M.A., Arizona State University
- Schutte, Jerry** (1988), Associate Professor of Art; B.A., Fort Hays State University; M.F.A., Arizona State University
- Schwalbe, Carol** (2002), Assistant Professor of Journalism and Mass Communication; B.A., Smith College; M.A., George Washington University
- Schwalm, David E.** (1986), Associate Professor of English; Dean, East College, Vice Provost of Arizona State University East; B.A., Carleton College; M.A., Ph.D., University of Chicago
- Schwartz, Andrew B.** (1993), Research Professor of Bioengineering; B.A., Ph.D., University of Minnesota
- Scoggin, Janet** (1989), Professor Emerita of Nursing; B.S.N., University of Portland; M.S., Ph.D., Arizona State University
- Scott, G. Richard** (1992), Adjunct Professor of Anthropology; B.A., Ph.D., Arizona State University
- Scowen, Paul A.** (1992), Assistant Research Professor of Physics and Astronomy; B.S., University of Birmingham (United Kingdom); M.S., Ph.D., Rice University
- Searfoss, Lyndon W.** (1973), Professor Emeritus of Curriculum and Instruction; B.S., West Chester State College; M.A., Ph.D., Syracuse University
- Sears, Robert L.** (1986), Senior Research Administrator Emeritus, Center for Energy Systems Research; B.S., U.S. Military Academy; M.S.E., Arizona State University
- Seaton, Helen J.** (1987), Librarian, Noble Science Reference Services; B.A., Rutgers, The State University of New Jersey; M.L.S., University of Missouri, Columbia
- Segal, Elizabeth A.** (1995), Professor of Social Work; B.A., Brandeis University; M.S.W., Boston University; Ph.D., University of Illinois, Chicago
- Segura, Joseph M.** (1979), Associate Professor of Art; B.A., M.F.A., Southern Illinois University, Carbondale
- Sehsted, Colene R.** (1967), Assistant Professor of Nursing; B.S.N., University of Arkansas, Fayetteville; M.S.N., University of Maryland, Baltimore
- Seipp, Kenneth F.** (1963), Professor Emeritus of Music; B.S., Hartwick College; M.M., University of Kansas; Mus.Ed.D., Indiana University, Bloomington
- Selkirk, Susan** (1977), Senior Research Professional of Geological Sciences; B.A., M.A., Arizona State University
- Sell, Susan** (1995), Adjunct Faculty of Microbiology; A.B., University of California, Berkeley; Ph.D., University of Utah Medical Center
- Sellheim, Eckart** (1989), Professor of Music; Concert Diploma, Cologne Academy of Music (Germany)

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Sen, Arunabha** (1986), Associate Professor of Computer Science and Engineering; Associate Chair for Graduate Programs, Department of Computer Science and Engineering; B.E., Jadavpur University (India); Ph.D., University of South Carolina
- Senner, Wayne M.** (1973), Professor Emeritus of German; B.A., Portland State University; M.A., University of Washington; Ph.D., University of Illinois
- Sensibar, Judith L.** (1985), Professor of English; B.A., Vassar College; M.A., Ph.D., University of Chicago
- Seo, Dong-Kyun** (2001), Assistant Professor of Chemistry and Biochemistry; B.S., M.S., Seoul National University (South Korea); Ph.D., North Carolina State University
- Serwint, Nancy J.** (1988), Associate Professor of Art; B.A., University of Illinois; M.A., University of Chicago; M.A., Ph.D., Princeton University
- Shackle, Linda A.** (1984), Librarian; Team Leader, Noble Science Reference Services; B.A., State University of New York, Oswego; M.L.S., State University of New York, Albany
- Shaeffer, J. Duncan** (2000), Lecturer of Geography; B.S., Brigham Young University; M.A., Ph.D., Arizona State University
- Shah, Jami** (1984), Professor of Engineering; B.S.M.E., University of Karachi (Pakistan); M.S., University of Pittsburgh; Ph.D., Ohio State University
- Shao, Benjamin** (1999), Assistant Professor of Computer Information Systems; B.S., M.S., National Chiao Tung University (Taiwan); Ph.D., State University of New York, Buffalo
- Shapiro, Joan Rankin** (1997), Adjunct Professor of Biology; B.S., Westminster College; M.A., Hofstra University; Ph.D., Cornell University Medical College
- Sharer, Jon W.** (1975), Professor of Art; Interim Director, School of Art; B.A., Roosevelt University; M.S., Illinois Institute of Technology; Ph.D., Ohio State University
- Sharma, Renu** (1985), Associate Research Scientist, Center for Solid State Science; B.S., B.Ed., Punjab University (India); M.S., Ph.D., University of Stockholm (Sweden)
- Sharp, Thomas** (1996), Associate Professor of Geological Sciences; B.S., University of Minnesota; M.S., Ph.D., Arizona State University
- Sharp, William P.** (1979), Senior Research Specialist of Plant Biology; B.A., University of Northern Iowa; M.S., Arizona State University
- Shaw, Milton C.** (1978), Professor Emeritus of Engineering; B.S.M.E., Drexel University; M.E.Sc., Sc.D., University of Cincinnati; Dr.H.C., University of Louvain (Belgium)
- Shearer, Nelma B.C.** (1993), Assistant Professor of Nursing; B.S., South Dakota State University; M.Ed., University of Missouri, St. Louis; M.S., Southern Illinois University, Edwardsville; Ph.D., University of Arizona
- Shearman, Harriett Joy** (1995), Professor Emerita of Nursing; B.S.N., University of Iowa; M.S., Boston University
- Shears, Brenda L.** (1987), Assistant Research Administrator; Research Coordinator, Center for Environmental Studies; B.A., Arizona State University; M.A., Hunter College
- Shell, Leon G.** (1967), Professor Emeritus of Counselor Education; B.A., University of Colorado; A.M., Ed.D., University of Northern Colorado
- Shellans, Michael J.** (1992), Senior Lecturer of Music; B.M., University of Arizona; M.M., Arizona State University
- Shelton, Leslie** (2001), Lecturer of Mathematics and Statistics; B.S., Kansas State University; M.A., Arizona State University
- Shen, Jun** (1996), Professor of Electrical Engineering; B.S., South China University of Science and Technology (China); M.S., Texas Tech University; Ph.D., University of Notre Dame
- Sheppard, Douglas C.** (1971), Professor Emeritus of Spanish; B.A., Montana State University; M.A., Ph.D., University of Wisconsin, Madison
- Sherman, Thomas L.** (1964), Professor Emeritus of Mathematics and Statistics; B.A., University of California, Los Angeles; M.S., Ph.D., University of Utah
- Sheydayi, E. Yury** (1973), Professor Emeritus of Architecture; B.S.C.E., University of Arizona; M.S.C.E., Arizona State University
- Shimomura, Tomoko** (2002), Lecturer of Japanese; B.A., Kwassui Women's College (Japan); M.A., Ohio State University
- Shinn, Randall A.** (1978), Professor of Music; B.A., Southwestern Oklahoma State University; M.M., University of Colorado; D.M.A., University of Illinois
- Shipp, Vernon E.** (1966), Professor Emeritus of Art; B.S., Grand Canyon College; M.A., Arizona State University
- Shlyakhtenko, Luda** (1993), Adjunct Faculty of Microbiology; M.S., Ph.D., Moscow Physical Technical Institute (Russia)
- Shock, Everett L.** (2002), Professor of Chemistry and Biochemistry and Geological Sciences; B.S., University of California, Santa Cruz; Ph.D., University of California, Berkeley
- Shrader, Tina** (1999), Assistant Librarian; B.A., Bethany College, Bethany; M.S.L.I.S., University of Kentucky
- Shrednick, Harvey R.** (1995), Senior Lecturer of Computer Information Systems; B.S., City College of New York; M.B.A., Baruch College
- Shriver, Keith A.** (1982), Professor Emeritus of Accountancy and Information Management; B.S., Linfield College; M.S., Arizona State University; Ph.D., University of Texas, Austin; C.P.A., Arizona
- Shuman, I. Gayle** (1974), Professor Emeritus of Justice Studies; B.S., M.A., Ed.D., Arizona State University
- Shumway, John** (2001), Assistant Professor of Physics and Astronomy; B.S., M.S., University of Missouri, Columbia; Ph.D., University of Illinois, Urbana-Champaign
- Shunk, Dan L.** (1984), Professor of Industrial Engineering; B.S.I.E., M.S.I.E., Ph.D., Purdue University
- Si, Jennie** (1991), Professor of Electrical Engineering; B.S., M.S., Tsinghua University (China); Ph.D., University of Notre Dame
- Siegel-Valdes, Rebeca** (2002), Assistant Professor of Spanish; B.A., Manuel del Castillo Negrete National School of Conservation, Restoration and Museum Studies (Mexico); M.A., Ph.D., University of Texas, Austin
- Sieradzki, Karl** (1994), Professor of Chemical and Materials Science Engineering and Mechanical and Aerospace Engineering; B.S., Utica College of Syracuse University; M.S., Ph.D., Syracuse University
- Sierks, Michael R.** (2000), Associate Professor of Chemical Engineering; B.S., Stanford University; M.S., Colorado State University; Ph.D., Iowa State University
- Siferd, Sue Perrott** (1989), Associate Professor of Supply Chain Management; Director, Undergraduate Supply Chain Management Program; B.S., Denison University; M.B.A., Wright State University; M.A., Ph.D., Ohio State University
- Silcock, B. William** (2001), Assistant Professor of Journalism and Mass Communication; B.A., M.A., Brigham Young University; Ph.D., University of Missouri

Silver, Benjamin (1971), Professor Emeritus of Journalism and Mass Communication; B.A., M.A., University of Iowa

Simhony, Avital (1994), Associate Professor of Political Science; B.A., M.A., University of Haifa (Israel); D.Phil., University of Oxford (United Kingdom)

Simmons, Douglas J. (1963), Professor Emeritus of French; A.B., Wabash College; M.A.T., Harvard University; Certificat de français usuel, degré supérieur, Certificat de prononciation française, Sorbonne University (France)

Simmons, Howard (1996), Professor Emeritus of Educational Leadership and Policy Studies; B.S., Spring Hill College; M.A.T., Indiana University; Ph.D., Florida State University

Simon, Arleyn W. (1989), Associate Research Professor of Anthropology; B.A., Montana State University; M.A., Oregon State University; Ph.D., Arizona State University

Simon, Sheldon (1975), Professor of Political Science; B.A., University of Minnesota, Twin Cities; M.A., Princeton University; Ph.D., University of Minnesota, Twin Cities

Simpson, Brooks (1990), Professor of History; B.A., University of Virginia; M.A., Ph.D., University of Wisconsin, Madison

Sinclair, Mark R. (1985), Adjunct Professor of Geography; B.Sc., Otago University (New Zealand); Ph.D., U.S. Naval Postgraduate School, Monterey

Sinex, Donal (1995), Professor of Speech and Hearing Science; Director, Executive Committee, Speech and Hearing Science; B.S., Purdue University; Ph.D., Washington University, St. Louis

Singh, Sheo Bux (1983), Associate Research Professor, Cancer Research Institute; B.Sc., M.Sc., Gorakhpur University (India); Ph.D., Avadh University (India)

Singhal, Avi C. (1977), Professor of Civil and Environmental Engineering; B.Sc.Math., Agra University (India); B.Sc.Engr., B.Sc.Hons., St. Andrews University (United Kingdom); S.M., C.E., Sc.D., Massachusetts Institute of Technology

Sinha, Rajiv K. (1989), Associate Professor of Marketing; B.A., M.A., Delhi University (India); Ph.D., Pennsylvania State University

Sipka, Danko (2002), Research Associate Professor of Russian and Slavic Languages; B.A., University of Sarajevo (Bosnia); M.A., Ph.D., University of Belgrade (Serbia); Ph.D., Polish Academy of Sciences (Poland)

Sirkis, Murray D. (1968), Professor Emeritus of Electrical Engineering; B.S., Massachusetts Institute of Technology; M.S., Ph.D., University of Illinois

Skiba, Christopher J. (1987), Senior Research Professional of Geological Sciences; B.S., Arizona State University

Skibo, Edward B. (1982), Professor of Chemistry and Biochemistry; B.S., M.S., Drexel University; Ph.D., University of California, San Francisco

Skindlov, Jonathan A. (1993), Adjunct Professor of Geography; B.A., St. Olaf College; M.A., Ohio University; Ph.D., University of Delaware

Skoldberg, Phyllis (1977), Professor Emerita of Music; B.M., M.M., New England Conservatory of Music; M.M.E., D.M., Indiana University, Bloomington

Skromme, Brian J. (1989), Associate Professor of Electrical Engineering; B.S., University of Wisconsin, Madison; M.S., Ph.D., University of Illinois

Smeltzer, Larry R. (1986), Professor of Supply Chain Management; B.S., University of Montana; M.A., University of Nebraska; Ed.D., Northern Illinois University

Smith, Andrew T. (1978), Professor of Biology; A.B., University of California, Berkeley; Ph.D., University of California, Los Angeles

Smith, Arthur B. Jr. (1967), Professor Emeritus of General Business; B.S., Hardin-Simmons University; M.B.A., Ed.D., University of Houston

Smith, Beth (2000), Associate Law Librarian; Assistant Director, Ross-Blakley Law Library; B.A., Centenary College; M.L.S., J.D., University of Washington

Smith, Cheryl Aubin (1996), Faculty Associate of Nursing; B.S.N., University of Arizona; M.S., Arizona State University



Smith, David J.
(1984)

Regents' Professor of Physics and Astronomy and Solid State Science; Director, Center for Solid State Science; B.Sc., Ph.D., D.Sc., University of Melbourne (Australia)

Smith, Hal L. (1979), Professor of Mathematics and Statistics; B.A., Ph.D., University of Iowa

Smith, Harvey A. (1977), Professor Emeritus of Mathematics and Statistics; B.S., Lehigh University; M.S., A.M., Ph.D., University of Pennsylvania

Smith, Henry Charles (1989), Professor Emeritus of Music; B.A., University of Pennsylvania; Artist Diploma, Curtis Institute of Music

Smith, Jeffrey B. (1990), Associate Professor of Music; M.M., University of Illinois; D.M.A., University of North Texas

Smith, Karen Ann (1999), Associate Professor of Curriculum and Instruction; B.A., University of the Americas (Mexico); M.A., Ph.D., Arizona State University

Smith, L. Christian (1971), Associate Professor of History; B.A., Union College; M.A., Ph.D., University of Illinois

Smith, Lehi T. (1959), Professor Emeritus of Mathematics and Statistics; B.S., M.A., Arizona State University; Ed.D., Stanford University

Smith, Marion W. (1952), Professor Emerita of Music; B.S., Capital University; M.M., American Conservatory of Music

Smith, Mary Lee (1986), Professor of Educational Leadership and Policy Studies; B.A., M.P.S., Ph.D., University of Colorado

Smith, Ralph E. (1970), Professor of Accountancy and Information Management; B.B.A., Washburn University of Topeka; M.S., Ph.D., University of Kansas; C.P.A., Kansas

Smith, Richard L. (1967), Professor Emeritus of Industrial Engineering; B.S., Washington University; M.S., Ohio State University; Ph.D., Arizona State University

Smith, Ronald D. (1962), Professor Emeritus of History; A.B., San Diego State College; Ph.D., University of Southern California

Smith, Stanley E. (1977), Professor Emeritus of Journalism and Mass Communication; B.A., Colgate University; M.A., Purdue University

Smith-Daniels, Dwight E. (1987), Associate Professor of Supply Chain Management; B.B.A., University of Michigan; Ph.D., University of Arizona

Smith-Daniels, Vicki L. (1987), Professor of Supply Chain Management; B.B.A., University of San Diego; Ph.D., Ohio State University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Sneed, Jim (1990), Faculty Associate of Design; B.S., Arizona State University

Sneed, Jimmie R. (1988), Faculty Associate of Construction; B.S., Arizona State University

Snow, Robert (1970), Professor Emeritus of Sociology; B.S., M.A., Ph.D., University of Minnesota, Twin Cities

Snyder, Ernest E. Jr. (1958), Professor Emeritus of Physics and Astronomy/Science Education; A.B., M.A., Colorado State University; Ed.D., New York University

Snyder, Lester M. Jr. (1967), Professor Emeritus of Counseling Psychology; B.S., Millersville State College; M.Ed., Western Maryland College; Ph.D., University of Michigan

Soergel, Philip M. (1989), Associate Professor of History; B.A., Muskingum College; A.M., Ph.D., University of Michigan

Sola, Anthony (1995), Faculty Associate of Design; B.A., Ottawa University; M.B.A., University of Phoenix

Solis, Theodore (1989), Professor of Music; B.A., Arizona State University; M.A., University of Hawaii, Manoa; Ph.D., University of Illinois

Somerville, Susan C. (1977), Professor of Psychology; B.A., University of New England (Australia); Ph.D., Australian National University (Australia)

Sommerfeld, Milton R. (1968), Professor of Plant Biology; Associate Dean, College of Liberal Arts and Sciences; B.S., Southwest Texas State College; Ph.D., Washington University

Song, Yuwu (1999), Assistant Librarian; B.A., Luo Yang Foreign Languages University, China (China); M.A., Clemson University; M.L.I.S., University of Texas, Austin

Sonmez, Sevil F. (1995), Associate Professor of Recreation Management and Tourism; B.B.A., Bernard M. Baruch College; M.P.R.T.M., Clemson University; Ph.D., Pennsylvania State University

Sousa, Karen H. (1998), Associate Professor of Nursing; Interim Associate Dean for Graduate Programs and Research; B.S., M.S., Ph.D., University of California, San Francisco

Spanias, Andreas S. (1988), Professor of Electrical Engineering; B.S.E.E., M.S.E.E., Ph.D., West Virginia University

Spanias, Photini (1998), Lecturer of Curriculum and Instruction; B.A., M.Ed., Ed.D., Arizona State University

Speer, Therese (1997), Faculty Associate of Nursing; B.S.N., Salve Regina University; M.S., University of Arizona

Spellman, Catherine (1995), Associate Professor of Architecture; B.A., B.Arch., Rice University; M.Arch., University of California, Los Angeles



Spence, John C.H.
(1976)

Regents' Professor of Physics and Astronomy;
M.Sc., Ph.D., University of Melbourne (Australia)

Spielberg, John (1990), Associate Professor of Mathematics and Statistics; B.S., Stanford University; Ph.D., University of California, Berkeley

Spielmann, Katherine A. (1987), Professor of Anthropology; A.B., Harvard University; M.A., Ph.D., University of Michigan

Spiers, James V. (1990), Senior Lecturer of Marketing; B.S., Weber State College; M.A., University of Northern Colorado

Spindler, Robert P. (1988), Archivist; Head, Department of Archives and Manuscripts; B.A., M.A., Boston University; M.S., Simmons College

Spinoso, Frank (1965), Professor Emeritus of Music; B.M., M.A., Boston University; D.M.A., University of Illinois

Spinrad, Tracy (2000), Assistant Professor of Family and Human Development; B.A., University of California, Irvine; M.S., Ph.D., Pennsylvania State University

Spring, Robert S. (1988), Professor of Music; B.M., M.M., D.M.A., University of Michigan

Spritzer, Ralph S. (1986), Visiting Professor of Law; B.S., LL.B., Columbia University

Spruyt, Hendrik (1999), Associate Professor of Political Science; Director, Graduate Studies; B.A., Leiden University (Netherlands); M.A., Ohio State University; Ph.D., University of California, San Diego

Squires, Kyle D. (1997), Professor of Mechanical and Aerospace Engineering; B.S., Washington State University; M.S., Ph.D., Stanford University

Squires, Rose L. (1981), Professor Emerita of Nursing; B.S., Duquesne University; M.A., Ed.D., Columbia University

St. Louis, Robert D. (1982), Professor of Accountancy and Information Management; Interim Codirector, School of Accountancy and Information Management; A.B., Rockhurst College; M.S., Ph.D., Purdue University

Staab, Wayne J. (2001), Adjunct Professor of Speech and Hearing Science; B.A., Fort Hays State University; M.S., University of Wisconsin; Ph.D., Michigan State University

Stafford, Kenneth R. (1957), Professor Emeritus of Education; B.A., M.Ed., Ph.D., University of Oklahoma

Stafford, Mary E. (1994), Associate Professor of Educational Psychology; Training Director, School Psychology; B.A., University of Texas, Austin; M.Ed., University of Houston, Victoria; Ph.D., University of Texas, Austin

Stage, Christina W. (1992), Senior Lecturer of Interdisciplinary Studies; Director, Bachelor of Interdisciplinary Studies; B.J., University of Nebraska, Lincoln; M.A., Ohio University; Ph.D., Arizona State University

Stahl, Robert (1978), Professor of Curriculum and Instruction; B.A., M.A., Ed.D., University of Florida

Staley, Frederick A. (1970), Professor of Curriculum and Instruction; B.A., M.A., Western Michigan University; Ph.D., Michigan State University

Stalzer, Frank S. (1955), Professor Emeritus of Music; B.M.Ed., University of Kansas; M.M., Eastman School of Music

Stamm, Jill (1998), Clinical Assistant Professor of Psychology in Education; B.A., DePauw University; M.A., Ph.D., Arizona State University

Stancliff, Michael G. (2001), Lecturer of English; B.A., Albion College; M.A., Ph.D., State University of New York, Buffalo

Stanford, Michael (1992), Senior Lecturer of the Barrett Honors College; B.A., Duke University; M.A., Ph.D., University of Virginia

Stange, Jean B. (1970), Professor Emerita of Family and Human Development; B.S., Iowa State University; M.S., University of Minnesota, Twin Cities

Stanley, James T. (1968), Professor Emeritus of Materials Science and Engineering; B.S., M.S., Ph.D., University of Illinois

Stanton, Ann M. (1980), Professor of Law; B.A., University of Minnesota, Twin Cities; Ph.D., J.D., Stanford University

Stanton, Dan (2000), Assistant Librarian, Government Documents/Maps Collection; B.A., Trinity College; M.L.S., University of Arizona

Stark, Barbara L. (1972), Professor of Anthropology; B.A., Rice University; M.Phil., Ph.D., Yale University



Starrfield, Sumner G.
(1972)

Regents' Professor of Physics and Astronomy; B.A., University of California, Berkeley; M.A., Ph.D., University of California, Los Angeles

Stauffer, Sandra L. (1990), Professor of Music; B.S., West Chester University; M.M., Ph.D., University of Michigan

Steadman, Lyle B. (1971), Assistant Professor of Anthropology; B.A., Occidental College; M.A., University of California, Los Angeles; Ph.D., Australian National University (Australia)



Stearns, Mary Beth
(1981)

Regents' Professor Emerita of Physics and Astronomy; B.S., University of Minnesota, Twin Cities; Ph.D., Cornell University

Steenerson, Craig A. (2001), Assistant Professor of Theatre; B.A., California State University, San Bernardino; M.F.A., Utah State University

Steere, Caryl J. (1960), Professor Emerita of Education; B.A., Albion College; M.A., Arizona State University

Steffl, Bernita M. (1961), Professor Emerita of Nursing; B.S.N., M.P.H., University of Minnesota, Twin Cities

Steimle, Timothy C. (1985), Professor of Chemistry and Biochemistry; B.S., Michigan State University; Ph.D., University of California, Santa Barbara

Steinbart, Paul (1997), Professor of Accountancy and Information Management; B.A., University of Illinois; M.B.A., Southern Illinois University; Ph.D., Michigan State University

Steiner, Sue (1996), Associate Professor of Social Work; B.A., Brandeis University; M.S.W., San Francisco State University; Ph.D., University of Washington

Stelmach, George E. (1990), Professor of Kinesiology; B.S., University of Illinois; M.A., Ed.D., University of California, Berkeley

Stephens, Nancy J. (1979), Associate Professor of Marketing; Director, Night M.B.A. Program; B.S., M.S., University of Illinois; Ph.D., University of Texas, Austin

Stephenson, Christine F. (1995), Adjunct Professor of Biology; B.S., University of Ulster (United Kingdom); Ph.D., The Queen's University of Belfast (United Kingdom)

Stephenson, Larry K. (1986), Adjunct Professor of Geography; B.S., M.A., Arizona State University; Ph.D., University of Cincinnati

Sterling, Pamela (1999), Assistant Professor of Theatre; B.F.A., M.F.A., University of Washington

Steverson, Norris J. (1932), Professor Emeritus of Kinesiology; B.A., Arizona State University; M.S., University of Southern California

Stewart, Donald G. (1964), Professor Emeritus of Mathematics and Statistics; B.A., M.S., Utah State University; Ph.D., University of Tennessee, Knoxville

Stewart, Kenneth M. (1947), Professor Emeritus of Anthropology; A.B., M.A., Ph.D., University of California, Berkeley

Stiftel, Ruthy Z. (1997), Lecturer of Hebrew; B.A., Hebrew University of Jerusalem (Israel); M.A., Ohio State University

Stillwell, Susan B. (1997), Clinical Associate Professor of Nursing; B.S., College of Saint Teresa; M.S.N., University of Florida

Stinson, Judith M. (1997), Senior Instructional Professional; Director, Legal Research and Writing and Academic Success Program; B.S., J.D., University of Arizona

Stites, William H. (1954), Professor Emeritus of Communication; B.A., Louisiana Polytechnic Institute; M.A., Ph.D., University of Denver

Stock, William A. (1984), Professor Emeritus of Kinesiology; B.A., Blackburn College; M.S., Ph.D., Iowa State University

Stocker, David Allen (1978), Professor Emeritus of Music; B.S., Concordia Teachers College; M.M., Ph.D., Northwestern University

Stokrocki, Mary L. (1990), Professor of Art; B.S., State University of New York, New Paltz; M.S., Massachusetts College of Art; D.Ed., Pennsylvania State University

Stone, Gregory O. (1986), Associate Professor of Psychology; B.A., Harvard University; Ph.D., University of California, San Diego

Stoner, K. Lynn (1985), Associate Professor of History; B.S., George Peabody College for Teachers; M.A., Ph.D., Indiana University

Stout, Robert (1978), Professor Emeritus of Educational Administration and Supervision; B.A., Carleton College; Ph.D., University of Chicago

Stout, Valerie (1991), Associate Professor of Microbiology; B.S., University of Wisconsin, Madison; Ph.D., Kansas State University

Stowe, Noel J. (1967), Professor of History; Chair, Department of History; B.A., Ph.D., University of Southern California

Strange, Richard E. (1974), Professor Emeritus of Music; B.M.E., Wichita State University; M.M.E., University of Colorado; D.M.A., Boston University

Streufert, Hildegarde (1961), Professor Emerita of Design; B.S., University of Minnesota, Twin Cities; M.S., Iowa State University

Strittmatter, Connie (2000), Assistant Law Librarian; B.A., Indiana University of Pennsylvania; M.L.S., Kent State University

Strom, Robert (1969), Professor of Psychology in Education; B.S., Macalester College; M.S., University of Minnesota, Twin Cities; Ph.D., University of Michigan

Stromberg, Juliet C. (1988), Associate Professor of Plant Biology; B.S., M.S., University of Wisconsin, Milwaukee; Ph.D., Arizona State University

Stromwall, Layne (1996), Associate Professor of Social Work and Women's Studies; B.A., M.S.S.W., University of Wisconsin, Madison; Ph.D., Case Western Reserve University

Strouse, Daniel S. (1990), Professor of Law; A.B., S.M., Harvard University; J.D., University of Wisconsin, Madison

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Stulter, John H.** (1962), Professor Emeritus of Art; B.A., M.F.A., Arizona State University
- Stump, Edmund** (1976), Professor of Geological Sciences; A.B., Harvard University; M.S., Yale University; Ph.D., Ohio State University
- Stump, Glenda** (2000), Faculty Associate of Nursing; B.S., University of Pittsburgh; M.S., Wayne State University
- Stumpf, Angela M.** (1959), Professor Emerita of Nursing; B.S.N., Marquette University; M.A., University of Chicago
- Stutz, Jean C.** (1981), Associate Professor of Plant Biology; B.S., Ursinus College; M.S., University of Delaware; Ph.D., Pennsylvania State University
- Sudol, David E.** (1996), Senior Lecturer of English; B.A., Simpson College; M.A., Drake University; Ph.D., University of Arizona
- Sugar, Thomas G.** (1999), Assistant Professor of Mechanical and Aerospace Engineering; B.S.E., M.S.E., Ph.D., University of Pennsylvania
- Sugiyama, Saburo** (1999), Associate Research Professor of Anthropology; B.S., Tokyo-Keizai University (Japan); Ph.D., Arizona State University
- Sullivan, Deborah A.** (1976), Associate Professor of Sociology; B.S., University of Massachusetts, Amherst; M.A., University of California, Irvine; Ph.D., Duke University
- Sullivan, Howard** (1971), Professor of Psychology in Education; B.S., Oregon College of Education; M.Ed., Ph.D., University of Oregon
- Sullivan, Jill M.** (2000), Assistant Professor of Music and Women's Studies; B.M., Illinois State University; M.M., University of Michigan; Ph.D., University of Iowa
- Sullivan, John J.** (1976), Professor Emeritus of Education; B.A., Villanova University; M.A., Ph.D., Arizona State University
- Sundaram, Hari** (2002), Assistant Professor of Computer Science and Engineering; B.Tech., Indian Institute of Technology, New Delhi (India); M.S., State University of New York, Stony Brook; Ph.D., Columbia University
- Sunkett, Mark E.** (1976), Professor of Music; B.M., Curtis Institute of Music; M.M., Temple University; Ph.D., University of Pittsburgh
- Surbeck, Elaine** (1988), Professor of Curriculum and Instruction; Associate Director of Initial Teacher Certification, Division of Curriculum and Instruction; B.A., University of Washington; M.Ed., Ed.D., University of Georgia
- Surgent, Scott** (1997), Lecturer of Mathematics and Statistics; B.S., M.S., University of California, Riverside
- Sushka, Marie E.** (1984), Professor of Finance; B.A., Sweet Briar College; M.A., Ph.D., Georgetown University
- Suslov, Sergei K.** (1997), Associate Professor of Mathematics and Statistics; M.Sc., Moscow Institute of Physics and Technology (Russia); Ph.D., Kurchatov Institute of Atomic Energy (Russia)
- Susser, Eric** (1997), Senior Lecturer of the Barrett Honors College; B.A., University of Michigan; M.A., Ph.D., University of Virginia
- Suwarno, Peter** (1993), Associate Professor of Indonesian; B.A., Satya Wacana Christian University (Indonesia); M.A., Ph.D., Ohio University
- Svoboda, William S.** (1969), Professor Emeritus of Education; B.S., M.S., Ed.D., University of Kansas
- Swadener, Beth Blue** (2001), Professor of Curriculum and Instruction; B.A., Indiana University, South Bend; M.S., Ph.D., University of Wisconsin, Madison
- Swafford, James R.** (1971), Professor Emeritus of Plant Biology; B.S., M.S., Arizona State University
- Swain, S. Daniel** (1975), Professor of Music; B.M., Cincinnati College Conservatory of Music; M.M.E., Indiana University, Bloomington; D.M.A., North Texas University
- Swanson, Tod D.** (1988), Associate Professor of Religious Studies; Director, Latin American Studies Center; B.A., University of Minnesota, Twin Cities; M.Div., Luther Theological Seminary; Ph.D., University of Chicago
- Swartz, Jonathan** (2001), Assistant Professor of Music; B.M., Rice University; M.M., Mannes College of Music; D.M.A., Rice University
- Swaty, Mary A.** (1968), Associate Librarian, Technical Services Department; B.A., University of Missouri, Columbia; M.L.S., Indiana University, Bloomington
- Sweeney, J. Gray** (1986), Professor of Art; B.A., University of New Mexico; M.A., Ph.D., Indiana University, Bloomington
- Sweeney, James D.** (1989), Associate Professor of Bioengineering; Sc.B., Brown University; Ph.D., Case Western Reserve University
- Swimmer, Alvin** (1963), Professor Emeritus of Mathematics and Statistics; B.S., Pennsylvania State University; M.S., New York University; Ph.D., University of California, Berkeley
- Sylvester, Douglas J.** (2002), Associate Professor of Law; B.A., University of Toronto; LL.M., New York University; J.D., University of Buffalo
- Sylvester, Edward J.** (1982), Professor of Journalism and Mass Communication; A.B., Princeton University; M.A., City College
- Sylvester, Ginny** (1981), Librarian; Head, Access Services/ Interlibrary Loan and Document Delivery; B.A., Hobart and William Smith Colleges; M.L.S., Rutgers, The State University of New Jersey
- Syrotiuk, Violet R.** (2002), Assistant Professor of Computer Science and Engineering; B.Sc., University of Alberta (Canada); M.Sc., University of British Columbia (Canada); Ph.D., University of Waterloo (Canada)
- Szarek, Stanley R.** (1974), Associate Professor of Plant Biology; Associate Chair of Plant Biology; B.S., California Polytechnic State University, Pomona; Ph.D., University of California, Riverside

T

- Tambo, Lewis A.** (1969), Professor Emeritus of History; B.S., University of California, Berkeley; M.A., Ph.D., University of California, Santa Barbara
- Tan, Rui** (1990), Assistant Research Professor, Cancer Research Institute; B.S., Beijing Medical University (China); M.S., Ph.D., Chinese Academy of Medical Sciences (China)
- Tann, Sheila** (2001), Assistant Professor of Nursing; B.S.N., Northern Arizona University; N.D., University of Colorado Health Sciences Center, School of Nursing
- Tao, Nongjian** (2001), Professor of Electrical Engineering; B.S., Anhui University (China); Ph.D., Arizona State University
- Tatro, B.J.** (1990), Faculty Associate of Public Affairs; B.A., M.S.W., University of Louisville; D.P.A., Arizona State University
- Taylor, Jack J.** (1960), Professor Emeritus of Art; B.S., Kutztown State College; M.Ed., Pennsylvania State University
- Taylor, Jacqueline** (1984), Professor Emerita of Nursing; B.S.N., University of Washington; M.S., University of North Carolina, Chapel Hill; Ph.D., University of Arizona

- Taylor, Nora** (1998), Assistant Professor of Interdisciplinary Humanities and History; B.A., Brown University; M.A., Ph.D., Cornell University
- Taylor, Thomas** (1983), Associate Professor of Mathematics and Statistics; B.S., California State University; Ph.D., Harvard University
- Tenney, Lester I.** (1969), Professor Emeritus of Finance; B.A., University of Miami; M.A., San Diego State College; D.B.A., University of Southern California
- Tepedelenlioglu, Cihan** (2001), Assistant Professor of Electrical Engineering; B.S., Florida Institute of Technology; M.S., University of Virginia; Ph.D., University of Minnesota
- Teye, Victor B.** (1984), Associate Professor of Recreation Management and Tourism; B.A., University of Ghana (Ghana); M.A., Ph.D., University of Manitoba (Canada)
- Tharp, Julie** (1991), Associate Librarian, Hayden Reference Services; B.A., University of Hawaii; M.L.S., University of Arizona
- Theobald, Clarabelle** (1962), Professor Emerita of Nursing; B.S.N., Arizona State University; M.S., University of California, Los Angeles; Ph.D., Arizona State University
- Thibeau Catsis, Connie** (2001), Assistant Professor of Design; B.Sc., University of Maryland; M.Sc., Ph.D., Oklahoma State University
- Thieme, Horst R.** (1988), Professor of Mathematics and Statistics; Associate Chair, Graduate Studies; M.S., Ph.D., University of Münster (Germany)
- Thomas, David A.** (1999), Lecturer of Interdisciplinary Studies; B.S., California State Polytechnic University; M.B.A., Ph.D., University of Southern California
- Thomas, George M.** (1981), Professor of Sociology; B.A., Arizona State University; M.A., Ph.D., Stanford University
- Thomas, Keith J.** (1975), Professor Emeritus of Reading and Library Science; B.S., Illinois State University; M.A., Loyola University, Chicago; Ed.D., University of Arizona
- Thompson, Janice Catherine** (1977), Professor of Music; B.M.E., M.M.E., University of Wisconsin; M.M., Western Michigan University; D.M., Northwestern University
- Thompson, Marilyn S.** (1999), Assistant Professor of Educational Psychology; B.A., Carleton College; M.A., Ph.D., University of Kansas
- Thompson, Victoria E.** (1999), Associate Professor of History; B.A., University of California, Berkeley; Ph.D., University of Pennsylvania
- Thomson, Jeffrey** (1981), Professor of Theatre; B.A., Ripon College; M.A., University of Washington; M.F.A., Wayne State University
- Thomson, Tom R.** (1961), Professor Emeritus of Chemistry and Biochemistry; B.A., University of California, Berkeley; M.S., Ph.D., Kansas State University
- Thorne, Anita** (1984), Professor Emerita of Nursing; Diploma, Allegheny General Hospital; B.S.N.Ed., M.A., University of Pittsburgh
- Thornton, Sybil** (1994), Associate Professor of History; B.A., University of California, Berkeley; B.A., University of Cambridge (United Kingdom); M.A., San Francisco State University; M.A., Ph.D., University of Cambridge (United Kingdom)
- Thornton, Trevor John** (1998), Professor of Electrical Engineering; Director, Center for Solid State Electronics Research; B.S., Saint Catherine's College (United Kingdom); M.A., Ph.D., Cambridge University (United Kingdom)
- Thorpe, Scott P.** (1999), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.S., Kennesaw State College; M.A., University of Colorado, Denver
- Thurber, Frances** (1991), Professor of Nursing; B.S.N., Saint Anselm College; M.S.N., University of Pennsylvania; Ph.D., University of Michigan
- Tice, Thomas E.** (1967), Professor Emeritus of Electrical Engineering; B.S.E.E., M.S.E.E., Ph.D., Ohio State University
- Tidwell, Victor H.** (1971), Professor Emeritus of Accountancy and Information Management; B.S., Illinois College; M.B.A., D.B.A., Indiana University; C.P.A., Arizona, Iowa
- Tillery, Bill W.** (1973), Professor of Physics and Astronomy and Science Education; B.S., Northeastern State College; M.A., Ed.D., University of Northern Colorado
- Tillman, Hoyt C.** (1976), Professor of History; B.A., Belhaven College; M.A., University of Virginia; A.M., Ph.D., Harvard University
- Timothy, Dallen J.** (2000), Associate Professor of Recreation Management and Tourism; B.S., Brigham Young University; M.A., University of Western Ontario (Canada); Ph.D., University of Waterloo (Canada)
- Tipton, Gary P.** (1969), Assistant Professor of Chinese; B.A., Brigham Young University; Ph.D., Indiana University, Bloomington
- Tobiason, Sarah J.** (1963–67; 1974), Professor Emerita of Nursing; B.S.N., Vanderbilt University; M.A., Columbia University
- Tobin, Beth Fowkes** (2001), Professor of English; B.A., Earlham College; M.A., Ph.D., University of Chicago
- Tobin, Joseph** (2001), Nadine Mathis Basha Professor of Curriculum and Instruction; B.A., Earlham College; Ph.D., University of Chicago
- Tohe, Laura** (1994), Associate Professor of English; B.A., University of New Mexico; M.A., Ph.D., University of Nebraska
- Tompkins, Cynthia M.** (1992), Associate Professor of Spanish; Licenciada en Letras Modernas, National University of Cordoba (Argentina); M.A., Ph.D., Pennsylvania State University
- Tongret, JoAnn** (2000), Lecturer of Dance, Music, and Theatre; B.A., M.A., Arizona State University
- Torrest, Robert S.** (1980), Professor Emeritus of Chemical Engineering; B.S., Polytechnic Institute of Brooklyn; Ph.D., University of Minnesota, Twin Cities
- Towe, Bruce C.** (1984), Professor of Bioengineering; B.S., M.S., Ph.D., Pennsylvania State University
- Towill, Leslie R.** (1975), Associate Professor of Plant Biology; B.S., M.S., University of Wisconsin, Milwaukee; Ph.D., University of Michigan
- Traaen, Teresa** (1993), Faculty Associate of Public Affairs; B.A., Northern Arizona University; M.A., Wheaton College; Ed.D., D.P.A., Arizona State University
- Tracey, Terence J.G.** (1999), Professor of Counselor Education and Counseling Psychology; Academic Program Leader, Counselor Education and Counseling Psychology; B.A., Cornell University; M.S.Ed., University of Kansas, Lawrence; Ph.D., University of Maryland, College Park
- Tracogna, Stefania** (2000), Lecturer of Mathematics and Statistics; Laurea, University of Trieste (Italy); Ph.D., Arizona State University
- Tracy, Sarah J.** (2000), Assistant Professor of Communication; B.A., University of Southern California; M.A., Ph.D., University of Colorado

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Trapido-Lurie, Barbara (1987), Associate Research Professional of Geography; B.A., Pomona College; M.A., University of Hawaii

Trapuzzano, Michael (1989), Senior Lecturer of Mathematics and Statistics; B.S., United States Air Force Academy, Colorado; M.B.A., University of Utah

Treasure, Darren C. (1998), Associate Professor of Kinesiology; B.A., West London Institute of Higher Education (United Kingdom); M.S., Ph.D., University of Illinois, Urbana-Champaign

Trelease, Richard N. (1971), Professor of Plant Biology; B.S., M.S., University of Nevada, Reno; Ph.D., University of Texas, Austin

Trennert, Robert A. (1974), Professor of History; B.A., Occidental College; M.A., Los Angeles State College; Ph.D., University of California, Santa Barbara

Trethewey, Angela (1996), Associate Professor of Communication; B.A., M.A., California State University, Chico; Ph.D., Purdue University

Trotta, Victoria K. (1996), Associate Dean and Director, Ross-Blakley Law Library; B.A., Occidental College; M.L.S., University of California, Los Angeles; J.D., University of Southern California

Trujillo, Octaviana Valenzuela (1995), Assistant Professor of Curriculum and Instruction; B.A., M.A., Ph.D., Arizona State University

Tsai, Wei-Tek (1999), Professor of Computer Science and Engineering; S.B., Massachusetts Institute of Technology; M.S., Ph.D., University of California, Berkeley

Tsakalis, Konstantinos S. (1988), Associate Professor of Electrical Engineering; B.S., National Technical University of Athens (Greece); M.S.E.E., Ph.D., University of Southern California

Tsen, Kong-Tong (1984), Professor of Physics and Astronomy; B.S., Fu-Jen Catholic University (Japan); M.S., Ph.D., Purdue University

Tseng, Ampere A. (1995), Professor of Mechanical and Aerospace Engineering; M.S., University of Illinois, Urbana-Champaign; Ph.D., Georgia Institute of Technology

Tsong, Ignatius S.T. (1981), Professor of Physics and Astronomy; B.Sc., M.Sc., University of Leeds (United Kingdom); Ph.D., University of London (United Kingdom); D.Sc., University of Leeds (United Kingdom)

Tsosie, Rebecca A. (1993), Professor of Law; Executive Director, Indian Legal Program; B.A., J.D., University of California, Los Angeles

Tsukayama, Jennifer (1998), Assistant Professor of Dance; B.F.A., George Mason University; M.F.A., New York University

Tu, Eugenia Y. (1973), Professor Emerita of Chinese; B.Ed., Taiwan Normal University (Taiwan); B.A., University of Mary Hardin-Baylor; M.S., University of Arizona

Tucker, Bonnie P. (1987), Professor of Law; B.S., Syracuse University; J.D., University of Colorado

Turban, Renee C. (2002), Lecturer of Computer Science and Engineering; B.S., M.S., Rensselaer Polytechnic Institute

Turk, Rudy H. (1967), Professor Emeritus of Art; B.S., University of Wisconsin; M.A., University of Tennessee

Turnbow, James W. (1959), Professor Emeritus of Civil Engineering; B.S.M.E., Texas Technological College; M.S.E.M., Ph.D., University of Texas

Turner, Caroline (1999), Professor of Educational Leadership and Policy Studies; Academic Program Coordinator, Ed.D. in Higher and Postsecondary Education; B.A., M.A., University of California, Davis; Ed.S., Ph.D., Stanford University



Turner, Christy G. II

(1966)

Regents' Professor of Anthropology; B.A., M.A., University of Arizona; Ph.D., University of Wisconsin, Madison

Turner, Terry (2000), Lecturer of Mathematics and Statistics; B.S., College of Charleston; M.S., Northern Arizona University

Tyburcy, James A. (1985), Professor of Geological Sciences; B.A., Whitman College; Ph.D., University of Oregon

Tylavsky, Daniel J. (1982), Associate Professor of Electrical Engineering; B.S.E., M.S.E., Ph.D., Pennsylvania State University

U

Uhl, Rebecca S. (1989), Associate Librarian; Team Management, Technical Services Department; B.S., M.A., Colorado State University; M.S.L.I.S., University of Illinois

Umar, Muhammad Sani (1996), Assistant Professor of Religious Studies; B.A., University of Jos (Nigeria); M.A., Bayero University (Nigeria); Ph.D., Northwestern University

Umberger, Emily (1982), Associate Professor of Art; B.A., University of Pennsylvania; M.A., University of Texas, Austin; Ph.D., Columbia University

Umberson, George E. (1977), Professor Emeritus of Music; B.M.E., Eastern New Mexico University; M.A., University of Iowa; Ed.D., University of North Colorado

Underhill, Michael J. (1990), Professor of Architecture; Interim Director, School of Architecture; B.Arch., Massachusetts Institute of Technology; M.C.P.U.D., Harvard University

Underiner, Tamara (2001), Assistant Professor of Theatre; B.A., University of Dayton; M.A., Arizona State University; Ph.D., University of Washington, Seattle

Underwood, Max (1985), Professor of Architecture; B.S., University of Southern California; M.Arch., Princeton University

Upchurch, Jonathan E. (1982), Professor Emeritus of Civil and Environmental Engineering; B.S., M.S., University of Illinois; Ph.D., University of Maryland

Updegraff, Kimberly (1997), Assistant Professor of Family and Human Development; B.S., M.S., Ph.D., Pennsylvania State University

Upton, Mark Roy (1995), Faculty Associate of Construction; B.S., Michigan State University

Urban, Joseph E. (1989), Professor of Computer Science and Engineering; B.S., Florida State of Technology; M.S., University of Iowa; Ph.D., University of Southwestern Louisiana

Urban, Susan D. (1989), Professor of Computer Science and Engineering; B.S., M.S., Ph.D., University of Southwestern Louisiana

Urioste-Azcorra, Carmen (1995), Associate Professor of Spanish; Licenciatura, University of Seville (Spain); M.A., Ph.D., Arizona State University

Usman, Arribidesi (2001), Assistant Professor of African American Studies; B.A., M.A., University of Ibadan (Nigeria); Ph.D., Arizona State University

Uttal, William R. (1988), Professor Emeritus of Industrial Engineering; B.S., University of Cincinnati; Ph.D., Ohio State University

V

Valdivieso, L. Teresa (1971), Professor of Spanish; B.A., M.A.E., Ph.D., Arizona State University

Valentine, Carol Ann (1975), Professor Emerita of Communication; B.A., M.A., University of Michigan; Ph.D., Pennsylvania State University

Valentine, Kristin B. (1976), Professor of Communication; B.S., University of Wisconsin, Madison; M.A., University of Washington; Ph.D., University of Utah

Valiente, Carlos (2003), Assistant Professor of Family and Human Development; B.S., M.S., Ph.D., Arizona State University

Vallejo, Carlos J. (1975), Associate Professor of Curriculum and Instruction; B.S., Chadron State College; M.A., Ph.D., University of Nebraska, Lincoln

Valverde, Leonard A. (1992), Professor of Educational Leadership and Policy Studies; B.A., California State University, Los Angeles; Ph.D., Claremont Graduate School

Van Duzer, Leslie (1996), Associate Professor of Architecture; B.Arch., M.Arch., University of California, Berkeley

van Gelderen, Elly (1995), Professor of English; B.A., M.A., Utrecht University (Netherlands); Ph.D., McGill University (Canada)

Van Hook, Barry L. (1976), Associate Professor of Management; B.S., Illinois State University; M.S., Ed.D., Northern Illinois University

Van Orden, Guy C. (1987), Professor of Psychology; B.S., University of Oregon; M.A., Ph.D., University of California, San Diego

Van Schilfgaarde, Mark (2002), Associate Professor of Chemical and Materials Science and Mechanical and Aerospace Engineering; B.A., University of California, San Diego; Ph.D., Stanford University

Van Wagenen, R. Keith (1963), Professor Emeritus of Education; B.A., Pacific Union College; M.A., Arizona State University; Ph.D., University of Utah

Vanacour, Martin (1987), Faculty Associate of Public Affairs; B.A., State University of New York, Buffalo; M.P.A., New York University; D.P.A., Arizona State University

Vanderhoff, Barbara A. (1968), Associate Librarian, Technical Services Department; B.A., Fort Hays State University; M.A., University of Denver

VanderMeer, Philip R. (1985), Associate Professor of History; B.A., Calvin College; M.A., Ph.D., University of Illinois

Vasilevska, Dragica (1997), Assistant Professor of Electrical Engineering; B.S., M.S., University Cyril and Methodius (Macedonia); Ph.D., Arizona State University

Vaz, Paul (1997), Senior Lecturer of Mathematics and Statistics; B.S., M.S., Ph.D., Bombay University (India); Ph.D., Arizona State University

Vega, Santos C. (1989), Senior Research Specialist, Hispanic Research Center; B.A., M.Ed., University of Arizona; Ph.D., Arizona State University

Venables, John A. (1986), Professor of Physics and Astronomy; B.A., Ph.D., University of Cambridge (United Kingdom)

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

Vekstein, Claudio (2002), Assistant Professor of Architecture; B.S., Buenos Aires University (Argentina); M.Arch., Academy of Arts Stadelshule (Germany)

Vermaas, Willem F.J. (1986), Professor of Plant Biology; Ph.D., Agricultural University (Netherlands)

Vernon, Brent (2000), Assistant Professor of Bioengineering; B.S.E., Arizona State University; Ph.D., University of Utah

Verstegen, Clare M. (1989), Professor of Art; B.S., University of Wisconsin, Stevens Point; M.F.A., Cranbrook Academy of Art

Vestre, Norris D. (1972), Professor Emeritus of Psychology; B.A., Ph.D., University of Minnesota, Twin Cities

Vicencio, Christina (1994), Lecturer of Speech and Hearing Science; B.A., M.T.E.S.L., Arizona State University

Vicenti Carpio, Myla (2001), Assistant Professor of American Indian Studies; B.A., University of New Mexico; M.A., Ph.D., Arizona State University

Villalobos, J. Rene (1999), Associate Professor of Industrial Engineering; B.S., Institute of Technology of Chihuahua (Mexico); M.S., University of Texas, El Paso; Ph.D., Texas A&M University

Vining, David C. (1975), Associate Professor of Theatre; B.A., University of Redlands; M.F.A., University of Minnesota, Twin Cities

Vinze, Ajay (1998), Professor of Accountancy and Information Management; B.Com., University of Delhi (India); M.B.A., University of Connecticut; Ph.D., University of Arizona

Virden, Randy J. (1984), Associate Professor of Recreation Management and Tourism; Chair, Department of Recreation Management and Tourism; B.S., M.S., Arizona State University; Ph.D., Utah State University

Virgillo, Carmelo (1965), Professor Emeritus of Romance Languages; A.B., State University of New York, Albany; A.M., Ph.D., Indiana University

Viri, Denis (1998), Associate Research Professional; Interim Director, Center for Indian Education; B.A., San Francisco State University; M.Ed., Ph.D., University of Arizona

Vissicaro, Pegge (1983), Assistant Professor of Dance; B.F.A., University of Michigan; M.F.A., University of North Carolina, Greensboro

Vitulo, Juliann (1990), Associate Professor of Italian; B.A., University of Illinois; M.A., Ph.D., Indiana University, Bloomington

Voaden, Rosalynn (1998), Associate Professor of English; B.A., B.Ed., Queen's University, Kingston (Canada); M.A., University of Victoria, British Columbia (Canada); Ph.D., University of York (United Kingdom)

Voeller, Kytja (2000), Adjunct Professor of Speech and Hearing Science; B.A., Reed College; M.A., Bryn Mawr College; M.D., Columbia University

Vogel, Julie Ann (2001), Lecturer of Curriculum and Instruction; B.S., Iowa State University; M.Ed., Arizona State University

Vogus, Brad T. (1999), Assistant Librarian; Head, Government Documents/Map Collection; B.A., Indiana University, Bloomington; M.I.L.S., University of Michigan, Ann Arbor

Volek, Emil (1975), Professor of Spanish; Prom.Phil., Ph.D., Charles University, Prague (Czechoslovakia)

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Voller, Sandra L. (1999), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.A., Saint John Fisher College; M.A., State University of New York, Albany

Voorhees, William R. (2002), Assistant Professor of Public Affairs; B.A., University of South Florida; M.P.A., Georgia State University; Ph.D., Indiana University, Bloomington

Voss, Howard G. (1964), Professor Emeritus of Physics and Astronomy; A.B., Hope College; M.N.S., Arizona State University; M.S., Purdue University

Voth, Annette (1978), Librarian Emerita; B.Mus., University of Kansas; M.L.S., M.A., University of California, Berkeley

Votichenko, T. Alexander (1956), Professor Emeritus of Philosophy; A.B., Princeton University; M.A., Columbia University

W

Wachter, Rebekka (2001), Assistant Professor of Chemistry and Biochemistry; B.A., University of California, Santa Cruz; Ph.D., University of Oregon



Wagner, J. Bruce Jr.
(1977)

Regents' Professor Emeritus, Chemistry and Biochemistry and Solid State Science; B.S., Ph.D., University of Virginia

Wagner, Michael G. (1997), Assistant Professor of Computer Science and Engineering; B.S., M.S., Ph.D., Technical University of Vienna (Austria)

Wagner, Ronald F. (1962), Professor Emeritus of Art; B.S., University of Wisconsin, Madison; M.F.A., University of Iowa

Walker, Beth A. (1988), Associate Professor of Marketing; B.S., Virginia Polytechnic Institute and State University; M.S., Ph.D., Pennsylvania State University

Walker, John E. (1970), Professor Emeritus of Educational Administration and Supervision; B.A., Albion College; M.A., Michigan State University; Ed.D., Utah State University

Walker, Margaret U. (2002), Professor of Justice Studies and Lincoln Professor of Ethics, Justice, and the Public Sphere; B.A., University of Illinois, Chicago; M.A., Ph.D., Northwestern University

Walker, Stephen G. (1969), Professor of Political Science; B.A., Creighton University; M.A., Ph.D., University of Florida

Wall, Gerard (1992), Adjunct Professor of Plant Biology; B.S., State University of New York, Stony Brook; M.S., Ph.D., Kansas State University

Wallace, Charles E. (1958), Professor Emeritus of Mechanical and Aerospace Engineering; B.S., Lewis and Clark College; M.S., Oregon State University; Ph.D., Stanford University

Wallen, Carl (1973), Professor Emeritus of Curriculum and Instruction; B.A., University of California, Santa Barbara; M.A., San Francisco State College; Ed.D., Stanford University

Waller, Margaret Ann (1997), Associate Professor of Social Work; B.M., DePaul University; M.S.W., University of Illinois; Ph.D., University of Chicago

Walmsley, Amanda (2001), Assistant Research Professor of Plant Biology; B.S., Ph.D., University of Queensland (Australia)

Walsberg, Glenn E. (1978), Professor of Biology; B.S., California State University, Long Beach; Ph.D., University of California, Los Angeles

Walt, Henry J. (2002), Adjunct Professor of Anthropology; B.A., University of California, Santa Barbara; M.A., Ph.D., University of New Mexico

Walters, Sheila A. (1971), Librarian Emerita; B.A., University of Oklahoma; M.L.S., Louisiana State University

Walton-Ramirez, Anne (1999), Lecturer of Spanish; B.A., University of South Alabama; M.A., Arizona State University

Wamacks, Naomi W. (1968), Professor Emerita of Curriculum and Instruction; B.A., M.A., Ed.D., Arizona State University

Wang, Alan P. (1970), Professor Emeritus of Mathematics and Statistics; B.A., Washington State University; M.A., Ph.D., University of California, Los Angeles

Wang, Cecilia (1971), Professor Emerita of Mathematics and Statistics; B.A., Immaculate Heart College; M.A., Ph.D., University of California, Los Angeles

Wang, Edward Y. (1979), Professor Emeritus of Electrical Engineering; B.S., Morningside College; M.S., Purdue University; Ph.D., Tufts University

Ward, James C. (1986), Professor of Marketing; B.A., M.B.A., Ph.D., University of Minnesota, Twin Cities

Ward, Lance (1997), Lecturer of Mathematics and Statistics; B.S., M.S., Brigham Young University

Wardwell, Sandra W. (1974), Research Specialist Emerita of Geography; B.S., University of Michigan

Warner, Carolyn (1994), Associate Professor of Political Science; B.A., University of California, San Diego; M.A., Ph.D., Harvard University

Warnicke, Retha M. (1972), Professor of History; A.B., Indiana University; M.A., Ph.D., Harvard University

Warren-Findley, Jannelle (1992), Associate Professor of History; B.A., Texas Woman's University; M.Phil., Ph.D., George Washington University

Watson, Clyde W. (1971), Professor Emeritus of Art; B.F.A., Bethany College; M.A., Kansas State University

Watson, George L. (1969), Professor of Journalism and Mass Communication; B.A., Phillips University; M.A., Ph.D., Duke University

Webb, L. Dean (1978), Professor of Educational Leadership and Policy Studies; Academic Program Coordinator, M.Ed. and Ph.D. in Educational Administration and Supervision; B.A., M.A.T., Ph.D., University of Florida

Webb Peterson, Patricia R. (1998), Assistant Professor of English; B.A., M.A., Illinois State University, Normal; Ph.D., University of Illinois, Urbana-Champaign

Webber, Andrew N. (1989), Professor of Plant Biology; Director, Center for the Study of Early Events in Photosynthesis; B.Sc., Ph.D., University of Essex (United Kingdom)

Weber, Sandra L. (1985), Associate Professor of Construction; B.S.C.E., M.S.C.E., University of California, Berkeley; Ph.D., Arizona State University

Weed, Andrew (1999), Assistant Professor of Design; B.F.A., Arizona State University; M.F.A., Basel School of Design (Switzerland)

Weidemaier, William (1977), Professor Emeritus of the Barrett Honors College; B.A., Northern Arizona University; M.A., Ph.D., Arizona State University

Weierstall, Uwe (1994), Assistant Research Scientist of Physics and Astronomy; B.S., University of Tübingen (Germany); M.S., Ph.D., Institute of Applied Physics in Tübingen (Germany)

Weigand, Robert F. Jr. (1990), Senior Lecturer of Family and Human Development and Psychology; Director, Child Laboratory Programs; B.S., University of Scranton; M.S., Purdue University

Weigend, Guido G. (1976), Professor Emeritus of Geography; Dean Emeritus, College of Liberal Arts and Sciences; B.S., M.S., Ph.D., University of Chicago

Weiner, Gordon M. (1968), Professor Emeritus of History; A.B., Ph.D., University of Pennsylvania

Weinstein, James (1986), Professor of Law; Amelia D. Lewis Professor of Constitutional Law; B.A., J.D., University of Pennsylvania



Weiser, Kurt
(1989)
Regents' Professor of Art; B.F.A., Kansas City Art Institute; M.F.A., University of Michigan

Weiss, Karl H. (1984), Senior Research Professional, Center for Solid State Science; B.Sc., Ursinus College; M.Sc., University of Arizona

Weiss, Jane (2000), Assistant Professor of Accountancy and Information Management; B.B.A., University of Wisconsin, Whitewater; M.Acc., University of Georgia; Ph.D., University of Wisconsin

Weiss, Neil A. (1970), Professor Emeritus of Mathematics and Statistics; B.A., M.A., Ph.D., University of California, Los Angeles

Weitz, Rose (1978), Professor of Sociology; B.A., City University of New York; M.A., Ph.D., Yale University

Weitzman, Irene (1998), Adjunct Faculty of Microbiology; B.S., Brooklyn College; M.A., Ph.D., Columbia University

Welch, H. William (1967), Professor Emeritus of Electrical Engineering; B.A., DePauw University; M.S., Ph.D., University of Michigan; P.E.

Welfert, Bruno (1990), Associate Professor of Mathematics and Statistics; M.A., University of Paris VI (France); Ph.D., University of California, San Diego

Wells, Barrie E. (1981), Professor Emeritus of Music; B.M., M.M., University of the Pacific; D.M.A., University of Oregon

Wells, Christine L. (1976), Professor Emerita of Kinesiology; B.S., University of Michigan; M.S., Smith College; Ph.D., Pennsylvania State University

Wells, David (1998), Senior Lecturer of Interdisciplinary Studies; B.A., Bucknell University; Ph.D., University of Southern California

Wells, Valana L. (1987), Associate Professor of Engineering; A.B., M.S., Ph.D., Stanford University

Welsh, Peter H. (1986), Associate Professor of Anthropology; B.A., Northern Arizona University; M.A., Ph.D., University of Pennsylvania

Wentz, Elizabeth A. (1997), Assistant Professor of Geography; B.A., M.A., Ohio State University; Ph.D., Pennsylvania State University

Wentz, Richard E. (1972), Professor Emeritus of Religious Studies; A.B., Ursinus College; B.D., Lancaster Theological Seminary; M.Phil., Ph.D., George Washington University

Wesbury, Stuart A. Jr. (1994), Professor Emeritus of Health Administration and Policy; B.S., Temple University; M.H.A., University of Michigan; Ph.D., University of Florida

Weschler, Louis (1980), Professor Emeritus of Public Affairs; B.A., California State University, Long Beach; M.A., Ph.D., University of California, Los Angeles

West, Stephen G. (1981), Professor of Psychology; B.A., Cornell University; M.A., Ph.D., University of Texas

Westerhoff, Paul (1995), Associate Professor of Civil and Environmental Engineering; B.S., Lehigh University; M.S., University of Massachusetts, Amhurst; Ph.D., University of Colorado, Boulder

Westie, Frank R. (1983), Adjunct Professor of Sociology; B.S., Central Michigan University; Ph.D., Ohio State University

Wetsel, W. David (1989), Professor of French; B.A., University of Texas, Austin; M.A., University of Chicago; M.A., Ph.D., Brandeis University

Wexler, Kathryn (1992), Clinical Assistant Professor of Speech and Hearing Science; B.A., University of Michigan; M.S., Tulane University

Wheatley, John C. (1983), Senior Research Professional of Physics and Astronomy; B.S., Arizona State University

Wheeler, Jacqueline (1994), Senior Lecturer of English; B.S., M.A., Northern Arizona University; Ph.D., Arizona State University

Wheeler, Michael D. (1975), Senior Research Professional of Chemistry and Biochemistry; B.S., University of Wisconsin, Madison

Whitaker, Matthew (2001), Assistant Professor of History; B.A., M.A., Arizona State University; Ph.D., Michigan State University

Whitam, Frederick L. (1966), Professor Emeritus of Sociology; B.A., Millsaps College; A.M., Ph.D., Indiana University, Bloomington

White, Barbara G. (1990), Clinical Associate Professor of Nursing; B.S., M.S., Virginia Commonwealth University

White, Dave D. (2001), Assistant Professor of Recreation Management and Tourism; B.A., George Mason University; M.A., University of Idaho; Ph.D., Virginia Polytechnic Institute and State University

White, Harold C. (1966), Professor Emeritus of Management; B.S., M.S., University of Oregon; Ph.D., University of Florida

White, James J. (1991), Senior Lecturer of Chemistry and Biochemistry; B.A., Idaho State University; M.S., Ph.D., University of Arizona

White, James R. (1981), Professor of Art; B.F.A., M.F.A., Ohio University

White, Joann (1997), Faculty Associate of Design; B.S., Northwestern University

White, Michael J. (1974), Professor of Philosophy; B.A., Arizona State University; M.A., Ph.D., University of California, San Diego

White, Patricia D. (1999), Professor of Law; Dean, College of Law; B.A., M.A., J.D., University of Michigan

Whitcotton, Stacey (1997), Associate Professor of Accountancy and Information Management; B.A., Texas Tech University; Master of Accountancy, Ph.D., University of Oklahoma

Whitehurst, Harry B. (1958), Professor Emeritus of Chemistry and Biochemistry; B.A., M.A., Ph.D., Rice University

Wie, Bong (1989), Professor of Engineering; B.S., Seoul National University (South Korea); M.S., Ph.D., Stanford University

Wiesel, Avi (1995), Associate Professor of Construction; B.Sc.C.E., Polytechnic Institute of Timisoara (Romania); M.Sc.C.E., Ph.D., Technion-Israel Institute of Technology (Israel)

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- Wigal, Kathy D.** (2000), Lecturer of Accountancy and Information Management; B.S., Arizona State University; M.B.A., M.Ed., Ed.D., Northern Arizona University
- Wiggins, Harry B.** (1987), Senior Lecturer Emeritus of Supply Chain Management; B.S., U.S. Merchant Marine Academy; B.S., University of Vermont; M.B.A., Harvard University
- Wilcox, M. Jeanne** (1990), Professor of Speech and Hearing Science; B.A., Kansas State; M.A., Ph.D., Memphis State University
- Wiley, Terrence G.** (2000), Professor of Educational Leadership and Policy Studies; Director, Division of Educational Leadership and Policy Studies; B.A., M.A., California State University, Long Beach; Ph.D., University of Southern California
- Wilkens, Barry J.** (1992), Senior Research Professional, Center for Solid State Science; B.A., Columbia Union College; M.Sc., Rutgers, The State University of New Jersey
- Wilkinson, Christine K.** (1970), Associate Professor of Educational Leadership and Policy Studies; Senior Vice President and Secretary of the University; B.A., Arizona State University; M.A., University of California, Berkeley; Ph.D., Arizona State University
- Wilkinson, Joseph W.** (1964), Professor Emeritus of Accountancy and Information Management; B.S., Carnegie Institute of Technology; M.B.A., Stanford University; D.B.A., University of Oregon
- Williams, Carol E.** (1984), Academic Associate, Division of Undergraduate Academic Services; Coordinator, Campus Match and Academic Success at the University; B.A., Trinity University, San Antonio; M.A., Arizona State University
- Williams, David P. III** (1978), Instructor of Sociology; B.A., B.S., M.A., University of Pennsylvania; Ph.D., Arizona State University
- Williams, Douglas** (2000), Lecturer of Mathematics and Statistics; B.S., University College of Belize (Belize); M.S., Arizona State University
- Williams, Frank G.** (1975), Professor Emeritus of Health Administration and Policy; B.S., M.A., Oregon State University; M.A., Ph.D., University of Iowa
- Williams, Jenny L.** (1967), Librarian Emerita; B.A., M.L.S., Indiana University
- Williams, Peter** (1981), Professor of Chemistry and Biochemistry; B.S., Ph.D., University of London (United Kingdom)
- Williams, Philip F.C.** (1986), Professor of Chinese; B.A., University of Arkansas; M.A., Ph.D., University of California, Los Angeles
- Williams, Robert C.** (1978), Professor of Anthropology; B.A., M.A., University of Cambridge (United Kingdom); B.A., M.A., Ph.D., University of Michigan
- Williams, Stanley N.** (1991), Professor of Geological Sciences; B.S., Beloit College; M.A., Ph.D., Dartmouth College
- Williamson, Madeline J.** (1976), Professor of Music; B.A., Ohio Wesleyan University; M.M., Western Michigan University; Ph.D., Arizona State University
- Willis, Wayne T.** (1989), Associate Professor of Kinesiology; A.B., University of California, Berkeley; M.A., San Francisco State University; Ph.D., University of California, Berkeley
- Wills, J. Robert** (1994), Professor of Theatre; Dean, Herberger College of Fine Arts; B.A., College of Wooster; M.A., University of Illinois; Ph.D., Case Western Reserve University
- Wilson, Angela Cavender** (2000), Assistant Professor of History; B.A., University of Minnesota, Minneapolis; M.A., Ph.D., Cornell University
- Wilson, Gail Eugene** (1972), Associate Professor of Music; B.S., Ohio State University; M.M., Arizona State University
- Wilson, Gloria N.** (1961), Professor Emerita of Educational Media and Computers; B.A., Montclair State College; M.A., Ed.D., Columbia University
- Wilson, Jeffrey R.** (1985), Associate Professor of Statistics; Interim Director, School of Health Administration and Policy; B.A., University of the West Indies (Trinidad and Tobago); M.S., Ph.D., Iowa State University
- Wilson, Lorna A.** (1968), Professor Emerita of French; B.Ed., University of Saskatchewan (Canada); M.A., Arizona State University
- Wilson-Rawls, N. Jeanne** (1997), Assistant Professor of Biology; B.S., McMaster University (Canada); Ph.D., Saint Louis University
- Wilt, Glenn A. Jr.** (1963), Professor Emeritus of Finance; A.B., Occidental College; M.B.A., Miami University; Ph.D., University of Michigan; C.F.A.
- Windhorst, Rogier A.** (1987), Professor of Physics and Astronomy; B.Sc., M.Sc., Ph.D., University of Leiden (Netherlands)
- Winer, Laurence H.** (1983), Professor of Law; B.A., M.A., Ph.D., Boston University; J.D., Yale University
- Winkelman, Michael** (1988), Senior Lecturer of Anthropology; B.A., Rice University; Ph.D., University of California, Irvine
- Winkelman, Richard D.** (1965), Professor Emeritus of Economics; B.A., Southern Illinois University; M.A., Ph.D., University of Illinois
- Wintergalen, Barbara A.** (1992), Professor Emerita of Nursing; B.S.N., Loretto Heights College; M.S., Arizona State University
- Wirtz, Dorothy** (1959), Professor Emerita of French; B.A., University of Iowa; M.A., Ph.D., University of Wisconsin
- Wiseman, Douglas E.** (1976), Professor Emeritus of Curriculum and Instruction; B.S., M.A., Eastern Michigan University; Ph.D., University of Illinois
- Witczak, Matthew W.** (1999), Professor of Civil and Environmental Engineering; B.S.C.E., M.S.C.E., Ph.D., Purdue University
- Witt, Tom** (1975), Associate Professor of Design; B.A., M.A., M.F.A., University of California, Los Angeles
- Wixted, J. Timothy** (1978), Professor of Asian Languages; B.A., University of Toronto (Canada); A.M., Stanford University; D.Phil., University of Oxford (United Kingdom)
- Wodrich, David L.** (2002), Associate Professor of Psychology in Education; B.S., M.A., Northern Arizona University; Ph.D., Arizona State University
- Wojciechowski, Martin F.** (2001), Assistant Professor of Plant Biology; B.S., Northern Michigan University; Ph.D., University of Northern Colorado
- Wolchik, Sharlene** (1980), Professor of Psychology; B.A., Vassar College; M.S., Ph.D., Rutgers, The State University of New Jersey
- Wolf, Donald J.** (1969), Professor Emeritus of Political Science; B.A., M.A., Gonzaga University; S.T.M., University of Santa Clara; Ph.D., Georgetown University
- Wolf, George H.** (1986), Associate Professor of Chemistry and Biochemistry; B.A., University of California, San Diego; M.S., Ph.D., University of California, Berkeley

Wolf, Robert (1985), Professor Emeritus of Design; B.S., Southern Illinois University, Carbondale; M.A., University of Missouri; Certificate, Konstindustriskolan (Sweden)

Wolf, W. Shapard Jr. (1983), Associate Research Administrator, Sociology; Director, Survey Research Laboratory, Sociology; B.F.A., Florida State University; M.Ed., University of Georgia

Wolfe, Philip M. (1988), Professor of Industrial Engineering; B.S., University of Missouri; M.S.E., Ph.D., Arizona State University

Wolfthal, Diane (1995), Associate Professor of Art; B.A., M.A., City University of New York; Ph.D., Institute of Fine Arts, New York University

Wollam, Owen A. (1964), Professor Emeritus of French; B.A., M.A., Montana State University; Ph.D., University of Washington

Wong, Elizabeth (1996), Lecturer of Japanese; B.A., William Smith College; M.A., Washington University, St. Louis; Ph.D., Stanford University

Wong, Timothy C. (1995), Professor of Chinese; Director, Center for Asian Studies; B.A., Saint Mary's College; M.A., University of Hawaii; Ph.D., Stanford University

Wood, Byard D. (1970), Professor Emeritus of Mechanical and Aerospace Engineering; B.S.M.E., M.S.M.E., Utah State University; Ph.D., University of Minnesota, Twin Cities

Wood, Steven D. (1975), Professor Emeritus of Marketing; B.S., M.A., California State University, San Diego; Ph.D., University of Wisconsin, Madison

Woodbury, Neal W. (1987), Professor of Chemistry and Biochemistry; B.S., University of California, Davis; Ph.D., University of Washington

Woodfill, Marvin C. (1966), Professor Emeritus of Computer Science and Engineering; B.S., M.S., Ph.D., Iowa State University

Wooding, Robert R. (1971), Professor Emeritus of Construction; B.S., United States Naval Academy; B.C.E., M.C.E., Rensselaer Polytechnic Institute

Woodley, Ann E. (2000), Professor of Law; Director, Lodestar Mediation Clinic; B.A., University of Arizona; J.D., Arizona State University

Woodman, Natalie J. (1969), Professor Emerita of Social Work; B.A., New York University; M.S.S., Smith College

Woodson, Stephani E. (2000), Assistant Professor of Theatre; B.F.A., M.A., University of Texas, Austin; Ph.D., Arizona State University

Woodward, Mark R. (1985), Associate Professor of Religious Studies; B.A., M.A., Ph.D., University of Illinois

Woolf, Charles M. (1961–63; 1964), Professor Emeritus of Biology; Dean Emeritus, College of Liberal Arts and Sciences and Graduate College; B.S., M.S., University of Utah; Ph.D., University of California, Berkeley

Wootten, William W. (1959), Professor Emeritus of History; B.A., University of Chicago; M.A., University of Iowa; Ph.D., University of Minnesota, Twin Cities

Wootton, Richard T. (1964), Professor Emeritus of Education; B.S., M.S., Ed.D., University of Utah

Wosinski, Marek (1995), Senior Lecturer of Psychology; B.A., M.A., Ph.D., University of Warsaw (Poland)

Wotring, Roxena A. (1994), Clinical Assistant Professor of Nursing; B.S.N., M.S., Arizona State University

Wright, David (1981), Associate Research Professional, Center for Solid State Science; B.S., Arizona State University

Wright, Johnson Kent (1994), Associate Professor of History; Director, Graduate Studies; B.A., Kalamazoo College; M.A., Ph.D., University of Chicago

Wright, M. Lin (1973), Professor Emerita of Theatre; B.A., M.A., Ph.D., University of Minnesota, Twin Cities

Wu, Ai-Hwa (1964), Librarian Emerita; B.A., National Taiwan University (Taiwan); M.L.S., University of Washington

Wu, Jianguo (1995), Associate Professor of Plant Biology; B.S., University of Inner Mongolia (China); M.S., Ph.D., Miami University

Wu, Teresa (2001), Assistant Professor of Industrial Engineering; B.S., M.S., Beijing University of Aeronautics and Astronautics (China); Ph.D., University of Iowa

Wulk, Ned W. (1957), Professor Emeritus Kinesiology; B.S., Wisconsin State University; M.Ed., Xavier University

Wurzburger, Marilyn J. (1960), Librarian; Department of Archives and Manuscripts; B.A., MacMurray College

Wurzell, Carol A. (1965), Professor Emerita of Nursing; B.S., California State College, Chico; M.S., University of Maryland, College Park

Wyckoff, Susan (1979), Professor of Physics and Astronomy; B.A., Mount Holyoke College; Ph.D., Case Western Reserve University

Wyndelts, Robert W. (1974), Professor of Accountancy and Information Management; B.B.A., M.P.A., Georgia State University; Ph.D., University of Georgia; C.P.A., Arizona, Georgia

Wytko, Joseph R. (1975), Professor of Music; B.M.E., West Virginia University; M.M., D.M., Northwestern University

X

Xu, Jun-Ping (1991), Assistant Research Professor, Cancer Research Institute; B.S., Shanghai College of Traditional Chinese Medicine (China); Ph.D., Tokyo College of Pharmacy (Japan)

Xue, Guoliang (2001), Associate Professor of Computer Science and Engineering; B.S., M.S., Qufu Teachers University (China); Ph.D., University of Minnesota, Minneapolis

Y

Yabes, Ruth Ammerman (1990), Associate Professor of Planning and Landscape Architecture; B.S., B.A., University of California, Davis; M.C.P., University of Pennsylvania; Ph.D., Cornell University

Yabiku, Scott (2002), Assistant Professor of Sociology; B.A., University of Chicago; M.A., Pennsylvania State University; Ph.D., University of Michigan

Yamaguchi, Gary T. (1989), Associate Professor of Bioengineering; A.B., Occidental College; B.S., California Institute of Technology; S.M.M.E., Massachusetts Institute of Technology; Ph.D., Stanford University

Yamamori, Tetsumao (1989), Adjunct Professor of Sociology; B.A., Northwest Christian College; B.D., Texas Christian University; Ph.D., Duke University

Yancy, Margaret Lee (1997), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University

Yao, Lun-Shin (1981), Professor of Engineering; B.S.E., Cheng Kung University; M.S., University of Texas; Ph.D., University of California, Berkeley

Yao, Winberta M. (1975), Librarian Emerita; B.A., University of California, Berkeley; M.S., Columbia University

ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

Yates, Ann M. (1978), Research Professional Emerita of Chemistry and Biochemistry; B.S., Saint Lawrence University; Ph.D., Arizona State University

Yau, Stephen S. (1994), Professor of Computer Science and Engineering; B.S., National Taiwan University (Taiwan); M.S., Ph.D., University of Illinois, Urbana-Champaign

Ye, Nong (1998), Professor of Industrial Engineering; B.S., Peking University (China); M.S.E., Chinese Academy of Sciences (China); Ph.D., Purdue University

Yeater, James W. (1958), Professor Emeritus of Theatre; B.A., Baker University; M.A., University of Washington; Ph.D., University of Illinois

Yellow Bird, Michael J. (2000), Associate Professor of Social Work; B.S.W., University of North Dakota; M.S.W., University of Wisconsin, Milwaukee; Ph.D., University of Wisconsin, Madison

Yopez, Eleanor (1984), Academic Professional of Social Work; B.A., Michigan State University; M.A., Western Michigan University; M.S.W., University of Michigan

Yoshioka, Carlton F. (1988), Professor of Recreation Management and Tourism; Graduate Coordinator, Department of Recreation Management and Tourism; B.A., University of California, Santa Barbara; M.A., California State University, Chico; Ph.D., University of Oregon

Young, Bernard (1988), Professor of Art; B.F.A., Temple University; M.F.A., Ph.D., Cornell University

Young, David A. (2001), Professor of Plant Biology; Dean, College of Liberal Arts and Sciences; B.A., M.A., California State University, Fullerton; Ph.D., Claremont Graduate University

Young, Dennis L. (1975), Professor of Mathematics and Statistics; B.S., Saint Louis University; M.S., Ph.D., Purdue University

Young, Hewitt H. (1967), Professor Emeritus of Industrial Engineering; B.S.M.E., M.S.I.E., Case Institute of Technology; Ph.D., Arizona State University

Young, Joseph E. (1979), Professor Emeritus of Art; B.A., California State University, Los Angeles; M.A., University of California, Los Angeles

Young, Josephine Peyton (1998), Assistant Professor of Curriculum and Instruction; M.A., University of West Florida; Ph.D., University of Georgia

Young, Otis E. Jr. (1963), Professor Emeritus of History; A.B., A.M., Ph.D., Indiana University

Young, Sheila (2002), Assistant Librarian; Nobel Science Reference Services; B.Ed., University of Toledo; M.S., University of Arkansas; M.L.S., University of Oklahoma

Youngblood, Robert L. (1973), Professor of Political Science; B.A., Willamette University; M.A., University of Hawaii, Manoa; Ph.D., University of Michigan

Z

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

Zhang, Junshan (2000), Assistant Professor of Electrical Engineering; B.E., Huazhong University of Science and Technology (China); M.S., University of Georgia; Ph.D., Purdue University

Zhang, Xia (2002), Lecturer of Chinese; B.A., Sichuan University (China); M.A., University of Victoria (Canada); Ph.D., University of Alberta (Canada)

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

Zimiles, Herbert (1988), Professor Emeritus 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

Zottola, Adelina (1997), Academic Associate, Division of Undergraduate Academic Services; Program Coordinator, Science and Math Service Learning; B.S., State University of New York, Binghamton

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

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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ASU Main

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Director, University Evaluation	Patricia Green

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Associate Dean Janet M. Burke

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Director, Herberger Center for Design Excellence Mary Kihl
Coordinator, Joint Urban Design Program John McIntosh
Coordinator, Joint Urban Design Studio Michael Dollin

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Associate Dean, Teacher Education Carlos Julio Ovando
Associate Dean, Academic Programs and Personnel Sarah J. Hudelson
Associate Dean for Research James Arthur Middleton
Assistant Dean, Office of Student Services Inta “Maggie” Tolan
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and Instruction Robert B. Rutherford Jr.
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and Instruction Billie J. Enz
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Director, Education Policy Studies Laboratory Alex Molnar
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Academic Program Coordinator, Ed.D. in Higher and
Postsecondary Education Caroline Turner
Academic Program Coordinator, Educational Leadership and Policy Studies Gene V Glass
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Academic Program Coordinator, M.Ed. and Ph.D. in Educational
Administration and Supervision L. Dean Webb
Academic Program Coordinator, Social and Philosophical Foundations Nicholas R. Appleton
Internship Coordinator and Certification, Educational Administration and Supervision Donna J. Macey
Director, Division of Psychology in Education Elsie G.J. Moore
Training Director, Counseling Psychology Richard T. Kinnier
Academic Program Leader, Counselor Education and Counseling Psychology Terence J.G. Tracey
Academic Program Leader, Educational Technology Wilhelmina C. Savenye
Academic Program Leader, Educational Psychology Samuel B. Green
Training Director, School Psychology Mary E. Stafford
Director, Southwest Center for Education Equity and Language Diversity Josué M. González
Director, Bureau of Educational Research and Services Margaret A. Mangini
Interim Director, Center for Indian Education Denis Viri
Director, Counselor Training Center Judith Homer
Director, Office of Professional Field Experiences Karen Kimerer

College of Engineering and Applied Sciences

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Associate Dean, Academic Affairs Ronald J. Roedel
Associate Dean, Planning and Administration Ben M. Huey
Interim Associate Dean, Research Paul C. Johnson

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Chair, Department of Chemical and Materials Engineering	Subhash Mahajan
Chair, Department of Civil and Environmental Engineering	Sandra L. Houston
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Chair, Department of Electrical Engineering	Stephen M. Goodnick
Chair, Department of Industrial Engineering	Gary L. Hogg
Chair, Department of Mechanical and Aerospace Engineering	Robert E. Peck
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Director, Center for Research on Education in Science, Mathematics, Engineering, and Technology	Donovan L. Evans
Codirector, Center for Low Power Electronics Research	Dieter K. Schroder
Director, Center for Professional Development and Distance Education	Jeffrey S. Goss
Director, Center for Solid State Electronics Research	Trevor John Thornton
Director, Institute for Manufacturing Enterprise Systems	Thomas E. Callarman
Interim Director, Telecommunications Research Center	Sayfe Kiaei

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Associate Dean for Academic Affairs and Research	Patrick Brennan
Associate Dean and Director, Ross-Blakley Law Library	Victoria K. Trotta
Assistant Dean, Administrative and Business Services	Rhonda Sandler
Assistant Dean and Director of Admissions	Brenda Brock
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Executive Director, Indian Legal Program	Rebecca A. Tsosie
Executive Director, Center for the Study of Law, Science, and Technology	Gary E. Marchant
Executive Director, Clinical Programs	Catherine O'Grady
Director, Communications	Franklyn Jeans
Director, Center for the Study of Law, Science, and Technology	Andrew Askland
Director, Legal Research and Writing and Academic Success Program	Judith M. Stinson
Director, Student Development and Financial Aid	Michael Bossone
Director, Indian Legal Program	Kathlene Rosier
W. P. Carey Director of Placement	Iлона DeRemer

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Associate Dean, Academic Programs	Daniel Bivona
Associate Dean, Administration and Personnel	Nancy A. Gutierrez
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Chair, Department of Anthropology	John K. Chance
Chair, Department of Chemistry and Biochemistry	Robert E. Blankenship
Chair, Department of Chicana and Chicano Studies	Cordelia C. Candelaria
Chair, Department of English	Elizabeth R. Horan
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
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Chair, Department of Mathematics and Statistics	Andrew Bremner
Chair, Department of Military Science	Major Herbert M. Chong
Interim Chair, Department of Philosophy	Steven L. Reynolds
Chair, Department of Physics and Astronomy	Barry G. Ritchie
Chair, Department of Political Science	Patrick Kenney
Chair, Department of Psychology	Darwyn E. Linder

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Chair, Department of Religious Studies	Joel D. Gereboff
Director, School of Life Sciences	<i>To Be Appointed</i>
Chair, Department of Sociology	Verna M. Keith
Chair, Department of Speech and Hearing Science	David Ingram
Director, African American Studies	Leonor Boulín Johnson
Director, Center for Asian Studies	Claudia Brown
Director, Cancer Research Institute	G. Robert Pettit
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Director, Climatology Laboratory	Robert C. Balling
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Director, Hispanic Research Center	Gary D. Keller
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Director, Center for Solid State Science	David J. Smith
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Director, Women's Studies Program	Kathleen J. Ferraro

College of Nursing

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Interim Associate Dean for Graduate Programs and Research	Karen H. Sousa
Associate Dean for Undergraduate Programs and Extended Education	Mary Killeen
Director, Continuing and Extended Education	David P. Hrabe
Director, Student Services	Jean Craig Stengel
Chair, Division of Adult Health/Parent-Child Nursing	Susan Mattson
Chair, Division of Community Health/Psychosocial Nursing Systems	Rojann Alpers
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
Director, School of Public Affairs	Jeffrey Chapman
Director, School of Social Work	Leslie Leighninger
Chair, Department of Recreation Management and Tourism	Randy J. Virden
Director, Advanced Public Executive Program	Peggy O'Sullivan
Director, American Indian Studies Program	Carol C. Lujan
Director, Asian Pacific American Studies Program	Thomas K. Nakayama
Director, Morrison Institute for Public Policy	Robert Melnick
Director, Center for Nonprofit Leadership and Management	Robert F. Ashcraft
Director, Center for Urban Inquiry	Peg Bortner

Division of Undergraduate Academic Services

Executive Director, Division of Undergraduate Academic Services	William S. Johnson
Associate Executive Director, Division of Undergraduate Academic Services	Gay W. Brack
Associate Executive Director, Division of Undergraduate Academic Services	Shelly Potts
Director, Academic Community Engagement Services	Janice M. Kelly
Director, Academic Success Programs	Stephen Rippon
Director, Academic Advising Services	Casey Self
Director, Bachelor of Interdisciplinary Studies	Christina W. Stage

ADMINISTRATIVE PERSONNEL

Senior Program Coordinator, General Studies Phyllis Lucie
Senior Business Manager Kathleen Renshaw

Graduate College

Interim Dean, Graduate College Maria T. Allison
Associate Dean, Student Support Services Marjorie S. Zatz
Associate Dean, Academic Programs Filiz Ozel
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
Associate Dean, Research and Administration Margaret M. Knapp
Assistant Dean, Student Services Gina Stephens
Interim Director, School of Art Jon W. Sharer
Chair, Department of Dance Claudia Murphey
Director, School of Music Wayne A. Bailey
Chair, Department of Theatre *To Be Appointed*
Director, Communications Stacey Shaw
Director, Community Programs Melanie Ohm
Director, Institute for Studies in the Arts Thanassis Rikakis
Director, Public Art Dianne Cripe
Director, ASU Art Museum Marilyn A. Zeitlin
Senior Business Operations Manager Marty Wyas

University Libraries

University Librarian and Dean Sherrie Schmidt
Associate Dean, Library Services Jane A. Conrow
Assistant Dean, Personnel Kurt R. Murphy
Head, Access Services/Interlibrary Loan and Document Delivery Ginny Sylvester
Head, Architecture and Environmental Design Library Deborah H. Koshinsky
Head, Department of Archives and Manuscripts Robert P. Spindler
Head, Government Documents/Map Collection Brad T. Vogus
Head, Library Instruction, Systems, and Technology (LIST) Scott S. Herrington
Head, Music Library Brian Doherty
Head, Preservation Lois I. Schneberger
Team Leader, Noble Science Reference Services Linda A. Shackle
Team Leader, Collection Development Jeanne Richardson
Team Leader, Hayden Reference Services Rosalinda DeFato
Team Management, Technical Services Department Betsy J. Redman, Ronda L. Ridenour, and Rebecca S. Uhl

W. P. Carey School of Business

Dean, W. P. Carey School of Business *To Be Appointed*
Associate Dean, Executive and Professional Programs Lee R. McPheters
Associate Dean, Graduate Programs Dennis L. Hoffmann
Associate Dean, Undergraduate Programs Philip R. Regier
Assistant Dean, Fiscal and Business Services Anne Nguyen
Assistant Dean, Graduate Programs Carl Harris
Assistant Dean, Undergraduate Programs Kay Faris
Director, School of Accountancy and Information Management *To Be Appointed*
Chair, Department of Economics Arthur E. Blakemore
Chair, Department of Finance Herbert M. Kaufman
Interim Director, School of Health Administration and Policy Jeffery R. Wilson
Chair, Department of Management William H. Glick
Chair, Department of Marketing Michael P. Mokwa
Chair, Department of Supply Chain Management Joseph R. Carter
Director, Center for Advanced Purchasing Studies Phillip L. Carter
Director, Center for the Advancement of Small Business Mary Lou Bessette

ADMINISTRATIVE PERSONNEL

Director, Arizona Real Estate Center	Jay Q. Butler
Director, Center for Business Research	Timothy D. Hogan
Director, Center for Services Leadership	Stephen W. Brown
Director, Bank One Economic Outlook Center	Lee R. McPheters
Director, L. William Seidman Research Institute	Timothy D. Hogan

Administration and Finance

Executive Vice President, Administration and Finance	Mernoy E. Harrison
Associate Vice President, Administration and Finance	LeEtta Overmyer
Senior Executive Assistant to the Executive Vice President, Administration and Finance	Sheila Stokes
Director, Administration and Finance Information Technology	Susan Madden
Associate Vice President, Financial Services, and Treasurer	Gerald E. Snyder
Associate Comptroller	Terri Deasey
Associate Comptroller	Marilyn Mulhollan
Associate Comptroller	Joanne Wamsley
Assistant Comptroller	Laura James
Assistant Comptroller	Edalia Kousari
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Associate Vice President, Facilities Planning and Management	Scott Cole
Director, Capital Programs Management Group	Ted Cary
Director, Facilities Planning and Space Management	David Techau
Director, Facilities Management	Dave Brixen
Director, Risk Management	Robert Gomez
Campus Planner	Rick Collins
Manager, Information Management Services	Joe Metzger
Interim Associate Vice President, Human Resources	LeEtta Overmyer
Director, Human Resources Programs	Connie Wood
Assistant Director, Human Resources	Christine Cervantes
Director/Chief of Police, Public Safety	John Pickens
Assistant Chief of Police	Kay Gojkovich
Assistant Director of Parking and Transit	Melinda Helton
Associate Vice President, Administration	Ray Jensen
Director, Purchasing and Business Services	John Riley
Director, Auxiliary Business Services	Greg Rush
Assistant Director, Real Estate	Karen Honeycutt
Assistant Director, Document Production Services	Robert Lane
Assistant Director, ASU Stores Operations	Gina Webber
Director, ASU Bookstore	Val Ross
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Associate Director, Budget Planning and Management	James Sliwicki

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Vice President for Public Affairs	Virgil Renzulli
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Intercollegiate Athletics

Executive Director, Athletics	Gene Smith
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Basketball—Men	Rob Evans
Basketball—Women	Charli Turner Thorne
Cross Country—Men	Walt Drenth
Cross Country—Women	Walt Drenth
Diving—Men and Women	Mark Bradshaw
Football—Men	Dirk Koetter
Golf—Men	Randy Lein
Golf—Women	Melissa McNamara
Gymnastics—Women	John Spini
Soccer—Women	Ray Leone
Softball—Women	Linda Wells
Swimming—Men	Michael Chasson
Swimming—Women	Michael Chasson
Tennis—Men	Lou Belken
Tennis—Women	Sheila McInerney
Track and Field—Men	Greg Kraft
Track and Field—Women	Greg Kraft
Volleyball—Women	Patti Snyder-Park
Water Polo—Women	Vicki Gorman
Wrestling—Men	Thom Ortiz

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Student Affairs

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Assistant Vice President for Student Affairs and Dean, Student Life	<i>To Be Appointed</i>
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Registrar	Lou Ann Denny

ASU East

See “ASU East Administrative Personnel,” page 447.

ASU Extended Campus

See “ASU Extended Campus Administrative Personnel,” page 468.

ASU West

See “ASU West Administrative Personnel,” page 460.

ASU East

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Charles E. Backus, Ph.D., 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, with additional programs in the planning stages.

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.

East College offers a range of supporting courses for all ASU East programs and bachelor's degrees with majors in Applied Biological Sciences, Applied Psychology, Business Administration, Elementary Education, Exercise and Wellness, Human Health Studies, Interdisciplinary Studies, Multimedia Writing and Technical Communication, and Nutrition. New facilities, new programs, and new opportunities are constantly emerging at ASU East. The campus is easily accessible via major interstate routes. See the "ASU East Map," page 441. For the latest information, call 480/727-EAST (3278), or access the Web site at www.east.asu.edu.

ACADEMIC ORGANIZATION AND ACCREDITATION

The chief academic officer of ASU East is the provost. There are two colleges and one school at ASU East administered by deans. These academic units develop and implement the teaching, research, and service programs of the institution. Additional support for the academic mission of the campus is provided by Library Services and Information Technology, each administered by a director. See "ASU East Faculty and Academic Professionals," page 443.

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 Technol-

ogy 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

The Bachelor of Science in Industrial Technology degree (including the environmental technology management, graphic information technology, and industrial technology management concentrations) is fully accredited by the National Association of Industrial Technology (NAIT). For more information, call 734/677-0720, e-mail nait@nait.org, or write

NATIONAL ASSOCIATION OF INDUSTRIAL
TECHNOLOGY
3300 WASHTENAW AVE, SUITE 220
ANN ARBOR MI 48104-4200

CAMPUS AND STUDENT SERVICES

ASU East is a student-centered campus that offers many of the features of a small residential college in a suburban 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: mediated classrooms and modern 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, and copy center. 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. Qualified undergraduate and graduate students provide tutoring to individual students or study groups by appointment or on a drop-in basis. Writing assistance is offered both face-to-face and online through the Learning Center Web site to students seeking help with any written assignment. Other services include workshops on writing, presentation and study skills, and computer-assisted instruction. Learning Center tutors also staff the Freshman Year Experience hall study room during weekday and evening hours.

The Learning Center is located in the Academic Center Building. 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 300 workstations in five classrooms, three computing sites, and a Computing Commons, Information Technology (IT) at ASU East provides general computing services that include 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 more than 28 mediated classrooms and audiovisual materials 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, academic computing, and administrative computing.

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 examinations 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. Professional help is offered in the following areas: psychological issues, personal concerns, relationship issues, career/life decision making, and crisis intervention. Individual, couples, and group sessions are available at no cost. Students may schedule an appointment by calling 480/727-1255. Appointments may also be made in person at Student Counseling 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, résumé 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.

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

ASU East and Chandler-Gilbert Community College are partners in providing recreation, intramural, and group fitness opportunities on the Williams Campus. A \$30 per semester fitness membership provides access to the Physical Activity Center (PAC) and the Chandler-Gilbert Physical Education Center. Facilities include:

1. a fitness center with state-of-the-art strength training and cardiovascular equipment;

ASU EAST

2. two aerobic studios and equipment for step aerobics, fitness cycling, and kickboxing;
3. a martial arts studio featuring a fully padded floor;
4. racquetball courts;
5. a gymnasium for intramural and open recreation;
6. an all-weather quarter mile track with an infield for soccer, ultimate Frisbee, and flag football;
7. four newly resurfaced tennis courts with lights for evening play; and
8. a seasonal swimming pool (May–October) with lights.

At the fitness center, trained exercise and wellness professionals are available to perform assessments, develop programs, and provide expert advice and personal training assistance.

In addition to the facilities, the PAC runs group fitness programs that are free of charge with the paid fitness membership. Classes are offered Monday through Thursday and include fitness cycling, yoga, aerobic fitstep, aerobic kickboxing, water aerobics, strength and conditioning, and cultural dance classes. A full schedule of intramural programs and special events are also offered at the PAC. Times for open recreation, such as pick-up games, are scheduled at the facilities.

ASU East students have developed clubs that work closely with the recreation programs to offer unique recreation experiences, including hiking, West African dance, flamenco dancing, and sunrise yoga.

For more information, access the PAC Web site at www.east.asu.edu/pac, or call 480/727-1972. The Chandler-Gilbert Fitness Center can be reached 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 a student chooses, 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.

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.

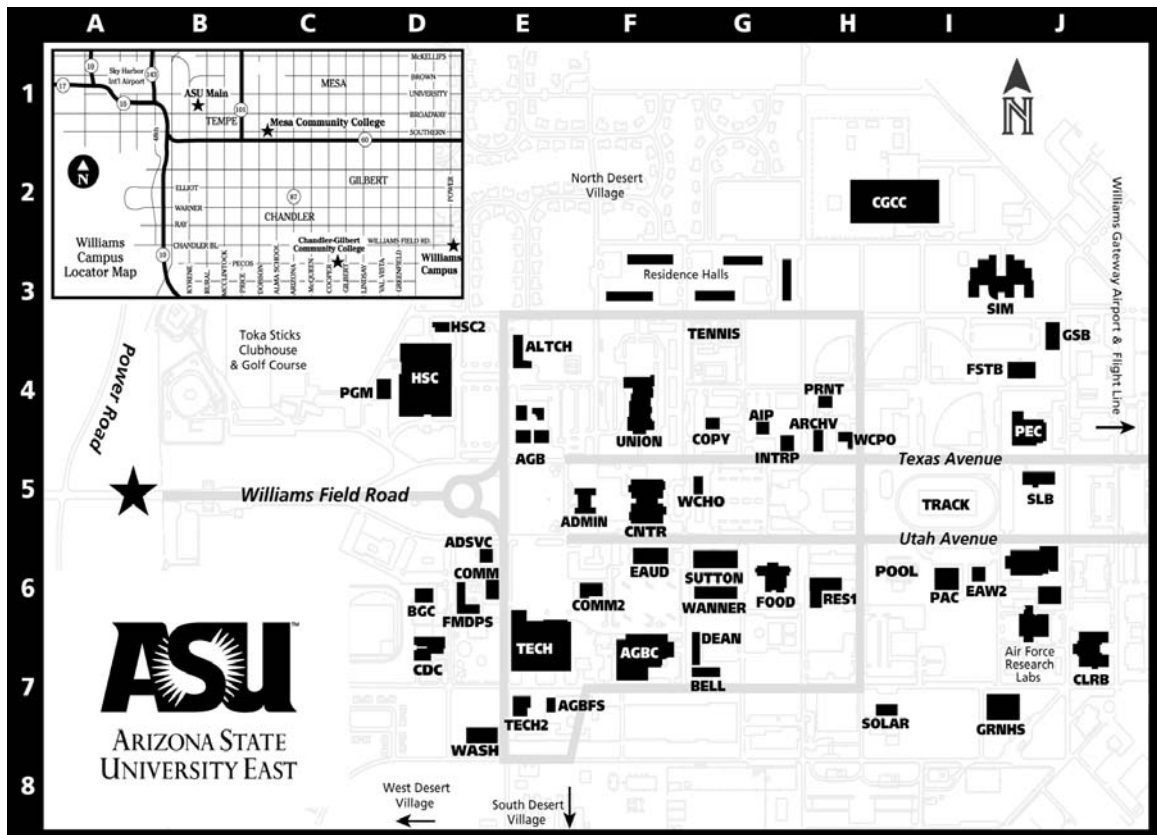
Houses. A large number of two- to four-bedroom houses are available for students with families or for groups of single undergraduate or graduate students. Each house includes basic appliances.

Faculty Fellows. The Faculty Fellows program provides opportunities for faculty to interact with students outside of the classroom and to build academic community on campus. Fellows join students for meals in the dining hall, participate in special events, such as the Leadership Conference, and help plan a variety of activities, including field trips, the Faculty Film Series, and community service projects. Through these informal meetings faculty enhance students' opportunities for learning outside of the classroom, and develop mentoring relationships, which help students make the most of their college experience. For more information about this program, call 480/727-1452.

The Residence Life Leadership Award. The Residence Life Leadership Award (RLLA) is designed to encourage the "best and brightest" ASU East undergraduates to live on campus and participate in a leadership development program. Applicants are selected for the RLLA based on:

1. the strength of their academic performance in high school;
2. their record of active involvement in leadership and/or service activities in their community;
3. their willingness to be actively involved in the leadership development program and in campus life at ASU East during their award year; and
4. the quality, completeness, and overall presentation of their application materials.

RLLA recipients receive a \$1,000 waiver that is applied toward their housing costs at ASU East. Five first-time freshmen and five continuing or new transfer students are selected for the awards each academic year. For more information, call 480/727-1452.



- | | | | |
|--------------|--|---------------|--------------------------------------|
| ADMIN | Administration Building (F5) | GRNHS | Greenhouses (I7) |
| ADSV | Administrative Services (E5) | GSB | General Studies Building (J4) |
| AGB | Morrison School of Agribusiness and Resource Management Complex 1-4 (E4) | HSC | Health Sciences Center (D4) |
| AGBC | Agribusiness Center (F7) | HSC2 | Health Sciences Center Research (D4) |
| AGBFS | Agribusiness Food Science Lab (E7) | INTRP | International Projects (G4) |
| AIP | American Indian Programs (G4) | PAC | Physical Activity Center (I6) |
| ALTCH | Altitude Chamber Building (E3) | PEC | Physical Education Center (J5) |
| ARCHV | Library Archives (H4) | PGM | Professional Golf Management (D4) |
| BELL | Bell Hall (F7) | POOL | Swimming Pool (H6) |
| BGC | Boys and Girls Club (D6) | PRNT | IMT Print Facility (H4) |
| CDC | Child Development Center (D7) | RES1 | Freshman Experience Dorm (H6) |
| CGCC | Chandler-Gilbert Community College (H2) | SIM | Flight Simulator Building (I3) |
| CLRB | Classroom Building (J7) | SLB | Science Lab Building (J5) |
| CNTR | Academic Center Building (F5) | SOLAR | Photovoltaic Testing Lab (H7) |
| COMM | Telecommunications (D6) | SUTTON | Sutton Hall (G6) |
| COMM2 | Communications Annex (E6) | TECH | Technology Center (E7) |
| COPY | Williams Express Copy Services (G4) | TECH2 | Technology Center Annex (E7) |
| DEAN | Dean Hall (F6) | TENNIS | Tennis Courts (G3) |
| EAUD | Auditorium (F5) | UNION | Williams Campus Union (F4) |
| EAW2 | Exercise Instructional Lab Building (I6) | WANNER | Wanner Hall (G6) |
| FMDPS | Facilities Management/DPS (D6) | WASH | Launderette (D7) |
| FOOD | Williams Campus Dining Hall (G6) | WCHO | Williams Campus Housing Office (G5) |
| FSTB | Fire Science Technology Building (I4) | WCPO | Williams Campus Post Office (H4) |

ASU East Directory

For the “ASU Main Directory,” see page 356. For the “ASU West Directory,” see page 452. For the “ASU Extended Campus Directory,” see page 468.

Organization	Location	Telephone	Web Address
Agribusiness and Resource Management, Morrison School of Professional Golf Management	CNTR 20	480/727-1585	www.east.asu.edu/msabr
American Indian Programs	CNTR 20	480/727-1017	www.east.asu.edu/msabr/pgm
Bookstore	AIP	480/727-1161	www.east.asu.edu/aip
Campus Copy Center, Williams		480/727-1075	
Campus Union	CNTR 102	480/727-1168	www.asu.edu/east/admin/business.htm
Cashiering Services	COPY	480/727-1616	www.asu.edu/east/admin/business.htm
Computing Commons, ASU East	UNION	480/727-1098	www.asu.edu/east/cls/union.htm
East College	CNTR 81	480/727-1081	www.asu.edu/east/admin/business.htm
Advising	CNTR 150	480/727-1118	www.east.asu.edu/infotech/labs
Applied Biological Sciences	CNTR 92	480/727-1515	www.east.asu.edu/ecollege
Applied Psychology, Faculty of		480/727-1333	—
Business Administration, Faculty of	CNTR 92	480/727-1515	—
Education, Faculty of	CNTR 92	480/727-1515	www.east.asu.edu/ecollege/appliedpsych
Exercise and Wellness, Department of	COMM2	480/727-1103	www.east.asu.edu/ecollege/businessadmin
Human Health Studies, Faculty of	CLRB 102	480/727-1945	www.east.asu.edu/ecollege/education
Multimedia Writing and Technical Communication, Faculty of	CLRB 102	480/727-1065	www.east.asu.edu/ecollege/wellness
Nutrition, Department of	CNTR 92	480/727-1515	www.east.asu.edu/ecollege/humanhealth
Fitness Center, Williams Campus	HSC 1386	480/727-1728	www.east.asu.edu/ecollege/multimedia
General Information	WCFC Bldg	480/988-8400	www.east.asu.edu/ecollege/nutrition
Housing, Williams Campus	CNTR	480/727-3278	www.asu.edu/east/cls/recreation.htm
Learning Center	Garden Level		www.east.asu.edu
Library Services	WCHO Bldg	480/727-1700	www.asu.edu/east/cls/housing
OASIS (Student Services)*	CNTR 160	480/727-1452	www.east.asu.edu/learningcenter
Provost, Office of the	CNTR 110	480/727-1037	eastlib.east.asu.edu
Student Health Services	CNTR	480/727-3278	www.east.asu.edu/sta/contact1.html
Technology and Applied Sciences, College of	Garden Level		
Aeronautical Management Technology, Department of	CNTR 30	480/727-1028	—
Electronics and Computer Engineering Technology, Department of	HSC	602/222-6568	www.asu.edu/east/student/stuheal.html
Information and Management Technology, Department of	CNTR 10	480/727-1874	www.east.asu.edu/ctas
Mechanical and Manufacturing Engineering Technology, Department of	SIM 201	480/727-1381	eastair.east.asu.edu
	TECH 101	480/727-1029	www.east.asu.edu/ctas/ecet
	TECH 102	480/727-1781	www.east.asu.edu/ctas/imt
	SIM 295	480/727-1584	www.east.asu.edu/ctas/mmet

* 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

Adams, Troy B. (2002), Assistant Professor of Exercise and Wellness; B.S., M.S., Brigham Young University; Ph.D., University of Texas, Austin

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; 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

Baxter, Harry R. (1982), Professor Emeritus of Electronics Engineering Technology; B.A., New York University; M.B.A., Fairleigh Dickinson University; M.Tech., Arizona State 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 Mechanical and Manufacturing Engineering Technology; B.S., M.S., Southern Illinois University; Ed.D., Arizona State University

Brady, Ward W. (1973), Professor of Applied Biological Sciences; Head, Applied Biological Sciences; B.S., M.S., Ph.D., Colorado State University

Brock, John H. (1977), Professor of Applied Biological Sciences; Coordinator, Sustainable Technologies, Agribusiness, and Resources Center; 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 Mechanical and Manufacturing Engineering Technology; B.Arch., Virginia Polytechnic Institute and State University; M.S., Ph.D., University of Illinois, Chicago

Cooke, Nancy J. (2003), Professor of Applied Psychology; B.A., George Mason University; M.A., Ph.D., New Mexico State University

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 Mechanical and Manufacturing Engineering Technology; Chair, Department of Mechanical and Manufacturing 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

ASU EAST FACULTY AND ACADEMIC PROFESSIONALS

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. (1998), 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

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 Applied Biological Sciences; 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; Project Director, International Projects Unit; B.A., University of the Pacific; M.S., Ph.D., Purdue University

Gryder, Missy (2001), Lecturer of Education; B.A., M.B.A., Ed.D., Arizona State University

H

Hall, Richard E. III (2002), Lecturer of Nutrition; B.S., Northern Arizona University; M.S., Arizona State University

Hampl, Jeffrey (1998), Assistant Professor of Nutrition; B.S., Liberty University; M.S., University of Massachusetts, Lowell; Ph.D., University of Nebraska

Harris, La Verne 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; 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 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

Hughner, Renee D. (2002), Assistant Professor of Agribusiness and Resource Management; B.S., M.B.A., University of Massachusetts, Amherst; Ph.D., Arizona State University

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

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 E. (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, Chris A. (1990), Associate Professor of Applied Biological Sciences; B.S., California Polytechnic State University and University of Southern California; M.S., Auburn University; Ph.D., University of Florida

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), 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; Head, Faculty of Human Health Studies; 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 Applied Biological Sciences; 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

Morgan, Owen W. (1968), Professor Emeritus of Nutrition; B.A., Grinnell College; M.A., University of Nebraska, Omaha; Ph.D., University of Nebraska, Lincoln

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 Mechanical and Manufacturing 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

Ohmart, Robert D. (1970), Professor of Applied Biological Sciences; B.S., M.S., New Mexico State University; Ph.D., University of Arizona

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 Mechanical and Manufacturing 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 Mechanical and Manufacturing Engineering Technology; B.S., University of Arizona; M.S., Stanford University; Ph.D., University of Hawaii

ASU EAST FACULTY AND ACADEMIC PROFESSIONALS

Prest, Alison (2002), Lecturer of Education; B.A., Arizona State University; M.S.Ed., Northern Arizona University

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 Mechanical and Manufacturing Engineering Technology; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., Georgia Institute of Technology

Reed, William H. (1968), Professor Emeritus of Mechanical and Manufacturing 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 (Canada); 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

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)

Robinson, Daniel O. (1950), Professor Emeritus of Agribusiness and Resource Management; A.B., Brigham Young University; M.S., University of Arizona; Ph.D., Ohio State University

Roe, Keith B. (1979), Professor Emeritus of Technology; B.S., Wisconsin State College; M.A., University of Michigan

Rogers, Bradley B. (1984), Associate Professor of Mechanical and Manufacturing Engineering Technology; B.S., M.S., Montana State University; Ph.D., 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 W. (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, East College; Vice Provost, Academic Programs, 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

Skilton, Paul F. (2003), Assistant Professor of Business Administration; B.A., University of California; M.B.A., Boston College; Ph.D., Arizona State University

Steele, Kelly P. (2002), Associate Professor of Applied Biological Sciences; B.A., Ph.D., University of California

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

Stutz, Jean C. (1981), Associate Professor of Applied Biological Sciences; B.S., Ursinus College; M.S., University of Delaware; Ph.D., Pennsylvania 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-Z

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

Tripp, Wayne E. (2002), Lecturer of Aeronautical Management Technology; B.S., Liberty University; M.E., Lynchburg College

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

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

Watkins, Thomas B. (1972), Professor Emeritus of Technology; B.S., University of Wyoming; M.S., Arizona State University
Watson, Emma J. (1999), Lecturer of Business Administration; B.A., Sonoma State University; M.Ed., Western Washington University
Welty, Ellen L. (1996), Reference/Instruction Librarian, ASU East Library Services; B.A., University of Wyoming; M.L.S., University of Arizona
Wenhart, James C. (1996), Senior Lecturer of Education; B.S., M.Ed., Arizona State University
Whitehouse, Richard O. (1997), Senior Lecturer of Electronics and Computer Engineering Technology; B.S., Worcester State College; M.S., University of Tennessee
Whysong, Gary L. (1974), Associate Professor of Applied Biological Sciences; 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
Winham, Donna M. (2002), Assistant Professor of Nutrition; B.S., Keene State College; M.A., University of Arizona; Dr.P.H., University of California, Los Angeles
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
Woolf, Kathleen (2002), Assistant Professor of Nutrition; B.S., Arizona State University; M.S., University of California, Los Angeles; Ph.D., Arizona State University
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

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
 Vice Provost, Administrative Services Terry C. Isaacson
 Director, American Indian Programs Phillip J. Huebner
 Director, Information Technology Kati L. Weingartner
 Interim Director, Public Affairs C. Vinette Williams
 Director, Library Services Charles W. Brownson
 Vice Provost, 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 Mechanical and Manufacturing Engineering Technology Scott G. Danielson
 Project Director, International Projects Unit Gary M. Grossman

East College

Dean, East College David E. Schwalm
 Chair, Department of Exercise and Wellness William J. Stone
 Chair, Department of Nutrition Linda A. Vaughan
 Head, Applied Biological Sciences Ward W. Brady
 Head, Faculty of Applied Psychology Roger W. Schvaneveldt
 Head, Faculty of Business Administration Roger W. Hutt
 Head, Faculty of Education Bette S. Bergeron
 Head, Faculty of Human Health Studies William L. Mermis
 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

ASU West

www.west.asu.edu

Elaine P. Maimon, Ph.D., Provost, ASU West; Vice President, ASU

Arizona State University West, a vital component of ASU's multicampus structure, serves nearly 7,000 students on its growing campus in northwest Phoenix. The four-year urban campus features a friendly, supportive atmosphere in the context of a nationally acclaimed, PAC-10 University. Courses at ASU West lead to 29 bachelor's degrees, nine master's degrees, and eight professional certificates through the Colleges of Arts and Sciences, Education, and Human Services; the School of Management; and the Division of Collaborative Programs.

Faculty and staff are dedicated to serving the evolving needs of high school graduates, working adults, and returning and continuing students. Expanding campus facilities and programs, along with a diverse student body, faculty, and staff, contribute to a culturally rich academic and social campus environment.

ASU West's mission encompasses research and teaching, faculty-student research collaboration, interdisciplinary perspectives, and the development of university-community partnerships. Academic programs, classes, and student services are innovative and provide students with a high-quality 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. 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, housing facilities, 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. For more information, call 312/263-0456, access the Web site at www.ncahigherlearningcommission.org, or write

HIGHER LEARNING COMMISSION
30 N LASALLE ST
SUITE 2400
CHICAGO IL 60602-2504

Professional programs in various academic areas are also accredited.

The Business and Accountancy degree programs in the School of Management are accredited by 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 471.

ACADEMIC ORGANIZATION AND ADMINISTRATION

The provost provides executive leadership for the continuing development and management of the campus and reports to the executive vice president and provost 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 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 454, and "[ASU West Administrative Personnel](#)," page 460.

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

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 admission 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 graduate degree programs, see the current *ASU West Catalog* or *ASU West Schedule of Classes*. For applications and admission information, call 602/543-4567, 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

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 PROGRAMS

Refer to the "ASU West Graduate Degrees and Majors" table, 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.

For more information on ASU West degree requirements, see the *ASU West Catalog* in print or on the Web at www.west.asu.edu/acadaffairs/catalog.

Certificates

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* or www.west.asu.edu/acadaffairs/catalog.

LIBRARY SERVICES

The ASU West Library provides resources that support the curricula of ASU West with a collection of 315,000 volumes, 1.4 million microforms, 7,500 videos, 15,000 slides, 277 electronic databases, and nearly 6,000 serial titles, including more than 4,000 electronic full-text journals. Approximately 47 percent of electronic databases are available to ASU registered users from home computers.

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. 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.

For library hours and information, call 602/543-8501.

ASU WEST

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. recruitment and outreach,
8. registration services,
9. student employment,
10. student health services,
11. student life, and
12. veterans services.

For more information, visit the University Center Building, access the Web site at www.west.asu.edu/sa, call 602/543-8203, or write

STUDENT AFFAIRS
ARIZONA STATE UNIVERSITY WEST
PO BOX 37100
PHOENIX AZ 85069-7100

STUDENT HOUSING

A new 400-bed student housing facility is scheduled to open at ASU West in August 2003. The project features two three-story buildings of apartment-style residential units with full kitchens, laundry facilities, a community hall with multipurpose rooms and a computer lab, a swimming pool, and convenient parking. Amenities will include tutoring services, academic advising, in-room Internet access, coordinated educational and social activities, and dining services close to campus. The expense to residents will be competitive with the rental costs of nearby apartment complexes. For more information, call 602/543-CASA.



View of ASU West campus from Fletcher Library

Arthur Holeman photo

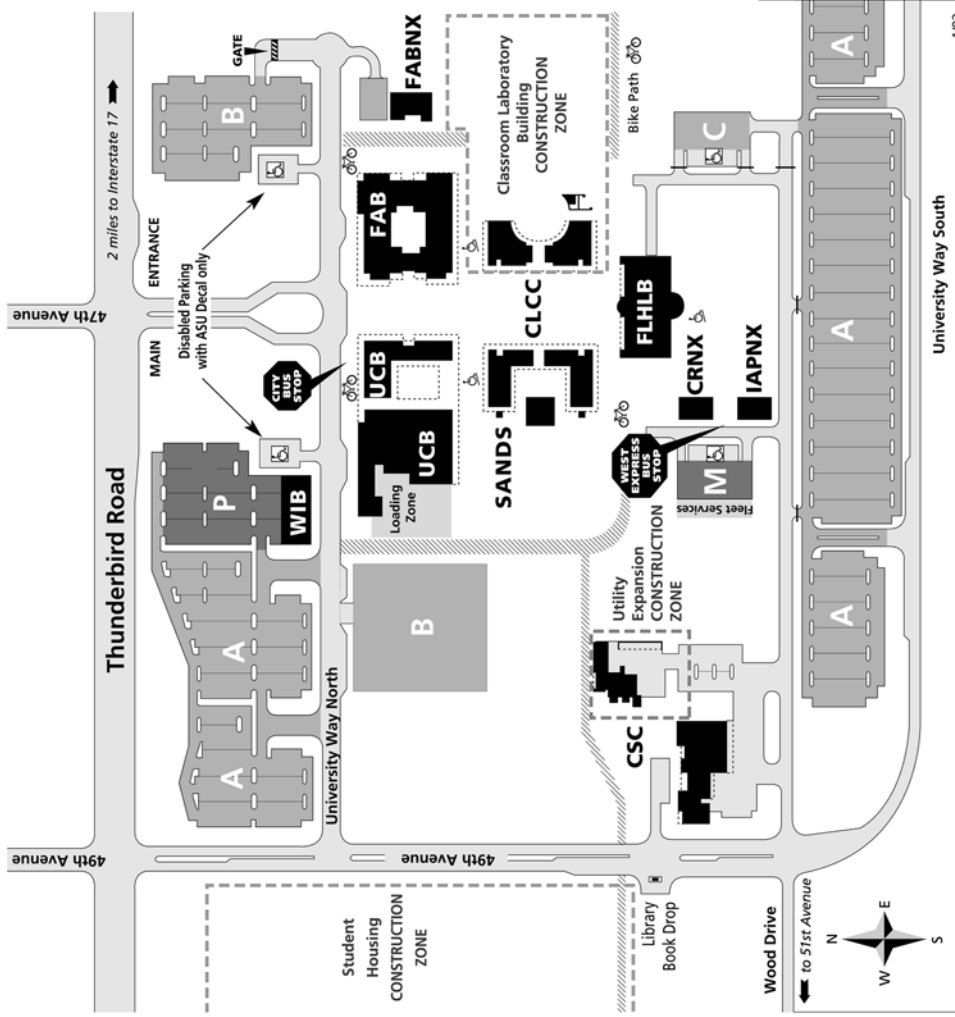
BUILDING LEGEND

- 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
 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
Classroom Lab/Computer Classroom Building (CLCC)

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.



1103

University Way South



(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 356. For the “ASU East Directory,” see page 442. For the “ASU Extended Campus Directory,” see page 468.

Organization	Location	Telephone	Web Address
Academic Affairs	FAB N301	602/543-4500	www.west.asu.edu/acadaffairs
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	FAB 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 226	602/543-8186	www.west.asu.edu/asasuw
ASU West	—	602/543-5500	www.west.asu.edu
Barrett Honors College	UCB 201	602/543-4503	www.asu.edu/honors
Bookstore	UCB 140	602/543-6800	www.west.asu.edu/adaff/auxs/bookstore
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	FAB N206	602/543-4BAS	www.west.asu.edu/bas
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	—	602/543-4327	—
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
First-Year Advising Center	UCB 105	602/543-WCAC	www.west.asu.edu/wcac
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 S121	602/543-6603	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
Learning Enhancement Center	FLHLB LL2	602/543-6151	www.west.asu.edu/lec
Library	FLHLB	602/543-8501	www.west.asu.edu/library

Organization	Location	Telephone	Web Address
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	FAB N120-A	602/543-6101	www.west.asu.edu/som
Quantitative Business Analysis,			
Department of			
Management, Department of	FAB N120-D	602/543-6204	www.west.asu.edu/som
Master of Business Administration 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
Native American Support Services Programs	UCB 201	602/543-8138	www.west.asu.edu/nativeamerican
Parking Services (Decals, Appeals)	WIB 101	602/543-7275	www.west.asu.edu/adaff/auxs/parking
Provost, Office of the	FAB N303	602/543-7000	—
Recruitment and Outreach	UCB 201	602/543-8143	www.west.asu.edu/recruitment
Research Consulting Center	UCB 201	602/543-3410	www.west.asu.edu/rcc
Residency Classification	UCB 120	602/543-8203	www.west.asu.edu/admissions
Student Employment	UCB 120	602/543-8178	www.west.asu.edu/financialaid
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 (TRiO)	UCB 220	602/543-8121	www.west.asu.edu/trio
Testing Services	WIB 102	602/543-8136	www.west.asu.edu/testing
Veteran Student Services	UCB 120	602/543-8220	www.west.asu.edu/veteran/vetinfo.htm
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

ASU West Faculty and Academic Professionals

A

Achilles, Elayne R. (1986), Associate Professor of Education; B.M.Ed., Temple University; M.M., Ed.D., Arizona State University

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

Allgood, Tammy (2002), Assistant Librarian; B.A., University of Arizona; M.S., University of North Carolina

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

Anokye, A. 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, 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 (1999), Associate Professor of Information Systems Management; 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 Emeritus of Human Services; Certificate of Social Work, University of Strathclyde (United Kingdom); D.S.W., University of Pennsylvania

Bredbenner, Candice D. (1990), Associate Professor of American Studies; Associate 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

Broadbudd, 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

Buscher, Dick (2002), Lecturer of Elementary Education; B.S., M.S., Eastern Illinois University; Ed.D., Arizona State University

Bushfield, Suzanne Y. (2002), Assistant Professor of Social Work; B.M., Southern Methodist University; M.S.W., University of Southern Mississippi; Ph.D., University of Idaho

Buss, Ray R. (1990), Associate Professor of Educational Psychology; Assistant Dean, College of Education; B.S., M.S., Ph.D., University of Wisconsin, Madison

C

Cabrera, Luis (2002), Assistant Professor of Political Theory; B.A., Western Washington University; M.F.A., Eastern Washington University; Ph.D., University of Washington

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
- Carey, Jane M.** (1988), Associate Professor of Information Systems Management; B.S., M.B.A., Eastern Illinois University; Ph.D., University of Mississippi
- Carter, Wendy** (1997), Assistant Professor of Sociology; B.A., Stanford University; M.S., Carnegie Mellon University; M.S., Ph.D., University of Wisconsin, Madison
- 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
- Cheek, Jane** (2002), Lecturer of Elementary Education; B.A.E., M.Ed., Arizona State University West
- 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), Professor Emerita of Education; B.A., Saint Olaf College; M.A., Ed.D., Northern Arizona University
- Collins-Chobanian, Shari C.** (1994), Associate Professor of Philosophy; Director, Ethnic Studies Program; 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; B.A., University of California, Santa Cruz; M.A., Ph.D., University of California, Berkeley
- Cutrer, Emily F.** (1990), Professor of American Studies; Dean, College of Arts and Sciences; B.A., M.A., Ph.D., University of Texas, Austin
- Cutrer, Thomas W.** (1992), Associate 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
- Davidson, Ronald** (1997), Associate Professor of Accountancy; B.Comm., University of Manitoba (Canada); M.B.A., York University (Canada); Ph.D., University of Arizona
- De La Cruz, Yolanda** (1991), 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, Academic Programs and Graduate Studies; B.A., San Jose State University; M.A., Ph.D., University of Iowa
- Dennis, Douglas** (2003), Professor of Biology; Chair, Department of Life Sciences; B.A., Adrian College; Ph.D., University of Tennessee

- Deutch, Charles** (2002), Associate Professor of Molecular Biology; B.A., Reed College; Ph.D., University of California, Riverside
- Di Mare, Lesley** (1992), Associate Professor 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

- Ealy, Sandra A.** (2002), Field Director and Lecturer of Social Work; B.S.W., Temple University; M.S.W., University of Michigan, Ann Arbor
- 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
- farrelly, deg** (1991), Associate Librarian; B.A., Illinois State University; M.L.S., Rutgers, The State University of New Jersey
- Feezor-Buttes, Barbara** (1995), Assistant Professor of American Studies; B.A., University of California, Berkeley; M.A., Ph.D., University of California, Los Angeles
- Firat, A. Fuat** (1990), Professor of Marketing; Licencié en Economie, Istanbul University (Turkey); Ph.D., Northwestern University
- Fitzpatrick, Tanya R.** (2000), Associate Professor of Social Work; Director, Undergraduate Studies, Department of Social Work; B.A., Clark University; M.S.W., Simmons School of Social Work; Ph.D., Boston College
- Flint, G. David** (1998), Lecturer of Management; B.A., Grand Canyon University; M.I.M., American Graduate School of International Management; Ph.D., Texas A&M University
- Forster, Bruce A.** (2000), Professor of Economics; Dean, School of Management; B.A., University of Guelph (Canada); Ph.D., Australian National University (Australia)
- Foster, Will** (2001), Assistant Professor of Information Systems Management; B.A., Williams College; Ph.D., University of Arizona

G

- Gaffney, Cynthia** (2001), Instructor of Communication Studies; B.A., M.A., Arizona State University
- Gallegos, Bee** (1984), Associate Librarian; B.S., University of North Alabama; M.L.S., George Peabody College for Teachers
- Gater, Helen** (1970), Dean Emerita; B.A., Fort Hays University; M.A., University of Denver
- George, Peggy J.** (2001), Lecturer of Elementary Education; B.A., Arizona State University; M.Ed., Ed.D., University of Massachusetts, Amherst

ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

Gilkerson, John S. (1991), Associate Professor of History; A.B., Amherst College; M.A., University of Oklahoma; Ph.D., Brown University

Gitelson, Richard (1994), Professor of Recreation and Tourism Management; Director, Gerontology Program; B.A., M.A.T., M.S., University of North Carolina, Chapel Hill; Ph.D., Texas A&M University

Glass, Ronald D. (1996), Associate Professor of Professional Core; B.A., Harvard College; M.A., Ph.D., Stanford University; Ed.M., Harvard University; C.Phil., University of California, Berkeley

Goldman, Alan (2002), Lecturer of Management; B.Ed., University of Miami, Coral Gables; M.A., San Francisco State University; Ph.D., University of Colorado, Boulder

Gonzalez-Jensen, Margaret (1994), Associate Professor of Bilingual Education; B.A., Our Lady of the Lake University; M.A., Ed.D., Texas A&M University

Gonzales, David S. (2002), Associate Professor of Animal Physiology; B.S., Metropolitan State College, Denver; M.S., Ph.D., University of Wisconsin, Madison

Gopalakrishnan, Mohan (1998), Associate Professor of Operations Production Management; B.E., College of Engineering (India); M.S., Ph.D., University of Alabama, Tuscaloosa

Gordon, Aubrie (2002), Instructor of Social Work; B.A., M.A., M.S.W., Ph.D., Western Michigan University

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

Greenstein, Marilyn (2000), Associate Professor of Accountancy; B.B.A., University of Houston; Ph.D., Temple University

Griffin, Marie (1997), Assistant Professor of Administration of Justice; B.S., Santa Clara University; Ph.D., Arizona State University

Gruber, Diane (1995), Lecturer of Communication Studies; B.A., Rutgers, The State University of New Jersey; M.A., Ph.D., Purdue University

Gutierrez, Sara E. (1990), Associate Professor of Psychology; B.S., M.A., Ph.D., Arizona State University

H

Haarr, Robin N. (1994), Associate Professor of Administration of Justice; B.S., State University of New York, Brockport; M.S., Ph.D., Michigan State University

Haas, Nancy S. (1986), Associate Professor of Curriculum and Instruction; Chair, Department of Secondary Education; B.A., M.Ed., Ph.D., Arizona 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

Hansen, Cory C. (2001), Assistant Professor of Reading/Language Arts; B.Ed., University of Calgary (Canada); M.Ed., Ph.D., Arizona State University

Harken, Henry R. Jr. (1986), Associate Librarian; B.A., Hofstra University; M.S.L.S., Long Island University

Harris, Kathleen C. (1990), Professor of Special Education; B.A., M.Ed., Rutgers, The State University of New Jersey; Ph.D., Temple University

Hattenhauer, Darryl (1988), Associate Professor of American Literature; B.A., M.A., California State University; Ph.D., University of Minnesota, Twin Cities

Hay, Victoria (1993), Senior Lecturer of Writing; B.A., University of Arizona; M.A., Ph.D., Arizona State University

Hayden, Mary (1998), Lecturer of Management; B.A., M.P.A., D.P.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

Hewitt, Kim A. (2002), Visiting Assistant Professor of Integrative Studies; B.A., University of Maryland; M.A., Ph.D., University of Texas, Austin

Hultsman, John T. (1990), Professor of Recreation and Tourism Management; Interim Dean, College of Human Services; B.G.S., University of Kansas; M.S., University of Missouri; Re.D., Indiana University, Bloomington

Hultsman, Wendy (1990), Associate Professor of Recreation and Tourism Management; Chair, Department of Recreation and Tourism Management; B.S.E., State University of New York, Cortland; M.S., Indiana University, Bloomington; Ph.D., Pennsylvania State University

Hurwitz, Sally (2001), Lecturer; B.A.E., M.Ed., Ph.D., Arizona State University

I

Inman, Thomas E. (2002), Lecturer of Mathematics; B.A.E., M.A.E., Arizona State University

Irvin, Glenn W. (1997), Professor of English; B.A., M.A., Ph.D., Arizona State University

Irwin, Leslie (1995), Associate 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

J

Johnson, Carolyn R. (1995), Associate Librarian; B.A., Montclair State College; M.S.L.S., University of Illinois; M.B.A., University of Minnesota

K

Kammerlocher, Lisa (1988), Associate Librarian; B.S., M.L.S., University of Oklahoma

Kassing, Jeffrey W. (1998), Assistant Professor of Communication Studies; Director of Graduate Studies, Department of Communication Studies; B.A., William Jewell College; M.A., Murray State University; Ph.D., Kent State University

Katz, Charles (1997), Assistant Professor of Administration of Justice; Director of Graduate Studies, Department 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; Associate Artistic Director; 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)

Knopf, Richard C. (1986), Professor of Recreation and Tourism Management; Interim Director, Partnership for Community Development; B.S., M.S., Ph.D., University of Michigan

Koptiuch, Kristin (1992), Associate Professor of Anthropology; B.A., State University of New York, Binghamton; M.A., Ph.D., University of Texas, Austin

L

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; Director, Graduate Studies, 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

Lowe, D. Jordan (2003), Associate Professor of Accountancy; B.S., M.Acc., Brigham Young University; Ph.D., Arizona State 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; 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), 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, The State University of New Jersey; 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 G. M. (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

Mesquita, Luiz F. (2003), Assistant Professor of Management; B.Sc., University of Sao Paulo (Brazil); M.Sc., Ph.D., Purdue University

Mezner, 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), Associate 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 Quantitative Business Analysis; B.A., Rockford College; Ph.D., Texas A&M University

Mohan, Srimathy (1999), Assistant Professor of Operations 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

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

Myers, Marilyn (1987), Librarian; Dean, ASU West Library; B.A., M.A., Kansas State University; M.S., University of Illinois; Ph.D., Purdue University

N

Nadesan, Majia H. (1994), Associate Professor of Communication Studies; B.A., M.A., San Diego State University; Ph.D., Purdue University

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; Faculty Director, Division of Collaborative Programs; B.A., University of Denver; M.A., Ph.D., University of Utah

Náñez, José E. Sr. (1988), Professor of Psychology; B.A., M.A., California State University; Ph.D., University of Minnesota, Twin Cities

Nevin, Ann (1988), Professor Emerita of 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

Noguchi, Emi (2003), Assistant Librarian; B.A., Hendrix College; M.S., University of Illinois, Urbana-Champaign

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

ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

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

Onofrey, Karen A. (2002), Assistant Professor of Reading/Language Arts; B.S., Westfield State College; M.Ed., American International College; Ph.D., University of Arizona

P

Painter, Suzanne R. (1995), Associate 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

Perry, Eleanor A. (1996), Associate 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

Pough, F. Harvey (1993), Professor of Integrative Biology; B.A., Amherst College; M.A., Ph.D., University of California, Los Angeles

Pulido, Alberto L. (1993), Associate Professor of American Studies; B.A., University of California, San Diego; M.A., Ph.D., University of Notre Dame

R

Raiser, Tiffany C. (2002), Lecturer of Rhetoric and Composition; B.A., Fu-Jen Catholic University (Taiwan); M.A., Sussex University (United Kingdom); M.Ed., Ph.D., Arizona State University

Ramsey, R. Eric (1994), Associate Professor of Communication Studies; Faculty Director, Barrett Honors College; B.A., Rutgers, The State University of New Jersey; M.A., Ph.D., Purdue University

Reese, Ruth (1988), Assistant Professor of Elementary Education; B.S., University of Wisconsin, Madison; M.S., Ph.D., University of Wisconsin, Milwaukee

Renne, Diane J. (2000), Assistant Professor 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

Ruff, William G. (2002), Assistant Professor of Educational Administration; B.S., Colorado State University, Fort Collins; M.A., Webster University; M.A., Ed.D., University of Texas, San Antonio

Ryan, Joseph M. (1995), Professor of Education; 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

Schmidtke, Paul C. (1998), Senior Lecturer of Astronomy; B.S., Rose-Hulman Institute of Technology; Ph.D., Ohio State University

Searle, Mark S. (1995), Professor of Recreation and Tourism Management; Vice Provost for Academic Affairs; 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 Emerita of Human Services; 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

Simmons, William P. (2002), Assistant Professor of Political Theory; B.A., University of Wisconsin; M.A., Ph.D., Louisiana 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

Soto, Leandro (2002), Senior Lecturer and Artist in Residence; B.F.A., National School for the Arts (Cuba); M.F.A., University of Havana (Cuba)

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

Swenson, Daniel (2000), Associate Professor of Accountancy; B.A., Memphis State University; Ph.D., University of Mississippi

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

Thording, Lars (2002), Lecturer of Marketing; B.Ed., Royal Danish School of Educational Studies (Denmark); M.A., Odense University (Denmark); Ph.D., University of Southern Denmark (Denmark)

Toel, William H. (2001), Lecturer of Finance; M.B.A., University of Illinois, Chicago

Toth, Stephen A. (2000), Assistant Professor of History; B.A., B.S., University of Nebraska at Omaha; M.A., Arizona State University; Ph.D., Indiana University

Tsoudis, Olga (2002), Visiting Assistant Professor of Administration of Justice; B.S., Cornell University; M.A., Ph.D., University of Arizona

U

Ukpanah, Ime J. (2001), Assistant Professor of History; B.S., M.A., Sam Houston State University; Ph.D., University of Houston

V

Vakiladeh, Ardeshir (2002), Lecturer of Mathematics; B.S., Florida Agricultural and Mechanical University; M.S., Ph.D., Tehran University (Iran)

Van Fleet, David D. (1989), Professor of Management; Director, Master of Business Administration Program; B.S., Ph.D., University of Tennessee, Knoxville

Vaughan, Suzanne (1987), Associate Professor of Sociology; B.A., Roanoke College; M.A., University of New Mexico; Ph.D., Ohio State University

Vickrey, Don W. (1992), Professor of Accountancy; B.B.A., University of Houston; M.B.A., Ph.D., University of Texas, Austin

W

Waldman, David A. (1995), Professor of Management; B.A., University of Kentucky; M.S., Ph.D., Colorado State University

Waldron, Kathleen M. (2002), Lecturer of Gerontology; B.A., University of Dayton; M.S., University of Texas, Dallas

Waldron, Vincent R. (1992), Professor of Communication Studies; B.A., M.A., University of Arizona; Ph.D., Ohio State University

Webb, Vincent J. (1996), Professor of Administration of Justice; B.A., University of Omaha; M.A., University of Nebraska, Omaha; Ph.D., Purdue University

Wertheimer, Eric (1995), Associate Professor of American Literature; B.A., Haverford College; M.A., Ph.D., University of Pennsylvania

Wetzel, Keith (1991), Professor of Educational Technology; B.A., Greenville College; M.A., Goddard College; M.A., Ph.D., University of Oregon

Wilhelm, Lance A. (2002), Lecturer of Technology in Education; B.S., M.S., Ph.D., Iowa State University

Williams, Mia K. (2002), Lecturer of Technology in Education; B.S., Northern Arizona State University; M.Ed., Arizona State University

Wilson, Denward J. (1989), Lecturer of Philosophy; B.A., Arizona State University; M.A., University of California, Davis

Wise, John Macgregor (1999), Associate Professor of Communication Studies; Chair, Department of Communication Studies; B.A., Trinity University; M.A., University of Illinois, Urbana-Champaign; Ph.D., Purdue University

Wosinska, Wilhelmina (1994), Senior Lecturer of Social Psychology; B.A., University of Warsaw (Poland); M.A., Ph.D., Jagiellonian University (Poland)

Y

Yungbluth, Stephen C. (2000), Lecturer of Communication Studies; B.A., Xavier University; M.A., 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 Gijón (Spain); M.S.S.A., Ph.D., Case Western Reserve University

ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

ASU West Administrative Personnel

Administration

Provost, ASU West; Vice President, ASU	Elaine P. Maimon
Executive Vice Provost	Gebeyehu Ejigu
Vice Provost for Academic Affairs	Mark S. Searle
Associate Vice Provost, Academic Programs and Graduate Studies	Fernando Delgado
Associate Vice Provost, Research and Faculty Development	Manuel Ávalos
Director, Curriculum and Academic Articulation	Julia R. Ramsden
Director, Research Consulting Center	Joseph M. Ryan
Faculty Director, Barrett Honors College	R. Eric Ramsey
Vice Provost for Planning and Budget	Barry R. Bruns
Vice Provost for Institutional Advancement	Carol A. Poore
Dean, ASU West Library	Marilyn Myers
Dean of Students	Jo Ann Madonna

College of Arts and Sciences

Dean, College of Arts and Sciences	Emily F. Cutrer
Associate Dean, College of Arts and Sciences	Candice D. Bredbenner
Cochair, Department of American Studies	A. Duku Anokye
Cochair, Department of American Studies	Thomas W. Cutrer
Chair, Department of Integrative Studies	Linda L. Stryker
Chair, Department of Interdisciplinary Arts and Performance	Robert D. Taylor
Chair, Department of Life Sciences	Douglas Dennis
Chair, Department of Social and Behavioral Sciences	Paul A. Miller
Chair, Women's Studies Program	Astair G. M. Mengesha

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

Interim Dean, College of Human Services	John T. Hultsman
Chair, Department of Administration of Justice	<i>To Be Appointed</i>
Chair, Department of Communication Studies	John Macgregor Wise
Chair, Department of Recreation and Tourism Management	Wendy Hultsman
Chair, Department of Social Work	Melissa R. Lavitt
Director, Gerontology Program	Richard Gitelson
Interim Director, Partnership for Community Development	Richard C. Knopf
Liaison, Nursing (ASU Main Program)	Lasca Beck

Division of Collaborative Programs

Faculty Director, Division of Collaborative Programs	Afsaneh Nahavandi
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School of Management

Dean, School of Management	Bruce A. Forster
Chair, Department of Accounting and Information Systems Management	William A. Duncan
Chair, Department of Economics, Finance, Marketing and Quantitative Business Analysis	Joseph A. Bellizzi
Chair, Department of Management	Leanne E. Atwater

ASU Extended Campus

www.asu.edu/xed

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 beyond. 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.

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 university 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 462.

Graduate Degrees

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 MBA 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

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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 a concentration in 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. Call 520/884-5507 for more information about the Tucson 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.

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

Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education

Major	Degree	Concentration	Administered By
Business Administration	M.B.A.	—	W. P. Carey School of Business (ASU Main) School of Management (ASU West)
Curriculum and Instruction	M.Ed.	Secondary education	Division of Curriculum and Instruction
Educational Administration and Supervision	Ed.D.	—	Division of Educational Leadership and Policy Studies
Electrical Engineering	M.S.E.	—	Department of Electrical Engineering
Engineering	M.E.*	—	School of Engineering
Public Administration	M.P.A.	Nonprofit administration	School of Public Affairs
Social Work	M.S.W.	Advanced direct practice; planning, administration, and community practice	School of Social Work
Technology	M.S.Tech.	Environmental technology management	Department of Information and Management Technology (ASU East)

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

(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 in this program must pass a comprehensive examination covering topics in the major. Using the department’s three-year schedule of courses, students are able to complete course requirements over the interactive television system. For more information, call 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 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 Ari-

zona—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.Tech.

ASU East. The faculty in the Department of Information and Management Technology offer this degree with a concentration in environmental technology management. Two areas of study are available within the concentration: international environmental management and 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 (environment, safety, and health), 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 taken 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

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ARIZONA STATE UNIVERSITY
PO BOX 870603
TEMPE AZ 85287-0603

Winter Session (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 at all ASU campuses 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 College of Human Services (at ASU West), is available to all ASU graduate students enrolled in master's or doctoral degree programs in disciplines such as communication, exercise science, nursing, psychology, social work, and sociology. Nondegree graduate students may pursue the certificate. This program consists of 21 semester hours 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 602/543-6642.

Transportation Systems Certificate Program

The interdisciplinary studies certificate program offers current ASU graduate students and transportation professionals the opportunity to pursue a wide range of transportation-related issues from multimodal and interdisciplinary

perspectives. The certificate is intended to be either a specialization within an existing master's degree program or a stand-alone 15 semester hour nondegree program.

For more information, access the Web site at www.asu.edu/caed/transportation, or call 480/965-6693.

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 degrees. 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

ASU EXTENDED CAMPUS

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 220 courses offered by various ASU colleges each semester, and these courses are available for credit at a variety of remote locations, including students' homes. Videotapes of most televised courses are available through University Libraries. 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, and other cable providers. Televised courses are also available in university residence halls at ASU Main.

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 480/965-3590.

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 480/965-3590, 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 both an advisor's and a 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. Grades earned are not calculated in the ASU Honors G.P.A. 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 on registration, lesson formats, submission of assignments, correspondence with instructors, and other course details 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.

Global and Community Outreach

American English and Culture Program. The American English and Culture Program (AECPP) 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 may 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 AECPP: business English, pronunciation, conversation, TOEFL and TOEIC preparation, grammar, and idioms.

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 ses-

sions are offered in January and July. AECF 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/esl.

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 boardroom, 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 about the programs and services provided at the center, call 480/965-3046, or write

ASU DOWNTOWN CENTER
502 E MONROE ST
PHOENIX AZ 85004-4442

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 463, 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 the ASU Downtown Center at 480/965-3046.

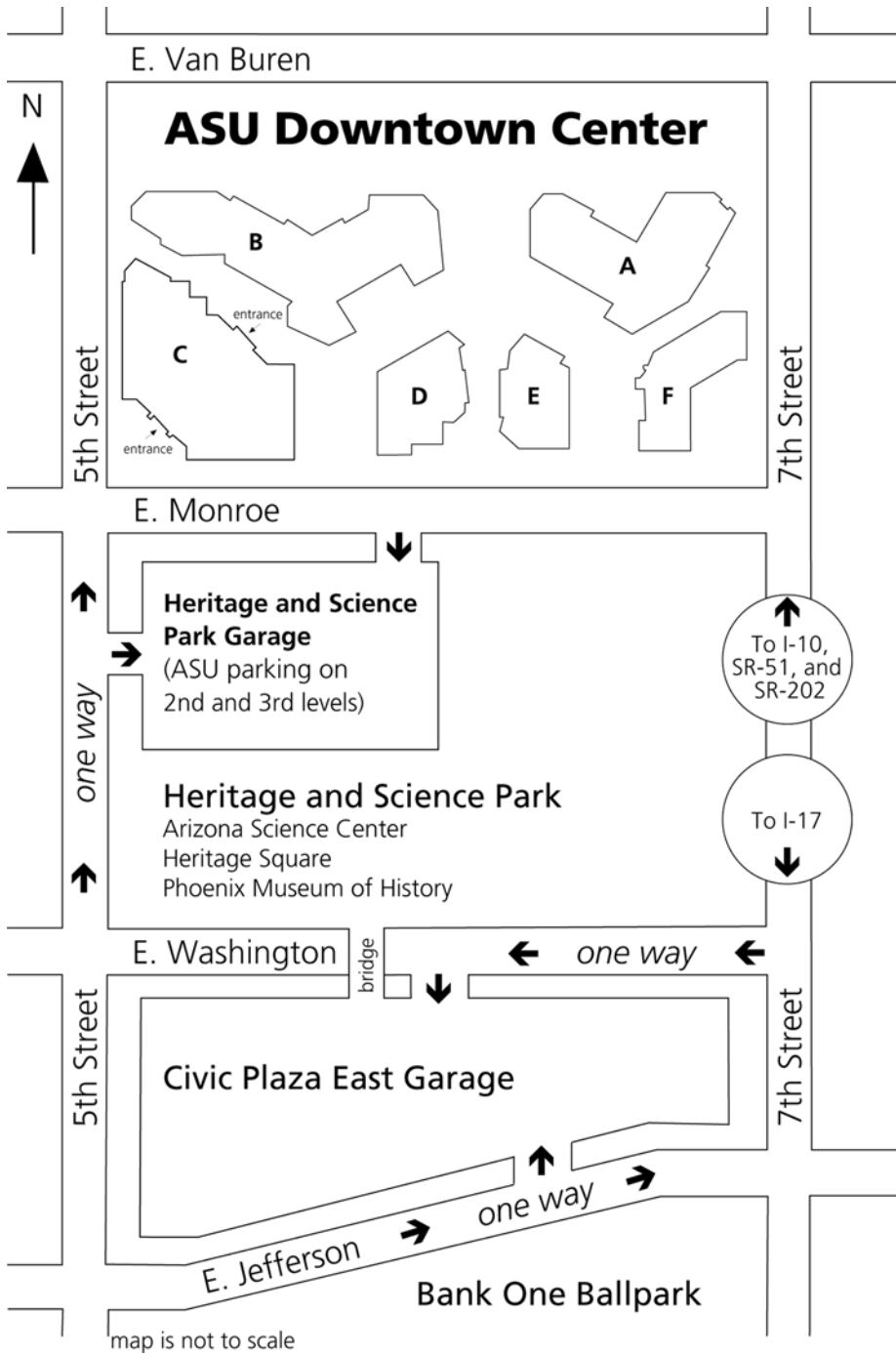
Advanced Public Executive Program. The Advanced Public Executive Program of the College of Public Programs is housed at the ASU Downtown Center. This program is designed to provide public managers and administrators with analytical approaches and skills through short courses and seminars to help mobilize 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 information about planning, mobilizing, training, and evaluating community prevention efforts, 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

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; B.A., Thiel College; M.S.W., Rutgers, The State University of New Jersey; Ph.D., 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

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

McLaws, 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

Mitchell, Marie (1980), Lecturer, College of Extended Education; B.A., Fort Hays State University; M.A., School for International Training

P

Pope, Donna (1999), Assistant Instructional Professional, College of Extended Education; Manager, Professional Development Programs, 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

ASU EXTENDED CAMPUS FACULTY AND ACADEMIC PROFESSIONALS

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

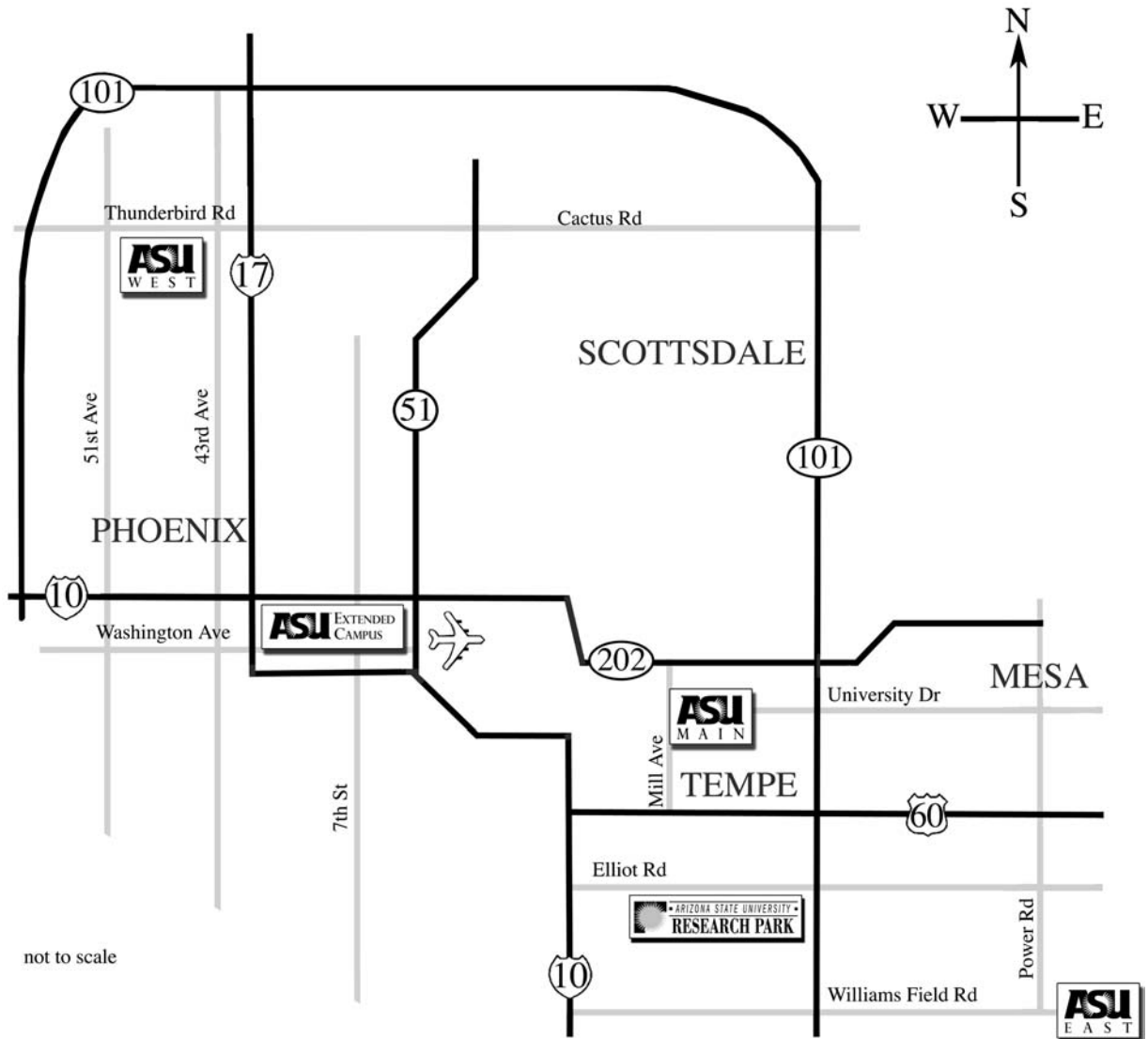
ASU Extended Campus Administrative Personnel

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, Distance Learning and Technology	Elizabeth H. Craft
Director, Downtown Center	Bette F. DeGraw
Director, Extended Campus Programs	Jim Patzer
Director, External Relations	Scott Sheldon
Director, Property Administration	Cathie Fox

ASU Extended Campus Directory

For the “ASU Main Directory,” see page 356. For the “ASU East Directory,” see page 442. For the “ASU West Directory,” see page 452.

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	—
Distance Learning and Technology	RITT A129	480/965-6738	www.dlt.asu.edu
Extended Campus Programs	ASUDC C250	480/965-3046	—
External Relations	ASUDC C250	480/727-5330	—
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	—
Winter Session	RITT B132	480/965-9797	www.asu.edu/xed/winter



East of Mill Avenue at University Drive, Tempe



ASU Downtown Center, Monroe and Fifth Streets, Phoenix



East of Power Road at Williams Field Road, 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. For more information, call 312/263-0456, access the Web site at www.ncahigherlearningcommission.org, or write

HIGHER LEARNING COMMISSION
30 N LASALLE ST
SUITE 2400
CHICAGO IL 60602-2504

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; and the “**Academic Affiliation and Membership**” table, page 472. 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 471.

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 B.S.D., Interior Design B.S.L.A. B.S.P., M.E.P. M.Arch. M.S.D., Design, with concentrations in graphic design and industrial design	National Association of Schools of Art and Design Foundation for Interior Design Education Research Landscape Architectural Accreditation Board Planning Accreditation Board National Architectural Accrediting Board National Association of Schools of Art and Design
College of Education M.C., Counseling Ph.D., Counseling Psychology; Educational Psychology, with a concentration in school psychology	Council for Accreditation of Counseling and Related Educational Programs American Psychological Association
College of Engineering and Applied Sciences B.S., Computer Science B.S., Construction B.S.E., Aerospace Engineering; Bioengineering; Chemical Engineering; Civil Engineering; Computer Systems Engineering; Electrical Engineering; Industrial Engineering; Materials Science and Engineering; Mechanical Engineering	Computer Science Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. American Council for Construction Education Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
College of Law J.D.	American Bar Association
College of Liberal Arts and Sciences B.S., Clinical Laboratory Sciences M.S., Communication Disorders M.S., Family and Human Development, with a focus in marriage and family therapy under the family studies concentration Ph.D., Psychology, with a concentration in clinical psychology	National Accrediting Agency for Clinical Laboratory Sciences American Speech-Language-Hearing Association Commission on Accreditation for Marriage and Family Therapy Education—Candidacy Status American Psychological Association

* This program is accredited through the ASU Main W. P. Carey School of Business.

Academic Accreditation at ASU Main and East (continued)

Unit or Program	Accredited By
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
M.P.A.	National Association of Schools of Public Affairs and Administration
Walter Cronkite School of Journalism and Mass Communication	Accrediting Council on Education in Journalism and Mass Communications
College of Technology and Applied Sciences B.S., Aeronautical Management Technology, with concentrations in professional flight and air transportation management	Council on Aviation Accreditation
B.S., Electronics Engineering Technology; Manufacturing Engineering Technology; Aeronautical Engineering Technology	Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Industrial Technology, with concentrations in environmental technology management, graphic information technology, and industrial technology management	National Association of Industrial Technology
East College B.S., Business Administration*	AACSB International, the Association to Advance Collegiate Schools of Business American Dietetic Association
B.S., Nutrition (didactic program in dietetics); M.S., Nutrition (dietetic internship)	
Herberger College of Fine Arts Department of Theatre School of Music	National Association of Schools of Theatre National Association of Schools of Music
W. P. Carey School 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

* This program is accredited through the ASU Main W. P. Carey School of Business.

Academic Accreditation at ASU West

Unit or Program	Accredited By
College of Human Services B.S.W., Department of Social Work Department of Recreation and Tourism Management	Council on Social Work Education 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

ACCREDITATION AND AFFILIATION

Academic Affiliation and Membership

Unit or Program	Affiliation or Membership 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
	Architectural Research Centers Consortium
	Association for Computer-Aided Design in Architecture
School of Design	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
	Society of Environmental Graphic Designers
School of Planning and Landscape Architecture	American Planning Association
	American Society of Landscape Architects
	Association of Collegiate Schools of Planning
	Council of Educators in Landscape Architecture
College of Education	American Association of Colleges for Teacher Education
	American Educational Research Association
	American Psychological 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 Chemistry and Biochemistry	American Association for the Advancement of Science
	American Chemical Society
	American Society for Advancement of Science
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 Kinesiology	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

Academic Affiliation and Membership (continued)

Unit or Program	Affiliation or Membership With
Department of Kinesiology (continued)	Society for Experimental Biology
Department of Languages and Literatures	Society for Neuroscience
	American Council on Teaching Foreign Language
Department of Mathematics and Statistics	International Studies Association
	Modern Language Association
	American Mathematical Society
Department of Military Science	Mathematical Association of America
Department of Philosophy	Rocky Mountain Mathematics Consortium
Department of Physics and Astronomy	Society for Industrial and Applied Mathematics
	Association of U.S. Army
	American Philosophical Association
	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 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
School of Life Sciences	American Association of Immunologists
	American Association of Immunology
	American Chemical Society
	American Institute of Biological Sciences
	American Society for Biochemistry and Molecular Biology
	American Society for Microbiology
	American Society for Photobiology
	American Society for Virology
	American Society of Cell Biology
	American Society of Horticultural Science
	American Society of Naturalists
	American Society of Plant Physiologists
	American Society of Plant Taxonomy
	American Society of Zoologists
	Animal Behaviorists' Society
	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

ACCREDITATION AND AFFILIATION

Academic Affiliation and Membership (continued)

Unit or Program	Affiliation or Membership With
School of Life Sciences (continued)	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 Psi Sigma Xi Society for Economic Botany Society for Neuroscience Society of Ecological Restoration Society of Wetlands Scientists Soil Science Society of America Southwestern Association of Naturalists
Women's Studies Program	Association for Women in Science National Women's Studies Association
College of Nursing	American Association of Colleges of Nursing National Organization of Nurse Practitioner Faculties Western Institute of Nursing
Continuing and Extended Education Programs	Arizona Nurses Association (American Nurses Credentialing Center's Commission on Accreditation)
College of Public Programs	
Department of Recreation Management and Tourism	American Humanics, Inc. 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 Nonprofit Academic Centers Council 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	American Society of Criminology Arizona Justice Educators Association of Criminal Justice Doctoral Programs Consortium for Graduate Law and Society Programs Justice Studies Association National Academic Advising Onati International Institute for the Sociology of Law Society for the Study of Social Problems
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

Academic Affiliation and Membership (continued)

Unit or Program	Affiliation or Membership With
Walter Cronkite School of Journalism and Mass Communication	Association of Schools of Journalism and Mass Communication Broadcast Education Association
East College	
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 Nutrition	American Dietetic Association
Graduate College	
Herberger College of Fine Arts	
Department of Theatre	American Alliance for Theatre and Education Association for Theatre in Higher Education United States Institute of Theatre Technology
School of Music	American Music Therapy Association
Morrison School of Agribusiness and Resource Management	
B.S., Agribusiness with a concentration in professional golf management	Professional Golfer's Association of America
B.S., M.S., Environmental Resources	Society for Range Management

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Building Abbreviations

For building abbreviations used in the *General Catalog*, *Graduate Catalog*, *Schedule of Classes*, and *Summer Sessions Bulletin*, see the “Building Abbreviations” table below. For the ASU Main map, see the inside back cover. For other locations, see the “ASU East Map,” page 441; “ASU West Map,” page 451; and “ASU Downtown Center Map,” page 466.

Building Abbreviations

Abbreviation	Name	Wings	Location
ADM	Administration	A, B	Main
ADPCM	Adelphi Commons	—	Main
AED	College of Architecture and Environmental Design/North	—	Main
AG	Agriculture Building	—	Main
AGB1–4	ASU East Agribusiness Quads 1–4	—	East
AIP	ASU East American Indian Programs	—	East
ALTCH	ASU East Altitude Chamber	—	East
ANTH	Anthropology Building	—	Main
ANX	Visual Arts Annex	—	Main
AQUAT	Mona Plummer Aquatics Center	A, B	Main
ARCH	College of Architecture and Environmental Design/South	—	Main
ARCV	University Archives	—	Main
ART	Art Building	—	Main
ARWH	Art Warehouse	—	Main
ASUDC	Downtown Center	—	502 E. Monroe St., Phoenix
BA	Business Administration Building	—	Main
BAC	Business Administration C-Wing	—	Main
BKSTR	ASU Bookstore	—	Main
CERA	Ceramics Annex	A, B	Main
CFS	Center for Family Studies	—	Main
CHAPL	Danforth Chapel	—	Main
CHOLA	Cholla Apartments	—	Main
CLCC	Classroom Laboratory/Computer Classroom Building	—	West
CLRB	ASU East Classroom Building	—	East
CMPIN	Campus Inn	—	Main
CNTR	ASU East Academic Center Building	—	East
COMM2	ASU East Communications Building	—	East
COOR	Lattie F. Coor Mediated Classroom Building	—	Main
COWDN	Cowden Family Resources Building	—	Main
CP	Central Plant	—	Main
CPCOM	Computing Commons Building	—	Main
CRI	Cancer Research Institute	—	Main
CRNX	Classroom Annex	—	West
CSAC	Nadine and Ed Carson Student Athlete Center	—	Main

BUILDING ABBREVIATIONS

Building Abbreviations (continued)

Abbreviation	Name	Wings	Location
CSB	Community Services Building	—	200 E. Curry Road, Tempe
CSC	Central Services Complex	—	West
DPSMN	Department of Public Safety	—	Main
EAW2	ASU East Exercise Instructional Lab Building	—	East
ECA	Engineering Center A-Wing	—	Main
ECANX	Engineering Center Annex	—	Main
ECB	Engineering Center B-Wing	—	Main
ECC	Engineering Center C-Wing	—	Main
ECD	Engineering Center D-Wing	—	Main
ECE	Engineering Center E-Wing	—	Main
ECF	Engineering Center F-Wing	—	Main
ECG	Engineering Center G-Wing	—	Main
ED	Hiram B. Farmer Education Building	—	Main
EDB	Ira D. Payne Education Hall	—	Main
EDC	Education Lecture Hall	—	Main
ELAB	Electronics Laboratory Building	—	West
ENGRC	Engineering Research Center	—	Main
ENVIR	Environmental Lab	—	Main
FAB	Faculty and Administration Building	—	West
FABNX	Faculty and Administration Building Annex	—	West
FAC	Nelson Fine Arts Center	—	Main
FDSC1	ASU East Agribusiness Food Science Lab	—	East
FIELD	University Field Lab	—	Main
FLHLB	Fletcher Library	—	West
GGMA	Grady Gammage Memorial Auditorium	—	Main
GHALL	Dixie Gammage Hall	—	Main
GWC	Barry M. Goldwater Center for Science and Engineering Research	—	Main
HAYDN	Hayden Hall	—	Main
HSC	ASU East Health Sciences Center	—	East
HSC2	ASU East Health Sciences Center Research	—	East
IAPNX	Interdisciplinary Arts and Performance Annex	—	West
ICA	Intercollegiate Athletics	—	Main
IRISH	Frederick M. Irish Hall	A–C	Main
LAW	John S. Armstrong Hall	—	Main
LAWLB	John J. Ross–William C. Blakley Law Library	—	Main
LIB	Charles T. Hayden Library	—	Main
LL	G. Homer Durham Language and Literature Building	—	Main
LSA	Life Sciences A-Wing	—	Main
LSC	Life Sciences C-Wing	—	Main
LSE	Life Sciences E-Wing	—	Main
LYC	Lyceum Theatre	—	Main

Building Abbreviations (continued)

Abbreviation	Name	Wings	Location
MAIN	Old Main	—	Main
MANZH	Manzanita Hall	—	Main
MARIP	Mariposa Hall	—	Main
MB	M.O. Best Hall	A–C	Main
MCENT	A.J. Matthews Center	—	Main
MCL	James H. McClintock Hall	—	Main
MHALL	Carrie Matthews Hall	—	Main
MOEUR	B.B. Moeur Administration	—	Main
MTCHL	Mitchell School	—	900 S. Mitchell St., Tempe
MU	Memorial Union	—	Main
MUR	John Murdock Lecture Hall	—	Main
MUSIC	Music Building	E, W	Main
NEEB	L.S. Neeb Hall	—	Main
NOBLE	Daniel E. Noble Science and Engineering Library	—	Main
NUR	Nursing Building	—	Main
OCOT	Ocotillo Hall	—	Main
PABLO	San Pablo Residence Hall	—	Main
PAC	ASU East Physical Activity Center	—	East
PBS	Packard Baseball Stadium	—	Main
PEBE	Physical Education Building East	—	Main
PEBW	Physical Education Building West	—	Main
PGM	ASU East Professional Golf Management	—	East
PPS	Facilities Management	—	Main
PRNT	ASU East Technology Print Building	—	East
PS	George M. Bateman Physical Sciences Center	A–G	Main
PSH	Physical Sciences H-Wing	—	Main
PSY	Psychology Building	—	Main
PVE	Palo Verde East Hall	—	Main
PVM	Palo Verde Main Hall	—	Main
PVW	Palo Verde West Hall	—	Main
RITT	Ritter Building	A, B	Main
SAHU	Sahuaro Hall	—	Main
SANDS	Sands Classroom Building	—	West
SCOB	John W. Schwada Classroom Office Building	—	Main
SCRED	Sonora Center Residence Education Center	—	Main
SDF	Solar Demonstration Facility	—	Main
SHS	Student Health Service	A, B	Main
SIM	ASU East Flight Simulator Building	—	East
SOLAR	ASU East Photovoltaics Testing Laboratory	—	East
SRC	Student Recreation Complex	—	Main
SS	Social Sciences Building	—	Main

BUILDING ABBREVIATIONS

Building Abbreviations (continued)

Abbreviation	Name	Wings	Location
SSV	Student Services Building	—	Main
STAD	Sun Devil Stadium	—	Main
STAUF	Charles Stauffer Communication Arts Building	A, B	Main
TC	Technology Center	—	Main
TCB	Aeronautics Building	—	Main
TCC	Technology Center Annex	—	Main
TECH	ASU East Technology Center	—	East
TECH2	ASU East Technology Center Annex	—	East
THWH	Theatre Warehouse	—	Main
TMPCT	Tempe Center	—	929 (Suite 150) and 951 (Suite 190) S. Mill Ave., Tempe
TOWER	Tower Center*	A, B	Main
TRACK	Joe Selleh Track	—	Main
UASB	Undergraduate Academic Services Building	—	Main
UCB	University Center Building	—	West
UCLUB	University Club	—	Main
UNION	ASU East Williams Campus Union Building	—	East
USB	University Services Building	—	1551 S. Rural Road, Tempe
UVCMN	University Commons	—	Main
UWT	Unsteady Wind Tunnel	—	Main
VISIT	ASU Visitor's Information Center	—	Main
WFA	Wells Fargo Arena	—	Main
WFLD	ASU West Alternate Locations	—	West
WH	Warehouse	—	Main
WHALL	West Hall	—	Main
WIC	Welcome and Information Center	—	West
WILSN	George W. Wilson Hall	—	Main
WTC	Whiteman Tennis Center	—	Main

* The Tower Center is different from University Towers, 525 S. Forest Ave., which has no official building abbreviation.