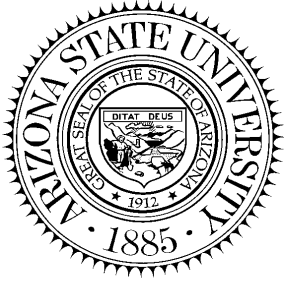


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# Arizona State University

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2004–2005 Graduate Catalog

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President Michael M. Crow

Tim Trumble photo

Dear ASU Students and Prospective Students:

It is my privilege to welcome you to Arizona State University and introduce you to the 2004–2005 *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 breadth 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

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ACC Accountancy .....	100	CCS Chicana and Chicano Studies .....	<i>General Catalog</i>
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AME Arts, Media, and Engineering .....	129	CIS Computer Information Systems.....	247
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HEB	Hebrew .....	<i>General Catalog</i>
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HHS	Human Health Studies .....	<i>General Catalog</i>
HIS	History.....	<i>ASU West Catalog</i>
HON	Honors.....	<i>General Catalog</i>
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HRM	Human Resources Management ...	<i>ASU West Catalog</i>
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HUM	Humanities .....	243
IAP	Interdisciplinary Arts and Performance.....	<i>ASU West Catalog</i>
IAS	Integrative Studies.....	<i>ASU West Catalog</i>
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IDN	Indonesian.....	<i>General Catalog</i>
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IMC	Information and Management Core .....	349
IMD	Instructional Media.....	<i>General Catalog</i>
IND	Industrial Design.....	<i>General Catalog</i>
INT	Interior Design.....	<i>General Catalog</i>
IPO	International Programs Overseas .....	51
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ITA	Italian.....	<i>General Catalog</i>
ITM	Industrial Technology Management.....	349
JAC	Joint Admission Continuous Enrollment.....	51
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JPN	Japanese.....	256
JUS	Justice Studies .....	248
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KOR	Korean .....	<i>General Catalog</i>
LAT	Latin .....	<i>General Catalog</i>
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## COURSE PREFIX INDEX

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PHI Philosophy .....296	SLV Slavic ..... <i>General Catalog</i>
PHS Physical Sciences .....301	SOC Sociology ..... 331
PHY Physics.....301	SPA Spanish..... 257
PLA Landscape Architecture .....217	SPE Special Education ..... 332
PLB Plant Biology.....304	SPF Social and Philosophical Foundations ..... 322
POL Political Science..... <i>ASU West Catalog</i>	STE Society, Values, and Technology ..... <i>General Catalog</i>
POR Portuguese ..... <i>General Catalog</i>	STP Statistics and Probability ..... 271
POS Political Science .....307	SWE Swedish..... <i>General Catalog</i>
PSY Psychology (Science and Mathematics).....113, 309	SWG Social Work (Graduate Program) ..... 328
PUB Scholarly Publishing .....319	SWU Social Work (Undergraduate Program) ..... 330
PUP Urban and Environmental Planning .....217	THA Thai..... <i>General Catalog</i>
QBA Quantitative Business Analysis ..... 144, 189	THE Theatre ..... 355
RDG Reading Education .....178	THP Theatre Performance and Production ..... 356
REA Real Estate .....144	TRC Transportation Systems Certificate..... 359
REC Recreation Management and Tourism.....317	TWC Multimedia Writing and Technical Communication ..... 279
REL Religious Studies.....318	UET Microelectronics Engineering Technology ..... 345
ROM Romanian ..... <i>General Catalog</i>	UNI Academic Success at the University ..... <i>General Catalog</i>
RUS Russian .....257	VTN Vietnamese..... <i>General Catalog</i>
SBS Social and Behavioral Sciences..... <i>ASU West Catalog</i>	WAC Writing Across the Curriculum..... <i>General Catalog</i>
SCA Scandinavian ..... <i>General Catalog</i>	WSH Women’s Studies Humanities ..... <i>General Catalog</i>
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# 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 15](#).

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 Advanced Study (M.A.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.Eng.)  
 Master of Environmental Planning (M.E.P.)

Master of Fine Arts (M.F.A.)  
 Master of Health Sector Management (M.H.S.M.)  
 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)  
 Professional Science Master’s (P.S.M.)  
 Doctor of Audiology (Au.D.)  
 Doctor of Education (Ed.D.)  
 Doctor of Musical Arts (D.M.A.)  
 Doctor of Nursing Science (D.N.S.)  
 Doctor of Philosophy (Ph.D.)  
 Juris Doctor (J.D.)

## ASU Graduate Degrees

Major	Degree	Concentration <sup>1</sup>	Campus	Page
Accountancy and Information Systems	M.A.I.S.	—	Main	<a href="#">99</a>
Aerospace Engineering	M.S., M.S.E., Ph.D.	—	Main	<a href="#">100</a>
Agribusiness	M.S.	Optional: agribusiness management and marketing, or food quality assurance <sup>1</sup>	East	<a href="#">102</a>
Anthropology	M.A.	Archaeology, bioarchaeology, linguistics, museum studies, physical anthropology, or social-cultural anthropology	Main	<a href="#">106</a>
	Ph.D.	Archaeology, physical anthropology, or social-cultural anthropology	Main	<a href="#">107</a>
Applied Biological Sciences	M.S.	GIS/remote sensing, natural resource management, or range ecology	East	<a href="#">110</a>
Applied Psychology	M.S.	—	East	<a href="#">113</a>
Architecture	M.Arch.	—	Main	<a href="#">114</a>
Art	M.A.	Art education or art history	Main	<a href="#">121</a>
	M.F.A.	Ceramics, digital technology, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, or wood	Main	<a href="#">122</a>

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.  
<sup>2</sup> Applications are not being accepted at this time.  
<sup>3</sup> This major is jointly offered with the University of Arizona.  
<sup>4</sup> Students apply to this degree program through the College of Law, not the Graduate College.

## ASU Graduate Degrees (continued)

Major	Degree	Concentration <sup>1</sup>	Campus	Page
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Bioengineering	M.S., Ph.D.	—	Main	131
Biology	M.S., Ph.D.	Optional: ecology <sup>1</sup>	Main	134
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, or facilities development and management	Main	117
Business Administration	M.B.A.	—	Main	138
			West	456
	Ph.D.	Accountancy, computer information systems, finance, health services research, <sup>2</sup> management, marketing, or supply chain management	Extended Main	469 139
Chemical Engineering	M.S., M.S.E., Ph.D.	—	Main	145
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, or solid-state chemistry	Main	148
Civil Engineering	M.S., M.S.E., Ph.D.	—	Main	150
Communication	M.A.	—	Main	154
	Ph.D.	Communicative development, intercultural communication, or organizational communication	Main	156
Communication Disorders	M.S.	—	Main	159
Communication Studies	M.A.	—	West	456
Composition	M.M.	Optional: interdisciplinary digital media and performance <sup>1</sup>	Main	281
Computational Biosciences	P.S.M.	—	Main	162
Computer Science	M.C.S.	—	Main	163
	M.S., Ph.D.	Optional: arts, media, and engineering <sup>1</sup>	Main	163
Construction	M.S.	Construction science, facilities, or management	Main	167
Counseling	M.C.	—	Main	169
Counseling Psychology	Ph.D.	—	Main	170
Counselor Education	M.Ed.	—	Main	171
Creative Writing	M.F.A.	—	Main	172
Criminal Justice	M.A.	—	West	456
Curriculum and Instruction	M.A.	Any M.Ed. concentration except professional studies	Main	174
		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, or social studies education	Main	174
	M.Ed.	English as a second language	East	174
	M.Ed.	Secondary education	Extended	470

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This major is jointly offered with the University of Arizona.

<sup>4</sup> 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 <sup>1</sup>	Campus	Page
Curriculum and Instruction (continued)	Ed.D.	Bilingual education, curriculum studies, early childhood education, elementary education, <sup>2</sup> English as a second language, Indian education, language and literacy, mathematics education, science education, secondary education, <sup>2</sup> or social studies education	Main	175
	Ph.D.	Art education, curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, language and literacy, mathematics education, physical education, science education, or special education	Main	180
Dance	M.F.A.	Optional: interdisciplinary digital media and performance <sup>1</sup>	Main	182
Design	M.S.D.	Graphic design, industrial design, or interior design	Main	184
Economics	M.S., Ph.D.	—	Main	187
Educational Administration and Supervision	M.Ed.	—	Main	191
	Ed.D.	—	West	456
			Main	192
			Extended	469
Educational Leadership and Policy Studies	Ph.D.	—	Main	193
Educational Psychology	M.A., M.Ed.	—	Main	195
	Ph.D.	Learning; lifespan developmental psychology; measurement, statistics, and methodological studies; or school psychology	Main	196
Educational Technology	M.Ed., Ph.D.	—	Main	197
Electrical Engineering	M.S., Ph.D.	Optional: arts, media, and engineering <sup>1</sup>	Main	199
	M.S.E.	—	Main	199
			Extended	471
Elementary Education	M.Ed.	Optional: bilingual education, educational technology, ESL education, or reading <sup>1</sup>	West	456
Engineering	M.Eng.	—	Main	204
			Extended	470
Engineering Science	M.S., Ph.D.	—	Main	206
	M.S.E.	Optional: executive embedded systems <sup>1</sup>	Main	206
			Extended	470
English	M.A.	Comparative literature, English linguistics, literature and language, or rhetoric and composition	Main	206
	Ph.D.	Literature or rhetoric/composition and linguistics	Main	207
Environmental Design and Planning	Ph.D.	Design; history, theory, and criticism; or planning	Main	213
Environmental Planning	M.E.P.	—	Main	216
Exercise and Wellness	M.S.	—	East	218
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, or physiology of exercise	Main	220
Family and Human Development	M.S.	Optional: family studies <sup>1</sup>	Main	221
Family Science	Ph.D.	Optional: marriage and family therapy <sup>1</sup>	Main	223
French	M.A.	Comparative literature, linguistics, or literature	Main	224

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This major is jointly offered with the University of Arizona.

<sup>4</sup> Students apply to this degree program through the College of Law, not the Graduate College.

## ASU Graduate Degrees (continued)

Major	Degree	Concentration <sup>1</sup>	Campus	Page
Geographic Information Systems	M.A.S.	—	Main	225
Geography	M.A., Ph.D.	—	Main	225
Geological Sciences	M.S., Ph.D.	—	Main	228
German	M.A.	Comparative literature, language and culture, or literature	Main	232
Health Sector Management	M.H.S.M.	—	Main	234
Higher and Postsecondary Education	M.Ed., Ed.D.	Optional: higher education <sup>1</sup>	Main	236
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, or U.S. Western history	Main	237
	Ph.D.	Asian history, British history, European history, Latin American history, or U.S. history	Main	238
History and Theory of Art <sup>3</sup>	Ph.D.	—	Main	123
Humanities	M.A.	—	Main	242
Industrial Engineering	M.S., M.S.E., Ph.D.	—	Main	244
Information Management	M.S.	—	Main	246
Interdisciplinary Studies	M.A.	—	West	456
Justice Studies	M.S.	—	Main	247
	Ph.D.	Optional: criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; or women, law, and justice <sup>1</sup>	Main	249
Kinesiology	M.S.	—	Main	251
Law <sup>4</sup>	J.D.	—	Main	258
Mass Communication	M.M.C.	—	Main	261
Materials Engineering	M.S., M.S.E.	—	Main	264
Materials Science	M.S.	—	Main	266
Mathematics	M.A., Ph.D.	—	Main	267
Mechanical Engineering	M.S., M.S.E., Ph.D.	—	Main	272
Microbiology	M.S., Ph.D.	—	Main	276
Molecular and Cellular Biology	M.S., Ph.D.	—	Main	278
Music	M.A.	Ethnomusicology, music history and literature, or music theory	Main	280
	D.M.A.	Conducting, interdisciplinary digital media and performance, music composition, music education, or performance	Main	283
Music Education	M.M.	Choral music, general music, instrumental music, jazz studies	Main	282
Natural Science	M.N.S.	Biology, chemistry, geological sciences, mathematics, microbiology, physics, and/or plant biology	Main	287

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This major is jointly offered with the University of Arizona.

<sup>4</sup> 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 <sup>1</sup>	Campus	Page
Nursing	M.S.	Adult health nursing, community health nursing, family health nursing, nursing administration, <sup>2</sup> parent-child nursing, psychiatric/mental health nursing, or women's health	Main Extended	288 471
	D.N.S.	—	Main	288
Nutrition	M.S.	—	East	293
Performance	M.M.	Music theatre/opera musical direction, music theatre/opera performance, performance, performance pedagogy, or piano accompanying	Main	280
Philosophy	M.A., Ph.D.	—	Main	295
Physical Education	M.P.E.	—	Main	251
Physics	M.S., Ph.D.	—	Main	297
Plant Biology	M.S., Ph.D.	Optional: ecology or photosynthesis <sup>1</sup>	Main	303
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, or political theory	Main	305
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, quantitative research methods, or social psychology	Main	309
Public Administration	M.P.A.	Optional: nonprofit administration <sup>1</sup>	Main Extended	311 470
	Ph.D.	—	Main	314
Public Health <sup>2</sup>	M.P.H.	Community health practice or health administration and policy	Main	—
Recreation	M.S.	—	Main	316
Religious Studies	M.A., Ph.D.	—	Main	317
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis or solid-state device materials design	Main	320
Secondary Education	M.Ed.	Optional: educational technology <sup>1</sup>	West	456
Social and Philosophical Foundations of Education	M.A.	—	Main	322
Social Work	M.S.W.	Advanced direct practice or planning, administration, and community practice Advanced generalist practice	Main Extended	323 471
			West	456
	Ph.D.	—	Main	326
Sociology	M.A., Ph.D.	—	Main	330
Spanish	M.A.	Comparative literature, language and culture, linguistics, or literature	Main	331
	Ph.D.	Cultural studies or literature		
Special Education	M.A.	—	Main	331
	M.Ed.	Gifted, mildly disabled, multicultural exceptional, or severely/multiply disabled Infants and young children	Main West	332 456
			Main	334
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, or neurogerontologic communication disorders	Main	334
Statistics	M.S.	—	Main	335
Taxation	M.Tax.	—	Main	337

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This major is jointly offered with the University of Arizona.

<sup>4</sup> Students apply to this degree program through the College of Law, not the Graduate College.

## ASU Graduate Degrees (continued)

Major	Degree	Concentration <sup>1</sup>	Campus	Page
Teaching English as a Second Language	M.TESL	—	Main	338
Technology	M.S.Tech.	Aeronautical engineering technology, aviation human factors, aviation management technology, computer systems, 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, or security engineering technology Environmental technology management	East Extended	339 471
Theatre	M.A.	—	Main	353
	M.F.A.	Interdisciplinary digital media, performance, scenography, or theatre for youth	Main	353
	Ph.D.	Optional: theatre for youth <sup>1</sup>	Main	354

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This major is jointly offered with the University of Arizona.

<sup>4</sup> Students apply to this degree program through the College of Law, not the Graduate College.

## Concurrent and Dual Degrees

Degrees	Administered By
J.D./M.B.A.	College of Law/W. P. Carey School of Business
J.D./M.H.S.M.	College of Law/School of Health Management and Policy
J.D./M.S. in Economics*	College of Law/Department of Economics
J.D./Ph.D. in Justice Studies	College of Law/School of Justice Studies
M.A. in Anthropology/M.S. in Justice Studies	Department of Anthropology/School of Justice Studies
M.A.I.S./M.B.A.	W. P. Carey School of Business
M.Arch./M.B.A.	School of Architecture/W. P. Carey School of Business
M.B.A./M.H.S.M.	W. P. Carey School of Business
M.B.A./M.S. in Economics	W. P. Carey School of Business
M.B.A./M.S. in Information Management	W. P. Carey School of Business
M.B.A./M.Tax.	W. P. Carey School of Business
M.B.A./Master of International Management	W. P. Carey School of Business/Carlos III University of Madrid (Spain); Graduate School of Business Administration (Peru); Graduate School of Commerce (France); Monterrey Institute for Technical and Superior Studies, Mexico State Campus (Mexico); and Thunderbird, the Garvin School of International Management
M.S. in Nursing/M.P.H.*	College of Nursing/University of Arizona College of Public Health
M.S.E. in Industrial Engineering/Master of International Management of Technology	Department of Industrial Engineering/Thunderbird, the Garvin School of International Management

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

# ASU Certificates

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

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

## ASU Graduate Certificates

Certificate	Administered By	Campus	Page
African and African Diaspora Studies, Graduate Certificate in	African and African American Studies Program	Main	101
Asian Studies, Graduate Certificate in	Center for Asian Studies	Main Extended	130 471
Atmospheric Science, Graduate Certificate in	College of Liberal Arts and Sciences and Ira A. Fulton School of Engineering	Main	130
Geographic Information Science, Interdisciplinary Certificate in	College of Liberal Arts and Sciences and the Graduate College	Main	224
Gerontology, Certificate in*	Gerontology Program	West Extended	456 471
Health Industry Leadership Graduate Certificate	W. P. Carey School of Business	Main	234
Indian Law Certificate	College of Law	Main	74
Institutional Research, Graduate Certificate in	College of Education	Main	247
Law, Science, and Technology, Certificate in	College of Law	Main	261
Linguistics, Graduate Certificate in	Committee on Linguistics	Main	261
Medieval Studies Certificate	Arizona Center for Medieval and Renaissance Studies (ACMRS)	Main	275
Museum Studies Certificate	Department of Anthropology	Main	107
Nonprofit Leadership and Management Certificate	College of Public Programs	Main	287
Post-Bachelor’s Artist Diploma	School of Music	Main	284
Post-Master’s Nurse Practitioner Certificate	College of Nursing	Main	288
Public Art, Graduate Certificate in	Katherine K. Herberger College of Fine Arts	Main	316
Renaissance Studies Certificate	ACMRS	Main	275
Scholarly Publishing Certificate	Department of History	Main	319
Statistics, Certificate in	Committee on Statistics and the Graduate College	Main	335
Transportation Systems Certificate	Committee on Transportation Systems and the Graduate College	Main Extended	358 472

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



# 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

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	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

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., May 4

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 30

Fri., July 30

Mon., Aug. 2

Tues. Aug. 3

Fri., Aug. 6

## 2004

Check the fall 2004 *Schedule of Classes* for details and to confirm these dates.

Thurs., Mar. 25–

Fri., Apr. 2

Mon., Apr. 19–

Sun., Aug. 29

Wed., Apr. 21–

Sun., Aug. 29

## 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

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

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

Restricted complete withdrawal deadline for eight-week session

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 or dissertation approval (due by 3 P.M.)

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

Second five-week session ends

## Fall Semester

Preregistration

Drop/add

Registration

## GRADUATE COLLEGE CALENDAR

### 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				

### September 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		

### October 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						

### November 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				

### December 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	

### January 2005

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 2005

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

Mon., Aug. 2

Tues., Aug. 3

Mon., Aug. 16

Mon., Aug. 16–  
Tues., Aug. 17

Tues., Aug. 17–  
Thurs., Aug. 19

Wed., Aug. 18

Wed., Aug. 18

Mon., Aug. 23

Mon., Sept. 6

Fri., Sept. 17

Wed., Oct. 13

Fri., Oct. 15

Fri., Oct. 29

Thurs., Nov. 11

Wed., Nov. 24

Thurs., Nov. 25–

Fri., Nov. 26

Wed., Dec. 1

Fri., Dec. 3

Tues., Dec. 7

Wed., Dec. 8

Thurs., Dec. 9–

Sat., Dec. 11;

Mon., Dec. 13–

Wed., Dec. 15

Fri., Dec. 10

Mon., Dec. 13

Tues., Dec. 14

Thurs., Dec. 16

Fri., Dec. 17

Sat., Dec. 18

2004

### 2004

Fri., Oct. 1

Tues., Dec. 28

Fri., Dec. 31

Fri., Jan. 14, 2005

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

Final tuition payment deadline for fall 2004  
(For students who register on or after the deadline,  
fees are due daily.)

International Student Fall 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 Faculty and Academic Professional Orientation and Reception

New graduate student orientation/reception (5–7 P.M.)

Instruction begins

Classes are excused for Labor Day holiday

Unrestricted course and complete withdrawal deadline

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

December graduation filing deadline

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

Final examinations

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

Last day to obtain signature of the Graduate College dean for thesis  
or dissertation approval (due by 3 p.m.)

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

Commencement

Some residence halls close for semester break

Midyear recess begins

### Winter Session

Winter Session registration begins

Winter Session instruction begins

Winter Session classes are excused for New Year's Day holiday

Winter Session instruction ends

**December 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	

**January 2005**

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 2005**

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				

**March 2005**

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 2005**

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 2005**

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 2005**

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		

**2005**

Check the spring 2005 *Schedule of Classes* for details and to confirm these dates.

Mon., Oct. 25–  
Tues., Nov. 2, 2004

Mon., Nov. 15, 2004–  
Sun., Jan. 23, 2005

Wed., Nov. 17, 2004–  
Sun., Jan. 23, 2005

Tues., Dec. 14, 2004

Mon., Jan. 10–  
Tues., Jan. 11

Tues., Jan. 11

Wed., Jan. 12

Mon., Jan. 17

Tues., Jan. 18

Tues., Feb. 8

Sun., Feb. 13

Sun., Mar. 13–  
Sun., Mar. 20

Thurs., Mar. 31

Fri., Apr. 1

Wed., Apr. 6

Fri., Apr. 22

Wed., Apr. 27

Fri., Apr. 29

Tues., May 3

Wed., May 4

Thurs., May 5–  
Sat., May 7

Mon., May 9–  
Wed., May 11

Fri., May 6

Mon., May 9

Tues., May 10

Thurs., May 12

Fri., May 13

**Spring Semester**

Preregistration

Drop/add

Registration

Final tuition payment deadline for spring 2005 (For students who register on or after the deadline, fees are due daily.)

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

International Student Spring Orientation and activities

Residence halls open

Classes are excused for Martin Luther King Jr. Day holiday

Instruction begins

Thesis/Dissertation Workshop, Memorial Union, Arizona Ballroom (3–5 P.M.)

Unrestricted course and complete withdrawal deadline

Classes are excused for spring recess; semester midpoint

May graduation filing deadline

Restricted course withdrawal deadline

Graduate Forum and Information Fair

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

Restricted complete withdrawal deadline

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

Instruction ends

Reading day

Final examinations

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

Last day to obtain signature of the Graduate College dean for thesis and dissertation approval (due by 3 P.M.)

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

Commencement

Residence halls close

**GRADUATE COLLEGE CALENDAR**

**April 2005**

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 2005**

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 2005**

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 2005**

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 2005**

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			

**2005**

- Check the 2005 *Summer Sessions Bulletin* for details and to confirm these dates.
- Mon., Jan. 31–  
Wed., June 1
- Mon., Jan. 31–  
Wed., July 6
- Tues., May 3
- Mon., May 30
- Tues., May 31
- Tues., June 7
- Fri., June 17
- Fri., June 24
- Fri., July 1
- Fri., July 1
- Mon., July 4
- Tues., July 5
- Tues., July 12
- Fri., July 15
- Fri., July 15
- Fri., July 22
- Fri., July 22
- Fri., July 29
- Fri., July 29
- Fri., July 29
- Mon., Aug. 1
- Tues., Aug. 2
- Fri., Aug. 5

**Summer Sessions**

- Registration and drop/add for first five-week session and eight-week session
- Registration and drop/add for second five-week session
- Final tuition payment deadline for all summer sessions (For students who register on or after the deadline, fees are due daily.)
- Memorial Day holiday
- Instruction begins for first five-week session and eight-week session
- Unrestricted course and complete withdrawal deadline for first five-week session 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
- 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
- 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 (due by 3 P.M.)
- Last day to submit thesis or dissertation to ASU Bookstore for binding (due by 3 P.M.)
- Second five-week session ends

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# Frequently Asked Questions

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**Admission Information?** Requests for applications should be directed to Graduate Admissions at 480/965-6113 or [grad-q@asu.edu](mailto:grad-q@asu.edu). For more information, visit [www.asu.edu/graduate/admissions](http://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 does not waive, defer, or refund the fee. A decision cannot be made on your application until the \$50 application processing fee is paid.

**Campus Map?** See the “ASU Main Map,” on the inside back cover; “ASU East Map,” page 447; “ASU West Map,” page 458; and the “ASU Downtown Center,” page 474. 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 interactive Web site at [www.asu.edu/interactive](http://www.asu.edu/interactive) using your ASURITE UserID and password. If you have not activated your ASURITE UserID, do so at [www.asu.edu/asurite](http://www.asu.edu/asurite) using your ASURITE UserID and activation code included in your application acknowledgement letter. If you wish to contact your department, you can find departmental contact information at [www.asu.edu/graduate](http://www.asu.edu/graduate); click on “Graduate Studies.”

**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 Student Financial Assistance Office, Student Services Building, 480/965-3355. For more information, access [www.asu.edu/graduate/financial](http://www.asu.edu/graduate/financial) on the Web.

*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](http://www.asu.edu/graduate/admissions) on the Web.

**Housing?**

*On Campus.* Graduate Student Housing is available. For more information, call Residential Life at 480/965-3515, or send e-mail to [reslife@asu.edu](mailto: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](http://www.asu.edu/reslife) on the Web.

*Off Campus.* Information is available from the ASASU Tenants/Commuter Students Association, 480/965-4216. 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 admitting the student to a graduate degree program and receiving an acceptable Financial Guarantee Form.

**Immunization?** Students born after December 31, 1956, must receive a measles immunization or offer proof of measles immunity. For more information, call 480/965-8177, send e-mail to [measles@asu.edu](mailto:measles@asu.edu), or access [www.asu.edu/health](http://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](http://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 362, 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?** Staff members can give personal information to only 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 “English Language Requirement,” page 86.

**Transcripts?** See “Transcripts,” page 43.

# 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 436.

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 477.

## 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

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-of-its-kind, student-founded Intergroup Relations Center (IRC) enhances the university's primary directives of teaching and learning through the application of social justice approaches to diversity, intergroup relations programming, and scholarship in partnership with campus and external communities.

Through structured interaction programs for faculty, staff, and students—including intergroup dialogues, retreats, institutes, and 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, age, ethnicity, sexual orientation, disability status, nationality, adult re-entry, and other salient social identities found at ASU.

The center offers student programs that complement courses. For example, the Voices of Discovery intergroup dialogue program brings together small groups of students from different backgrounds for honest, reflective dialogue guided by trained facilitators. Additional programs include weekend retreats on diversity in the professions and on service leadership, and research and practicum internships on diversity and social justice issues.

For faculty and staff, the center offers initiatives addressing issues of diversity in the workplace and the classroom. These include the annual Faculty Diversity Conference which explores research, pedagogy, and curriculum

resources for instructors, and the Diversity Summit Series which provides opportunities to talk and work with nationally and internationally recognized scholars, master teachers, and policy experts.

IRC participates in and offers involvement opportunities with national research. These include program and publication initiatives on intergroup dialogues, anti-bias education, women of color in academia, and diverse democracy outcomes.

For more information regarding diversity resources and ways to get involved, visit the Intergroup Relations Center in SSV 278, call 480/965-1574, or access the IRC Web site at [www.asu.edu/provost/intergroup](http://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.

## GENERAL INFORMATION

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 hallmark building, Grady Gammage Memorial Auditorium, built in 1964.

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

The next three presidents—Harry K. Newburn, 1969–71, John W. Schwada, 1971–81, and J. Russell Nelson, 1981–89—and Interim President Richard Peck, 1989, led the university to increased academic stature, expansion of the campuses, and rising enrollment.

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 entered a new era on July 1, 2002, when Michael M. Crow joined the university as its 16th president. At his inauguration, President Crow highlighted his vision for transforming ASU into a New American University—one that is open and inclusive; that embraces its cultural, socioeconomic, and physical setting; and that promotes use-inspired research. As the only research university serving the entire metropolitan Phoenix area, ASU is in a unique position to evolve together with the city into one of the great intellectual institutions in the world.

A strong foundation already is in place to move forward with Dr. Crow's vision. ASU admitted its largest and highest-quality freshman class ever in fall 2003 and has developed nationally recognized programs in a number of fields, including accounting, astrobiology, design science, creative writing, music, ecology and evolutionary biology, electron microscopy, nanotechnology, psychology, solid-state science, and supply chain management.

In addition, ASU has embarked on its most aggressive capital building effort in more than a decade. The university is adding one million square feet of world-class, grade A research infrastructure, with the first building—Phase I of the Arizona BioDesign Institute—already under construction and scheduled for completion in 2004. ASU will take a leading role in biomedicine and biotechnology, designing new therapies, new vaccines, new diagnostic devices, and better delivery methods.

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

### Athletics

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

During President Matthews' tenure, some team competition began. The Tempe Bulldogs saw some interesting and rough competition with the University of Arizona Wildcats. In the 1940s, the college's teams became the Sun Devils.

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



In 2003, ASU finished 10th nationally in the Sears Directors' Cup, which recognizes the top athletic programs in the country. Ten teams finished in the top 20 nationally with five teams posting top 10 finishes. Wrestling finished fifth; men's golf, sixth; baseball, seventh; gymnastics, ninth; and women's swimming/diving, 10th.

**Graduate College**

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

Major changes in the nature and role of graduate education came in the early 1960s when the first Ph.D. programs were established in chemistry, education, engineering, English, physics, and psychology. The research focus of

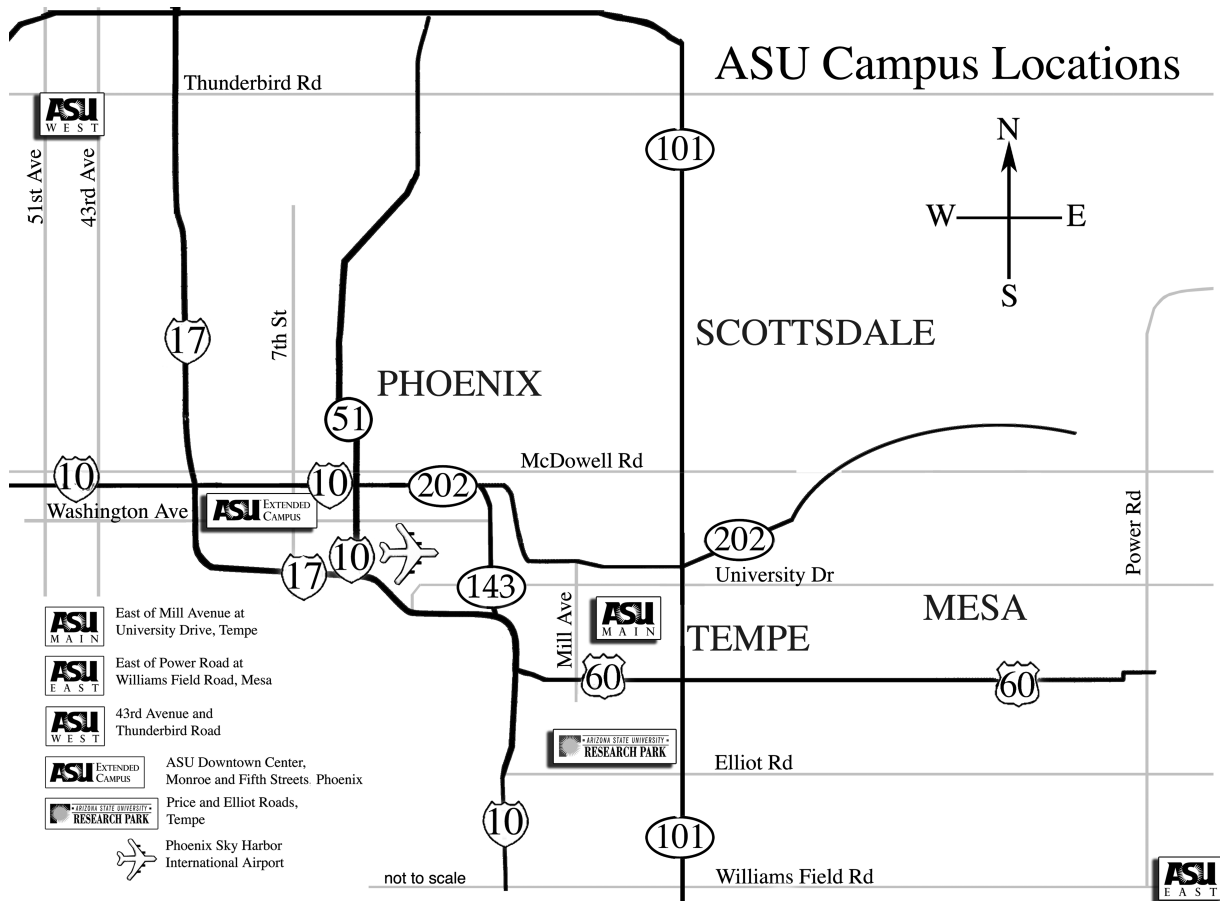
campus programs grew at a rapid pace. Master's programs matured as doctoral programs were added. From the late 1960s to the present, campus facilities for instruction, research, and advanced study significantly expanded to support university programs with the construction of new laboratories, classroom structures, and two large libraries—including a new main library and a separate science and engineering library.

**UNIVERSITY CAMPUSES AND SITES**

ASU comprises ASU Main, ASU East, ASU West, ASU Extended Campus, the ASU Research Park, and various other entities and facilities. See the "ASU Campus Locations" map, on this page.

**ASU Main.** ASU Main is located near the heart of metropolitan Phoenix in the city of Tempe (population 165,000). Nearby are the municipalities that make up the fast-growing Valley of the Sun: Chandler, Gilbert, Glendale, Mesa, Scottsdale, and other communities.

ASU Main comprises more than 700 acres and offers outstanding physical facilities to support the university's educational programs. The campus is characterized by broad pedestrian malls laid out in an easy-to-follow grid plan, spacious lawns, and subtropical landscaping.



## GENERAL INFORMATION

**ASU East.** The newest of the ASU campuses, ASU East opened in 1996 and serves more than 3,500 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 program'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 444](#).

**ASU West.** Celebrating its 20th year, Arizona State University West, located in northwest Phoenix, is a vital component of Arizona State University. The campus serves more than 7,100 students, offering a highly personalized, student-centered education.

ASU West is a force in the creation and communication of knowledge through its interdisciplinary teaching, research, and outreach programs. ASU West faculty are active scholars engaged in a wide variety of research to enhance the community, build new knowledge, and expand the frontiers of science. Research activities are diverse, including quality-of-life issues in the metropolitan region, applied leadership challenges for public and private organizations, and enhanced teacher education.

Students benefit from ASU West's unique blend of interactive, classroom-based learning communities, community- and field-based learning experiences, and faculty-student research partnerships that address important societal issues.

ASU West offers an interdisciplinary education for undergraduates, as well as an array of professional programs grounded in the liberal arts. ASU West offers 29 bachelor's degree programs, nine master's degrees, and eight professional certificates.

ASU West's commitment to integrated learning extends to Las Casas, an apartment-style, living-learning-based housing facility. Las Casas features faculty and academic advisors who live in the residence, faculty mentors, courses

taught on site at the community center, and student affinity groups focusing on topics such as global awareness, leadership, and the arts.

As a full-service campus, ASU West includes a child development center, student health center, bookstore, fitness center, credit union, computer center, food service facilities, theater, and meeting rooms. The campus offers valuable resources for the community, including fine arts and cultural programs, consulting for public and private organizations, workshops, and special events.

The campus is located in northwest Phoenix between 43rd and 51st Avenues on West Thunderbird Road, easily accessed from Interstate 17 and Loop 101.

For more information, see ["ASU West," page 455](#). For complete information and course listings, see the *ASU West Catalog*.

**ASU Extended Campus.** The ASU Extended Campus goes beyond the boundaries of the university's 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 468](#).

**ASU Downtown Center.** The ASU Downtown Center is the anchor location of the ASU Extended Campus. Located in central 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 the Web site at [researchpark.asu.edu](http://researchpark.asu.edu).

**Camp Tontozona.** Located in the famed Mogollon Rim country near Kohl's Ranch, northeast of Payson, this continuing education facility serves the needs of academic departments conducting teaching and research in mountain terrain. The camp is also available to faculty, staff, graduate students, and alumni for family use. For more information, call 480/965-6851.

**Deer Valley Rock Art Center.** Deer Valley Rock Art Center, located two miles west of the Black Canyon Freeway on Deer Valley Road, is operated by the ASU Department of Anthropology in consultation with the Hopi, Yavapai, and Gila River Indian tribes. It includes more than 1,500 petroglyphs that cover the eastern slope of Hedgpeth Hills. For more information, call 623/582-8007.

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

The Arboretum's collection began with Arthur J. Matthews. By the time Matthews' 30-year presidency was finished, nearly 1,500 trees of 57 species and more than 5,700 feet of hedges were planted. One of his most enduring landscape projects was the planting of Mexican Fan Palms along Palm Walk in 1916, which extends from University Drive south to the Student Recreation Complex. Today the Arboretum has expanded its collection to include nearly 4,000 trees of 164 species/varieties.

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

**U.S. Passport Acceptance Office.** Located in the International Programs Office, TMPCT 198, this office serves the public Monday through Friday from 9 A.M. to 4 P.M. For more information, call 480/965-0877, or access the Department of State Web site at [travel.state.gov](http://travel.state.gov).

## UNIVERSITY LIBRARY AND COLLECTIONS

### ASU Main Libraries

The collections of the university's libraries comprise more than 3.7 million volumes, approximately 7.4 million microform units, and more than 34,000 periodical and serial subscriptions. Computer access to commercially and locally produced databases and the ability to borrow research materials from other libraries enhance local resources. ASU is a

member of the Association of Research Libraries and the Center for Research Libraries.

For telephone numbers, see "Libraries," page 365. For more information, access the Web site at [www.asu.edu/lib](http://www.asu.edu/lib).

**Charles Trumbull Hayden Library.** The Charles Trumbull Hayden Library, designed by Weaver and Drover in 1966, houses the largest multidisciplinary collection at ASU. In addition to the open stack areas, separate collections and service areas include Access for Disability Accommodations; Circulation; 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](http://www.asu.edu/lib/hayden).

### Architecture and Environmental Design Library.

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

**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](http://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; and the Map Collection. For more information, access the Web site at [www.asu.edu/lib/noble](http://www.asu.edu/lib/noble).

### College of Law Library

The John J. Ross-William C. Blakley Law Library is located on McAllister Avenue. See "Organization," page 73, for more information.

### ASU West Library

The ASU West Library utilizes a range of electronic systems, from compact discs to telecommunications networks, to provide access to resources and delivery of materials. Its resources include more than 325,000 volumes, 8,780 videos, 15,000 slides, 240 electronic databases, 1.4 million microforms, and full or partial access to more than 27,000 print and electronic titles. For more information and to take

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a virtual tour of the library, access the Web site at [www.west.asu.edu/library](http://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](http://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](http://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 arts 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 Katherine K. 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](http://www.kaet.asu.edu), or call 480/965-8888.

**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.

**The Art Gallery.** The Art Gallery is located opposite the ASU Bookstore in ECA 100. The exhibition space features art work in a variety of media created by graduating seniors in the School of Art.

## 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](http://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;

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3. checking e-mail ([myasuportal.asu.edu](http://myasuportal.asu.edu)) and creating personal and course Web pages;
4. accessing courses online via myASU ([myasuportal.asu.edu](http://myasuportal.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](http://www.asu.edu/classroomsupport).

**Computing Sites.** In addition to the Computing Commons Atrium, there are four 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](http://www.asu.edu/it/fyi/sites).

**ASU Downtown Center Computer Lab.** The ASU Downtown Center offers two state-of-the-art computer labs. These facilities feature Pentium-class computers with the latest versions of software, high-speed laser printers, a color flat-bed scanner, and a ceiling-mounted video projection system. The ASU Downtown Center is located in central 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](http://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](http://www.asu.edu/asurite). Additional information about Computer Accounts is available on the Web at [www.asu.edu/it/fyi/accounts](http://www.asu.edu/it/fyi/accounts).

**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](http://www.asu.edu/quicklook). Additional information about the center is available on the Web at [www.asu.edu/cacenter](http://www.asu.edu/cacenter).

**Geographic Information Services.** Information Technology provides infrastructure support for the use of Geographic Information Systems (GIS) through the establishment of partnerships with faculty and staff to acquire, create, and enhance research and instruction. GIS staff support researchers from various disciplines by facilitating the use of hardware, software, and data in the creation of geographic information systems. The systems are used for spatial analysis, query, and display. Staff also provide opportunities for researchers to meet and share information and technical expertise. For more information, access the Web site at [www.asu.edu/gis](http://www.asu.edu/gis).

**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 filespace 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](http://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](http://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 asynchronous. Located in CPCOM 213, the IS Lab provides faculty, university professionals, and graduate students with a unique opportunity to integrate technology with instruction. The IS Lab sponsors workshops and demonstrations and serves as a dynamic clearinghouse of information and referrals for effective integration of technology with education. For more information about IS Lab resources, support, and workshops, access the Web site at [is.asu.edu/islab](http://is.asu.edu/islab).

## ALUMNI ASSOCIATION

Founded in 1894, the Alumni Association is a volunteer-led organization committed to serve and unite alumni for the purpose of advancing the interests of ASU and its alumni. The association, 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 42 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 441. 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](http://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.

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

See “[Research Centers](#),” page 32.

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# Research Centers

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Research centers, institutes, and laboratories 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 College of Education, the Ira A. Fulton School of Engineering, and the College of 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](http://www.eas.asu.edu/~CRESMET).

## **Institute for Studies in the Arts**

The Institute for Studies in the Arts (ISA) is an interdisciplinary research center within the Katherine K. 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 Ira A. Fulton School of Engineering (FSE). 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 FSE and HCFA, and affiliated FSE 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; and the Intelligent Stage—a research environment and performance space dedicated to the expansion of studies in interactive performance technologies, including 3-D motion capturing and 2-D 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 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 Web sites at [www.isa.asu.edu](http://www.isa.asu.edu) or [ame.asu.edu](http://ame.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](http://www.east.asu.edu/research/star).

## **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 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](http://www.asu.edu/caed).

## 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](http://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), which forecasts and provides 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](http://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 leadership positions in small and medium-size businesses, and aids small and medium-size businesses in the continuous improvement of human resources and business practices. CASB also engages in applied research on entrepreneurship and the emerging changes and trends in small business.

For more information, visit CASB in BAC 101, call 480/965-3962, access the CASB Web site at [www.wpcarey.asu.edu/seid/casb](http://www.wpcarey.asu.edu/seid/casb), or write

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

### Center for Advancing Business Through Information Technology

The Center for Advancing Business through Information Technology (CABIT) focuses on research and educational innovations in technology and business that have been accomplished since 2002. CABIT explores how technological innovations are transforming business operations and provides a forum for interactions between the academic and the practitioner communities. The aim is to leverage the internationally recognized expertise of the ASU faculty, to be in active partnership with industry, and to address current issues related to the technological impact on business.

One of the primary goals of CABIT is to encourage interdisciplinary research within the School of Business. Business faculty members then share their findings with colleagues throughout ASU who have a common interest regarding the impact of technology on business.

The creation of CABIT is an outgrowth of a decade of significant investment in the development of innovative business management programs and the recruitment of technology-savvy faculty. Similarly, the dean's office has worked with School of Business faculty to successfully advance the recommendations of the E-Business Task Force by implementing significant changes in the M.B.A. and undergraduate programs. For more information, call 480/965-2280, access the CABIT Web site at [www.wpcarey.asu.edu/seid/cabit](http://www.wpcarey.asu.edu/seid/cabit), or write

CENTER FOR ADVANCING BUSINESS THROUGH  
INFORMATION TECHNOLOGY  
PO BOX 873606  
TEMPE AZ 85287-3606

### 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 ASU 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](http://www.capsresearch.org), or write

CAPS RESEARCH  
ASU RESEARCH PARK  
2055 E CENTENNIAL CIRCLE  
PO BOX 22160  
TEMPE AZ 85285-2160

## RESEARCH CENTERS

### 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. CBR staff 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](http://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 marketing, the center's work is cross-functional, integrating concepts and techniques from marketing, operations, human resources, and management.

The center's areas of expertise include customer retention and loyalty; service quality; service delivery; professional services such as healthcare, accounting, and consulting; customer satisfaction; services strategy; service culture; and service recovery. A leader in the business and academic communities, the center's 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](http://www.wpcarey.asu.edu/seid), or write

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

### Institute for Manufacturing Enterprise Systems

See "[Institute for Computing and Information Science and Engineering](#)," page 36, for information about this joint venture of the Ira A. Fulton School of Engineering and the W. P. Carey School of Business.

## 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](http://coe.asu.edu/cie).

### **CRESMET**

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

### **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, visit EDB L1-01, call 480/965-1886, or access the laboratory's Web site at [www.asu.edu/educ/epspl](http://www.asu.edu/educ/epspl).

### **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 one articulated conversation: bilitery; 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 center in ED 440, call 480/965-7134, or access the center's Web site at [www.asu.edu/educ/sceed](http://www.asu.edu/educ/sceed).

## **IRA A. FULTON SCHOOL OF ENGINEERING**

### **Arizona Biodesign Institute**

This institute has a collaborative relationship with the Ira A. Fulton School of Engineering. For more information, see “Arizona Biodesign Institute,” page 41.

### **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, such as the world's leading companies involved in the manufacture of portable computing and communication systems. The center's technical areas of focus include

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

For more information, visit the center in ENGRC 115, call 480/965-8654, or access the Engineering Research Services Web site at [www.asu.edu/~ers](http://www.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 semiconductor 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.

## RESEARCH CENTERS

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

### **Institute for Computing and Information Science and Engineering**

The Institute for Computing and Information Science and Engineering (InCISE) fosters interdisciplinary research, education, and entrepreneurship in computing. A collection of basic research activities within the Department of Computer Science and Engineering (CSE) forms the inner core of InCISE, while the activities to which CSE contributes form the outer core of the institute. The three core research groups of InCISE are the Center for Cognitive Ubiquitous Computing, the Intelligent Information Integration core area, and the Information Assurance core area. InCISE also collaborates with five affiliated research groups: the Consortium for Embedded and Internetworking Technologies; the Partnership for Research in Stereo Modeling; the Arts, Media and Engineering Research Center; the Center for Advancing Business through Information Technology; and the Software Factory.

In addition, InCISE serves as the focal point for a host of researchers from various disciplines who want to get connected to the computing and information community at ASU. These domains include cognitive sciences, health sciences, social sciences, earth sciences, space sciences, biosciences, disability studies, and linguistics.

### **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 Ira A. Fulton School of Engineering, established to enhance manufacturing research and industrial collaboration at the interface between the two colleges. The institute'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, call 480/965-3709, or access the Engineering Research Services Web site at [www.eas.asu.edu/~ers](http://www.eas.asu.edu/~ers).

### **Institute for Studies in the Arts**

The Ira A. Fulton School of Engineering has a collaborative relationship with this institute. For more information, see “[Institute for Studies in the Arts](#),” page 32.

## **THE KATHERINE K. HERBERGER COLLEGE OF FINE ARTS**

### **Ceramics Research Center**

The Ceramics Research Center was established in 2002 as part of the ASU Art Museum and 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 opportunities for hands-on study and enjoyment of one of the outstanding ceramics collections in the country. For more information, call 480/

727-8170, or access the museum's Web site at [asuartmuseum.asu.edu](http://asuartmuseum.asu.edu).

### **Institute for Studies in the Arts**

The Katherine K. Herberger College of Fine Arts has a collaborative relationship with this institute. For more information, see “[Institute for Studies in the Arts](#),” page 32.

## **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 229A, or call 480/965-6606.

## **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*, 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 COOR 4429, call 480/965-5900, or access the ACMRS Web site at [www.asu.edu/clas/acmrs](http://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 COOR 6611, or call 480/965-7184.

### **Center for Meteorite Studies**

The nation's largest university collection of extraterrestrial materials is available for research in the Center for Meteorite Studies. Teaching and research on meteorites, meteorite craters, and related areas of space and planetary science are accomplished through the regular academic units in cooperation with the center.

For more information, visit the center in PS C151, or call 480/965-6511.

### **Center for Solid State Science**

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

The membership comprises faculty and academic professional researchers and research support personnel, most of whom hold simultaneous appointments in affiliated academic units. The Center for Solid State Science is the ASU focal point for interdisciplinary research on the properties

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

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

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

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

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

**GMSL.** These facilities include

1. the Materials Facility (MF), which provides a wide range of synthesis and processing capabilities for preparation of specimen materials. MF also provides thermal analysis for study of solid-state reactions and Auger and X-ray photoelectron spectroscopy for analysis of surface compositions and electronic structure of surfaces;
2. the Materials Science Electron Microscopy Laboratory (MSEML), which provides state-of-the-art electron microscopes for analysis of microstructures, including imaging and diffraction, and high spatial resolution chemical analysis using energy dispersive X-ray and electron energy loss micro-spectroscopy;
3. the Ion Beam Analysis of Materials (IBeAM) facility, which provides compositional and structural determination of the surface and near-surface regions (0–2 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.

## RESEARCH CENTERS

- 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. The facilities are also used extensively by students in disciplinary programs from affiliated departments.

For more information, visit PS A213, call 480/965-4544, or access the Web site at [www.asu.edu/clas/csss](http://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 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](http://www.asu.edu/clas/hrc).

### Institute of Human Origins

The Institute of Human Origins (IHO), founded in 1981 by Donald Johanson, became part of the College of Liberal Arts and Sciences in 1997. IHO is a multidisciplinary research organization dedicated to the recovery and analysis of the fossil evidence for human evolution and the establishment of a chronological framework for human evolutionary events. IHO's scientists carry out field research at sites in Africa, the Middle East, and Asia. IHO houses the largest collection of *Australopithecus afarensis* casts (including "Lucy," a 3.2 million-year-old human ancestor) in the world as well as an extensive collection of other fossil hominid casts. IHO's library contains more than 3,000 volumes, numerous journals, videotapes, audiotapes, and slides related to human evolution and fossil sites. IHO produces periodic newsletters, offers lecture series, conducts tours and workshops, and supports numerous informal science education outreach projects.

For more information, visit IHO in SS 103, call 480/727-6580, or access the IHO Web site at [www.asu.edu/clas/iho](http://www.asu.edu/clas/iho).

### Joan and David Lincoln Center for Applied Ethics

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

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

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

## RESEARCH CENTERS

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 COOR 4450, or call 480/965-5127.

### **Russian and East European Studies Center**

The ASU Russian and East European Studies Center (REESC) functions within the College of Liberal Arts and Sciences. REESC administers research, training, and outreach programs involving the lands and people of Eastern Europe and Eurasia. More than two dozen ASU faculty from five colleges and University Libraries collaborate in center programming. REESC also works with other postsecondary educational institutions, government agencies, local high schools, and private corporations in coordinating programs of research, study, travel, and exchange relating to Russia, Eastern Europe, and Eurasia. The center is an institutional member of the American Association for the Advancement of Slavic Studies (AAASS). ASU is also a member of the International Research and Exchanges Board (IREX), which administers United States academic exchanges with Russia and Eastern Europe.

The Critical Languages Institute (CLI) offers intensive summer language instruction in the less commonly taught languages of Eastern Europe and Eurasia. Summer practicums and study abroad programs offer students opportunities to take classes and conduct research overseas. REESC/CLI faculty mentor students for competitive national fellowships, including Fulbright and the National Security Education Program.

For more information, call REESC at 480/965-4188 or CLI at 480/965-7706, or access their Web sites at [www.asu.edu/reesc](http://www.asu.edu/reesc) and [www.asu.edu/cli](http://www.asu.edu/cli).

### **Virginia G. Piper Center for Creative Writing**

The Virginia G. Piper Center for Creative Writing at ASU was created in the fall of 2003. The center's goal is to elevate the university's creative writing program to international prominence while enriching the intellectual and artistic life of Arizona and the entire southwest.

The historic ASU President's House, located at Palm Walk and Tyler Mall, will serve as the permanent campus

home for the center. Renovations are anticipated to be completed in the fall of 2004.

Other programs funded by the center include

1. an international writer's exchange program;
2. funding of an endowed chair that will be used to attract high profile, distinguished authors to campus for extended residencies, authors who will work closely with ASU faculty and students; and
3. creation of the Piper Creative Scholars Program, designed to support ASU faculty and others in the pursuit of research, writing, and other creative activities.

For more information, access the center's Web site at [www.asu.edu/pipercenter](http://www.asu.edu/pipercenter).

## 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 in Nonprofit Leadership and Management), and a noncredit program (through the Nonprofit Management Institute). For more information, call 480/965-0607, or access the Web site at [www.asu.edu/copp/nonprofit](http://www.asu.edu/copp/nonprofit)

### **Center for Urban Inquiry**

The mission of the Center for Urban Inquiry (CUI) is threefold: critical social science research, community engagement, and innovative education. The research agenda prioritizes the scrutiny of economic and social privilege and disadvantage. Specific research requests from policymakers, nonprofit and government agencies, and citizen groups are also considered. This includes a rapid response community research initiative established to provide intensive feedback to community research requests that must be completed within a limited time frame, as well as long-term process and outcome evaluations of programs and policies in the private and public sectors. CUI also facilitates collaborative research efforts among faculty, research professionals, and students. Such research includes an examination of the individual and collective costs of poverty in the Southwest and the design of comprehensive research to explore the extent and nature of racial profiling among agents of social control.

CUI's direct community involvement ranges from the local to the global. This includes support of neighborhood groups advocating for homeowners and renters within the context of urban development and displacement, the



creation of a hospital-based community partnership to combat youth violence, and participation in United Nations summits on sustainable development and indigenous peoples' rights. The center serves the university and community through innovative educational endeavors, including a distance-learning college program for incarcerated women, in-depth research training for graduate and undergraduate students, and courses in service learning, community action research, and international urban issues. CUI also serves as the administrative and programmatic home for the needs-based Nina Mason Pulliam Legacy Scholars Program for nontraditional students.

For more information, call 480/965-9216, access the center's Web site at [www.asu.edu/copp/urban](http://www.asu.edu/copp/urban), or write

CENTER FOR URBAN INQUIRY  
ARIZONA STATE UNIVERSITY  
PO BOX 874603  
TEMPE AZ 85287-4603

### **Morrison Institute for Public Policy**

Morrison Institute for Public Policy conducts research which informs, advises, and assists Arizonans. As part of the School of Public Affairs (College of Public Programs), the institute serves as a bridge between the university and the community. Through a variety of publications and forums, Morrison Institute shares research results with, and provides services to, public officials, private sector leaders, and community members who shape public policy. A nonpartisan advisory board of leading Arizona business people, scholars, public officials, and public policy experts assist the institute with its work. Morrison Institute was established in 1982 through a grant from Marvin and June Morrison of Gilbert, Arizona and is supported by private and public funds and contract research. The institute conducts research on a broad range of topics including areas such as education, urban growth, workforce development, economic development, arts and culture, quality of life, and science and technology.

For more information, call 480/965-4525, access the institute's Web site at [www.asu.edu/copp/morrison](http://www.asu.edu/copp/morrison), or write

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

## **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 four focus areas of increasing contemporary importance:

1. biologics and therapeutics,
2. nano-biosystems and devices,
3. neural interface engineering, and
4. integrative tools for genomics and informatics.

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. AzBio will be a hub for biodesign research in central Arizona, building collaborative networks among scientists and clinical researchers from leading industries and institutions. The AzBio is anchored in an ASU Main research complex.

For more information, access AzBio's Web site at [www.azbio.org](http://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 community, the center advances the identification of key local and global environmental issues and collects reliable information to be used by scholars, policy makers, and the general public. For more information, access the CES Web site at [ces.asu.edu](http://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](http://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 [ces.asu.edu/igert](http://ces.asu.edu/igert).

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](http://www.scerp.org).

For more information, visit the center in TMPCT 151, call 480/965-2975, or access the center's Web site at [ces.asu.edu](http://ces.asu.edu).

# 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 "2004–2005 General University Tuition" table, page 43. 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 46.

Resident students registered for seven or more hours or nonresident students registered for 12 or more 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.

**Program Fees.** Certain graduate and undergraduate 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.** For summer sessions fees information, see the "2005 Summer Session Registration Fees Per Credit Hour" table below and the *Summer Sessions Bulletin*. The fees are per credit hour for credit or audit. See also "Summer Sessions," page 361.

**2005 Summer Session Registration Fees  
Per Credit Hour**

Student	Resident	Nonresident
Undergraduate	\$207.00	\$311.00
Graduate	264.00	396.00

## Tuition Installment Plan

The tuition installment plan offers students an option to divide fall and spring tuition payments 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. 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. The per semester enrollment fee is \$75.

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 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 Aid Trust grants are awarded under the established Student Financial Assistance office's aid eligibility criteria.

2004–2005 General University Tuition

Hours	Undergraduate Tuition		Graduate Tuition	
	Resident <sup>1</sup>	Nonresident <sup>1</sup>	Resident <sup>1</sup>	Nonresident <sup>1</sup>
1	\$ 207.00	\$ 535.00	\$ 264.00	\$ 565.00
2	414.00	1,070.00	528.00	1,130.00
3	621.00	1,605.00	792.00	1,695.00
4	828.00	2,140.00	1,056.00	2,260.00
5	1,035.00	2,675.00	1,320.00	2,825.00
6	1,242.00	3,210.00	1,584.00	3,390.00
7	1,987.00 <sup>2</sup>	3,745.00	2,519.00	3,955.00
8	1,987.00 <sup>2</sup>	4,280.00	2,519.00	4,520.00
9	1,987.00 <sup>2</sup>	4,815.00	2,519.00	5,085.00
10	1,987.00 <sup>2</sup>	5,350.00	2,519.00	5,650.00
11	1,987.00 <sup>2</sup>	5,885.00	2,519.00	6,215.00
12 or more	1,987.00 <sup>2</sup>	6,414.00	2,519.00	6,779.00

<sup>1</sup> Tuition is subject to change. In addition to tuition, students are charged other fees (e.g., the Student Recreation Complex fee, financial aid trust fee, special class fees, and program fees).

<sup>2</sup> Spring semester tuition is \$1,986.00.

**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.

**Admission Application.** The nonrefundable fee for graduate applications is \$50.

**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](http://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, by mail, or by fax at 480/965-2295 if a signed release is provided. 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/interactive](http://www.asu.edu/interactive).

*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.

## FEES, DEPOSITS, AND OTHER CHARGES

**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 fee is \$25.

**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. 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](http://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 \$27 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 45. 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.

**Campus Housing.** The cost of ASU Main housing varies. In 2004–2005 the typical cost for undergraduate students was \$3,600 per academic year. Meal plans are purchased separately.

## TRANSPORTATION

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

Alternative transportation modes are used by thousands of ASU students. ASU is served by a regional transit service; monthly and reduced-fare semester passes are available on campus. In addition, an inexpensive express shuttle runs between ASU Main in Tempe and ASU West in north-west Phoenix; another shuttle runs among ASU Main, Mesa Community College, and ASU East in Mesa; and a Free Local Area Shuttle (FLASH) is available around the periphery of ASU Main. A free Neighborhood FLASH also is available for the ASU community connecting the Escalante and University Heights neighborhoods with the Riverside/Sunset and Lindon Park neighborhoods through downtown Tempe and ASU Main.

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

For more information on commute alternatives, call the Travel Reduction Office at 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](http://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 make fee payments from any touch-tone phone or via the Web. Visa, MasterCard, and Discover are accepted. Refer to the *Schedule of Classes* for more information.

**Credit Cards.** ASU accepts Visa, MasterCard, and Discover. Credit card payments through SunDial and ASU Interactive are processed online with the bank. See the *Schedule of Classes* for information about using 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 courses. To assist eligible students, a Veterans Deferment

Request Form 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](http://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 below:

**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 below. *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. Upon withdrawal, access to the SRC is terminated.

**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 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 mailed to the student’s local address, or by direct deposit to the student’s bank account.

**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

## FEES, DEPOSITS, AND OTHER CHARGES

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

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](http://www.asu.edu/registrar/residency).



Old Main, the university's first classroom building, is now home to the ASU Alumni Association.

Tim Trumble photo

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# Financing Graduate Studies

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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 Financial Support 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](http://www.asu.edu/graduate/financial).

Research and teaching assistants are considered to be residents for tuition purposes. In addition to their stipend, they receive a reduction in resident tuition and, if they are employed 20 hours a week, health insurance. See “Assistantships and Associateships,” page 92.

## FELLOWSHIPS AND AWARDS

ASU offers several university-sponsored awards and fellowships 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 College Awards for Tuition.** A small number of full and partial tuition fellowships are available on a competitive basis. Applicants should contact their academic units for more information.

Information on merit and need-based fellowships and awards, both externally funded and internal to ASU, may be found at [www.asu.edu/graduate/financial](http://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 at [www.fafsa.ed.gov](http://www.fafsa.ed.gov). Graduate students may be eligible for Federal Perkins Loans and/or William D. Ford Direct Student Loans. For more information access the Web site at [www.asu.edu/fa](http://www.asu.edu/fa), or call the Student Financial Assistance Office at 480/965-3355.

## 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](http://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 fellowships 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](http://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 fellowships, 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. More information on fellowships available to international students may be found on the Web at [www.asu.edu/graduate/financial](http://www.asu.edu/graduate/financial).

## ONLINE SERVICES

Students can access personal information regarding financial aid by using ASU Interactive at [www.asu.edu/interactive](http://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](http://www.asu.edu/fa)—and (2) award information.



# 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](http://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](http://www.asu.edu/registrar/schedule).

## COURSE LISTINGS

See “[Course Prefix Index](#),” page 7, 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.

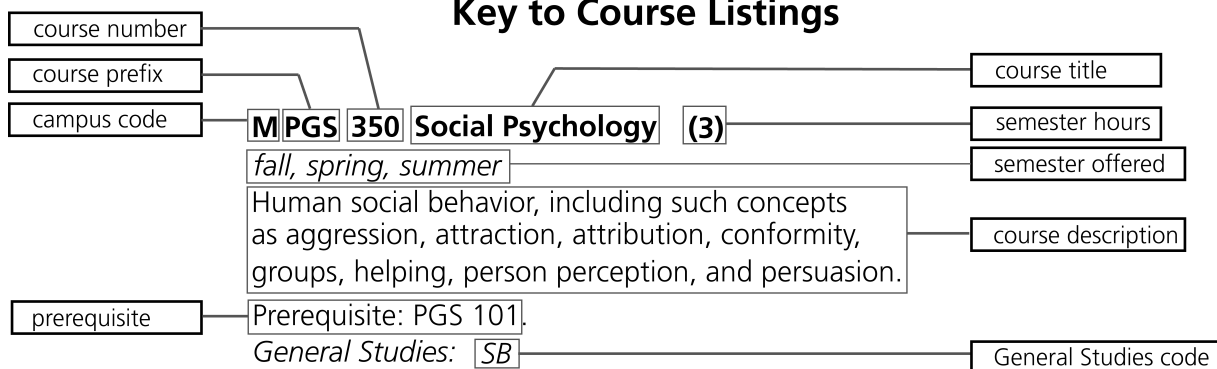
## COURSE NUMBERING SYSTEM

**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 90.

**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.

## Key to Course Listings



## 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, or 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, 792 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 theses or dissertations, 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

**Cohort Management.** Various prefixes that start with an “X” are used for registration purposes. These courses are used by Campus Match in the Division of Undergraduate

Academic Services; Learning Communities in the College of Liberal Arts and Sciences; EnGAGE in the Ira. A. Fulton School of Engineering; and other cohort management groups.

**Elementary Education Program.** 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 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 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.

**Joint Admission Continuous Enrollment.** Courses with the JAC prefix are used to track students admitted to ASU who are concurrently or solely enrolled in courses offered by a community college.



This wall wrap—highlighting ASU academics, research, and quality of life—greet the estimated 24 million people passing through Phoenix Sky Harbor Airport’s Terminal Four annually.

Cindi Farmer photo

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# Colleges

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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.

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## Graduate College

[www.asu.edu/graduate](http://www.asu.edu/graduate)

**Maria T. Allison, Ph.D.,  
Vice Provost and Dean of Graduate Studies**

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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 a wide range of master’s and doctoral degree programs 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, which 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, a large number of ASU graduate students were awarded prestigious fellowships and scholarships 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 11,000 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](http://www.asu.edu/graduate/admissions).

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

*Note:* A maximum of nine semester hours taken at ASU as a nondegree graduate student may be applied, at the academic unit's discretion, toward a future ASU master's degree.

For admission information and procedures, access the Web site at [www.asu.edu/graduate/admissions](http://www.asu.edu/graduate/admissions).

### Clinics on Preparing for Graduate School

Assistance is offered to prospective graduate students through workshops. Topics include the admissions process, program selection, and financial support. For more information, call the Graduate College at 480/965-3521, or access the Web site at [www.asu.edu/graduate](http://www.asu.edu/graduate).

### 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. 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 aca-

demical 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 basis for departments. Other fields of study are inherently interdisciplinary and do not fit well with conventional disciplines around which departments are formed. Curricula must reflect intrinsically broad disciplinary affinities, and faculty must be drawn from more than one academic unit.

Currently, the Graduate College oversees nine 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. Materials Science (M.S.);
6. Science and Engineering of Materials (Ph.D.);
7. Speech and Hearing Science (Ph.D.);
8. Statistics (M.S. and certificate); and
9. 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. Justice Studies (Ph.D.); and
8. Molecular and Cellular Biology (M.S., Ph.D.), administered by the College of Liberal Arts and Sciences.

Each of these programs uses resources and faculty from several disciplines. The programs promote cooperative research and instruction among faculty who share common interests but are housed in different academic units and allow students to pursue degrees that are intellectually coherent but that bring together diverse strengths of the university. See "Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College," page 54.

### CERTIFICATE PROGRAMS

A number of certificate programs are offered by various academic units or programs on campus (see the "ASU Graduate Certificates," page 16).

## COLLEGES

### Interdisciplinary Graduate Degrees and Majors Overseen by the Graduate College

Major	Degree	Concentration <sup>1</sup>	Administered By
Creative Writing	M.F.A.	—	Creative Writing Committee
Curriculum and Instruction	Ph.D. <sup>2</sup>	Art education, <sup>3</sup> curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, <sup>4</sup> language and literacy, mathematics education, physical education, science education, or special education	Interdisciplinary Committee on Curriculum and Instruction
Exercise Science	Ph.D.	Biomechanics, motor behavior/sport psychology, or physiology of exercise	Committee on Exercise Science
Materials Science	M.S.	—	Committee on the Science and Engineering of Materials
Science and Engineering of Materials	Ph.D.	High-resolution nanostructure analysis or solid-state device materials design	Committee on the Science and Engineering of Materials
Speech and Hearing Science	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, or neurogerontologic communication disorders	Committee on Speech and Hearing Science
Statistics	M.S.	—	Committee on Statistics

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> This program is administered in collaboration with the College of Education.

<sup>3</sup> This concentration is administered in collaboration with the Katherine K. Herberger College of Fine Arts.

<sup>4</sup> Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

## RESEARCH

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 31](#).

### Research Facilities

ASU 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

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

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

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

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

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

### GRADUATE STUDENT SUPPORT SERVICES

Providing academic and professional development support to graduate students is an important part of the Graduate College mission. Services include 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, access the Graduate College Web site at [www.asu.edu/graduate](http://www.asu.edu/graduate).

**Graduate College Financial Support Office.** The Graduate College Financial Support Office assists graduate students applying for external fellowships. The office processes tuition waivers/remission and health insurance benefits for research and teaching assistants, tuition fellowships for students who are not research or teaching assistants, travel grants, and other financial support in partnership with academic units.

For assistance with loans, access the Web site at [www.asu.edu/fa](http://www.asu.edu/fa), or visit Student Financial Assistance in SSV 216A.

**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.

*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.

*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.

**Diversity Programs.** Diversity Programs are designed to increase the number of graduate students from groups underrepresented in certain professions and fields of study.

*Step-Up.* The Graduate College STEP-UP (Seeking Talent, Expanding Participation, Unleashing Potential) program is designed to assist academic units in the recruitment and retention of excellent first-year graduate students from underrepresented groups. STEP-UP provides academic and financial support through assistantships. For more information, contact specific academic units.

*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 nominations to the Graduate College for 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 approach. The mentor receives an hourly compensation.

**Orientations.** Before each fall semester, the Graduate College hosts an orientation/reception for new graduate students. An online orientation is available on the Graduate College's Web site at [www.asu.edu/graduate](http://www.asu.edu/graduate).

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 and Professional Student Association (GPSA) is part of the Associated Students of ASU (ASASU), the student government. The GPSA represents graduate student interests within ASASU and the Office of Student Life. It assists the Graduate College in planning orientations, the Graduate and Professional Student Appreciation Week, and other student-related activities. The GPSA, with the Graduate College, funds small research grants to support graduate students' thesis and dissertation projects. In addition to the GPSA, other special

## COLLEGES

interest organizations are available for graduate students, such as the Latino(a) Graduate Student Association, American Indian Graduate Student Association, Black Graduate Student Association, and Graduate Women's Association.

**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](http://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](http://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](http://www.asu.edu/graduate).

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## Morrison School of Agribusiness and Resource Management

[www.east.asu.edu/msabr](http://www.east.asu.edu/msabr)

Raymond A. Marquardt, Ph.D., Dean

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### 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. The faculty is committed to excellence in teaching, research and service, and strives to create a well-rounded experience for 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](http://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.

The Morrison School of Agribusiness and Resource Management awards assistantships to selected candidates. These support ongoing research and teaching activities. The awards are made on the basis of availability and according to the needs of the faculty and interests of the students.



Scholarships are also available on a competitive basis for qualified candidates.

**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 available 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.

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## College of Architecture and Environmental Design

[www.asu.edu/caed](http://www.asu.edu/caed)

**Wellington Reiter, M.Arch., Dean**

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**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. Faculty from the Department of Applied Biological Sciences at ASU East also participate in offering this degree. Three areas of concentration are available: design; planning; and history, theory and criticism.

Faculty in the College of Architecture and Environmental Design offer four master’s degree programs through the Graduate College: a professional program leading to the National Architectural Accrediting Board (NAAB)-accredited Master of Architecture degree (the two-year as well as three-plus-year programs); a research and applications M.S. degree in Building Design; the Master of Science in Design degree with concentrations in graphic design, industrial design, and interior design; and a professional graduate program leading to the PAB-accredited Master of Environmental Planning degree. Faculty in the School of Design offer the 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, page 59.

**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 85. 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

## COLLEGES

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 submit a TOEFL score.

**Master of Science in Design Degree.** Applicants must hold a baccalaureate degree in graphic design, industrial design, interior design, or a related design discipline. 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, and 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 29). Teaching and research activities are also supported by a media center with photography and video services and a slide and media library. Individual studio work space is available to graduate students, and the expansion features extensive jury, review, and display space.

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

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

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

The rapidly growing Archival Drawings Collection is also part of the AED Library's Special Collections area. Included are the archival drawings and papers of several noteworthy architects, including Alfred N. Beadle, William P. Bruder, Blaine Drake, Albert Chase McArthur, Victor 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](http://www.asu.edu/caed/SOA) for general information about the programs and admission 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](mailto:arch_grad@asu.edu). For information about the under-

College of Architecture and Environmental Design Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
Architecture	M.Arch.	—	School of Architecture
Building Design	M.S.	Design knowledge and computing, energy performance and climate-responsive architecture, or facilities development and management	School of Architecture
Design	M.S.D.	Graphic design, industrial design, or interior design	School of Design
Environmental Design and Planning <sup>2</sup>	Ph.D.	Design; history, theory, and criticism; or planning	College of Architecture and Environmental Design
Environmental Planning	M.E.P.	—	School of Planning and Landscape Architecture

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Doctoral courses for these interdisciplinary programs administered by ASU Main are also offered at ASU East.

graduate program and for undergraduate advising, send e-mail to [caed.advising@asu.edu](mailto:caed.advising@asu.edu).

**Design.** Preadmission information, advising, and continued support are provided by the director of the school and the graduate program coordinator. General information can be found on the school’s Web site at [www.asu.edu/caed/SOD](http://www.asu.edu/caed/SOD). For additional information, call 480/965-4135, or send e-mail to [designmsd@asu.edu](mailto:designmsd@asu.edu).

**Planning.** Students should consult the school’s Web site at [www.asu.edu/caed/SPLA](http://www.asu.edu/caed/SPLA) for general information about the program and admission procedures. The school’s academic advisor provides admission information, general program information, and general advising. The school’s director and M.E.P. program coordinator provide professional advising and continued support. For more information, call 480/965-7167, or access the school’s Web site at [www.asu.edu/caed](http://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](http://www.naab.org)), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. (A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.)

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

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

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

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

The Master of Environmental Planning 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](http://wpcarey.asu.edu)

Robert E. Mittelstaedt Jr., M.B.A., Dean

**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.

## COLLEGES

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 eight 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, the School of Health Administration and Policy, and the Departments of Economics, Finance, Information Systems 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, a program for technology professionals, and an online program. 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 Sector Management, 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 Language 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 Thunderbird, the Garvin School of



The W. P. Carey School of Business is among the top 25 business programs at major universities throughout the country.

Tim Trumble photo

W. P. Carey School of Business Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
Accountancy and Information Systems	M.A.I.S.	—	School of Accountancy
Business Administration	M.B.A. Ph.D.	— Accountancy, computer information systems, finance, health services research, <sup>2</sup> management, marketing, or supply chain management	W. P. Carey School of Business W. P. Carey School of Business
Economics	M.S., Ph.D.	—	Department of Economics
Health Sector Management	M.H.S.M.	—	School of Health Management and Policy
Information Management	M.S.	—	Department of Information Systems
Public Health <sup>2</sup>	M.P.H.	Community health practice or health administration and policy	School of Health Management and Policy
Statistics <sup>3</sup>	M.S.	—	Committee on Statistics
Taxation	M.Tax.	—	School of Accountancy

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This program is administered by the Graduate College.

International Management, 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 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; Monterey Institute for Technical and Superior Studies in Mexico City; 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 Sector Management;
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. Students should

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 taught by ASU faculty. In addition, the institute contributes funding for operations.

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

**Bank One Economic Outlook Center.** The Bank One Economic Outlook Center serves as the economic forecasting unit of the 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

## COLLEGES

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 Advancing Business Through Information Technology.** The information revolution has challenged old economy business processes and value propositions. The Center for Advancing Business through Information Technology serves as a self-sustaining catalyst for a research and education partnership that focuses on collaboration, innovation, incubation, and technology transfer of knowledge management and software service innovations in the e-business environment.

**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 Ira A. Fulton School of Engineering. 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 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 29.

## ADVISING

Information sessions are held weekly throughout the year in the M.B.A. Program Office, BA 160. To inquire about information sessions, send e-mail to [wpcareymba.infosession@asu.edu](mailto:wpcareymba.infosession@asu.edu). M.B.A. brochures may be obtained at the office; call 480/965-3332.

## ACCREDITATION

The W. P. Carey School of Business and its School of Accountancy 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.

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# East College

[www.east.asu.edu/ecollege](http://www.east.asu.edu/ecollege)

Glenn W. Irvin, Ph.D., Dean

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## PURPOSE

East College provides academic foundations for students in all majors while providing popular undergraduate and graduate degree programs. The college serves as the academic home for students who choose the unique social and academic environment of ASU East but do not wish to declare a major immediately. East College offers 11 undergraduate and four graduate degrees.

### East College Graduate Degrees and Majors

Major	Degree	Concentration	Administered By
Applied Biological Sciences	M.S.	GIS/remote sensing, natural resource management, or range ecology	Department of Applied Biological Sciences
Applied Psychology	M.S.	—	East College
Curriculum and Instruction*	M.Ed. Ph.D.	English as a second language Exercise and wellness education	Faculty of Education Interdisciplinary Committee on Curriculum and Instruction
Environmental Design and Planning*	Ph.D.	Design; history, theory and criticism; or planning	Committee on Environmental Design and Planning
Exercise and Wellness	M.S.	—	Department of Exercise and Wellness
Nutrition	M.S.	—	Department of Nutrition
Plant Biology*	Ph.D.	—	School of Life Sciences (ASU Main)

\* 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
- Applied Psychology
- Business Administration
- Education
- Exercise and Wellness
- Human Health Studies
- Multimedia Writing and Technical Communication
- Nutrition

### 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](http://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

## COLLEGES

together with significant partners in the K–12 sector, as well as with constituents dedicated to the same purposes.

### ORGANIZATION

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

#### Division of Curriculum and Instruction

Thomas Barone, Interim Director  
(ED 426) 480/965-1644  
[coe.asu.edu/programs](http://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 and researchers.

The Division of Curriculum and Instruction offers undergraduate and postbaccalaureate programs that prepare students for teacher certification in Arizona 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](http://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](http://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 the School of Psychology concentration in Educational 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 graduate studies, 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](http://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](http://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 193](#).

**COLLEGES**

**College of Education Graduate Degrees and Majors**

Major	Degree	Concentration <sup>1</sup>	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, or 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, or social studies education	Division of Curriculum and Instruction
	Ed.D.	Bilingual education, curriculum studies, early childhood education, elementary education, <sup>2</sup> English as a second language, <sup>2</sup> Indian education, language and literacy, mathematics education, science education, secondary education, <sup>2</sup> or social studies education	Division of Curriculum and Instruction
	Ph.D. <sup>3</sup>	Art education, <sup>4</sup> curriculum studies, early childhood education, elementary education, English education, exercise and wellness education, <sup>5</sup> language and literacy, mathematics education, physical education, science education, or 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; or 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.	Optional: higher education <sup>1</sup>	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, or severely/multiply disabled	Division of Curriculum and Instruction

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

<sup>3</sup> This program is administered in collaboration with the Graduate College.

<sup>4</sup> This concentration is administered in collaboration with the Katherine K. Herberger College of Fine Arts.

<sup>5</sup> Doctoral courses for this interdisciplinary program administered by ASU Main are offered at ASU East.

**COLLEGE FACILITIES**

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

The Counselor Training Center provides counseling for ASU students, faculty, staff, and the community at large, regarding 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](http://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](http://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. program in Counseling Psychology and the School Psychology concentration in educational psychology are accredited by the American Psychological Association. School psychology 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.

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## Ira A. Fulton School of Engineering

[www.fulton.asu.edu](http://www.fulton.asu.edu)

Peter E. Crouch, Ph.D., Dean

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**PURPOSE**

Faculty in the Ira A. Fulton School of Engineering offer opportunities for graduate study and research that are designed to transform students into innovative leaders with career-ready skills. 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 programs are 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 Ira A. Fulton School of Engineering can be accessed via the World Wide Web at [www.fulton.asu.edu](http://www.fulton.asu.edu). The individual department and research program Web pages may also be accessed through this main address.

**ORGANIZATION**

The Fulton School of Engineering is organized as follows:

- Del E. Webb School of Construction
- 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 school research

## COLLEGES

### Ira A. Fulton School of Engineering Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
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.	—	Department of Computer Science and Engineering
	M.S., Ph.D.	Optional: arts, media, and engineering <sup>1</sup>	Department of Computer Science and Engineering
Construction	M.S.	Construction science, facilities, or management	Del E. Webb School of Construction
Electrical Engineering	M.S., Ph.D. M.S.E.	Optional: arts, media, and engineering <sup>1</sup> —	Department of Electrical Engineering Department of Electrical Engineering
Engineering	M.Eng.	—	Ira A. Fulton School of Engineering
Engineering Science	M.S., Ph.D.	—	Ira A. Fulton School of Engineering
	M.S.E.	Optional: executive embedded systems <sup>1</sup>	Ira A. Fulton 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. <sup>2</sup>	—	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. <sup>2</sup>	High-resolution nanostructure analysis or solid-state device materials design	Committee on the Science and Engineering of Materials

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> This program is administered by the Graduate College.

centers as well as individual laboratories and facilities. Drawing on the interests, strengths, and resources of academic units in the Ira A. Fulton School of Engineering and other schools and colleges within the university, interdisciplinary research centers coordinate research, sponsor conferences and continuing education courses, and serve as liaison between the academic and industrial or technical communities.

### ADMISSION REQUIREMENTS

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

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

### Graduate Programs

Through the Graduate College, faculty in the school of engineering offer various graduate programs leading to the M.S., Master of Science in Engineering, Master of Engineering, Master of Computer Science, and Ph.D. Several programs are delivered through both campus-based instruction or via the Internet.

The school is an internationally recognized center for graduate research. Faculty members conduct research on government or industry-sponsored programs in areas such as aerodynamics, arts and media engineering, 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 school are complemented and supported by the work of more than 20 centers, institutes, and programs for research and development. For a current list of research programs and signature research themes, access the school's Web site at [www.fulton.asu.edu](http://www.fulton.asu.edu).

The centers, institutes, and programs in operation (as of May 2004) include the following:

1. The Advanced Pavement Center studies new paving materials;
2. The Airworthiness Assurance Center of Excellence works on projects to increase aircraft safety;
3. The Arizona Partnership for Advancing Technology in Housing (AzPATH) finds ways to improve the quality and reduce the cost of homebuilding;
4. The Arts, Media, and Engineering program (AME), a joint research and education initiative of the Herberger College of Fine Arts and the Fulton School of Engineering, focuses on the integrated, parallel development of digital media technologies and digital media content;
5. The Center for Low Power Electronics is developing the next generation of ultra-low power electronic systems for mobile and portable applications;
6. The Center for Solid State Electronics Research (CSSER), which operates ASU's NanoFab facility, is working on microelectronics research projects in a wide variety of areas, including nanostructure and low power electronics;
7. The Center for Cognitive Ubiquitous Computing (CUBiC) is making computers easier to use, especially for people with disabilities;
8. Connection One: Communications Circuits and Systems Center is developing technology to improve wireless communication;
9. The Consortium for Embedded and Internetworking Technologies (CEINT) develops technologies that incorporate software designs and applications that communicate with one another;
10. Construction Research and Education for Advanced Technology Environments (CREATE) examines how to build cleanrooms and biotechnology facilities more efficiently;
11. The Environmental Fluid Dynamics Program studies the movement of air and water in the environment, particularly as it relates to pollution;
12. The Institute for Manufacturing Enterprise Systems, a joint effort with the W. P. Carey School of Business, works to solve problems in the business community related to software, supply chain, operations management, and other topics;
13. The NASA Space Grant Program designs and builds space-related craft, such as satellites and lunar rovers;
14. The National Center for Sustainable Water Supply investigates how to recycle reclaimed water;
15. The National Science Foundation (NSF) Water Quality Center works on projects to identify and remove both biological and chemical contaminants in water;
16. The Partnership for Research in Stereo Modeling (PRISM) uses computer modeling techniques to create three-dimensional models of microscopic objects; and
17. The Power Systems Engineering Research Center studies markets, systems, and transmission and distribution in the power industry.

In addition, faculty and researchers in the school contribute to a number of interdisciplinary research programs involving multiple schools and colleges in the university, including the Arizona Biodesign Institute (AzBio); the Institute for Computing and Information Sciences and Engineering; and the Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET).

Information about these programs is available elsewhere in this catalog or via the Web at [www.asu.edu](http://www.asu.edu).

**Center for Professional Development.** The Center for Professional Development (CPD) provides engineering and technical professionals the skills and knowledge necessary to master new methods, to lead projects and teams, and to advance professionally. By leveraging the internationally renowned faculty of the Ira A. Fulton School of Engineering and affiliated experts, CPD offers online master's degree programs allowing students with complex schedules to complete graduate degrees from a remote location while receiving the same degree and curriculum a student completes on campus. CPD also administers short courses and conferences, professional certification programs, and in-company customized programs. For more information, call 480/965-1740, or access the Web site at [asuengineeringonline.com](http://asuengineeringonline.com).

**Master of Engineering.** Arizona's three state universities—Arizona State University, Northern Arizona University, and the University of Arizona—are collaborating to offer the Arizona Master of Engineering program. This graduate degree program is designed to meet the educational needs of practicing engineers by offering courses via distance delivery. With input from industry professionals, the three universities are offering courses that develop the skills, fundamental knowledge, and understanding that are critical to today's practicing engineers. For more information, access the Web site at [triuniv.engr.arizona.edu](http://triuniv.engr.arizona.edu).

## SCHOOL 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,

## COLLEGES

molecular beam epitaxy, neuromechanical control, rapid manufacturing processes, transmission microscopy, and surface research, to name only a few of the diverse capabilities of the school's physical resources. Supporting the work of researchers, a well-equipped and well-staffed machine and structures fabrication shop makes special-purpose equipment for student and faculty projects. For more information about laboratories, consult the descriptions of individual programs and centers for research in this catalog.

The Ira A. Fulton School of Engineering offers extensive computing facilities to its faculty and graduate students. The school 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 school 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 school computing resources are interconnected via the Internet standard TCP/IP on 10Mb, 100Mb dedicated ethernet, or through wireless 802.11b access.

### ACADEMIC STANDARDS

**Retention.** A student who has been admitted to a graduate program of study in the Ira A. Fulton School of Engineering, 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" (1.00) or "E" (0.00) in a required deficiency or in a course at the 400 level or above; or
4. 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" (1.00) 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. 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.

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## The Katherine K. Herberger College of Fine Arts

[herbergercollege.asu.edu](http://herbergercollege.asu.edu)

J. Robert Wills, Ph.D., Dean

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### 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, which includes the Arts, Media, and Engineering program. 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 "Katherine K. Herberger College of Fine Arts Graduate Degrees and Majors" table, page 72.

### ADMISSION REQUIREMENTS

Admission requirements vary according to degree programs. However, applicants must first meet all admission requirements of the Graduate College. Most programs

require a bachelor's degree with a major in the selected area; many of them also require an audition. See the specific degree program for pertinent admission requirements.

### SPECIAL PROGRAMS

Together with faculty, visiting scholars, and artists-in-residence, graduate students in all fields of the college participate in dynamic, innovative programs. The creative energy that infuses the visual and performing arts finds expression in research and study.

The School of Art offers scholarly programs in the history, theory, and teaching of art, and highly respected studio programs in ceramics, digital technology media, 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 education, dance in relation to technology, dance music composition, laban movement analysis, somatics, 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.

The Arts, Media, and Engineering (AME) program evolved out of the Institute for Studies in the Arts (ISA), an interdisciplinary research center in the Herberger College of Fine Arts created in 1990. The ISA established an environment for the support of research and collaboration among artists, scholars, and technologists for inventing and sharing new forms of art experience and processes for creating and teaching the arts. The ISA continues to incorporate guest artists and scientists and presentations of AME research groups into its annual season of events, including performances, presentations, screenings, workshops, and residencies.

AME focuses on the integrated, parallel development of digital media technologies and digital media content. AME faculty and graduate students combine understanding of computation and computational modeling with the ability to apply this understanding at every level of the digital media communication process—from the development of tools and the creation of content, to analysis of the social implications of the digital revolution. Students benefit from a

dynamic educational experience that transcends traditional departmental or disciplinary modes. AME's modular and flexible curriculum allows students to customize their degree paths to reflect research interests.

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.

Four concentrations are available in the M.F.A. in Theatre program: interdisciplinary digital media, performance, scenography, and theatre for youth. The concentration in interdisciplinary digital media allows selected students to become sophisticated makers, evaluators, and entrepreneurs of digital media in addition to training in performance, scenography, or theatre for youth. The concentration in performance challenges performing artists to reinvigorate the classics, develop new works, explore new theatrical forms, and discover changing relationships between art and technology.

Students in the scenography program are actively involved in all aspects of design and technology for 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; a video lab; the Digital Arts Ranch;

## COLLEGES

### Katherine K. Herberger College of Fine Arts Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
Art	M.A.	Art education or art history	School of Art
	M.F.A.	Ceramics, digital technology, drawing, fibers, intermedia, metals, painting, photographic studies, photography, printmaking, sculpture, or wood	School of Art
Composition	M.M.	Optional: interdisciplinary digital media and performance <sup>1</sup>	School of Music
Creative Writing	M.F.A. <sup>2</sup>	—	Creative Writing Committee
Curriculum and Instruction	Ph.D. <sup>3</sup>	Art education	School of Art
Dance	M.F.A.	Optional: interdisciplinary digital media and performance <sup>1</sup>	Department of Dance
History and Theory of Art <sup>4</sup>	Ph.D.	—	School of Art
Music	M.A.	Ethnomusicology, music history and literature, or music theory	School of Music
	D.M.A.	Conducting, interdisciplinary digital media and performance, music composition, music education, or performance	School of Music
Music Education	M.M.	Choral music, general music, instrumental music, or jazz studies	School of Music
Performance	M.M.	Music theatre/opera musical direction, music theatre/opera performance, performance, performance pedagogy, or piano accompanying	School of Music
Theatre	M.A.	—	Department of Theatre
	M.F.A.	Interdisciplinary digital media, performance, scenography, or theatre for youth	Department of Theatre
	Ph.D.	Optional: theatre for youth <sup>1</sup>	Department of Theatre

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> This program is administered by the Graduate College.

<sup>3</sup> This program is administered in collaboration with the College of Education and the Graduate College.

<sup>4</sup> This major is jointly offered with the University of Arizona.

and the Computing Commons Gallery. 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 Department of Theatre 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, Siqueros, and Tamayo. The museum also displays many fine examples of 19th- and 20th-century crafts, paintings, and sculpture.

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

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

#### ADVISING

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

#### ACCREDITATION

While all of the arts programs in the college meet or exceed standards established by various arts accrediting agencies, the School of Music holds formal membership in the National Association of Schools of Music.



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# College of Law

[www.law.asu.edu](http://www.law.asu.edu)

Patricia D. White, J.D., Dean

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## PURPOSE

As the only law school in the United States' fifth largest metropolitan area and the state's political and legal capital, the College of Law plays a significant role in the legal profession nationally and serves as the region's principal intellectual center for the profession. In addition to training men and women for the profession and related assignments, the college contributes to the creation and administration of law and justice through the efforts of its faculty and students.

## 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 406,000 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, English Legal History, 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 20-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 may also access other campus libraries, including the Charles Trumbull Hayden Library, the Daniel E. Noble Science and Engineering Library, the Architecture and Environmental Design Library, and the Music Library. The collections maintained in all university libraries comprise more than 3 million volumes.

## GRADUATE PROGRAMS

### Juris Doctor Degree

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

### 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," page 74, 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 center, founded by the Arizona Board of Regents in 1984, is a multidisciplinary research center and a national leader in training law students to understand and manage the legal implications of new technologies. The center anticipates issues raised by new knowledge, stimulates dialogue between legal and scientific scholarship, and conducts research that promotes the legal community's engagement with scientific and technological developments. The unique breadth of faculty expertise within the College of Law, 19 of whom are center fellows, supports course offerings in a broad range of law, science, and technology subjects. Subjects include scientific evidence, intellectual property and cyberlaw, behavioral biology, health care and bioethics, information and communication technologies, statistics and mathematical methods, biotechnology, environmental and natural resource law and policy, and risk management. A certificate program provides coherence and structure to student academic development; there are specializations in intellectual property, health care law, and environmental law. Externships in the local legal community provide students with hands-on experience under the guidance of skilled practitioners. The center's Technology Transfer Clinic provides a unique applied clinical experience where students evaluate inventions generated by ASU researchers, devise marketing strategies, and file patent documentation. The center is a key player in several contemporary debates within the legal academic community. For example, it sponsors an annual conference on genetics and the law. It also sponsors a speaker series each semester that attracts the country's best legal scholars. The center also co-publishes, with the American Bar Association's Section of Science and Technology Law, *Jurimetrics: The Journal of Law, Science, and Technology*, the oldest and most widely circulated journal in the field of law and science. Students serve as editors and officers of the journal, editing articles for publication, conducting research, and developing and writing articles under the direction of the faculty editor.

## COLLEGES

### Clinical Program

The College of Law's Clinical Program provides second and third year students with an opportunity to handle actual cases under the direct guidance of skilled faculty members. The college offers five real-client clinics: the Civil Justice Clinic, the Criminal Practice Clinic, the Public Defender Clinic, the Mediation Clinic, and the newly designed Technology Ventures Clinic. The college's extensive and diverse clinical program allows students to choose among a variety of different work environments. The Civil Practice Clinic, for example, operates as a functioning law firm within the college, while students in the criminal litigation clinics work in prosecution or public defender agencies in the Phoenix area. Students in the Mediation Clinic learn how to facilitate the resolution of disputes without litigation, while other students serve as mediators in real disputes in the small claims court system. Finally, students in the Technology Ventures Clinic work collaboratively with students from other disciplines to analyze technology portfolios and participate in an intellectual property review process for new technologies. To help prepare for participation in a clinic, second-year students are offered "simulation-based" courses in Lawyering Theory and Practice, Trial Advocacy, Pre-Trial Practice, and Negotiation.

### Indian Legal Program

The Indian Legal Program at the college was established in 1988 to provide legal education to students on topics in Indian law, to generate scholarships in Indian law, and to provide public service to tribal governments. The college is a strong choice for students interested in studying Native American legal systems, federal Indian law, and the complex issues confronting Indian nations and individuals. 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 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 people. Courses on Federal Indian law and seminars on advanced Indian law topics, such as tribal law and government, gaming, and American Indian cultural resources protection, 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 students with an outstanding legal education and a firm grounding in both the theoretical and practical aspects of Indian law.

### Committee on Law and Philosophy

Both the College of Law and the College of Liberal Arts and Sciences have groups of excellent faculty with expertise in philosophy of law and related areas of moral and political philosophy. These faculty members have been brought together to form the Committee on Law and Philosophy. The overall goal of the committee is to create and maintain a rich and active intellectual community in this area and to use the resources of that community to offer conferences, lectures, courses, and seminars. Areas of particular interest to members of the committee include criminal law theory,

punishment, forgiveness, constitutional interpretation, human rights theory, law and literature, law and religion, and political obligation.

### Law Journal

The College of Law publishes a professional law review, the *Arizona State Law Journal*, edited by students of the second- and third-year classes. Membership on the law journal is determined by grade performance in the first year and by submitting written work in a writing competition. Participation on law review is hard but rewarding work. For those eligible, the review provides one of the finest avenues for legal education thus far developed. Its work contributes to the student's intellectual advancement, to the development of law and the legal profession, and to the stature of the law school.

### ADMISSION REQUIREMENTS

First-year students are admitted for only the fall semester. The formal requirements for 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 online at [www.law.asu.edu](http://www.law.asu.edu). To request an application form, 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](http://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.

**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.

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# College of Liberal Arts and Sciences

[www.asu.edu/clas](http://www.asu.edu/clas)

David A. Young, Ph.D., Dean

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## 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—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, six professional degrees are offered: the Master of Advanced Study in Geographic Information Systems, the Master of Natural Science, the Master of Teaching English as a Second Language, the Master of Physical Education, the Master of Fine Arts, and the Professional Science Master's degree in Computational Biosciences. An interdisciplinary creative writing program is also offered in cooperation with the Katherine K. Herberger College of Fine Arts. The interdisciplinary master's program in Humanities draws faculty expertise from the Departments of Anthropology, Dance,

## COLLEGES

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 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 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 77.

### 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 85). 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 subdisciplines; 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 distinguished poets, playwrights, and novelists to ASU. 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 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 in late 19th-century British literature and historical documents of the Southwest.

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

### FINANCIAL ASSISTANCE AND SUPPORT

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

### ADVISING

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

College of Liberal Arts and Sciences Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
Anthropology	M.A.	Archaeology, bioarchaeology, linguistics, museum studies, physical anthropology, or social-cultural anthropology	Department of Anthropology
	Ph.D.	Archaeology, physical anthropology, or social-cultural anthropology	Department of Anthropology
Asian Languages and Civilizations—Chinese/Japanese	M.A.	—	Department of Languages and Literatures
Audiology	Au.D.	—	Department of Speech and Hearing Science
Biology	M.S., Ph.D.	Optional: ecology <sup>1</sup>	School of Life Sciences
Chemistry	M.S., Ph.D.	Analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, or solid-state chemistry	Department of Chemistry and Biochemistry
Communication Disorders	M.S.	—	Department of Speech and Hearing Science
Computational Biosciences	P.S.M.	—	College of Liberal Arts and Sciences
Creative Writing <sup>2</sup>	M.F.A.	—	Creative Writing Committee
English	M.A.	Comparative literature, English linguistics, literature and language, or rhetoric and composition	Department of English
	Ph.D.	Literature or rhetoric/composition and linguistics	Department of English
Exercise Science <sup>2</sup>	Ph.D.	Biomechanics, motor behavior/sport psychology, or physiology of exercise	Committee on Exercise Science
Family and Human Development	M.S.	Optional: family studies <sup>1</sup>	Department of Family and Human Development
Family Science	Ph.D.	Optional: marriage and family therapy <sup>1</sup>	Department of Family and Human Development
French	M.A.	Comparative literature, linguistics, or literature	Department of Languages and Literatures
Geographic Information Systems	M.A.S.	—	Department of Geography
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, or literature	Department of Languages and Literatures
History	M.A.	Asian history, British history, European history, Latin American history, public history, U.S. history, or U.S. Western history	Department of History
	Ph.D.	Asian history, British history, European history, Latin American history, or U.S. history	Department of History
Humanities	M.A.	—	Graduate Committee on Humanities
Kinesiology	M.S.	—	Department of Kinesiology
Materials Science <sup>2</sup>	M.S.	—	Committee on the Science and Engineering of Materials

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> This program is administered by the Graduate College.

## COLLEGES

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

Major	Degree	Concentration <sup>1</sup>	Administered By
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
Natural Science	M.N.S.	Biology, microbiology, or plant biology Chemistry  Geological sciences Mathematics  Physics	School of Life Sciences Department of Chemistry and Biochemistry Department of Geological Sciences Department of Mathematics and Statistics Department of Physics and Astronomy
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	M.S., Ph.D.	Optional: ecology or photosynthesis <sup>1</sup>	School of Life Sciences
Political Science	M.A., Ph.D.	American politics, comparative politics, international relations, or political theory	Department of Political Science
Psychology	Ph.D.	Behavioral neuroscience, clinical psychology, cognitive/behavioral systems, developmental psychology, quantitative research methods, or social psychology	Department of Psychology
Religious Studies	M.A., Ph.D.	—	Department of Religious Studies
Science and Engineering of Materials <sup>2</sup>	Ph.D.	High-resolution nanostructure analysis or 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, or literature Cultural studies or literature	Department of Languages and Literatures Department of Languages and Literatures
Speech and Hearing Science <sup>2</sup>	Ph.D.	Developmental neurolinguistic disorders, neuroauditory processes, or neuro-gerontologic communication disorders	Committee on Speech and Hearing Science
Statistics <sup>2</sup>	M.S.	—	Committee on Statistics
Teaching English as a Second Language	M.TESL	—	Department of English

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> This program is administered by the Graduate College.

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# College of Nursing

[nursing.asu.edu](http://nursing.asu.edu)

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## 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 the Graduate Program 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: 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 think-

ing, 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 80. 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 children with special needs.

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.

## 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 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

## POST-MASTER'S PROGRAM

The college offers a Post-Master's Nurse Practitioner Certificate program in all specialty concentrations and the Clinical Nurse Specialist and Nurse Practitioner roles on a space-available basis. Completion of course work toward this academic certificate does not lead to medical certification.

## DOCTOR OF NURSING SCIENCE

For information on the new Doctor of Nursing Science (D.N.S.) degree, call the dean's office at 480/965-3244.

## FEES

In addition to tuition, program fees apply for the M.S., post-master's certificate, and D.N.S. For more information, call 480/965-3948.

## 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

## COLLEGES

### College of Nursing Graduate Degrees and Majors

Major	Degree	Concentration <sup>1</sup>	Administered By
Nursing	M.S.	Adult health nursing, community health nursing, family health nursing, nursing administration, <sup>2</sup> parent-child nursing, psychiatric/mental health nursing, or women's health	College of Nursing
	D.N.S.	—	College of Nursing
Public Health <sup>2</sup>	M.P.H.	Community health practice or health administration and policy	College of Nursing

<sup>1</sup> If a major offers concentrations, one must be selected unless noted as *optional*.

<sup>2</sup> Applications are not being accepted at this time.

professional. Some offerings are multidisciplinary and are also open to individuals in professions outside of nursing.

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

**Scholarships and Financial Assistance.** Information about scholarships and loan funds for nursing students may be obtained from the Student Financial Assistance Office, College of Nursing Office of Student Services (call 480/965-2987) or the Graduate Program and Research office (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 29.

### ADVISING

Students are advised by the Student Services Office before admission to the graduate program. Upon admission, each student is assigned a faculty advisor within the area of concentration. Questions may also be directed to the Graduate Program and Research office. 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.



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# College of Public Programs

[www.asu.edu/copp](http://www.asu.edu/copp)

Jeffrey Chapman, Ph.D., Interim Dean

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## 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. 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.

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 College of Public Programs.

**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," page 82, are offered by the faculty within the college.

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

## COLLEGES

### College of Public Programs Graduate Degrees and Majors

Major	Degree	Concentration*	Administered By
Communication	M.A.	—	Hugh Downs School of Human Communication
	Ph.D.	Communicative development, intercultural communication, or organizational communication	Hugh Downs School of Human Communication
Justice Studies	M.S.	—	School of Justice Studies
	Ph.D.	Optional: criminal and juvenile justice; dispute resolution; law, justice, and minority populations; law, policy, and evaluation; or women, law, and justice*	School of Justice Studies
Mass Communication	M.M.C.	—	Walter Cronkite School of Journalism and Mass Communication
Public Administration	M.P.A.	Optional: 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 or planning, administration, and community practice	School of Social Work
	Ph.D.	—	School of Social Work

\* If a major offers concentrations, one must be selected unless noted as *optional*.

### ADMISSION REQUIREMENTS

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

### SPECIAL PROGRAMS

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

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

### COLLEGE FACILITIES

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

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

### 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](http://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 84, 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
Total minimum semester hours required.....	33

### Applied Project Option

Technical area of emphasis .....	15–18
Supporting area .....	9–12
Research/applied project .....	3
Research/writing course .....	3
Total minimum semester hours required.....	33

A master’s degree candidate forms a supervisory committee, the chair of which is from one of four CTAS departments or the Division of Computing Studies. 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 aviation management technology and aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in electronic 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.

The Division of Computing Studies offers the concentration in computer systems.

**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, or mechanical engineering technology	Department of Mechanical and Manufacturing Engineering Technology
		Aviation human factors or aviation management technology	Department of Aeronautical Management Technology
		Computer systems	Division of Computing Studies
		Electronic systems engineering technology, instrumentation and measurement technology, or microelectronics engineering technology	Department of Electronics and Computer Engineering Technology
		Environmental technology management, fire service administration, information technology, or management of technology	Department of Information and Management Technology
		Global technology and development or security engineering technology	College of Technology and Applied Sciences

\* If a major offers concentrations, one must be selected unless noted as *optional*.



Malls are a recent addition to the ASU East campus, where new programs are being continually offered. Tim Trumble photo

**SPECIAL PROGRAMS**

**Concentration in Global Technology and Development (GTD)**

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

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

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# Graduate Studies at ASU Main and ASU East

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## 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 Advanced Study (M.A.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.Eng.)
- Master of Environmental Planning (M.E.P.)
- Master of Fine Arts (M.F.A.)
- Master of Health Sector Management (M.H.S.M.)
- 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)
- Professional Science Master's (P.S.M.)
- Doctor of Audiology (Au.D.)
- Doctor of Education (Ed.D.)
- Doctor of Musical Arts (D.M.A.)
- Doctor of Nursing Science (D.N.S.)

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

Anyone who holds a bachelor's (or equivalent) or graduate degree from a college or university of recognized standing is eligible to apply for admission to the Graduate College. Remedies for undergraduate deficiencies may be assigned if the undergraduate degree is based on credits not accepted by ASU, such as life experience or noncredit workshops and seminars.

### Graduate College Requirements

Generally, an applicant must have a GPA of 3.00 (scale is 4.00 = A), or the equivalent, in the last two years of work leading to the bachelor's degree. A student who enters a graduate degree program is expected to have undergraduate educational experiences, including general education studies, that are similar to those required for the baccalaureate degree at ASU.

### Requirements of the Academic Unit

Academic units, departments, or colleges, may have admission requirements in addition to those of the Graduate College. Many graduate programs require scores from a national admissions test such as the Graduate Record Examination, Graduate Management Admission Test, or the Miller Analogies Test. Some programs require a portfolio, letters of recommendation, or a statement of goals. Applicants should contact the academic unit regarding specific requirements.

### Submission of an Application

For admission information and procedures, access the Web site at [www.asu.edu/graduate/admissions](http://www.asu.edu/graduate/admissions). Students are encouraged to apply via the Web. If students cannot access the Internet, they may call the Graduate College at 480/965-6113 or send e-mail to [gradapp-q@asu.edu](mailto:gradapp-q@asu.edu).

### Application Fee

Each application for entry to ASU graduate programs must be accompanied by a nonrefundable application fee. The fee is \$50 to apply for admission to a degree program and \$25 to apply for nondegree studies. For admission information and procedures, access the Web site at [www.asu.edu/graduate/admissions](http://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 requirements of U.S. immigration regulations in addition to the requirements of the Graduate College and the academic units 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](http://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).

As required by the U.S. government, 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](http://www.asu.edu/graduate/admissions). The I-20 or the IAP66 (documents needed to obtain a student visa) are issued only after the completed, properly verified Financial Guarantee form and support documents have arrived. International students may enroll at ASU only if they have been admitted to a degree program, a certificate program, or the postbaccalaureate teacher education program. They must meet all appropriate immigration standards and requirements.

Applications are processed when they are received. However, international applicants should submit all materials in December or January in order to begin study the following fall semester and in August or September in order to begin study the following spring semester. An application fee of \$45 (in U.S. funds) must accompany each formal degree program application.

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

Upon arrival on campus, students must report to an advisor in the International Student Office.

**English Language Requirement.** Applicants who are from a country whose native language is not English must provide evidence of English proficiency as indicated by acceptable scores on the Test of English as a Foreign Language (TOEFL) as follows:

1. The minimum TOEFL requirement for entry into any graduate program is 550 (paper-based) or 213 (computer-based).
2. Individual academic units may have higher TOEFL requirements for their various programs. Consult the department Web sites and this catalog for more information.

The following exceptions apply to the TOEFL requirement:

1. Applicants who have earned a bachelor's degree or higher from a university in the United States are exempt from the TOEFL requirement. This study must have been done within the United States.
2. Applicants who have completed a minimum of 12 semester hours of graduate level study at a regionally accredited college or university in the United States with a GPA of 3.00 or higher are exempt from the TOEFL requirement.
3. Applicants who have completed the American English and Culture Program Advanced 2 Level are exempt from the TOEFL requirement.

All international applicants who are from a country whose native language is not English 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.

### 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 graduate studies can make formal offers of admission. The Graduate College notifies all applicants in writing of the admission decision.

All academic credentials and supporting materials received by the university in connection with an application for admission become the property of ASU. If the applicant does not enroll in the university within one year, the admission documents may be destroyed.

The date (month/day/year) on the dean of graduate studies' 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. Deficiency courses must be completed before the student is awarded a graduate degree. Deficiency courses may not be applied toward the minimum hours required for the degree program.

**Provisional Admission.** A student who does not meet minimum academic standards but has counterbalancing evidence to suggest the potential for success may be admitted on a provisional basis. Provisional admission provides an academic unit with more evidence on which to base its decision. Normally the academic unit reviews the student's status following completion of 12 semester hours of approved graduate study. At that time, the academic unit recommends to the Graduate College a change in status to either regular admission or withdrawal from the program. When students have completed their provisional requirements, they should check with their advisors to make sure that the change of status has been recommended. A provisional student may also be assigned deficiencies.

**Nondegree Admission.** A student not interested in earning a degree or not ready to apply to a particular degree program may enroll as a nondegree student. The application process is streamlined and does not require submission of transcripts or test scores. For nondegree admission information and procedures, access the Web site at [www.asu.edu/graduate/admissions](http://www.asu.edu/graduate/admissions). 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. Also, because of limited class size and resources, certain academic units may limit the enrollment of nondegree students.

### Recognition of a Degree

Recognition of a degree is acknowledgment that the program leading to the degree is equivalent to a program offered by ASU or is an acceptable program for the proposed graduate major at ASU. A student who enters a graduate degree program at ASU is expected to have undergraduate educational experiences, including general education studies, that are appropriate for the program.

### Definition of a Unit of Credit

The Arizona Board of Regents has defined (May 26, 1979) a unit of credit for the institutions under its jurisdiction. A minimum of 45 hours of work by each student is required for each unit of credit. An hour of work is the equivalent of 50 minutes of class time (often called a "contact hour") or 60 minutes of independent study work. For lecture-discussion courses, this requirement equates to at least 15 contact hours and a minimum of 30 hours of work outside of the classroom for each unit of credit. Even though the values of 15 and 30 may vary for different modes of instruction, the minimum total of 45 hours of work for each unit of credit is a constant. Since the unit of credit as defined by the Arizona Board of Regents is the cornerstone of aca-

demical 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 85.

### Readmission to the Graduate College

Any graduate student who has not been in attendance at the university for one semester 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](http://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

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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 registered courses. A student who officially withdraws from the university later than the fourth week receives a mark of “W” or “E” (0.00), 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” (0.00), 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” (0.00), 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 one calendar year is considered withdrawn and must reapply for admission to a degree program. Doctor of Philosophy students have additional enrollment requirements. See [“Continuous Enrollment,” page 97](#).

**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 stu-

dent’s major. For complete procedural information, contact the appropriate medical withdrawal designee.

### Course Load

The course load is determined by the supervisory committee but is not to exceed 15 semester hours of credit during each of the two semesters. Refer to the latest *Summer Sessions Bulletin* for course load limits for five-week and eight-week sessions. An audited course is counted in the student’s maximum load.

All teaching and research assistants and associates must enroll for a minimum of six semester hours during each semester (fall and spring) of their appointment. The six hours cannot include audit enrollment. Enrollment in continuing registration (595, 695, or 795) does not fulfill the six-hour requirement. A half-time (50 percent) teaching and research assistant or associate working 20 clock hours per week may not register for more than 12 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.

**Enrollment Verification Guidelines.** The registrar is responsible for verifying enrollment according to the general guidelines. See the [“Enrollment Verification Guidelines for Graduate Students” table, page 89](#).

## GRADUATE COLLEGE DEGREE REQUIREMENTS

### Graduate Advising

The Graduate College’s 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, page 89](#), defines grades and gives their values.

Ordinarily the instructor of a course has full discretion in selecting which grades to use and report from the available grading options.

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” (1.00) and “E” (0.00) 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” (1.00) or “E” (0.00) must repeat the course in a



## Enrollment Verification Guidelines for Graduate Students

	Full Time	Half Time	Less Than Half Time
<b>Regular semester</b>			
Graduate	9 or more hours	5–8 hours	4 or fewer hours
Graduate assistant*	6 or more hours	—	—
<b>Five-week summer session</b>			
Graduate	3 or more hours	2 hours	1 hour
Graduate assistant*	2 or more hours	1 hour	—
<b>Eight-week summer session</b>			
Graduate	5 or more hours	3–4 hours	2 or fewer hours

\* For enrollment verification purposes, “graduate assistant” is a generic term that includes teaching assistants, research assistants, teaching associates, and research associates.

## Grades

Grade	Definition	Value
A+	—	4.33 <sup>1</sup>
A	Excellent	4.00
A-	—	3.67
B+	—	3.33
B	Good	3.00
B-	—	2.67
C+	—	2.33
C	Passing	2.00
D	No graduate credit	1.00
E	Failure	0.00
I	Incomplete	—
NR	No report	—
W	Withdrawal	—
X	Audit	—
Y	Satisfactory	—
Z	Course in progress <sup>2</sup>	—

<sup>1</sup> Although the scale includes a grade of A+ with a value of 4.33, the cumulative GPA is capped at 4.00.

<sup>2</sup> This grade is usually given pending completion of courses.

regularly scheduled (not an independent study) class if it is to be included in the program of study. However, both the “D” (1.00) or “E” (0.00) 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.”

A grade of “W” is given whenever a student officially withdraws.

**Repeating ASU Courses.** Graduate students (degree or nondegree) may retake any course 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. University policy protects students filing grievances and those who are witnesses 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

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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 graduate studies 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 advisor, the head of the academic unit offering the class, and the dean of graduate studies.

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 a grade of "B" (3.00) or higher 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 dean of graduate studies' 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.

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

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

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

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. 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.

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 a grade of “B” (3.00) or higher may be transferred. A course with the grade of pass, credit, or satisfactory may not be transferred.

Official transcripts of any transfer credit to be used on a program of study must be sent directly to the Graduate Admissions Office from the Office of the Registrar at the institution where the credit was earned.

### Graduate Supervisory Committees

When the program of study is filed, upon the recommendation of the head of the academic unit, the dean of graduate studies appoints a graduate student’s supervisory committee, consisting of a chair and other resident faculty members. The number of members serving on this committee depends on the degree program.

Academic professionals (e.g., research scientists, research engineers), nontenure-track faculty (e.g., adjunct professors, research professors), and individuals granted affiliated faculty status through established university procedures may serve as cochairs, members, or extra members of thesis and dissertation committees upon approval by the Graduate College. Individuals who are recommended by an academic unit as eligible to serve as a cochair must meet the criteria established by the academic unit and be approved by the Graduate College.

Upon the recommendation of the committee chair and head of the academic unit, ASU West tenured (or tenure-track) faculty may serve on master’s and doctoral committees at ASU Main. ASU West tenured (or tenure-track) faculty may serve as cochairs for thesis and dissertation committees at ASU Main upon the recommendation of the head of the academic unit and approval of the dean of graduate studies. Cochairs must meet the academic unit’s criteria for chairing thesis and dissertation committees.

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 graduate studies, 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. The chair of the student’s supervisory committee is responsible for providing the Department of Languages and Literatures with materials from which the exam-

ination 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](http://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 should 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 later appears 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

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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 re-filing fee.

### Summer Sessions

Work taken during the summer sessions carries the same scholastic recognition as that taken during the regular semester. A complete schedule of offerings is available in the *Summer Sessions Bulletin*, which may be obtained from the Office of Summer Sessions.

### Dates and Deadlines

The “Graduate College Calendar,” 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. This information is also available on the Web at [www.asu.edu/graduate/resources/generalinfo/GradDdlns](http://www.asu.edu/graduate/resources/generalinfo/GradDdlns).

### Student Responsibility

Graduate students are responsible for knowing and observing 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](http://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/rsp105.html](http://www.asu.edu/aad/manuals/rsp/rsp105.html).

### ASSISTANTSHIPS AND ASSOCIATESHIPS

**Application Procedure.** Since it is necessary for all applicants to be admitted to degree programs before awards are made, students should apply for admission through the Graduate Admissions Office at the same time they apply for financial assistance.

**Teaching and Research Assistantships and Associateships.** Appointments as teaching or research assistants and associates (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 associateships 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 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.

#### Records Hold

The Office of the Registrar enforces a financial records hold or administrative hold on the records of a student when an outstanding financial obligation or disciplinary action has been reported.

When a financial hold is placed on the record, the following results may occur:

1. No official transcript is issued.
2. Registration privileges are suspended.
3. Other student services are revoked.

When an *administrative* hold is placed on the record, the following results may occur:

1. Registration privileges are suspended.
2. Other student services may be revoked.

The hold remains effective until removed by the initiating office. It is the student's responsibility to clear the conditions causing the hold.

#### Access to Records

Students 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.

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 educational 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 programs. Before initiating an appeal, the graduate student should fully utilize all other appeal and review processes available in the student's program, department, or college. The student should also discuss the situation with the associate dean of graduate studies to explore resolution of the matter at the unit or college level before filing an appeal.

The GCAB reviews written appeals of graduate students concerning

1. retention in graduate programs (with the limitations described below);
2. procedural matters in graduate student programs (e.g., procedures related to programs of study, theses, dissertations, and preliminary or comprehensive exams); and
3. other academic issues that are not covered by other university policies or processes.

The GCAB does not review appeals of course grades, allegations of academic dishonesty or scientific misconduct, matters relating to employment or assistantships, allegations of discrimination, or appeals for which the graduate student has not fully utilized all other appeal and review procedures in the academic unit and academic college. The GCAB normally does not review the application of department or program policies regarding adequate academic progress and objective performance or progress measures. Students

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

should be aware of the involvement of other appropriate units:

1. Grade appeals are subject to review by the dean of the academic college.
2. Allegations of academic dishonesty are subject to review under the ASU Student Academic Integrity Policy.
3. Allegations of scientific misconduct are subject to review under ASU policy RSP 111 (“Misconduct in Research”) in the *Research and Sponsored Projects Policies and Procedures Manual*.
4. Allegations of discrimination should be directed to the ASU Office of Equal Opportunity/Affirmative Action.

The Guidelines for Graduate Appeals describing further the GCAB appeal procedures, process, and jurisdiction are available from the Graduate College and on the Web at [www.asu.edu/graduate/resources/student](http://www.asu.edu/graduate/resources/student).

### 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 85. 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 graduate studies 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 graduate studies. 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](http://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 graduate studies, 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 dean of graduate studies’ 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 90.)

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 91.

**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 graduate studies 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 five hours may be any combination of 592 Research and 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 91, 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](http://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](http://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. 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 graduate studies. 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 88.

**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;

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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 program and master's degree program 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 91, 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, pro-

motes 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* — at [www.asu.edu/aad/manuals/rsp](http://www.asu.edu/aad/manuals/rsp).

### 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.

### 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 88.

### 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 85, 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 graduate studies 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 graduate studies 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 graduate studies.

**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 graduate studies. 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.

Students may not apply credit hours earned for a doctoral degree previously awarded at ASU or another institution toward their current ASU doctoral degree. However, at the individual academic unit’s discretion, students may apply up to 30 semester hours from a previously awarded master’s degree toward their doctoral program of study.

**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 semester, the student may apply for leave status. However, this leave status cannot exceed one semester.

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 graduate studies. 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 91.

**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

## GRADUATE STUDIES AT ASU MAIN AND ASU EAST

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 graduate studies 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](http://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 graduate studies.

**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 graduate studies. 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 graduate studies and ordinarily involves repetition of the comprehensive examinations.



The College of Architecture and Environmental Design/North building

Tim Trumble photo

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# Graduate Programs and Courses

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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 253.

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## Accountancy

### Certificate Program

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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](http://www.west.asu.edu) on the Web.

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## Accountancy and Information Systems

### Master’s Program

[wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc)

480/965-3631

BA 223

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#### James R. Boatsman, Director

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

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

**Assistant Professors:** Chen, Comprix, Dowling, Lee, O’Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

**Senior Lecturers:** Geiger, Goldman, Hayes, Maccracken, Shrednick

**Lecturer:** J.L. Boatsman

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The faculty in the School of Accountancy, W. P. Carey School of Business, offer specialized professional programs leading to the Master of Accountancy and Information Systems (M.A.I.S.) and Master of Taxation (see “[Taxation](#),” page 337) degrees. The objective of the M.A.I.S. program is to provide specialized preparation for careers in profes-

sional accounting, corporate accounting and finance, management consulting, and information systems. This program is also designed to meet the 150-hour requirement for earning the CPA certification.

The faculty participate in offering the program leading to the Master of Business Administration (see “[Master of Business Administration](#),” page 138) and Ph.D. in Business Administration (see “[Doctor of Philosophy](#),” page 139).

### MASTER OF ACCOUNTANCY AND INFORMATION SYSTEMS

**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 by 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/acc](http://wpcarey.asu.edu/acc).

**Prerequisites.** Applicants must complete program prerequisites. Refer to the School of Accountancy Web site for a current listing of required course prerequisites for the program.

**Program of Study.** The Master of Accountancy and Information Systems program consists of a minimum of 30 semester hours and is continually updated. In this program students acquire core knowledge and a set of professional skills from course work drawn from financial and managerial accounting, auditing, taxation, and information systems. These core courses, recommended by the AICPA as “a fundamental part of any graduate-level accounting curriculum,” build on a base level of such knowledge and skills that students presumed to have acquired from an undergraduate degree. Additionally, students select a sequence of courses that allow a greater focus in either information systems or traditional accounting. Completion of the program should result in students possessing an expanded understanding of the strategic role of accounting in business organizations and society, professional responsibilities, and the ethical standards of the accounting profession.

Access 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 Web site at [wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc).

#### 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.

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## Aerospace Engineering

### Master's and Doctoral Programs

[www.eas.asu.edu/~mae](http://www.eas.asu.edu/~mae)

480/965-3291

ECG 346

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Robert E. Peck, Chair

**Professors:** Chattopadhyay, Liu, Mignolet, Peck, Reed, Saric, Wie

**Associate Professors:** Lee, Wells

**Assistant Professor:** Mikellides

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The faculty in the Department of Mechanical and Aerospace Engineering offer graduate programs leading to the M.S., M.S.E., and Ph.D. degrees in Aerospace Engineering. A number of areas of study may be pursued, including aerodynamics, design, dynamics and control, propulsion, space systems, 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 December 1. Applications received after that date and before July 1 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 204, 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—M.Eng.*,” page 204.

**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; boundary-layer transition and flow control; composite structures; flight dynamics, guidance, and controls; fracture mechanics and fatigue; high-

speed aerodynamics; hydrodynamic stability; multidisciplinary optimization; satellite design; smart structures; structural dynamics and vibrations; and unsteady aerodynamics. State-of-the-art laboratory, flight research, and computational facilities are available to assist in the development of research skills. More information can be obtained by accessing the department Web site at [www.eas.asu.edu/~mae](http://www.eas.asu.edu/~mae).

**COURSES**

For courses, see “*Mechanical and Aerospace Engineering (MAE)*,” page 273.

**African and African Diaspora Studies**

**Interdisciplinary Graduate Certificate Program**

[www.asu.edu/clas/afamstu](http://www.asu.edu/clas/afamstu)

480/965-4399

COWDN 224

**Okechukwu Iheduru, Director**

**African and African American Studies**

Professor: Reyes  
Associate Professors: Bontemps, Boulin Johnson, Neff  
Assistant Professors: Hinds, Usman  
Clinical Associate Professor: Cox

**Communication**

Professor: Jain  
Associate Professor: Davis

**English**

Professors: Lester, Miller  
Associate Professor: DeLamotte  
Assistant Professor: Lockard

**History**

Associate Professor: El Hamel  
Assistant Professor: Whitaker

**Humanities**

Assistant Professor: Lund

**Justice Studies**

Professor: Romero

**Political Science**

Associate Professor: Mitchell

**Sociology**

Associate Professor: Keith

The graduate Certificate in African and African Diaspora Studies is an interdisciplinary program with four areas of emphasis: African studies, African diaspora studies, women and gender in African and African diaspora studies, and

## GRADUATE PROGRAMS AND COURSES

comparative studies. These areas of emphases provide students with access to an extensive range of information and systematic knowledge committed to the new model of African and African diaspora studies that focuses on the intersections of race, culture, and gender with interdisciplinary perspectives. The required course, AFR 500 Theory and Methods, offers students an overview of the focus and explicates relevant methodologies and theories. This required course, along with the courses within the areas of emphasis and the capstone course, complete the certificate. As this certificate program offers students an international dimension to the study of peoples and cultures of African descent, students will invigorate their knowledge about global issues and further expand their research pursuits. This certificate program characterizes the faculty's intellectual and research strengths and the curriculum's interdisciplinary strategies and research approaches that highlight the continuities and disjuncture of history and experiences throughout Africa and the diaspora.

**Admission.** Admission to the graduate Certificate Program in African and African Diaspora Studies is open to any student who has completed a bachelor's degree at an accredited U.S. institution or equivalent. Students who are regularly admitted to a graduate degree program may pursue the certificate in tandem with their degree program. Students who are not regularly admitted to a graduate degree program may still pursue the certificate as non-degree graduate students.

To be considered for admission, students should submit the following documents to the African and African American Studies program office (COWDN 224):

1. a completed application form (available in COWDN 224);
2. a personal statement describing interest in the certificate, academic objectives, and career goals;
3. a résumé or curriculum vitae;
4. an official transcript showing the completion of a Bachelor's degree in any academic field; and
5. two letters of recommendation.

After reviewing the application materials, the coordinator of the certificate program will contact you and set up an interview.

**Program of Study.** The certificate program requires 18 hours of course work.

AFR 500 Theory and Methods .....	3
Emphasis courses* .....	9
Capstone project.....	3
Elective.....	3
Total .....	18

\* Students choose one of the following emphases: African studies, African diaspora studies (includes African American studies), women and gender in Africa and African diaspora studies, and comparative studies.

**Prerequisites.** One upper-division history course and one upper-division literature course, each related to African and African diaspora studies, are required.

**Courses.** For course information, contact the African and African American Studies office in COWDN 224, or access the Web site at [www.asu.edu/clas/afamstu](http://www.asu.edu/clas/afamstu).

### AFRICAN AND AFRICAN AMERICAN STUDIES (AFR)

#### AFR 500 Research Methods. (1–12)

*selected semesters*

Topics may include the following:

- Theory and Methods. (3)  
Overview of interdisciplinary research methodologies and explanation of the relevant analyses of theory and praxis. Interactive lecture/discussions.

#### AFR 508 Colonial Rule and the African Experience. (3)

*selected semesters*

Impact of European colonial rule on the shaping of African consciousness. Interactive lecture/discussions.

#### AFR 525 Foundations of Caribbean Studies. (3)

*selected semesters*

Broad interdisciplinary understanding of the Caribbean that surveys the region's history, politics, economy, and culture. Interactive lecture/discussions.

#### AFR 526 Selected Topics in Caribbean Politics. (3)

*selected semesters*

In-depth understanding of the impact of selected topics on the political economy and social infrastructure of the Caribbean. Interactive lecture/discussions.

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

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## Agribusiness

### Master's Program

[www.east.asu.edu/msabr](http://www.east.asu.edu/msabr)

480/727-1585

WANNER 101

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**Raymond A. Marquardt, Dean**

**Professors:** Daneke, Edwards, Kagan, Marquardt, Seperich, Shultz, Thor

**Associate Professors:** Patterson, Raccach, Richards

**Assistant Professors:** Eaves, Hughner, Manfredo, Schmitz

**Senior Lecturer:** Odom

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### 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
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**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

## GRADUATE PROGRAMS AND COURSES

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. Fee. 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. Fee. 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 435 Agricultural Commodities. (3)**

*fall and spring*

Trading on futures markets. Emphasis on the hedging practices with grains and meats. Fee. Prerequisite: AGB 320.

#### **AGB 436 Entrepreneurship and Financial Management of E-commerce. (3)**

*fall*

Uses lectures, case studies, and business plans to highlight challenges of starting and running a small business. Lecture, seminar, case studies, computer labs.

#### **AGB 440 Food Safety. (3)**

*spring*

Control, prevention, and prediction of microbial and chemical food-borne diseases. Prerequisite: AGB 442 or instructor approval.

#### **AGB 441 Food Chemistry. (3)**

*spring*

Biochemical and chemical interactions that occur in raw and processed foods. Prerequisites: CHM 115, 231.

#### **AGB 442 Food and Industrial Microbiology. (4)**

*selected semesters*

Food- and industrial-related microorganisms; deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: a course in microbiology with lecture and lab.

#### **AGB 443 Food and Industrial Fermentations. (3)**

*spring*

Management, manipulation, and metabolic activities of industrial microbial cultures and their processes. Prerequisite: AGB 442 or instructor approval.

#### **AGB 445 Food Retailing. (3)**

*fall*

Food retail management. Discusses trends, problems, and functions of food retail managers within various retail institutions. Lecture, case studies.

#### **AGB 450 International Agricultural Development. (3)**

*fall*

Transition of developing countries from subsistence to modern agriculture. Emphasis placed on implications for U.S. agribusiness working abroad.

#### **AGB 451 Management Science. (3)**

*fall*

Focus on the construction, solution, and interpretation of quantitative models used for management decision making in agribusiness firms. Prerequisites: AGB 320, 360; ECN 112; MAT 117.

#### **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. (3)**

*spring*

Development and use of decision support systems for agribusiness management and marketing.

#### **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 465 Organic Farming Technologies. (3)**

*fall and spring*

Organic farming methods, including certification, soil fertility, planting, integrated pest management, irrigation, cover crops, rotations, and marketing farm products.



**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 481 Applied Microeconomics. (3)**

*fall and spring*

Emphasizes application of the theory of the firm, theory of exchange, and consumer theory.

**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 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.

## GRADUATE PROGRAMS AND COURSES

### **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.



The Student Services Building

Tim Trumble photo

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## Anthropology

### Master's and Doctoral Programs

[www.asu.edu/clas/anthropology](http://www.asu.edu/clas/anthropology)

480/965-6213

ANTH 233

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### Sander van der Leeuw, Chair

**Regents' Professor:** Clark

**Professors:** Barton, Brandt, Carr, Chance, Cowgill, Eder, Hegmon, Hudak, Johanson, Kimbel, Kintigh, Marean, Martin, Nash, B. Nelson, M. Nelson, Redman, Spielmann, Stark, van der Leeuw, Williams

**Associate Professors:** Baker, Falconer, Reed, Rice, Stone, Welsh

**Assistant Professors:** Haenn, Isaac, Jonsson, Steadman

**Senior Lecturer:** Winkelman

**Associate Research Professors:** Simon, Sugiyama

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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.

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, 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 248.

## DOCTOR OF PHILOSOPHY

Concentrations are available at the doctoral level in archaeology, physical anthropology, 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 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

## GRADUATE PROGRAMS AND COURSES

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](http://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.

##### 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.

## GRADUATE PROGRAMS AND COURSES

### 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 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.

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## Applied Biological Sciences

### Master's Program

[www.east.asu.edu/ecollege/appliedbiologicalsciences](http://www.east.asu.edu/ecollege/appliedbiologicalsciences)

480/727-1444

WANNER Third Floor

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### Ward W. Brady, Chair

**Professors:** Brady, Brock, Mushkatel, Ohmart, Stutz

**Associate Professors:** Green, Martin, Miller, Steele, Whyson

**Assistant Professor:** Marcum

**Lecturer:** Lefler

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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 Applied Biological Sciences. Areas of concentration are offered in natural resource management, GIS/remote sensing, and range ecology. Selected faculty in this program also participate in offering the Ph.D. in Environmental Design and Planning program and the Ph.D. in Plant Biology program. See "Doctor of Philosophy," page 96, for general information on the Ph.D. degree.

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

The M.S. in Applied Biological Sciences 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 biological 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.

### 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 and biological sciences or closely related courses. Applicants not meeting these requirements may be considered for admission with deficiencies.

Submit the following separate application materials to

DEPARTMENT OF APPLIED BIOLOGICAL  
SCIENCES  
EAST COLLEGE  
ARIZONA STATE UNIVERSITY EAST  
7001 E WILLIAMS FIELD ROAD  
MESA AZ 85212

1. a statement of intent (maximum 600 words) explaining
  - (a) the applicant's interest in applied biological sciences,
  - (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 9-semester-hour core curriculum. A minimum grade of "B" (3.00) is required in all core courses. First-year students are expected to complete either ABS 540 Plant Responses to Environmental Stress or ABS 550 Vegetation Dynamics, ABS 551 Advanced Environmental Analysis, and ABS 591 Graduate Seminar. Second-year students are required to complete ABS 691 Seminar in the fall semester. All students are also expected to complete a minimum of three semester hours of research and three semester hours of thesis. The remaining hours (15 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 the Department of Applied Biological Sciences 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 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.

## GRADUATE PROGRAMS AND COURSES

### **ABS 463 Golf and Sports Turf Management. (3)**

*fall*

Selection, establishment, and maintenance of turf grasses bred specifically for golf and sports facilities. Cross-listed as PGM 463. Credit is allowed for only ABS 463 or PGM 463. Integrated lecture/lab.

### **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. (4)**

*fall*

Habitat management considerations and practices for small game and nongame wildlife species in North America. Lecture, lab, 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 500 Research Methods. (1–12)**

*selected semesters*

### **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).

### **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 580 Practicum. (1–12)**

*selected semesters*

### **ABS 584 Internship. (1–12)**

*selected semesters*

### **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).

### **ABS 590 Reading and Conference. (1–12)**

*selected semesters*

### **ABS 591 Seminar. (1–12)**

*selected semesters*

### **ABS 592 Research. (1–12)**

*selected semesters*

### **ABS 593 Applied Project. (1–12)**

*selected semesters*

### **ABS 594 Conference and Workshop. (1–12)**

*selected semesters*

### **ABS 595 Continuing Registration. (1)**

*selected semesters*

### **ABS 598 Special Topics. (1–4)**

*selected semesters*

### **ABS 599 Thesis. (1–12)**

*selected semesters*

### **ABS 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.

## PROFESSIONAL GOLF MANAGEMENT (PGM)

### **PGM 463 Golf and Sports Turf Management. (3)**

*fall*

Selection, establishment, and maintenance of turf grasses bred specifically for golf and sports facilities. Cross-listed as ABS 463. Credit is allowed for only ABS 463 or PGM 463. Integrated lecture/lab.

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



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## Applied Psychology

### Master's Program

[www.east.asu.edu/ecollege/appliedpsych](http://www.east.asu.edu/ecollege/appliedpsych)

480/727-1515

SUTTON Third Floor

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**Professors:** Cooke, Schvaneveldt

**Assistant Professor:** Gray

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The faculty in the Applied Psychology Program at ASU East offer a graduate program leading to the M.S. degree in Applied Psychology.

**Admission.** In addition to the general requirements for admission to the Graduate College, the Applied Psychology Program requires:

1. an undergraduate degree (not necessarily in psychology) from a regionally accredited educational institution (minimum 3.00 GPA);
2. GRE scores on the Verbal and Quantitative tests;
3. three letters of recommendation;
4. a personal statement including background, interests, qualifications, and goals; and
5. TOEFL scores for applicants who are not native English speakers.

**Requirements.** The M.S. degree requires the completion of 32 semester hours with grades of "B" (3.00) or higher. The requirements are shown in the following table:

PSY 531 Multiple Regression in Psychological Research.....	3
E PSY 560 Advances in Theoretical Psychology.....	3
E PSY 561 Methods in Applied Psychology.....	3
E PSY 562 Advanced Human Factors.....	3
E PSY 594 Conference and Workshop (two semesters).....	2
Elective: seminar, special topics, etc.....	6
Thesis or applied project.....	12

The PSY 594 credits require attending departmental colloquia and special presentations on research, applications, and professional issues. Students have the option of completing a thesis or an applied project to develop and demonstrate professional knowledge and skills.

Students who plan to go on to a doctoral program are encouraged to complete a thesis. Work on the thesis will continue for at least a calendar year under faculty supervision. The first three credits will be devoted to developing an

idea and preparing a proposal for approval by a faculty committee. The next three credits will allow for preparing the details of research design and data collection for the thesis (materials, computer programs, experimental text beds, questionnaires, etc.). The final six credits will be devoted to collecting and analyzing data and writing and revising the thesis under the direction of the advisor. Students will defend the thesis in an oral exam.

Students selecting the applied project option will, under the guidance of an advisor, allocate the 12 semester hours to a combination of research, practicum, project activities, and report writing appropriate to the goals of the student and the program and the availability of practicum or internship opportunities. In all cases, the project will culminate in a substantial written report followed by a comprehensive oral examination covering the project and other materials from required courses.

### 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 under "Psychology."*

**E PSY 438 Human-Computer Interaction. (3)**  
*once a year*

Theories, methods, and findings concerning the usability of computer systems and the design of effective user interfaces. Lecture, discussion, projects. Prerequisite: PSY 437.

**E PSY 439 Training and Skill Acquisition. (3)**  
*once a year*

Theories, methods, and findings concerning the acquisition of skilled performance and the design of effective training systems. Lecture, discussion, projects. Prerequisite: PSY 437.

**E PSY 440 Industrial/Organizational Psychology. (3)**  
*once a year*

Examines personnel selection, performance assessment, job and workplace design, job satisfaction, organizational behavior, management systems, and industrial safety. Lecture, discussion, projects. Prerequisite: PSY 230 (or an equivalent statistics course).

**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.

**E PSY 594 Conference and Workshop. (1-12)**  
*selected semesters*

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

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## Architecture

### Master's Program

[www.asu.edu/caed/SOA](http://www.asu.edu/caed/SOA)

480/965-3536

AED 162

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#### Ron McCoy, Director

**Professors:** Bryan, Hoffman, McCoy, Meunier, Ozel, Reiter, Rotondi, Underhill, Underwood

**Associate Professors:** Ellin, Hartman, Krolloff, Loope, Spellman, Van Duzer, Zygaz

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

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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 117, 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 213, for information on this degree program.

### MASTER OF ARCHITECTURE

The Master of Architecture is the accredited professional degree program at ASU. There are two typical programs of study available: (1) a two-year program for applicants who have completed the four-year Bachelor of Science in Design (with a major in Architectural Studies) at ASU or an equivalent degree from another school that offers an accredited professional degree in architecture, and (2) a three-plus-year program for applicants with an undergraduate degree in a discipline or field other than architecture. Both programs promote broad areas of knowledge, professional skill, and a social awareness that the architect must command if architecture is to enhance contemporary life and remain an enduring and valid expression of society.

The program represents an attempt to develop the knowledge and skills necessary for graduates to achieve future leadership roles in the professional practice of architecture and related environmental design fields.

It is the intention of the faculty that the programs also

1. ensure a basic level of educational experience sufficient to enter the practice of architecture after successfully completing state licensing requirements and examination,

2. encourage the student to develop proficiencies in specific areas compatible with individual interests and university instructional capabilities,
3. provide a breadth of understanding that will encourage and motivate the student to continue learning throughout a professional career, and
4. develop opportunities that combine instruction and research directed toward adding value to the built environment.

Elective foci currently offered in the program include energy-conscious design, computer applications, urban design, architectural history and theory, and architectural administration and management.

In the first year of the two-year program, graduate design studio projects focus on advanced comprehensive problems that require integration of the full range of knowledge and skills from students' undergraduate education. In the second year, students select design studios and undertake final design projects that complement their areas of interest.

Courses in technology, history and theory, and architectural management are structured alongside the studio sequence.

The three-plus-year program begins with an intensive 10-week summer session introducing architecture and design fundamentals and continues with a preparatory year of architectural history, technology, and design. The final two years are similar to the two-year program described above. Students without work experience in architecture must also complete a summer internship between the first and second years.

**Application Requirements.** An applicant to the M.Arch. program must hold a baccalaureate or graduate degree from a college or university recognized by ASU and must meet the minimum GPA requirements as established by the Graduate College.

In addition, all applicants are required to submit for review a design portfolio, GRE scores, a statement of intent, and letters of reference. Applicants are accepted on a space-available basis only. Students may be admitted to the two-year program *with deficiencies* if their previous course work is not equivalent to the ASU undergraduate requirements and standards.

Students intending to apply for admission to the professional program in architecture at the *graduate level* should apply to the program well in advance of the application deadline.

International applicants whose native language is not English must submit the official GRE scores as well as the TOEFL (with a minimum score of 600, or 250 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. The letter of recommendation form can be downloaded from the Master of Architecture Web site at [www.asu.edu/caed/SOA](http://www.asu.edu/caed/SOA).
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 117.

**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**

<b>Fall</b>	
ADE	521 Advanced Architectural Studio I.....5
APH	505 Foundation Theory Seminar.....3
ATE	553 Building Systems III.....3

## GRADUATE PROGRAMS AND COURSES

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
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 Architecture and the W. P. Carey School of Business. It is intended for students who wish to obtain comprehensive business knowledge to complement their design education. Through this program, adequately prepared students can obtain both degrees in approximately three years of study if pursuing

the two-year M.Arch. program and four and a half years if pursuing the three-plus-year program.

The dual degree program requires a minimum of 91 graduate semester hours to complete. Students typically begin the program in the School of Architecture and finish in the W. P. Carey School of Business and must follow admission requirements for each program.

Admission to the M.Arch. program does not guarantee admission to the M.B.A. program. In addition, a student needs to complete the degree requirements for the M.Arch. before beginning study in the M.B.A. program.

### MASTER OF SCIENCE IN BUILDING DESIGN

The Master of Science in Building Design program is dedicated to the development of new knowledge useful to the arts and sciences of building design, and the integration of that knowledge into the building design process.

The Master of Science degree is an advanced post-professional degree for applicants who have completed an accredited professional degree program in architecture (a five-year B.Arch. or six-year M.Arch. degree). The M.S. in Building Science is not accredited, and therefore it is not intended to serve as a first professional degree in architecture. The program is structured to educate a new generation of scholars and practitioners who will bring appropriate technology and management techniques to the building and rebuilding of humane and supportable environments. Students who are interested in pursuing further academic studies are encouraged to apply to the interdisciplinary Ph.D. program in Environmental Design and Planning offered by the college after completion of the M.S. program.

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 post-professional level for architects. The goal of the program is to develop knowledge useful to the arts and sciences of building design and the integration of that knowledge into 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.

The curriculum for each concentration includes a research methods core, required courses, and in some cases, additional elective course work as approved and directed by the supervisory committee. Typically a student needs at least four semesters of course work and work on their thesis to successfully complete this degree program.

It is recommended that applicants have at least one year of professional employment or comparable field/research experience in building design in addition to their academic experiences.

**Application Requirements.** An applicant to the M.S. in Building Design program must hold a previous NAAB (National Architectural Accrediting Board) accredited professional degree in architecture 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 intending to apply for admission to the post-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 600, or 250 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.

**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. The letter of recommendation form can be downloaded from the School of Architecture Web site at [www.asu.edu/caed/SOA](http://www.asu.edu/caed/SOA).

*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

## GRADUATE PROGRAMS AND COURSES

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 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

Faculty in the School of Architecture are engaged in a wide variety of research, scholarship, and creative activity. Faculty research includes issues of history and theory, computing and design knowledge, building tectonics, urban design, design theory, and climate-responsive design, simulation and technology. For more information on the current research interests of the faculty, access the school’s Web site at [www.asu.edu/caed/SOA](http://www.asu.edu/caed/SOA).

## ARCHITECTURE COURSES

Courses offered by the faculty of the School of Architecture are categorized in the following instructional areas.

*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" (2.00) 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.

**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" (2.00) 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" (2.00) 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" (2.00) 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" (2.00) 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" (2.00) or higher: ADE 621; ANP 681. Corequisite: AAD 552.

##### 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-D transformations, and data structures. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval. Corequisite: ANP 563.

## GRADUATE PROGRAMS AND COURSES

### **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" (2.00) 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" (2.00) or higher: APH 505. Corequisites: ADE 522; ATE 556.

### **APH 581 Contemporary Urban Design. (3)**

*spring*

Explores contemporary city and urban design issues related to contemporary cities. Seminar, lecture, discussion.

### **APH 598 Special Topics. (1–4)**

*fall or spring*

### **APH 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.

### **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 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.

### **ATE 562 Experimental Evaluation. (3)**

*fall*

Instrumentation, measurement and computational techniques for analysis of building components, and assessment of thermal and luminous performance. Fee.

### **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 582 Environmental Control Systems. (3)**

*spring*

Heating, ventilation, and air-conditioning systems. Loads, psychrometrics, refrigeration cycle, air/water distribution, controls, energy performance standards, and utility rates. 2 hours lecture, 3 hours lab, field trips. Prerequisite: ATE 451 or 521.

### **ATE 599 Thesis. (1–12)**

*fall or spring*

Fee.



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

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**Art**

**Master's and Doctoral Programs**

[herbergercollege.asu.edu/art](http://herbergercollege.asu.edu/art)

480/965-3468

ART 102

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**Jon Sharer, Director**

**Regents' Professors:** Klett, Weiser

**Professors:** Alquist, Bates, Britton, Codell, Duncan, Eckert, Erickson, Fahlman, Gillingwater, Hajicek, Magenta, Marc, Maxwell, Meissinger, Pile, Pimentel, Pittsley, Risseeuw, Schmidt, Schoebel, Sharer, Stokrocki, Sweeney, Verstegen, White, Young

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

**Assistant Professors:** Mesch, Schneider

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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 Visual Culture Research.....3  
ARE 520 Issues in Teaching Inquiry in Art.....3  
ARE 525 Research on Teaching Art Instruction.....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.

## GRADUATE PROGRAMS AND COURSES

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.** For the student to continue graduate study, a qualifying research paper, submitted in the semester in which 15 hours will be completed, must be judged satisfactory by the faculty.

**Thesis Requirements.** A written thesis is required.

**Final 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, digital media, 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 (or a video or other format acceptable to the area of specialization) with a return envelope and postage. Applicants for the digital media concentration program must also include a statement and evidence of work demonstrating digital technology skills beyond end user applications, as well as an art and digital technology résumé. 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. For the digital media M.F.A., all admissions and financial aid decisions must be approved by both the School of Art and the Institute for Studies in the Arts/Arts Media and Engineering. 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 minimum of 60 to 63 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 (with the exception of digital media where 18 semester hours are ART classes and 18 semester hours are AME classes);
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), except for digital media which requires six semester hours of ARS;
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 (except for digital media which requires nine semester hours of electives in the School of Art and/or Institute for Studies in the Arts/Arts Media and Engineering); and
4. 10 to 15 hours of ART 680 Practicum, resulting in an M.F.A. exhibition (except for digital media where six hours will be ART 680 and six hours will be AME 593).

**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](http://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 179.](#)

**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 graduate studies. 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 graduate studies.

## 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 for 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.

## GRADUATE PROGRAMS AND COURSES

### **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.

### **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 Jomon period to the present. Meets non-Western art history requirement. Prerequisites: both ARS 101 and 102 or only instructor approval.

### **ARS 485 Women in the Visual Arts. (3)**

*spring*

Historical study of art by women in various media; related social, political, educational issues; representation of women in art. Lecture, discussion. Prerequisites: both ARS 101 and 102 or only instructor approval.

### **ARS 501 Methodologies and Art History. (3)**

*fall*

History of the discipline and an exploration of various methodologies, critical theory, and bibliographies used by art historians. Seminar.

### **ARS 502 Critical Studies in Egyptian Art. (3)**

*selected semesters*

Egyptian art from pre-Dynastic to New Kingdom periods. Focus on aesthetic, philosophical, and cultural contexts. Requires research paper and readings.

### **ARS 504 Critical Approaches to Greek Art. (3)**

*once a year*

Art and architecture of Aegean civilizations (Cycladic, Minoan, Mycenaean) and of Greece to end of Hellenistic period. Requires research paper and readings.

### **ARS 506 Critical Studies in Roman Art. (3)**

*once a year*

Art and architecture of Etruria, the Roman Republic, and the Roman Empire. Requires research paper and/or supplemental readings.

### **ARS 514 Critical Approaches to Romanesque Art. (3)**

*selected semesters*

Sculpture, painting, architecture, and the minor arts in western Europe, ca. 1030–1200, considered within religious, economic, and social contexts. Requires research paper.

### **ARS 516 Critical Approaches to Gothic Art. (3)**

*selected semesters*

Architecture, sculpture, painting, and the minor arts in western Europe, ca. 1150–1350, considered within religious, social, and economic contexts. Requires research paper.

### **ARS 517 Critical Approaches to Late Gothic Art. (3)**

*selected semesters*

Art of the late-Gothic style, ca. 1350–1525, considered within religious, social, economic, and political contexts. Requires research or reading project.

### **ARS 522 16th-Century Italian Art. (3)**

*once a year*

Critical study of painting, sculpture, and architecture in 16th-century Italy in its religious and historical context.

**ARS 528 18th-Century Art in Europe. (3)***once a year*

Critical study of European art from the late Baroque to the early years of Neoclassicism.

**ARS 530 Art of Spain and New Spain. (3)***once a year*

Critical study of architecture, painting, and sculpture from 1500 to 1800. Lecture, conference.

**ARS 532 Art, Politics, and Patronage, 1770–1850. (3)***fall*

Critical analyses of political events in Europe. Examines issues of patronage, art as propaganda. Impact of war and revolution on visual arts.

**ARS 534 Studies in Modern European Art, 1850–1914. (3)***once a year*

Critical study of visual arts using primary source material from mid-19th century to WWI within philosophical, socioeconomic, and economic contexts. Lecture, tutorial. Prerequisite: instructor approval.

**ARS 542 Critical Issues in American Painting. (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 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.
- Senior Exhibition and Portfolio
- 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:

## GRADUATE PROGRAMS AND COURSES

- 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-D Fibers  
Fee.
- Fibers and Surface  
Fee.
- Print Textiles  
Fee.
- Senior Exhibition and Portfolio

#### ART 598 Special Topics. (1–4)

*selected semesters*

Topics may include the following:

- 3-D 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 3-D 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 3-D 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-D 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.
- Senior Exhibition and Portfolio

#### 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.

## GRADUATE PROGRAMS AND COURSES

- 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 435 Foundry Research Methods. (3)**

*fall and spring*

Research in foundry techniques. Studio. Pre- or corequisite: ART 333 or instructor approval.

#### **ART 436 Architectural Sculpture. (3)**

*selected semesters*

Sculptural concepts as related to architecture and other man-made environments. Scale drawing, models, and relief sculpture. 6 hours a week. May be repeated for credit. Fee. Prerequisite: ART 332 or instructor approval.

#### **ART 437 Film Animation. (3)**

*fall*

Production of short 16mm films that feature articulated sculptural objects, models, dolls, puppets, and graphics through the use of single-frame filming techniques. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

#### **ART 438 Experimental Systems in Sculpture. (3)**

*spring*

Simple electrical and mechanical systems that can be utilized in the context of studio art and installations. Requires active production of studio artworks. 6 hours a week. May be repeated for credit. Fee. Prerequisite: instructor approval.

#### **ART 474 Advanced Wood. (3)**

*fall and spring*

Extended experience and advanced techniques in the use of wood to create functional works of art. 6 hours a week. May be repeated for credit. Fee. Prerequisites: ART 374; instructor approval.

#### **ART 494 Special Topics. (1–4)**

*selected semesters*

Topics may include the following:

- Advanced Sculpture  
Fee.
- Carving  
Fee.
- Film: Post-Production  
Fee.
- Foundry Casting Methods  
Fee.
- Foundry Research Methods  
Fee.
- Live Action Filmmaking  
Fee.
- Senior Exhibition and Portfolio
- 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.



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## Artist Diploma, Post-Bachelor's

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See "Post-Bachelor's Artist Diploma," page 284.

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## Arts, Media, and Engineering

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### ARTS, MEDIA, AND ENGINEERING (AME)

#### AME 592 Research. (1–12)

*selected semesters*

Topics may include the following:

- Introduction to Research Techniques in Media and Arts I. (1–4)  
*fall*  
Independent study work related to research projects at ISA/AME; supervised by project director and faculty advisor.
- Introduction to Research Techniques in Media and Arts II. (1–4)  
*spring*  
Independent study work related to research projects at ISA/AME; supervised by project director and faculty advisor.
- Introduction to Research Techniques in Arts and Technology
- Media and Arts I
- Media and Arts II

#### AME 593 Applied Project. (1–12)

*selected semesters*

Topics may include the following:

- Applied Project (AME/ISA)
- Applied Work Direction I. (1–4)  
*fall*  
Independent study work related to student's applied project and AME research.
- Applied Work Direction II. (1–4)  
*spring*  
Independent study work related to student's applied project and AME research.

#### AME 598 Special Topics. (1–4)

*selected semesters*

Topics may include the following:

- Advanced Animation, Reverse Kinematics, and Motion Rendering. (3)  
*spring*
- Advanced Audio for Media and Arts. (3)
- Arts Technologies Development and Theory. (3)  
*spring*
- Computational Models for the Arts. (3)  
*fall*  
Covers computability and intractability; kolmogorov complexity in the context of randomness and determinism.
- Dance Computation and Multimedia. (3)  
*spring*
- Digital Media Analysis. (3)
- 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 Katherine K. 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 Katherine K. Herberger College of Fine Arts. Prerequisite: instructor approval.

- Interdisciplinary Media and Performance I. (3)  
*fall*  
Survey, lecture, and lab exposure to the use of technology and algorithms as essential parts in the creation of interdisciplinary art, the development of technology, and as a foundation for collaborative art making. Open to graduate students from all disciplines. Brings together a mix of hands-on instruction, guest artist and faculty presentations, collaborative projects, theory, and in-depth examination of ISA/AME methods, projects, and practices. Prerequisite: instructor approval.
- Interdisciplinary Media and Performance II. (3)  
*spring*  
Applies experience and knowledge to a semester-long collaborative project mentored by the course faculty. In-class discussions, critiques, and working-time are supplemented with technology-oriented "streams" focusing on digital video production, MAX/MSP sensing and interactivity, and internet-based connectivity applications. Open to graduate students from all disciplines. Facilitated by the AME program and hosted within the ISA facilities.
- Internet-Based Arts. (3)
- Introduction to Research Techniques in Arts. (3)
- Media and Arts Theory. (3)
- Motion Capturing and Motion Analysis. (3)  
*spring*
- Performance and Installation Technologies Development. (3)
- Signal Processing and Programming for the Arts. (3)  
*spring*  
Introduces basic concepts behind the functioning of existing, widely used digital arts and media tools.
- Signal Processing for the Arts. (3)
- Technology/ Media, and Arts I. (3)

#### AME 599 Thesis. (1–12)

*selected semesters*

Topics may include the following:

- Introduction to Research Techniques in Arts and Technology
- Media and Arts I
- Thesis Direction I. (1–4)  
*fall*  
Independent study work related to student's thesis and AME research.
- Thesis Direction II. (1–4)  
*spring*  
Independent study work related to student's thesis and AME research.

#### AME 792 Research. (1–15)

*selected semesters*

Topics may include the following:

- Advanced Research Techniques in Arts and Technology I
  - Advanced Research Techniques in Arts and Technology II
  - Advanced Research Techniques in Media and Arts I. (1–4)  
*fall*  
Independent study work related to research projects at ISA/AME. Supervised by project director and faculty advisor.
  - Advanced Research Techniques in Media and Arts II. (1–4)  
*spring*  
Independent study work related to research projects at ISA/AME. Supervised by project director and faculty advisor.
  - Media and Arts I
  - Media and Arts II
- #### AME 799 Dissertation. (1–15)
- selected semesters*
- Topics may include the following:
- Dissertation Direction I. (1–4)  
*fall*  
Independent study work related to student's dissertation and AME research.
  - Dissertation Direction II. (1–4)  
*spring*  
Independent study work related to student's dissertation and AME research.

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

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## Asian Languages and Civilizations— Chinese/Japanese

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See “Languages and Literatures,” page 253.

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### Asian Studies

#### Certificate Program

[www.asu.edu/asian](http://www.asu.edu/asian)

480/965-7179

COOR 6668

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Marie Osterman, Advisor

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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 semester 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, COOR 6668, or call 480/965-7179.

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## Atmospheric Science

### Interdisciplinary Certificate Program

[geography.asu.edu/atmocert/](http://geography.asu.edu/atmocert/)

480/965-3051

SCOB 145

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Anthony J. Brazel, Codirector, Executive Committee

Joseph A. Zehnder, Codirector, Executive Committee

#### Chemical and Materials Engineering

Assistant Professors: Allen, Dillner

#### Civil and Environmental Engineering

Assistant Professors: Allen, Dillner, Peccia

#### Geography

Professors: Balling, Brazel, Cerveny, Zehnder

Assistant Professor: Ellis

#### Geological Sciences

Regents’ Professors: Christensen, Greeley

#### Life Sciences

Professor: Klopatek

Associate Professor: Day

#### Mathematics and Statistics

Professors: Nicolaenko, Ringhofer

Associate Professors: Gelb, Lopez, Mahalov

#### Mechanical and Aerospace Engineering

Professors: Boyer, Fernando

Assistant Professor: Calhoun

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The interdisciplinary certificate program in Atmospheric Science is administered by an Executive Committee composed of faculty from the Ira A. Fulton School of Engineering 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 [geography.asu.edu/atmocert](http://geography.asu.edu/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 480/965-3051.

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## Audiology

### Doctoral Program

[www.asu.edu/clas/shs/AuD](http://www.asu.edu/clas/shs/AuD)

480/965-2374

COOR 2351

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#### David Ingram, Chair

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

**Associate Professors:** Liss, Restrepo

**Assistant Professors:** Azuma, Edgar, Gray

**Clinical Professors:** Mathy, Wiley

**Clinical Associate Professors:** C. Bacon, Brown, Mintz

**Clinical Assistant Professors:** K. Ingram, McBride, Wexler

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The Doctor of Audiology (Au.D.) degree program is designed to prepare audiologists for autonomous clinical practice. The clinical doctorate model at ASU stresses the integration of academic classroom learning and practical experience across a broad spectrum of clinical specialties and practice environments. The Au.D. program is designed for full-time students over a period of 45 months, including four fall and four spring semesters and three summers. The four-year course of study includes both academic and clinical practicum components. The Au.D. program requires a minimum of 101 semester hours, of which 65 are required academic credits provided through the Department of Speech and Hearing Science, and 36 are required clinical credits.

The Department of Speech and Hearing Science also offers the M.S. degree in Communication Disorders (see “[Communication Disorders](#),” page 159) and participates in the interdisciplinary Ph.D. degree in Speech and Hearing Science (see “[Speech and Hearing Science](#),” page 334) degree programs.

**Admission Requirements.** An applicant to the Au.D. program must hold a baccalaureate degree in Speech and Hearing Science or another discipline. All applicants must also have a cumulative GPA of 3.00 or higher and a GRE score of 1000 (total of verbal and quantitative tests). Applicants are to submit three letters of recommendation, a statement of intent containing evidence of proficiency in written communication, and satisfactory completion of the prerequisite course work. All application materials must be submitted by January 15; enrollment begins in the fall semester only.

**Graduation Requirements.** Eligibility for graduation is based upon the following: achieving a passing score on a comprehensive written and/or oral examination administered midway through the program, successful completion of 65 semester hours of required academic course work,

successful completion of 36 semester hours of clinical experiences, and achieving a passing score on the ASHA Praxis national certification examination in audiology.

### COURSES

For courses, see “[Speech and Hearing Science \(SHS\)](#),” page 159.

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## Bioengineering

### Master’s and Doctoral Programs

[www.eas.asu.edu/~bme/new/](http://www.eas.asu.edu/~bme/new/)

480/965-3028

ECG 334

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#### Eric J. Guilbeau, Chair

#### CORE FACULTY

Professors: Guilbeau, He, Towe

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

Assistant Professors: Caplan, Muthuswamy, Panitch, Vernon  
Research Professors: Brophy, Herman, Khairallah, Yamaguchi

Research Associate Professor: Singh

Research Assistant Professors: Helms Tillery, Shimansky

Senior Research Professional: Brandon

Research Scientists: Coursen, Ehteshami, Pauken

Assistant Research Scientist: Carhart

#### AFFILIATED FACULTY

##### Electrical Engineering

Professor: Kozicki

Associate Professor: Kim

##### Electronics and Computer Engineering Technology (ASU East)

Associate Professor: Macia

##### Kinesiology

Assistant Professor: Santello

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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.

## GRADUATE PROGRAMS AND COURSES

The faculty also participate in offering the Tri-University Master of Engineering degree program. See “[Master of Engineering—M.Eng.](#),” page 204, for the program description.

**Graduate Record Examination.** Graduate Record Examination scores are required from all students.

**Transition Program.** Students applying to the Bioengineering M.S. or Ph.D. degree programs may have an undergraduate B.S. degree in a major field other than Bioengineering. The qualifications of transition students are reviewed by the department graduate committee, and a special program of transition course work is designed for successful applicants. In general, transition students should have had, or be prepared to take, calculus through ordinary differential equations, inorganic chemistry, physics, and a number of undergraduate engineering courses in order to be prepared for graduate bioengineering courses. Other course work from the undergraduate program may be required depending upon the research topic selected by the student. Transition students should contact the associate chair to evaluate the undergraduate transcript.

### MASTER OF SCIENCE

See “[Master’s Degrees](#),” page 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/new](http://www.eas.asu.edu/~bme/new).

### 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" (2.00) 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: ECE 210 or 214. Prerequisite with a grade of "C" (2.00) 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. Prerequisites: BME 101; ECE 300. Pre- or corequisites with a grade of "C"

(2.00) or higher: at least 5 of the 7 following courses: BME 318, 331, 350, 413, 470; ECE 340, 380.

#### **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 451 Cell Biotechnology Laboratory. (3)**

*fall*

Mammalian cell culture techniques, including mouse embryonic stem cells, the use of bioreactors, cell fractionation, and digital video imaging. Lab. Cross-listed as BIO 451. Credit is allowed for only BME 451 or BIO 451. Prerequisites: BIO 353; 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. Fee. Prerequisite: ECE 334. Prerequisite with a grade of "C" (2.00) or higher: BME 235. BME 413 and 423 recommended.

#### **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.

## GRADUATE PROGRAMS AND COURSES

### **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. Fee. Prerequisites: BME 235; 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 235 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.

### **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-D *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.

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## Biology

### Master's and Doctoral Programs

[sols.asu.edu](http://sols.asu.edu)

480/965-1768

LSE 229

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**Morton E. Munk, Interim Director**

**Andrew N. Webber,**  
**Associate Director for Graduate Programs**

**Willem F. J. Vermaas,**  
**Associate Director for Research Initiatives**

**Regents' Professors:** Alcock, Arntzen, Maienschein, Pyne

**Professors:** Burke, Capco, Chandler, Collins, Creath, Deviche, Dowling, Elser, Faeth, Fisher, Frasch, Grimm, Harrison, Hedrick, Jacobs, Klopatek, Lawson, Misra, Moore, Mossman, Nash, Rutowski, Satterlie, Schmidt, Smith, Sommerfeld, Trelease, Vermaas, Walsberg, Webber

**Associate Professors:** Armendt, Briggs, Chang, Clark, Day, Fewell, Garcia-Pichel, Goldstein, Hoffman, Hogue, Joshi, Kumar, McGregor, Orchinik, Pigg, Ramakrishna, Rawls, Roberson, Stout, Stromberg, Szarek, Towill, Wu

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

**Research Professors:** Cardineau, Davidson, Mahoney, Pearson

**Associate Research Professor:** Lopez

**Assistant Research Professors:** Bertram, Hope, Hu, Langland, Minter, Neuer, Walmsley

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The 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.

The faculty also participate in the program leading to the Master of Natural Science degree when one of the concentrations is biology (see “[Natural Science](#),” page 287).

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.** Applicants must submit Graduate Record Examination (GRE) scores. GRE scores in the advanced subject area are required for Ph.D. and highly recommended for M.S. applicants.

**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 undergraduate and graduate classes 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 480/965-0386.

### 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 foreign 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

## GRADUATE PROGRAMS AND COURSES

to disseminate this knowledge to a wide audience. For more details, access the Web site at [sols.asu.edu](http://sols.asu.edu).

### 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.

#### **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 451 Cell Biotechnology Laboratory. (3)**

*fall*

Mammalian cell culture techniques, including mouse embryonic stem cells, the use of bioreactors, cell fractionation, and digital video imaging. Lab. Cross-listed as BME 451. Credit is allowed for only BIO 451 or BME 451. Prerequisites: BIO 353; instructor approval.

#### **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 460 Astrobiology. (3)**

*fall and spring*

Origin, early evolution, distribution, and future of life on Earth and elsewhere in the cosmos. May be repeated for credit. Lecture, discussion, video conferences, possible field trips. Cross-listed as AST 460/CHM 483/GLG 460/MIC 475. Credit is allowed for only AST 460 or BIO 460 or CHM 483 or GLG 460 or MIC 475. Prerequisite: instructor approval.

#### **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. Mechanisms 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 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.

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## Building Design

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See "Master of Science in Building Design," page 117.

## Business Administration

### Master's and Doctoral Programs

#### School of Accountancy

[wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc)

480/965-3631

BA 223

#### Department of Finance

[wpcarey.asu.edu/fin](http://wpcarey.asu.edu/fin)

480/965-3131

BAC 519

#### Department of Information Systems

[wpcarey.asu.edu/is](http://wpcarey.asu.edu/is)

480/965-3252

BA 223

#### Department of Management

[wpcarey.asu.edu/mgt](http://wpcarey.asu.edu/mgt)

480/965-3431

BA 323

#### Department of Marketing

[wpcarey.asu.edu/mkt](http://wpcarey.asu.edu/mkt)

480/965-3621

BAC 400

#### Department of Supply Chain Management

[wpcarey.asu.edu/scm](http://wpcarey.asu.edu/scm)

480/965-6044

BA 318

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#### James R. Boatsman, Director School of Accountancy

**Professors:** J.R. Boatsman, Christian, Gupta, Johnson, Kaplan, Pany, Pei, Reckers, Schultz

**Associate Professors:** Golen, Hwang, Regier, Whitecotton

**Assistant Professors:** Comprix, Lee, O'Donnell, Petersen, Robinson, Rowe, Weiss

**Senior Lecturers:** Geiger, Goldman, Maccracken

**Lecturers:** J.L. Boatsman, Wigal

#### Herbert M. Kaufman, Chair, Department of Finance

**Professors:** Booth, Coles, Hertzell, Kaufman, Sushka

**Associate Professors:** Cesta, Gallinger, Hoffmeister

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

#### Robert D. St. Louis, Chair Department of Information Systems

**Professors:** Goul, Roy, St. Louis, Steinbart, Vinze

**Associate Professors:** David, Iyer, Keim, Kulkarni, O'Leary

**Assistant Professors:** Chen, Demirkan, Dowling, Ravindran, Roussinov, Santanam, Shao

**Senior Lecturers:** Birney, Hayes, Shrednick

#### William H. Glick, Chair, Department of Management

**Regents' Professor:** Gomez-Mejia

**Professors:** Ashforth, Cardy, Glick, Hershauer, Hom, Kinicki, Mittelstaedt, Roberson

**Associate Professors:** Boyd, 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, Nowlis, L. Ostrom, Reingen, Walker, Ward

**Associate Professors:** Blasko, A. Ostrom, Sinha, Stephens

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

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

**Associate Professors:** Brooks, Butler, Callarman, Choi, Davis, Keefer, Lock, Maltz, Rangtusanatham, Siferd, D. Smith-Daniels, Verdini

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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, executive, and online 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 eight academic units within the school of business.

**Admission.** See “Admission to the Graduate College,” page 85. All students applying to graduate business administration programs (except those applying to the M.S. degree in Economics) are required to take the GMAT. The TOEFL is required of all international applicants whose native language is not English or who are not graduates of an institution located in the United States. The TSE is not required for admission to the 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](http://www.toefl.org), send e-mail to [etsinfo@ets.org](mailto: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, executive, or online 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, executive, and online 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” (4.00) or “B” (3.00) satisfy the comprehensive examination requirement.

**Concurrent and Dual Degree Programs.** See “Concurrent and Dual Degree Programs,” page 60.

## 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 140.

Research activities in information management encompass areas of theory and application in computer information systems. See “Concentration in Computer Information Systems,” page 141.

Research interests of the finance faculty offering the finance concentration focus on corporate finance,

## GRADUATE PROGRAMS AND COURSES

investments, financial markets, banking, and entrepreneurial finance.

The management concentration requires three core courses: organizational theory, organizational behavior, and research methodology. In addition to these core courses, students choose one of two specialty tracks: strategic management or human resource management. See “[Concentration in Management](#),” page 141.

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

### 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.

**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](http://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.

## 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 Information Systems

### DOCTOR OF PHILOSOPHY

#### 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 Department of Systems Information.

**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](http://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 Management

### MASTER OF BUSINESS ADMINISTRATION

Faculty in the Department of Management participate actively in all of the master’s and Ph.D. programs. These programs are administered by the school of business. For more information, see “W. P. Carey School of Business,” page 59.

### 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

## GRADUATE PROGRAMS AND COURSES

management, strategic alliances, 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. In a recent update of a study originally published in the *Academy of Management Journal*, ASU's Department of Management climbed to third place internationally in research performance among journals, up from 21st place.

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](http://wpcarey.asu.edu/mgt).

General information on the M.B.A. program can be found at [wpcarey.asu.edu/mba](http://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](http://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 450 Changing Business Processes. (3)**

*once a year*

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.

#### **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. Cross-listed as IBS 459. Credit is allowed for only IBS 459 or MGT 459. Prerequisites: IBS 300, 306 (or ECN 306); MGT 300 (or 320 or 380).

#### **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: MGT 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)
- Strategic 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.

#### **MGT 523 Performance Management. (2–4)**

*once a year*

Addresses effective management of people in organizations. Considers evaluating and improving performance using concepts and application. 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.

#### **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.

## 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 302.

**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” (2.00) 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” (2.00) or higher: MKT 302, 304, 451.

**MKT 494 Special Topics. (1–4)**

*fall, spring, summer*

Chosen from topics in the marketing and international marketing arenas to include seminars in international marketing in Europe and Asia. Topics may include the following:

- Applied International Marketing
- 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.

**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:

- Branding
- Business-to-Business Marketing
- Customer Satisfaction and Loyalty Measures
- E-commerce Marketing Strategy
- Interactive Sports Business Strategies
- New Product and Service Development
- Service Operations
- Sports Business Revenue Generation
- Sports Business Negotiation/Alliance Management
- Strategies for Consumer Markets

**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 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.

## GRADUATE PROGRAMS AND COURSES

### 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, 345; professional program business student majoring in Supply Chain Management. Pre- or corequisite: SCM 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" (2.00) 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" (2.00) or higher: SCM 345, 355, 432.

#### 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 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.

**SCM 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.

**SCM 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.

**SCM 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.

**SCM 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.

**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.

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## Business Administration

### Master’s Program

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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](http://www.west.asu.edu) on the Web.

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## Chemical Engineering

### Master’s and Doctoral Programs

[www.eas.asu.edu/~cme](http://www.eas.asu.edu/~cme)

480/965-3313

ECG 202

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### Subhash Mahajan, Chair

**Professors:** Mahajan, Raupp

**Associate Professors:** Beckman, Burrows, Rivera, Sierks

**Assistant Professors:** Allen, Dillner, Park, Razatos

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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 206, 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 320, for program description). A *Graduate Student Handbook*, detailing information on graduate studies in Chemical Engineering, is available to admitted students. Students should contact the department.

The faculty also participate in offering the tri-university Master of Engineering degree program. See “Master of Engineering—M.Eng.,” page 204, 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

## GRADUATE PROGRAMS AND COURSES

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 204, 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 require-

ments, 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](http://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. Prerequisites: CHE 334, 342.

#### **CHE 475 Biochemical Engineering. (3)**

*selected semesters*

Applies chemical engineering methods, mass transfer, thermodynamics, and transport phenomena to industrial biotechnology. Prerequisite: instructor approval.

#### **CHE 476 Bioreaction Engineering. (3)**

*selected semesters*

Principles of analysis and design of reactors for processing with cells and other biologically active materials; applications of reaction engineering in biotechnology. Prerequisite: instructor approval.

#### **CHE 477 Bioseparation Processes. (3)**

*selected semesters*

Principles of separation of biologically active chemicals; the application, scale-up, and design of separation processes in biotechnology. Prerequisite: instructor approval.

#### **CHE 501 Introduction to Transport Phenomena. (3)**

*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 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 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.

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

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## Chemistry

### Master's and Doctoral Programs

[www.asu.edu/clas/chemistry](http://www.asu.edu/clas/chemistry)

480/965-4664

PS D102A

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**George H. Wolf, Assistant Chair for Graduate Studies**

**Regents' Professors:** Angell, Buseck, Pettit

**Professors:** Allen, Blankenship, Fromme, Fuchs, Gust, Holloway, Kouvetakis, Lindsay, Lohr, A. Moore, T. Moore, Petuskey, Rose, Shock, Skibo, Steimle, Thorpe, Williams, Woodbury

**Associate Professors:** Booksh, Hayes, Wolf

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

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The faculty in the Department of Chemistry and Biochemistry offer programs leading to the M.S. and the Ph.D. degrees in Chemistry. Areas of concentration include analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, and solid-state chemistry.

The faculty also participate in offering programs leading to the Master of Natural Science degree when one of the concentrations is chemistry (see "Natural Science," page 287), and the interdisciplinary programs, leading to the Ph.D. degrees with majors in Exercise Science (see "Exercise and Wellness," page 218) and the Science and Engineering of Materials (see "Science and Engineering of Materials," page 320).

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.

### 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 435 Medicinal Chemistry. (3)***spring*

Principles of medicinal and pharmaceutical chemistry. Drug design, synthesis, and mechanism of action. Prerequisites: a combination of BCH 361 (or 461) and BIO 353 and CHM 318 (or 332) 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 483 Astrobiology. (3)***fall and spring*

Origin, early evolution, distribution, and future of life on Earth and elsewhere in the cosmos. May be repeated for credit. Lecture, discussion, video conferences, possible field trips. Cross-listed as AST 460/ BIO 460/GLG 460/MIC 475. Credit is allowed for only AST 460 or BIO 460 or CHM 483 or GLG 460 or MIC 475. Prerequisite: instructor approval.

**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 524 Separation Science. (3)***selected semesters*

Addresses principles and applications for all areas of chemical separations. Emphasizes separations principles in microfluidics and its interface with nanotechnology and traditional electronic materials. 2 hours lecture, 4 hours lab.

**CHM 525 Analytical Spectroscopy. (4)***spring*

Theoretical and practical considerations involving the use of optical instruments for chemical analyses. 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 Electroanalytical Chemistry. (4)***selected semesters*

Theoretical and practical considerations for modern electroanalytical chemistry, including voltammetry, potentiometry, and microelectrode analysis. 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. (3)***spring*

Organic mechanisms, thermodynamic and kinetic control, structure/activity relationships, isotope effects, multistep reactions, reactive intermediates, radical reactions, electron transfer. Prerequisite: CHM 531.

**CHM 535 Medicinal Chemistry. (3)***spring*

Principles of medicinal and pharmaceutical chemistry. Drug design, synthesis, and mechanism of action. Prerequisites: a combination of BCH 361 (or 461) and BIO 353 and CHM 318 (or 332) or only instructor approval.

**CHM 537 Organic Reactions. (3)***spring*

Organic synthetic methodologies and important synthetic reactions emphasizing recently discovered reactions of preparative value. Protection/deprotection synthetic strategies; peptide synthesis. Prerequisite: CHM 531.

**CHM 541 Advanced Thermodynamics. (3)***fall*

Equilibrium thermodynamics. Chemical reactions, phase equilibria, and stability in multicomponent systems. Aqueous solutions and electrochemistry. Introduction to statistical thermodynamics. Prerequisite: CHM 346.

## GRADUATE PROGRAMS AND COURSES

### CHM 543 Computational Chemistry. (3)

*selected semesters*

Provides basic concepts and practical experience in computational chemistry. Covers electronic structure methods and computer simulation techniques. Prerequisite: CHM 345 or 545.

### CHM 545 Quantum Chemistry. (3)

*spring*

Wave and matrix formulation of quantum mechanics applied to the vibrational, rotational, and electronic states of polyatomic molecules. Hartree-Fock, electron correlation, and molecular orbital theory. Selection rules and introduction to group theory. Prerequisite: CHM 346.

### CHM 546 Molecular Spectroscopy and Group Theory. (3)

*spring*

Applies quantum mechanics to the general problem of the interaction of light with molecular systems. Angular momentum and group theory. Symmetry classifications. Overview of the formalism and experimental techniques in different resonant-based spectroscopies. Prerequisite: CHM 545.

### CHM 548 Chemical Kinetics and Dynamics. (3)

*spring in odd years*

Experimental and theoretical aspects of time-dependent processes in chemistry. Topics include kinetics of chemical reactions, diffusion, and relaxation phenomena in ordered and disordered materials. Prerequisite: CHM 545.

### CHM 549 Advanced Topics in Physical Chemistry. (3)

*selected semesters*

Various advanced and special topics in physical chemistry. Previous topics included: supercooled liquids and the glass transition, vibrational spectroscopy of solids, phase transitions and critical phenomena. May be repeated for credit. Prerequisite: CHM 345 or 545.

### CHM 552 Advanced Inorganic and Materials Synthesis Laboratory. (2)

*fall*

Preparation and characterization of inorganic compounds and materials, emphasizing advanced methods and techniques of importance in inorganic and materials chemistry. Schlenk-line and glovebox manipulations, solvothermal syntheses, and gas-phase reactions. Lab. Prerequisites: CHM 345; instructor approval. Pre- or corequisite: CHM 453 or instructor approval.

### CHM 553 Advanced Inorganic Chemistry. (3)

*fall*

Principles of modern inorganic chemistry applied over the entire periodic system. Bonding theory, chemical reactivity, spectroscopic and magnetic properties. Prerequisites: CHM 345, 346, 453.

### CHM 571 Structure, Bonding, and Symmetry in Materials. (3)

*fall*

Principles of structural and materials chemistry, emphasizing crystal chemistry. Symmetry of periodic structures (space groups), factors determining bond lengths and coordination geometries, and the role of structure in determining physical properties.

### CHM 579 Topics in Inorganic and Materials Chemistry. (3)

*selected semesters*

Various advanced and special topics in inorganic and materials chemistry. 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.

### CHM 598 Special Topics in Organic Chemistry. (1-4)

*selected semesters*

Topics may include the following:

- Biological Photochemistry. (3)  
Photochemistry and photophysics of pigment molecules. Emphasizes photobiological processes. Topics may include: dipole transition moment, electronic structure and relaxation of excited states, time-resolved spectroscopy, excimers, charge-transfer complexes and exciplexes, photoinduced energy and electron transfer, photoisomerization in vision, photochemistry of DNA.
- Bioorganic Chemistry. (3)
- Organic Photochemistry. (3)
- Organic Problems. (3)
- Special Topics in Organic Chemistry. (3)

*fall*

Two topics selected from and rotating among the following: NMR spectroscopic techniques as applied to organic problems, medicinal chemistry, bioorganic chemistry, organic photochemistry, and supramolecular chemistry.

- Supramolecular Chemistry. (3)

May be repeated for credit. Prerequisite: instructor approval.

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

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## Civil Engineering

### Master's and Doctoral Programs

[www.eas.asu.edu/~civil](http://www.eas.asu.edu/~civil)

480/965-3589

ECG 252

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Sandra L. Houston, Chair

Richard Snell Presidential Chair Professor: Crittenden

**Professors:** Fox, Houston, Johnson, Mamlouk, Mays, Rajan, Singhal, Witczak

**Associate Professors:** Abbaszadegan, Fafitis, Hinks, Mobasher, Muccino, Westerhoff

**Assistant Professors:** Allen, Dillner, Kaloush, Owusu-Antwi, Peccia

**Research Faculty:** Alum, Esparza-Soto, Febres, Hokanson, Lee, Mash, Zapata

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The faculty in the Department of Civil and Environmental Engineering offer graduate programs leading to the M.S., the Master of Science in Engineering (M.S.E.), 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—M.Eng.," page 204, 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 204.

### 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 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 construction engineering, 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](http://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 423 Structural Design. (3)

*fall*

Analysis and design of reinforced concrete steel, masonry, and timber structures. Fee. Prerequisite: CEE 421. Pre- or corequisite: CEE 420.

#### 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.

## GRADUATE PROGRAMS AND COURSES

### **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, free-ways, and interchanges. Lecture, computer lab. Fee. Prerequisite: CEE 372.

### **CEE 486 Integrated Civil Engineering Design. (3)**

*fall and spring*

Requires completion of a civil engineering design in a simulated practicing engineering environment. Limited to undergraduates in their final semester. Lecture, team learning. Prerequisites: CEE 321, 341, 351, 361, 372.

### **CEE 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. Fee. 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. Fee. Prerequisite: ECE 350 or 351.

### **CEE 521 Stress Analysis. (3)**

*fall*

Introduces tensors: kinematics, stress analysis, and constitutive assumptions leading to elastic and plastic behavior. Strain energy and energy methods; applications. Cross-listed as MAE 520. Credit is allowed for only CEE 521 or MAE 520.

### **CEE 522 Experimental Stress Analysis. (3)**

*selected semesters*

Specification and analysis of stress and strain at a point, stress-strain relationships. Mechanical, optical, and electrical strain gages and circuits, digital data acquisition and analysis, closed loop mechanical testing, fracture mechanics, optical methods and photoelasticity, and introduction to nondestructive testing. Lecture, lab.

### **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 420.

### **CEE 526 Finite Elements for Engineers. (3)**

*fall*

Direct stiffness, method of weighted residuals, weak formulation, and variational techniques in the solution of engineering problems. Cross-listed as MAE 527. Credit is allowed for only CEE 526 or MAE 527. Prerequisite: CEE 432 or MAE 404 (or their equivalents).

### **CEE 527 Advanced Concrete Structures. (3)**

*selected semesters*

Ultimate strength design. Combined shear and torsion. Serviceability. Plastic analysis. Special systems. Prerequisite: CEE 421.

### **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 421.

### **CEE 532 Developing Software for Engineering Applications. (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. Design sensitivity analysis. FEM-based optimal design of structural and mechanical systems. Cross-listed as MAE 521. Credit is allowed for only CEE 533 or MAE 521. Prerequisites: ASE 582; CEE 526 (or MAE 527).

### **CEE 536 Structural Dynamics. (3)**

*selected semesters*

Free vibration and forced response of discrete and continuous systems, exact and approximate methods of solution, response spectra, computational techniques, special topics. Lecture, recitation. Cross-listed as MAE 515. Credit is allowed for only CEE 536 or MAE 515.

### **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-D 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. Fee. 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)**

*selected semesters*

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*

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. Fee. Prerequisite: CEE 361.

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

*selected semesters*

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 567 Environmental Microbiology. (4)**

*fall*

Overview of the microbiology of natural and human-impacted environment, microbial detection methodologies, waterborne disease outbreaks, risk assessment, and regulations. Credit allowed for only CEE 567 or 467. Lecture, lab. Prerequisite: CEE 361 or instructor approval.

**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*

**CEE 590 Reading and Conference. (1–12)**

*selected semesters*

**CEE 591 Seminar. (1–12)**

*selected semesters*

Topics may include the following:

- Transportation Systems Pro-Seminar

**CEE 592 Research. (1–12)**

*selected semesters*

**CEE 598 Special Topics. (1–4)**

*selected semesters*

Topics may include the following:

- Environmental Microbiology  
Fee.
- Highway Geometric Design  
Fee.
- Intelligent Transportation Systems
- Structural Design  
Fee.

**CEE 599 Thesis. (1–12)**

*selected semesters*

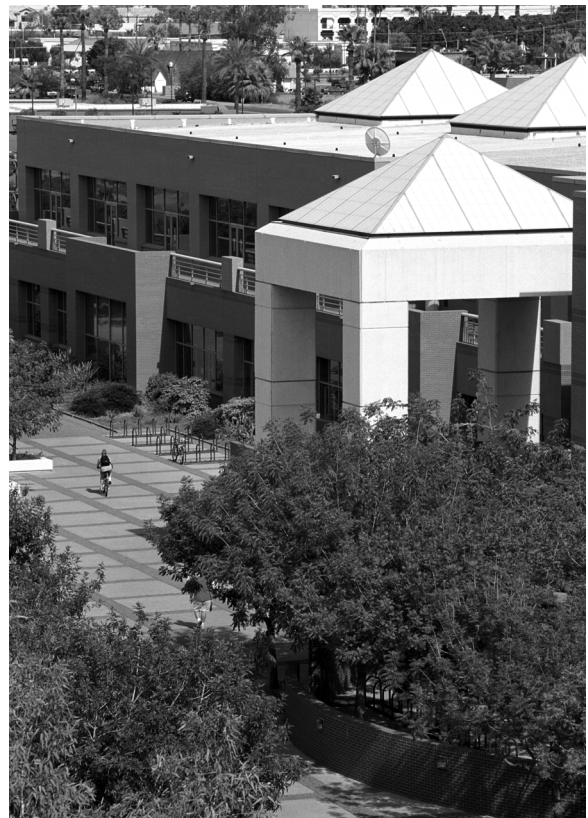
**CEE 792 Research. (1–15)**

*selected semesters*

**CEE 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.



The Student Recreation Complex

Tim Trumble photo

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## Communication

### Master's Program

[com.pp.asu.edu/academic/masters.html](http://com.pp.asu.edu/academic/masters.html)

480/965-5096

STAUF A412

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**Harold Goodall, 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

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

**Assistant Professors:** Brouwer, Messman, Park-Fuller, Tracy

**Instructional Professional:** Olson

**Assistant Instructional Professional:** McDonald

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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 rhetorical studies.

**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 writing) 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 250 on the computer version of this test.

A completed application for admission and official transcripts of all undergraduate and graduate work must be submitted to the Graduate Admissions Office. See "[Admission to the Graduate College](#)," page 85, for Graduate College general requirements. All application materials must be received by February 1. Late applications cannot be considered.

**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" (3.00);
2. COM 504 Theories and Models in Communication with a minimum grade of "B" (3.00);
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" (3.00);
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 Communication. The general areas of study include intercultural communication, interpersonal communication, organizational communication, performance studies, and rhetoric. A variety of metatheoretical approaches are used for studying communication issues, including traditional social science perspectives as well as interpretive and critical approaches. 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. For more information, visit the school's Web site at [com.pp.asu.edu](http://com.pp.asu.edu).

**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)**

*fall, spring, summer*

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 421 Rhetoric of Social Issues. (3)**

*fall and spring*

Critical rhetorical study of significant speakers and speeches on social issues of the past and present. Prerequisites: COM 308, 321 (or 323).

**COM 422 Advanced Argumentation. (3)**

*selected semesters*

Advanced study of argumentation theories and research as applied to public forum, adversary, scholarly, and legal settings. Prerequisites: COM 222; minimum cumulative ASU GPA of 2.50.

**COM 426 Political Communication. (3)**

*fall*

Theories and criticism of political communication, including campaigns, mass persuasion, propaganda, and speeches. Emphasis on rhetorical approaches. Prerequisite: minimum cumulative ASU GPA of 2.50.

**COM 430 Leadership in Group Communication. (3)**

*selected semesters*

Theory and process of leadership in group communication, emphasizing philosophical foundations, contemporary research, and applications to group situations. Prerequisites: COM 230; minimum cumulative ASU GPA of 2.50.

**COM 441 Performance Studies. (3)**

*fall, spring, summer*

Theory, practice, and criticism of texts in performance. Emphasis on the interaction between performer, text, audience, and context. Prerequisites: COM 241, 308; minimum cumulative ASU GPA of 2.50.

**COM 442 Identity, Performance, and Human Communication. (3)**  
*selected semesters*

Explores communication dimensions of self and others as performance. Examines topics including gender, race, sexuality, age, and ethnicity through performance. Lecture, workshops. Prerequisites: COM 225 (or 241); minimum cumulative ASU GPA of 2.50.

**COM 445 Narrative Performance. (3)**

*selected semesters*

Theory and practice of performing narrative texts (e.g., prose fiction, oral histories, diaries, essays, letters). Includes scripting, directing, and the rhetorical analysis of storytelling. Prerequisites: COM 241; minimum cumulative ASU GPA of 2.50.

**COM 446 Performance of Literature Written by Women. (3)**

*selected semesters*

Explores, through performance and critical writing, literature written by women. Prerequisite: minimum cumulative ASU GPA of 2.50.

**COM 450 Theory and Research in Organizational Communication. (3)**

*fall, spring, summer*

Critical review and analysis of the dominant theories of organizational communication and their corollary research strategies. Prerequisites: COM 250, 308; minimum cumulative ASU GPA of 2.50.

**COM 453 Communication Training and Development. (3)**

*once a year*

Examines the procedures and types of communication training and development in business, industry, and government. Prerequisites: COM 250; minimum cumulative ASU GPA of 2.50.

**COM 463 Intercultural Communication Theory and Research. (3)**

*fall, spring, summer*

Surveys and analyzes major theories and research dealing with communication between people of different cultural backgrounds, primarily in international settings. Lecture, discussion, small group work. Prerequisites: COM 263, 308; minimum cumulative ASU GPA of 2.50.

**COM 465 Intercultural Communication Workshop. (3)**

*selected semesters*

Experientially based study of communication between members of different cultures designed to help improve intercultural communication skills. Prerequisites: minimum cumulative ASU GPA of 2.50; instructor approval.

**COM 494 Special Topics. (1–3)**

*fall, spring, summer*

Prerequisite: minimum cumulative ASU GPA of 2.50.

**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 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.

## GRADUATE PROGRAMS AND COURSES

### 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 691 Seminar. (1–12)

*fall, spring, summer*

Lecture, discussion. Topics may include the following:

- Current Organizational Approaches to Communication. (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.

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## Communication

### Interdisciplinary Doctoral Program

[com.pp.asu.edu/academic/doctorate.html](http://com.pp.asu.edu/academic/doctorate.html)

480/965-5096

STAUF A412

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Jess K. Alberts, Director, Hugh Downs School  
of Human Communication

Paul A. Mongeau, Director, Doctoral Program

### Educational Leadership and Policy Studies

Associate Professor: Margolis

### English

Professors: Roen, Miller

Associate Professor: Goggin

### Family and Human Development

Professors: Christopher, Fabes

### Human Communication

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

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

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

### Journalism and Mass Communication

Professor: Godfrey

### Justice Studies

Regents' Professor: Altheide

Professors: Johnson, Romero

### Recreation Management and Tourism

Professor: Allison

Assistant Professor: Leclerc

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## 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



The Brickyard, in downtown Tempe, houses the Ira A. Fulton School of Engineering dean's office and the Department of Computer Science and Engineering.

Tim Trumble photo

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 writing) 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 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 graduate studies based upon the director’s recommendation. At least two-thirds of the committee must be full-time faculty at the ASU Main Campus and at least

two-thirds of the committee must be from the communication faculty. At least one member must be from an academic discipline outside of communication. The chair of the supervisory committee, who serves as the student’s advisor, must be knowledgeable in the student’s area of concentration, have an active research agenda, publish regularly in appropriate refereed academic journals, and be experienced in graduate education. Members of the committee must represent more than one academic discipline. The purpose of the committee is to guide the student through the completion of the program of study, the comprehensive examinations, and the dissertation research.

**Areas of Concentration.** Students admitted to the program select a formal area of concentration in any of the three broad areas of communicative development, intercultural communication, and organizational communication. However, the interdisciplinary nature of the program and breadth of its faculty allow students to design individual programs of study geared toward more specialized topics in human communication. As a rule, these cut across the formal areas of concentration and generally follow the areas of expertise of program faculty. Program graduates study areas such as interpersonal communication, organizational communication, performance studies, rhetoric, critical/cultural studies, relational communication, and information technology. 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. Contact the director for an up-to-date list of program faculty and their areas of interest.

**Communicative Development.** The communicative development emphasis includes three distinct specialty areas: interpersonal communication, performance studies, and rhetoric/public communication. *Interpersonal communication* refers to the exchange of messages between people in a variety of contexts, most of which concern relational aspects of communication. *Performance studies* focuses on activism and advocacy through performance with special emphasis on contemporary issues related to diversity, justice, sexuality, health, and other social and cultural concerns. *Rhetoric/public communication* considers how discourses function persuasively as social, cultural and political phenomena, and a variety of discourses are engaged, including social movements, political campaigns, legal argument, and popular culture.

**Intercultural Communication.** Intercultural communication focuses on the theoretical and conceptual relationships between culture and communication.

**Organizational Communication.** Organizational communication focuses on the conditions, impacts, and implications of communicative processes and systems for both public and private sector organizations.

**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

## GRADUATE PROGRAMS AND COURSES

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 under-

take 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 candidacy, but research hours (COM 792) may be taken before admission to candidacy. Students must enroll for 12 hours of 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.

### RESEARCH ACTIVITY

Both applied and theoretical research are an integral part of the master's and doctoral degree programs in Communication. The general areas of study include intercultural communication, interpersonal communication, organizational communication, performance studies, and rhetoric. A variety of metatheoretical approaches are used for studying communication issues, including traditional social science perspectives as well as interpretive and critical approaches. 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. For more information, visit the school's Web site at [com.pp.asu.edu](http://com.pp.asu.edu).

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## Communication Disorders

### Master's Program

[www.asu.edu/clas/shs](http://www.asu.edu/clas/shs)

480/965-2374

COOR 2211

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### David Ingram, Chair

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

**Associate Professor:** Liss

**Assistant Professors:** Azuma, Edgar, Gray

**Clinical Professors:** Mathy, Wiley

**Clinical Associate Professors:** C. Bacon, Brown, Mintz

**Clinical Assistant Professors:** K. Ingram, McBride, Wexler

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### 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. The speech-language pathology program is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association. The Department of Speech and Hearing Science also offers the Doctor of Audiology and participates in the interdisciplinary Ph.D. in Speech and Hearing Science degree programs.

**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 January 15 for fall admission, which is the only term in which students may begin their program of study. Candidates who have undergraduate deficiencies may need to take required prerequisite courses.

**Academic Requirements.** A student must complete 37 semester hours of graduate course work, exclusive of credit for practicum, as approved by the supervisory committee.

**Statistical Proficiency Requirements.** A student pursuing the M.S. degree must provide satisfactory evidence of competency in statistical methods appropriate to the behavioral sciences.

**Clinical Requirements.** A student in the M.S. program must complete at least 400 clock hours of supervised clinical practicum experience, of which a minimum of 325 clock hours must be obtained at the graduate level.

**Thesis Option.** Students wishing to pursue the thesis option must complete 37 semester hours of course work, six hours

of which must be thesis credit, excluding practicum and internship hours. The thesis must meet requirements established by the Graduate College.

**Nonthesis Option.** Students choosing the nonthesis option must complete 37 semester hours of course work, excluding practicum and internship hours.

**Final Examinations.** For a candidate for the M.S. degree (thesis option), two final examinations are required: (1) the ASHA Praxis national certification examination in speech-language pathology, 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 ASHA Praxis national certification examination in speech-language pathology, 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](http://www.asu.edu/clas/shs).

### SPEECH AND HEARING SCIENCE (SHS)

#### SHS 401 Introduction to Audiology. (3)

*fall*

Introduces hearing disorders and the purposes and procedures for basic clinical tests of auditory function. Credit is allowed for only SHS 401 or 501. Prerequisites: both SHS 311 and 376 or only instructor approval.

#### 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 500 Research Methods in Communication Disorders. (3)

*spring*

Surveys research methods in areas related to speech, language, and hearing.

#### SHS 501 Introduction to Audiologic Evaluation. (3)

*fall*

Measurement of the basic audiologic test battery, including audiograms, immittance, masking, and speech recognition. Credit is allowed for only SHS 501 or 401. Prerequisites: SHS 311, 376 (or their equivalents).

## GRADUATE PROGRAMS AND COURSES

### **SHS 502 Basic Audiometry. (4)**

*fall or spring*

Covers the bases, purposes, rationales, and procedures for the core clinical tests of auditory function in adults and children. Lecture, lab, discussion, case studies, student presentations. Pre- or corequisite: SHS 513 or instructor approval.

### **SHS 504 Amplification I. (4)**

*fall or spring*

Operation, electroacoustic measurement, selection, and prescriptive fitting of amplification devices. Lecture, lab, discussion, case studies, guest lecturers, seminar, student presentations. Prerequisites: a combination of SHS 502 and 513 and 515 or only instructor approval.

### **SHS 505 Survival Sign Language. (2)**

*fall or spring*

Facilitates effective manual and alternative methods of communication with deaf individuals in clinical settings. Discussion, case studies, demonstrations, interactive, student presentations.

### **SHS 508 Pediatric Audiology. (3)**

*fall or spring*

Emphasizes the principles and procedures for early identification and management of congenital and early-onset hearing loss. Lecture, discussion, case studies, seminar, student presentations. Prerequisite: SHS 502 or instructor approval.

### **SHS 510 Amplification II. (4)**

*fall or spring*

Verification and validation of hearing aid performance, benefit, and satisfaction. Fitting considerations for pediatric and geriatric populations. Lecture, lab, discussion, case studies, guest lecturers, seminar, student presentations. Prerequisites: a combination of SHS 502 and 504 and 513 and 515 or only instructor approval.

### **SHS 511 Psychoacoustics of Hearing Impairment. (3)**

*fall or spring*

Psychophysical methods and behavioral aspects of hearing, with an emphasis on the perceptual consequences of sensorineural hearing loss. Lecture, discussion, demonstrations, seminar, student presentations. Prerequisites: both SHS 376 and 513 or only 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 513 Neurophysiology of the Auditory System. (3)**

*fall or spring*

Focuses on the neurophysiology of the normal auditory system and on changes associated with hearing loss. Lecture, discussion, demonstrations. Prerequisite: instructor approval.

### **SHS 515 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 instructor approval.

### **SHS 516 Auditory-Evoked Potentials. (3)**

*fall or spring*

Electrophysiologic assessment of the peripheral and central auditory nervous system. Lecture, lab. Prerequisites: both SHS 502 and 513 or only instructor approval.

### **SHS 517 Balance Assessment. (3)**

*fall or spring*

Clinical analysis and treatment of balance disorders and dizziness. Lecture, discussion, case studies, seminar, student presentations. Pre- or corequisite: SHS 513 or instructor approval.

### **SHS 518 Auditory Rehabilitation. (2)**

*fall or spring*

Study and clinical application of assistive technology and rehabilitative services for managing the effects of hearing impairment. Lecture, lab, discussion, case studies, seminar, student presentations. Pre- or corequisites: both SHS 502 and 504 or only instructor approval.

### **SHS 519 Auditory Pathologies and Disorders. (3)**

*fall or spring*

Familiarizes students with major diseases, pathologies, and disorders of the human auditory system. Lecture, discussion, case studies, demonstrations, field trips, seminar, student presentations. Prerequisites: both SHS 502 and 513 or only instructor approval.

### **SHS 520 Otoneurologic Applications in Audiology. (3)**

*fall or spring*

Advanced otologic, neurologic, and audiologic approaches in the differential diagnosis of peripheral and central disorders of the auditory system. Lecture, lab, discussion, case studies, seminar, student presentations. Prerequisites: a combination of SHS 502 and 513 and 516 and 552 or only instructor approval.

### **SHS 521 Auditory Aging. (2)**

*fall or spring*

Focuses on aging and related effects on the auditory system and audition. Lecture, discussion, case studies, seminar, student presentations. Prerequisites: both SHS 502 and 513 or only instructor approval.

### **SHS 522 Hearing Conservation. (2)**

*fall or spring*

Examines the prevention, identification, physiological effects, and management of hearing loss due to noise exposure. Lecture, discussion, seminar, student presentations. Prerequisites: both SHS 502 and 513 or only instructor approval.

### **SHS 524 Counseling for the Hearing Impaired. (2)**

*fall or spring*

Theories of counseling emphasizing the psychosocial and emotional impact and the management of individuals with hearing and their families. Lecture, discussion, case studies, seminar, student presentations. Prerequisites: both SHS 502 and 504 or only instructor approval.

### **SHS 525 Audiology Practice Management. (3)**

*fall or spring*

Business practice issues, quality assurance, and professional ethics for the practicing audiologist. Lecture, discussion, case studies, seminar, student presentations. Prerequisites: both SHS 502 and 504 or only instructor approval.

### **SHS 545 Speech Perception by the Hearing Impaired. (2)**

*fall or spring*

Focuses on the perception of speech by normal-hearing and hearing-impaired listeners. Lecture, discussion, case studies, seminar, student presentations. Prerequisite: instructor approval.

### **SHS 552 Physiological Measures of Auditory Function. (3)**

*fall or spring*

Focuses on the measurement of otoacoustic emissions and acoustic immittance. Lecture, discussion, student presentations. Prerequisite: SHS 513 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)**

*fall*

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)**

*fall*

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)**

*spring*

Communication disorders related to dysfunction of the phonatory and resonance systems of voice production, assessment, and treatment. Prerequisite: SHS 310 or instructor approval.

**SHS 579 Feeding and Swallowing Disorders Across the Lifespan. (3)**

*fall*

Focuses on individuals across the age span who have feeding and/or swallowing disorders. Presents assessment and treatment strategies. Prerequisite: SHS 567.

**SHS 580 Clinical Practicum. (1–6)**

*fall, spring, summer*

Supervised practicum 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 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 589 Audiology Grand Rounds. (1)**

*fall or spring*

Grand Rounds bridges clinical and academic knowledge through case studies, application of emerging research, and clinical workshops. Discussion, case studies, interactive, seminar, student presentations. Prerequisite: SHS 502 or instructor approval.

**SHS 591 Seminar. (1–12)**

*fall, spring, summer*

Topics may include the following:

- Bilingual Language Assessment and Intervention. (3)  
*spring*
- Clinical Methods for Craniofacial Disorders. (1)  
*spring*
- Clinical Methods for Fluency Disorders. (1)  
*fall*
- Clinical Methods for Language Assessment. (1)  
*spring*
- Clinical Methods for Motor Speech Disorders. (1)  
*spring*
- Clinical Methods for Voice Disorders. (1)  
*fall*
- Cognitive and Linguistic Interactions in Adult Neurogenic Disorders. (3)  
*fall*
- Clinical Methods for Language Assessment. (1)  
*spring*
- Preschool Language Disorders. (3)  
*spring*
- Spanish Language Acquisition. (3)  
*fall*

**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 597 Audiology Clerkship. (1–6)**

*fall or spring*

Provides students with advanced, intensive clinical experiences within selected audiological facilities. May be repeated for credit. Practicum. Prerequisites: SHS 580; faculty coordinator approval.

**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.](#)

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## Communication and Human Relations Certificate Program

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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](http://www.west.asu.edu) on the Web.

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## Communication Studies

### Master's Program

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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](http://www.west.asu.edu) on the Web.

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## Composition

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See "Music," page 280.

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## Computational Biosciences

### Interdisciplinary Master's Program

[www.asu.edu/compbiosci](http://www.asu.edu/compbiosci)

480/965-5519

PS A216

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Rosemary Renaut, Director

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

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. The P.S.M. 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 important with regard to a student's competitive status. Applications are accepted for fall only.

**Fees.** In addition to tuition, program fees apply. For more information, call 480/965-5519.

**Prerequisites.** Requirements include one-year sequences in chemistry and biology, one semester of calculus and differential equations, a course in data structures and analysis of algorithms, a course with a substantial programming component, a course in organic chemistry, and a course in statistics. 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 and 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 micro-biology.

### 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 572 Data Mining. (3)***spring*

Advanced data mining techniques: classification, clustering, association, preprocessing; performance evaluation; information assurance, Web mining, security and privacy issues, and other applications.

Cross-listed as CSE 572. Credit is allowed for only CBS 572 or CSE 572. Prerequisite: CSE 412 or 471 or ECE 380 (or their equivalents).

**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](http://cse.asu.edu)

480/965-3190

BYENG

#### Sethuraman Panchanathan, Chair

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

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

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

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. The department offers a concentration in the area of arts, media, and engineering, and graduate students can exercise this option while pursuing their graduate studies.

Areas of study include algorithms, artificial intelligence, bioinformatics, computer-aided geometric design and computer graphics, computer networks, database systems, distributed computing and operating systems, embedded systems, information assurance, intelligent information integration, multimedia information systems, and software engineering.

## 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 85, for general requirements. An applicant for the M.S. program should normally have a baccalaureate degree in computer science, computer engineering, or a closely related area. The applicant's undergraduate GPA and depth of preparation in computer science and engineering are the primary factors affecting admission. Every applicant must submit scores for the Graduate Record Examination (GRE) (verbal, quantitative, and analytical required; the subject test in computer science is optional). An international student must also submit Test of English as a Foreign Language (TOEFL) scores. The application deadline for admission in the fall semester is 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

## GRADUATE PROGRAMS AND COURSES

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 85.

**Program of Study.** Each student defines a potentially unique program of study subject to approval by the department and the Graduate College. The program of study must include courses in four focus areas and must contain a minimum of 30 semester hours of approved graduate-level course work. At least 18 hours must be CSE 500-level credits (excluding CSE 598), and at least 27 hours must be for formal course work. A three-semester hour course, CSE 593 Applied Project, is also required. The department may prescribe additional courses based on the background of the candidate.

**Foreign Language Requirements.** None.

**Thesis Requirements.** None.

**Final 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 algorithms, artificial intelligence, bioinformatics, computer-aided geometric design and computer graphics, computer networks, database systems, distributed computing and operating systems, embedded systems, information assurance, intelligent information integration, multimedia information systems, and software engineering. In addition, the department conducts research closely with the Center for Cognitive Ubiquitous Computing; Center for Research in Arts, Media, and Engineering; and Partnership for Research in Stereo Modeling in various aspects of computer science.

For more information, access the research section of the Web site at [cse.asu.edu](http://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. Fee. 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. Fee. 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. Fee. Prerequisite: CSE 421.

#### CSE 423 Microcomputer System Hardware. (3)

*fall and spring*

Information and techniques presented in CSE 422 are used to develop the hardware design of a multiprocessor, multiprogramming, microprocessor-based system. Fee. 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. Fee. 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)***selected semesters*

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. Fee. Prerequisite: CSE 360 or instructor approval.

**CSE 446 Client-Server User Interfaces. (3)***selected semesters*

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. Fee. 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, Dijkstra's logic, proof obligations, and program proving. Prerequisite: CSE 355.

**CSE 460 Software Analysis and Design. (3)***fall and spring*

Object-oriented and structured analysis and design; software architecture and design patterns; component-based development; software safety and reliability. Fee. 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. Fee. 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. Fee. Prerequisite: CSE 461.

**CSE 463 Introduction to Human Computer Interaction. (3)***spring*

Design, evaluate, and implement interactive software intended for human use. Prerequisite: CSE 310.

**CSE 470 Computer Graphics. (3)***fall and spring*

Display devices, data structures, transformations, interactive graphics, 3-D graphics, and hidden line problem. Fee. 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. Fee. Prerequisites: CSE 240, 310.

**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 3-D 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. Fee. 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.

## GRADUATE PROGRAMS AND COURSES

### **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. Fee. 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. Fee. 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. Fee. 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 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)**

*selected semesters*

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. Fee. 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 572 Data Mining. (3)**

*spring*

Advanced data mining techniques: classification, clustering, association, preprocessing; performance evaluation; information assurance, Web mining, security and privacy issues, and other applications. Cross-listed as CBS 572. Credit is allowed for only CBS 572 or CSE 572. Prerequisite: CSE 412 or 471 or ECE 380 (or their equivalents).

### **CSE 573 Advanced Computer Graphics II. (3)**

*selected semesters*

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)***selected semesters*

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*

Topics may include the following:

- Client-Server User Interfaces  
Fee.
- Computational Models for the Arts. (3)  
*fall*  
Covers computability and intractability; kolmogorov complexity in the context of randomness and determinism.
- Computer Graphics  
Fee.
- Database Management  
Fee.
- Distributed Computing with Java and CORBA  
Fee.
- Introduction to Artificial Intelligence  
Fee.
- Microcomputer System Hardware  
Fee.
- Microprocessor System Design I  
Fee.
- Microprocessor System Design II  
Fee.
- Operating Systems  
Fee.
- Signal Processing and Programming for the Arts. (3)  
*spring*  
Introduces basic concepts behind the functioning of existing, widely used digital arts and media tools.
- Software Analysis and Design  
Fee.
- Software Engineering Project I  
Fee.
- Software Engineering Project II  
Fee.

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

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**Construction****Master's Program**[construction.asu.edu](http://construction.asu.edu)

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**William W. Badger, Director****Professor:** Badger**Associate Professors:** Ariaratnam, Bashford, Chasey, Ernzen, Kashiwagi, Sawhney, Wiesel**Assistant Professors:** Fiori, Knutson

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**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.

## GRADUATE PROGRAMS AND COURSES

**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](http://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.

#### 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. May be repeated for credit. Lecture, field trips. Prerequisites: CON 341, 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. Fee. 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](http://coe.asu.edu/psyched)

480/965-6339

EDB 446

**Patricia Arredondo, Academic Program Leader**

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

**Associate Professors:** Abreu, 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.

**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 before 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](http://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.

**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 graduate studies.

**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 170, 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).

## GRADUATE PROGRAMS AND COURSES

### **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 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.

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## Counseling Psychology

### Doctoral Program

[coe.asu.edu/psyched](http://coe.asu.edu/psyched)

480/965-6339

EDB 446

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**Richard T. Kinnier, Training Director**

**Patricia Arredondo, Academic Program Leader**

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

**Associate Professors:** Abreu, Arciniega, Arredondo, Hood

**Assistant Professor:** Rayle

**Clinical Associate Professor:** Homer

**Clinical Assistant Professor:** Glidden-Tracey

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## 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 before 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](http://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, ethics, 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.

#### 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.

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## Counselor Education

### Master's Program

[coe.asu.edu/psyched](http://coe.asu.edu/psyched)

480/965-6339

EDB 446

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### Patricia Arredondo, Academic Program Leader

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

**Associate Professors:** Abreu, Arciniega, Arredondo, Hood

**Assistant Professor:** Rayle

**Clinical Associate Professor:** Homer

**Clinical Assistant Professor:** Glidden-Tracey

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The faculty in the Division of Psychology in Education offer a degree program leading to the Master of Education (M.Ed.) degree in Counseling.

### MASTER OF EDUCATION

The M.Ed. 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 must submit all application materials before October 15 or April 15 to be considered for admission for the following semester. Applicants should get the complete program brochure from EDB 302 or from the Web site. For more information, see "Master of Education," page 189.

### RESEARCH ACTIVITY

See "Counseling Psychology," page 170.

### COURSES

For courses, see "Counseling," page 169.

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## Creative Writing

### Interdisciplinary Master's Program

[www.asu.edu/clas/english/creativewriting](http://www.asu.edu/clas/english/creativewriting)

480/965-3528

LL 307C

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Melissa Pritchard, Director, Executive Committee

#### English

Regents' Professors: Carlson, Dubie, Ríos  
Professors: Boyer, Goldberg, Hogue, McNally, Rhodes  
Associate Professors: Pritchard, Savard  
Senior Lecturer: Cook

#### Theatre

Professors: Bedard, Knapp  
Associate Professors: Edwards, Reyes  
Assistant Professor: Sterling

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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 Katherine K. 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 graduate studies. 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, 562, 563, 594, 598, 662, 663, and 664. The course 594 Conference and Workshop may be taken twice to varied offerings. The literature component of 24 semester hours must include ENG 591, 665, and two ENG courses in literature selected by the student's supervisory committee or the director of the creative writing committee such as ENG 667. 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 graduate studies. 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 graduate studies. 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."

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 208, "Theatre (THE)," page 355, and "Theatre Performance and Production (THP)," page 356.

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## Criminal Justice

### Master's Program

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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](http://www.west.asu.edu) on the Web.



Hopi Flute Player is one of many sculptures on ASU Main campus.

Angela Reaburn photo

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## Curriculum and Instruction

### Master's and Doctoral Programs

[coe.asu.edu/programs](http://coe.asu.edu/programs)

480/965-4602

ED 434

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**Thomas E. Barone, Interim Director**

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

**Professor and Endowed Chair:** Tobin

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

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

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

**Clinical Associate Professors:** P. Garcia, Mathur

**Clinical Assistant Professor:** Christine

**Lecturers:** Atkinson, Burstein, Cocchiarella, Devitt, Harrison, Kastre, Kortman, Maderazo, Roanhorse-Dineyazhe, Rutowski, Soroka, Spanias, Stahlman

**Administrative Professional:** Enz

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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 179](#), 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, 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 language, 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, and
3. provide three letters of recommendation.

Applicants who have junior-senior GPAs of 3.00 or higher, have an acceptable application package, 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.

**Initial Teacher Certification Program.** The Initial Teacher Certification (ITC) program is for students who have completed 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 190, for information on the Doctor of Education degree.

### RESEARCH ACTIVITY

Current faculty research activities include the e-learning network: learning anytime anywhere; family-centered early identification of children with learning disabilities and behavior disorders; bilingual/English as a second language/special education; Arizona behavior initiative: creating school environments that support high academic standards for all students; relationship-based practice in early intervention settings; explaining low achievement in limited English proficient students; and extending and sustaining use of reforms in mathematics classrooms.

## BILINGUAL EDUCATION (BLE)

### BLE 511 Introduction to Language Minority Education. (3)

*once a year*

Historical, philosophical, theoretical, and pedagogical foundations of language minority education in the United States.

### BLE 514 Bilingual/Multicultural Aspects of Special Education. (3)

*spring*

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

### BLE 515 Instructional Methods for Bilingual Students. (3)

*fall*

Introduces general dual language teaching approaches and assessment strategies. Focuses on the effective teaching of limited-English-proficient populations.

### 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.

### 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.

### 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.

### 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.

### 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.

### 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.

### 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.

### 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.

### 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.

### 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.

## GRADUATE PROGRAMS AND COURSES

### **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. Lecture, discussion. Cross-listed as LIS 565/RDG 565. Credit is allowed for only BLE 565 or LIS 565 or RDG 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. Fee. 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 502 Organization and Management of Cooperative Programs. (3)**

*fall*

Work-study programs for business occupations in high schools and community colleges.

### **BUE 505 Current Literature in Business and Vocational Education. (3)**

*spring*

Critical analyses, generalizations, and trends 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.

### **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.

### **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.

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

*fall and spring*

Supervised teaching for postbaccalaureate students, synthesized experience in curriculum, instruction, and classroom management. Fee. Prerequisites: completion of 21 hours of identified course work from an approved program of study; GPA of 2.50 (postbaccalaureate nondegree) or 3.00 (postbaccalaureate degree); approval of the Office of Professional Field Experiences.

**EED 581 Diagnostic Practices in Mathematics. (3)**

*fall and spring*

Specific skills in diagnosing and treating children's learning difficulties in mathematics. Includes practicum experiences, both on and off campus, in identifying strengths and weaknesses and initial remediation. Prerequisite: instructor approval.

**EED 584 Internship. (1–12)**

*selected semesters*

**EED 598 Special Topics. (1–4)**

*selected semesters*

Topics may include the following:

- Using Math Manipulatives/Elementary Schools  
Fee.
- Using Math Manipulatives/Middle Schools  
Fee.

**EED 720 Language in Education. (3)**

*once a year*

Sociolinguistic seminar on language issues in education, including language acquisition, classroom interaction, language attitudes, relation language, and class-gender ethnicity.

**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.

## GRADUATE PROGRAMS AND COURSES

### **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.

#### **LIS 533 Current Library Problems. (3)**

*fall*

Critical analysis of current practices and problems in school librarianship.

#### **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. Lecture, discussion. Cross-listed as BLE 565/RDG 565. Credit is allowed for only BLE 565 or LIS 565 or RDG 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*

**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.

#### **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.

#### **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 565 Literature for Hispanic Youth/Literatura para Jóvenes Hispanoparlantes. (3)**

*spring*

Selects, analyzes, and utilizes literature for Hispanic and Spanish-speaking children and adolescents. Lecture, discussion. Cross-listed as BLE 565/LIS 565. Credit is allowed for only BLE 565 or LIS 565 or RDG 565.

#### **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 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.

**SED 577 Issues and Trends in Secondary Education. (3)***selected semesters*

Analyses of lay and professional reports; problems and issues in American secondary education.

**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 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.

**SED 722 Improvement of Instruction in the Secondary School. (3)***fall*

Evaluates the research; issues and theories related to the improvement of instruction.

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

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**Curriculum and Instruction****Interdisciplinary Doctoral Program**[coe.asu.edu/programs](http://coe.asu.edu/programs)

480/965-4602

ED 434

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

Professors: Erickson, Stokrocki, B. Young

**Curriculum and Instruction**

Professors: Baker, Barone, Bitter, Christie, Edelsky, Faltis, Flores, E. Garcia, Guzzetti, Hudelson, Ovando, Rutherford, Swadener, Tobin, Zucker

Associate Professors: Anijar, Arias, Blumenfeld-Jones, Cohn, Di Gangi, Gomez, McCoy, Middleton, Surbeck

Assistant Professors: Clark, Lamorey, MacSwan, J. Young

**Educational Leadership and Policy Studies**

Regents' Professor: Berliner

Associate Professor: Margolis

**English**

Professors: Crowley, Edelsky, Lester, Miller, Nilsen, Roen

Associate Professors: Goggin, Nelson

**Exercise and Wellness (ASU East)**

Professors: Burkett, Stone

Associate Professors: Phillips, Swan

Assistant Professor: Tudor-Locke

**Human Communication**

Professor: Arnold

**Kinesiology**

Professor: Darst

**Life Sciences**

Professor: Lawson

**Mathematics and Statistics**

Associate Professor: Carlson

Assistant Professor: Zandieh

**Nutrition (ASU East)**Professors: Hampl, Vaughan

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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;

## GRADUATE PROGRAMS AND COURSES

3. early childhood education;
4. elementary education;
5. English education;
6. exercise and wellness education;
7. language and literacy;
8. mathematics education;
9. physical education;
10. science education; and
11. 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 graduate studies, 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 examina-

tion. 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 graduate studies.

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 graduate studies. 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 graduate studies.

**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 graduate studies. 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 702 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);
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 dissertation credits must be reserved for postcandidacy registration. The dissertation is designed to be the student's culminating experience. The dissertation must consist of a fully documented written study demonstrating a high level of expertise in research and scholarship in the student's area of concentration. The dissertation should make an original contribution to inquiry in the area of curriculum and instruction and be worthy of publication by an established press as a book or monograph or as one or more articles in a refereed, scholarly journal. The dissertation should not only demonstrate that the student is able to conduct quality research, but also should be conceived and carried out in such a way that it should make a contribution to advancing scholarship in the field of curriculum and instruction.

**Final Examinations.** The final oral examination in defense of the dissertation is scheduled and conducted by the student's dissertation committee. A candidate must pass the final examination within five years after completing the comprehensive examination.

**Master's in Passing.** A master's in passing is available for the following concentrations: early childhood education, elementary education, language and literacy, mathematics education, science education, and special education.

## 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.

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## Dance

### Master's Program

[herbergercollege.asu.edu/dance](http://herbergercollege.asu.edu/dance)

480/965-5029

PEBE 107A

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**Claudia Murphey, Chair**

**Professors:** Kaplan, Keuter, Murphey

**Associate Professor:** Jackson

**Assistant Professors:** Fitzgerald, Parrish, Tsukayama, Vissicaro

**Associate Research Professional:** Mitchell

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### 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](http://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](mailto: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.

**Interdisciplinary Digital Media and Performance Concentration.** Students interested in this M.F.A. in Dance, collaborative program should contact the director of Graduate Admissions in Dance.

**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.

## 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. (1–2)***spring*

Focus on digital recording/editing of audio compositions for choreographic and video projects. Lecture, lab. Fee. Prerequisite: instructor approval. 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 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.
- Integrated Approaches in Dance Education 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 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.

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## Design

### Master's Program

[www.asu.edu/caed/SOD/](http://www.asu.edu/caed/SOD/)

480/965-4135

AED 154

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**Dr. Jacques Giard, Director**

**Professors:** Brandt, Giard

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

**Assistant Professors:** Bender, Boradkar, Brungart, Herring, McCoy, Schoenhoff, Thibeau Catsis, Weed

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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 with concentrations in graphic design, industrial design, and interior design. Course offerings focus on such areas as facilities planning and management in design; human factors in design; methodology, theory, criticism in design; and visual communication design.

The faculty in the school also participate in offering the Ph.D. in Environmental Design and Planning program. See “[Environmental Design and Planning](#),” page 213, 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 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, 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 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.

### Areas of Study

There are four areas of study.

**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 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.

**Visual Communication Design.** This area of study emphasizes the production and analysis of visual language systems in context. Students study the effects of visual media in society and investigate ways of employing that media to communicate information with increasing sophistication. Critical to this process is the development of ideas and approaches independent of commercial and technological trends. Research and applied projects require innovative thinking, writing, and form giving that consciously integrate knowledge of aesthetics, perception, human factors, and technology. Other areas of study, particularly those within the arts and social sciences, often inform research and applied projects. The teaching content of this area is tailored to the needs of the individual applicant; however, students may be invited to assist faculty on established research projects.

**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 .....	9–15
Approved electives outside the school .....	6–12
Approved research methods courses .....	6–9
Thesis or Applied Project .....	6
Minimum 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: methodology, theory, and criticism in design; facilities planning and management in design; human factors in design; or visual communication design. Admission to the M.S.D. program is selective. 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. Materials must be sent separately to each department. Materials not sent directly to the individual departments may experience a delay and may result in denial of the application.

**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 (A 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 mandatory statement of intent form (available at [www.asu.edu/caed/SOD/design/PROGRAMS/Forms.htm](http://www.asu.edu/caed/SOD/design/PROGRAMS/Forms.htm)), on which the applicant
  - a. specifies an intended concentration: graphic design, industrial design, or interior design.
  - b. specifies an area of study: facilities planning and management in design; human factors in design; methodology, theory, and criticism in design; or visual communication design.
  - c. discusses a 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. specifies his or her proposed mentor for intended research. Faculty biographies can be found on the Web site at [www.asu.edu/caed/SOD](http://www.asu.edu/caed/SOD).
  - e. discusses 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 qualified to comment on the applicant's potential in the selected concentration.
5. An application for Graduate Research/Teaching Assistantship and a résumé from applicants wishing to be considered for teaching or research assistantships (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).
6. An 8.5" x 11" portfolio documenting research and imaginative projects that support the intended concentration.

The portfolio is returned after final admission procedures, provided sufficient prepaid postage is enclosed, or if the

## GRADUATE PROGRAMS AND COURSES

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.** All materials must be received by the Graduate College and the School of Design by January 15 for fall semester consideration.

Applications for assistantships and scholarships are considered at the same time.

**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](http://www.asu.edu/caed). E-mail inquiries or requests should be sent to [designmsd@asu.edu](mailto:designmsd@asu.edu).

### Facilities

The College of Architecture and Environmental Design maintains a high-bay research facility, a lighting laboratory, an ethnographic studies laboratory (DESIGNSPACE), 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.

### RESEARCH ACTIVITY

Research is an integral component of the M.S.D. program. Research interests of the School of Design faculty include design history, theory, and criticism; ambient environment; human factors and ergonomics; human behavior in the work environment; gender issues in design; leadership; cultural analysis; design methodologies and pedagogies; decision making and creativity; user-centered business and design innovation; ethnography in design; interactive learning experiences; and technology in education. For more

information about School of Design faculty research, access the school's Web site at [www.asu.edu/caed/SOD](http://www.asu.edu/caed/SOD).

### 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)

*selected semesters*

Projected applications in design production, planning, and decision-making processes. Lecture, seminar. Prerequisites: INT 310 and 311 (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 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)

*selected semesters*

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.

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## Economics

### Master's and Doctoral Programs

[wpcarey.asu.edu/ecn/programs.cfm](http://wpcarey.asu.edu/ecn/programs.cfm)

480/965-3531

BAC 659

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#### Arthur E. Blakemore, Chair

**Professors:** Blakemore, Boyes, Brada, Burdick, Burgess, DeSerpa, Happel, Hoffman, Kingston, Low, Manelli, Mayer, McDowell, McPheters, Melvin, Méndez, Ormiston, Rogerson, Santos, Schlee, Zhou

**Associate Professors:** Ahn, Chade, Datta, Reffett, Reiser, Wilson

**Senior Lecturer:** Roberts

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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 138), the program leading to the M.S. in Statistics (see “[Master of Science](#),” page 336) and the program leading to the Ph.D. degree in Business Administration. 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 85. 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 anal-

ysis. 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

## GRADUATE PROGRAMS AND COURSES

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 410 Applied Business Forecasting. (3)**

*once a year*

Applies forecasting techniques in business and institutional environments. Prerequisite: STP 226 or QBA 221.

#### **ECN 475 Capstone in Economics. (3)**

*fall and spring*

Capstone course integrating several areas of 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. (2–4)**

*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 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 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 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.

#### **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 715 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 716 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 721 Labor Economics I. (3)**

*spring*

Development of basic theoretical models for analyzing labor market issues. Prerequisites: both ECN 713 and 714 or only instructor approval.

#### **ECN 722 Labor Economics II. (3)**

*selected semesters*

Extensions/criticisms of labor market theories. Applications to a variety of policy issues. Prerequisites: both ECN 713 and 714 or only 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 736 International Trade Theory. (3)***selected semesters*

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 713 and 714 or only instructor approval.

**ECN 738 International Monetary Theory and Policy. (3)***selected semesters*

Foreign exchange market, balance of payments, and international financial institutions and arrangements; theory and applications. Prerequisites: both ECN 713 and 714 or only instructor approval.

**ECN 753 Industrial Organization. (3)***selected semesters*

Analyzes structure, conduct, and performance in industrial markets; the economics of organizations. Prerequisites: both ECN 713 and 714 or only instructor approval.

**ECN 760 Economics of Growth and Development. (3)***selected semesters*

Economic problems, issues, and policy decisions facing the developing nations of the world. Prerequisites: both ECN 713 and 714 or only 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.

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**Education****Master's and Doctoral Programs**

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**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.

A Master of Arts degree in Social and Philosophical Foundations of Education is also available.

**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

## GRADUATE PROGRAMS AND COURSES

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 graduate studies.

### 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 191, 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 graduate studies, 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 three semesters 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 graduate studies 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](http://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 graduate studies.

**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 graduate studies.

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 graduate studies and ordinarily involves repetition of the comprehensive examinations.

**Courses.** The core courses for the College of Education graduate programs carry the prefix “COE.” These courses are no longer required for all graduate majors in the College of Education. Contact the appropriate division to obtain specific core requirements.

**COLLEGE OF EDUCATION (COE)**

**COE 501 Introduction to Research and Evaluation in Education. (3)**

*fall, spring, summer*

Overview of educational inquiry from controlled, quantitative to qualitative, naturalistic. Emphasizes locating and critically interpreting published research.

**COE 502 Introduction to Data Analysis. (3)**

*fall, spring, summer*

Descriptive statistics, visual approaches, estimation, and inferential methods for univariate and bivariate educational research problems. Experience using statistical software. Cross-listed as EDP 502. Credit is allowed for only COE 502 or EDP 502.

**COE 503 Introduction to Qualitative Research. (3)**

*fall, spring, summer*

Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory, and hermeneutics), and qualitative versus quantitative social sciences; methods of inquiry. Cross-listed as EDP 503. Credit is allowed for only COE 503 or EDP 503.

**COE 504 Learning and Instruction. (3)**

*fall, spring, summer*

Introduces psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as EDP 504. Credit is allowed for only COE 504 or EDP 504.

**COE 505 American Education System. (3)**

*fall, spring, summer*

Political, social, historical, and philosophical analyses of American education at all levels. Examines primary sources, legal findings, and case studies.

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see “[Omnibus Courses](#),” page 50.

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**Educational Administration  
and Supervision**

**Master’s and Doctoral Programs**

[coe.asu.edu/elps/admin.php](http://coe.asu.edu/elps/admin.php)

480/965-6357

ED 120

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

**James E. Jurs, Academic Program Coordinator,  
M.Ed. in Educational Administration and Supervision**

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

**Donna J. Macey, Internship Coordinator and Certification**

**Professors:** González, Norton, Webb, Wiley

**Associate Professors:** Danzig, Hunnicutt

**Assistant Professors:** Begaye, Read

**Clinical Associate Professor:** Macey

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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 193. 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.

## GRADUATE PROGRAMS AND COURSES

### MASTER OF EDUCATION

See “**Master of Education**,” page 189, for general information on the Master of Education degree.

### DOCTOR OF EDUCATION

See “**Doctor of Education**,” page 190, 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.



Programs offered through Disability Resources ensure that the campus is accessible to all students.

Tim Trumble photo

### 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.

**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 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.

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## Educational Administration and Supervision

### Master’s Program

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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](http://www.west.asu.edu) on the Web.

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## Educational Leadership and Policy Studies

### Doctoral Program

[coe.asu.edu/elps/edlead.php](http://coe.asu.edu/elps/edlead.php)

480/965-6357

ED 120

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**Gene V Glass, Academic Program Coordinator**

**Regents’ Professor:** Berliner, Glass, Smith

**Professors:** Appleton, Barone, Fenske, González, Hanson, Molnar, Norton, Tobin, Turner, Valverde, Webb, Wiley, Swadener

**Associate Professors:** Danzig, Hunnicutt, Margolis, Wilkinson

**Assistant Professor:** Moses

**Research Professor:** de los Santos

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## 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.

## GRADUATE PROGRAMS AND COURSES

### 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. Applications are considered at the end of October, February, and April. To be considered at any admissions meeting, a candidate’s file must be completed no later than the first day of the month in which the meeting is held. 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 graduate studies.

**Dissertation Committee.** After passing the comprehensive examination, a dissertation committee is formed upon the approval of the dean of graduate studies. 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 graduate studies.

**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)	
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
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 645 Leadership Development for Education Leaders .....	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 649 Law of Higher Education .....	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)	
HED 799 Dissertation (3)	
SPF 799 Dissertation (3)	

Total minimum semester hours required.....24

**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.

**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 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 192, “Higher and Postsecondary Education (HED),” page 236, and “Social and Philosophical Foundations (SPF),” page 322.*

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**Educational Psychology**

**Master’s and Doctoral Programs**

[coe.asu.edu/psyched](http://coe.asu.edu/psyched)

480/965-3384

EDB 302

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**Samuel B. Green, Academic Program Leader**

**Regents’ Professor:** Berliner, Glass, Smith

**Professors:** Barona, Blanchard, Green, Krus, Moore, Santos de Barona, Strom

**Associate Professors:** Nakagawa, Stafford, Wodrich

**Assistant Professors:** Arzubiaga, Brem, Gorin, Husman, Ladd, Thompson

**Clinical Assistant Professor:** Stamm

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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. Doctoral concentrations are available in learning; lifespan developmental psychology; measurement, statistics, and methodological studies; and school psychology.

Students applying for admission to these programs should see “[Admission to the Graduate College](#),” page 85. Applicants to these programs must submit scores on the verbal, quantitative, and analytical sections of the Graduate Record Examination. Applicants to the M.Ed. may substitute a Miller Analogies Test score. These programs generally require a statement of purpose as well as other items. Applicants should refer to the division’s Web site at [coe.asu.edu/psyched](http://coe.asu.edu/psyched) for other requirements and applicable forms.

These programs, except school psychology, accept students for fall and spring semesters. A completed graduate application and all program application materials should be received by October 15 for admission in the spring semester. For admission in the fall semester, a completed graduate application and all program application materials should be received by February 15. School psychology applicants should submit a completed graduate application and all program application materials before January 15 for fall admission.

**MASTER OF EDUCATION**

This program is intended for persons who wish to further prepare themselves as classroom teachers or for other positions related to instruction. The degree requires 36 semester hours of graduate course work and a written evaluation as a culminating experience. Students completing this program are not expected to continue for a Ph.D. degree in Educational Psychology at ASU.

## GRADUATE PROGRAMS AND COURSES

See “[Master of Education](#),” page 189, for more information on the degree.

### MASTER OF ARTS

The program of each student is prepared in consultation with the supervisory committee, consisting of a chair and two or more additional faculty members. A minimum of 30 semester hours is required. The program must include six hours of thesis and a written comprehensive examination. Students in this program generally are preparing for doctoral studies.

See “[Master’s Degrees](#),” page 94, for general requirements.

### DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Psychology offers the following areas of study: learning; lifespan developmental psychology; measurement, statistics, and methodological studies; and school psychology. These programs prepare students for professional positions in universities, school districts, departments of education, and industry. Complete descriptions of each area are on the division’s Web site at [coe.asu.edu/psyched](http://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 program is accredited by the American Psychological Association and approved by the National Association of School Psychologists. For more information on the faculty, the programs of study, and admission requirements, applicants should contact the Division of Psychology in Education or access the Web site at [coe.asu.edu/psyched](http://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.

**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. Fee. 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. Fee. 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](http://coe.asu.edu/psyched)

480/965-7192

EDB 121

**Wilhelmina C. Savenye, Academic Program Leader**

**Professors:** Bitter, Klein, Sullivan

**Associate Professor:** Savenye

**Assistant Professor:** Atkinson

**Clinical Assistant Professor:** Igooe

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

## GRADUATE PROGRAMS AND COURSES

complete description of the M.Ed. program in Educational Technology, access the Web site at [coe.asu.edu/psyched](http://coe.asu.edu/psyched). For general requirements, see “[Master of Education](#),” page 189.

### DOCTOR OF PHILOSOPHY

The Ph.D. degree in Educational Technology requires a minimum of 84 semester hours beyond the bachelor’s degree. The content focus of the program is on instructional design, development, evaluation, and the application of educational technology to support learning. In addition, the doctoral program has a strong emphasis on research using educational technology in applied settings. Students participate in research courses and practica that lead to conference presentations and journal publications. Each Ph.D. student must complete a comprehensive examination and satisfy a publication requirement before beginning work on their dissertation.

For a complete description of the Ph.D. in Educational Technology, access the Web site at [coe.asu.edu/psyched](http://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.

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## Electrical Engineering

### Master's and Doctoral Programs

[www.eas.asu.edu/~eee](http://www.eas.asu.edu/~eee)

480/965-3590

ENGRC 555

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**Joseph C. Palais, Director of Graduate Studies**

**Regents' Professors:** Balanis, Ferry, Heydt

**Professors:** Backus, Crouch, Goodnick, Gorur, 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, Grondin, Holbert, Karam, Kim, Morrell, Rodriguez, Skromme, Tsakalis, Tylavsky

**Assistant Professors:** Ayyanar, Duman, Joo, Papandreou-Suppappola, Reisslein, Tepedelenioglu, Vasileska, J. Zhang

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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 interdisciplinary program leading to the Ph.D. degree in the Science and Engineering of Materials; see "[Science and Engineering of Materials](#)," page 320. The faculty also participate in the Master of Engineering program; see "[Engineering](#)," page 204.

**Admission.** See "[Admission to the Graduate College](#)," page 85. 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.

#### MASTER OF SCIENCE

See "[Master's Degrees](#)," page 94, for general information.

#### MASTER OF SCIENCE IN ENGINEERING

See "[Master of Science in Engineering](#)," page 204, 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.

#### ONLINE PROGRAMS

A wide selection of graduate-level electrical engineering courses are offered online. By taking classes over the Internet, students can complete all requirements for an M.S.E. degree from off campus. Students in the M.S. and Ph.D. programs can also utilize the online classes in their programs of study. The Ira A. Fulton School of Engineering Center for Professional Development provides support for the online classes. For more information about these programs, see "[Center for Professional Development](#)," page 69.

#### ARTS, MEDIA, AND ENGINEERING (AME) PROGRAM

The Electrical Engineering faculty offer the M.S.E. and Ph.D. degrees with a concentration in arts, media, and engineering in collaboration with the Departments of Computer Science and Engineering, Dance, and Theatre and the Schools of Art and Music. For more information, see "[Arts, Media, and Engineering](#)," page 129.

#### RESEARCH ACTIVITY

Opportunities at the master's or doctoral level 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.

## GRADUATE PROGRAMS AND COURSES

Research participation in the Department of Electrical Engineering is available in a broad spectrum of subjects encompassing traditional as well as new specialties. Significant research activity exists in 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, and telecommunications have been selected for support as part of a program establishing excellence centers at ASU.

For a current list of the subjects available for research in the department, access the department's Web site at [www.eas.asu.edu/~eee](http://www.eas.asu.edu/~eee).

### 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. Fee. Prerequisites: EEE 303; MAT 342 (or 343).

#### 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. Fee. Prerequisite: ECE 334.

#### EEE 433 Analog Integrated Circuits. (4)

*fall and spring*

Analysis, design, and applications of modern analog circuits using integrated bipolar and field effect transistor technologies. Lecture, lab. Fee. 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 that 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. Fee. 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. Fee. Prerequisite: EEE 340.

#### EEE 448 Fiber Optics. (4)

*fall*

Principles of fiber-optic communications. Lecture, lab. Fee. 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. Fee. 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. Fee. 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 505 Time-Frequency Signal Processing. (3)***fall*

Joint time-frequency analysis of time-varying signals and systems; linear and quadratic time-frequency representations; applications in current areas of signal processing. Prerequisite: EEE 407.

**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. Fee. 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. Fee. 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. Fee.

**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 528 Phase-Locked Loop Systems and Circuits. (3)***fall*

Fundamentals, concepts of system analysis and design, and principles that apply to phase-locked loops (PLLs) used in frequency synthesis. Prerequisite: EEE 433. Pre- or corequisite: EEE 523.

**EEE 529 Mixed-Signal Circuit Design. (3)***spring*

Analysis and design of mixed-signal integrated circuits with emphasis in CMOS technology. Prerequisites: EEE 523, 525.

**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. 2-D 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 540 Fast Computational Electromagnetics. (3)***selected semesters*

Method of moments, finite difference time-domain, finite element methods implemented using fast algorithms (wavelets, FMM, Nystrom) to gain high efficiency. Prerequisite: EEE 440.

**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).

## GRADUATE PROGRAMS AND COURSES

### 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 queuing 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 557 Broadband Networks. (3)

*fall*

Physics of wireless and optical communications. Broadband multiplexing and switching methods. Blocking and queuing analysis. Network optimization, routing, and economics. Prerequisite: EEE 350.

### EEE 558 Wireless Communications. (3)

*fall*

Cellular systems, path loss, multipath fading channels, modulation and signaling for wireless, diversity, equalization coding, spread spectrum, TDMA/FDMA/CDMA. Prerequisite: EEE 552.

### EEE 571 Power System Transients. (3)

*spring*

Simple switching transients. Transient analysis by deduction. Damping of transients. Capacitor and reactor switching. Transient recovery voltage. Travelling waves on transmission lines. Lightning. Protection of equipment against transient overvoltages. Introduces computer analysis of transients. Prerequisite: EEE 471.

### EEE 572 Advanced Power Electronics. (3)

*fall*

Analyzes device operation, including thyristors, gate-turn-off thyristors, and transistors. Design of rectifier and inverter circuits. Applications such as variable speed drives, HVDC, motor control, and uninterruptible power supplies. Prerequisite: EEE 470.

### EEE 573 Electric Power Quality. (3)

*spring*

Sinusoidal waveshape maintenance; study of momentary events, power system harmonics, instrumentation, filters, power conditioners, and other power quality enhancement methods. Prerequisite: EEE 360 (or its equivalent).

### EEE 574 Computer Solution of Power Systems. (3)

*selected semesters*

Algorithms for digital computation for power flow, fault, and stability analysis. Sparse matrix and vector programming methods, numerical integration techniques, stochastic methods, solution of the least squares problem. Prerequisite: EEE 471.

### EEE 577 Power Engineering Operations and Planning. (3)

*fall*

Economic dispatch, unit commitment, dynamic programming, power system planning and operation, control, generation modeling, AGC, and power production. Prerequisite: EEE 471 or graduate standing.

### EEE 579 Power Transmission and Distribution. (3)

*spring*

High-voltage transmission line electric design; conductors, corona, RI and TV noise, insulators, clearances. DC characteristic, feeders voltage drop, and capacitors. Prerequisite: EEE 470.

### EEE 581 Filtering of Stochastic Processes. (3)

*selected semesters*

Modeling, estimation, and filtering of stochastic processes, with emphasis on the Kalman filter and its applications in signal processing and control. Prerequisites: EEE 482, 550, 554.

### EEE 582 Linear System Theory. (3)

*selected semesters*

Controllability, observability, and realization theory for multivariable continuous time systems. Stabilization and asymptotic state estimation. Disturbance decoupling, noninteracting control. Prerequisite: EEE 482.

### EEE 584 Internship. (3)

*selected semesters*

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 591 Seminar. (1–12)**

*selected semesters*

Topics may include the following:

- Analog Integrated Circuits  
Fee.
- Communication Systems
- Digital Signal Processing  
Fee.
- Digital Systems and Circuits
- Electromagnetic Engineering II
- Feedback Systems
- Fiber Optics
- Microelectronics  
Fee.
- Microwaves
- Real-Time DSP  
Fee. Credit is allowed for only EEE 591 or 498.

**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 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 784 Internship. (3)**

*selected semesters*

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.

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## Elementary Education

### Postbaccalaureate Program

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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.

#### EARLY CHILDHOOD EDUCATION (EAC)

**EAC 494 Special Topics. (1–4)**

*selected semesters*

**EAC 594 Conference and Workshop. (1–12)**

*selected semesters*

**EAC 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.

#### 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 562 Planning and Designing Curriculum with Media. (3)**

*fall, spring, summer*

Planning and design of curriculum and effective learning experiences supported by technology to maximize student learning. Prerequisite: EDC 560 or department approval.

**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.

**EDC 568 Developing and Using Video in Instruction. (3)**

*fall, spring, summer*

Techniques for developing and using video for instruction; methods and materials for teaching video production in schools.

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

#### ENGLISH AS A SECOND LANGUAGE (ELL)

**ELL 484 Internship. (1–12)**

*selected semesters*

**ELL 494 Special Topics. (1–4)**

*selected semesters*

**ELL 584 Internship. (1–12)**

*selected semesters*

**ELL 594 Conference and Workshop. (1–12)**

*selected semesters*

## GRADUATE PROGRAMS AND COURSES

### ELL 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.

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## Elementary Education

### Master's Program

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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](http://www.west.asu.edu) on the Web.

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## Engineering

### Master's Programs

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#### MASTER OF ENGINEERING—M.ENG.

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.Eng.).

The M.Eng. 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.Eng. Web site at [triuniv.engr.arizona.edu](http://triuniv.engr.arizona.edu).

The M.Eng. 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](http://triuniv.engr.arizona.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.Eng. Admission Committee. Upon completion of recommended course work, provisional and/or deferred admission status students may be elevated to regular status. Refer to the M.Eng. Web site for program admission details.

Individuals wanting to take courses offered in the M.Eng. 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.Eng. 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.Eng. 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.Eng. degree is six years from the time of admission.

#### MASTER OF SCIENCE IN ENGINEERING

The faculty in the Ira A. Fulton School of Engineering 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 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 (AECF) before enrolling in course work in the academic program.

**Program of Study.** In general, all candidates for the M.S.E. degree program are required to complete 30 semester hours. Additional courses may be assigned by the supervisory committee depending on the background of the candidate.

*Option 1.* A minimum of six semester hours of research and thesis credit must be included in the 30 hours.

*Option 2.* A minimum of 30 semester hours and a comprehensive examination are required.

**Foreign Language Requirements.** None.

**Thesis Requirements.** Only students who elect option one are required to write a thesis.

**Final 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.

## CENTER FOR PROFESSIONAL DEVELOPMENT

As a unit of the Ira A. Fulton School of Engineering, the Center for Professional Development (CPD) provides engineers and technical professionals the skills and knowledge

necessary to master new methods, to lead projects and teams, and to advance professionally. Programs are offered in traditional classroom environments and through distance learning. By leveraging the nationally renowned faculty of the school and affiliate experts, CPD administers short courses and conferences, professional certification programs, off-campus graduate degree programs, and in-company customized programs.

The school offers a growing list of M.S.E. programs to engineering professionals globally. We understand that adult students have professional, family, and community responsibilities in addition to their educational goals. We strive to provide convenient and high-quality programs while ensuring high academic standards.

## Distance Learning Programs for Engineering Professionals

The distance learning programs are offered to professionals seeking flexible "anytime, anyplace" off-campus education programs. A broad portfolio of programs offers engineering and technical professionals new strategies, tools and methods, and technology to remain competitive in the New Economy. In general, professionals pursuing the M.S.E. distance learning programs have two or more years of professional experience and are sponsored by their employer through tuition benefit programs. Traditional program areas include electrical engineering, materials science engineering, chemical engineering, industrial engineering and non-traditional specialty areas such as semiconductor processing and manufacturing. Executive-focused programs are offered through the M.S.E. in Engineering Sciences with a concentration in executive embedded systems engineering.

For more information, access the school's Web site at [www.asuengineeringonline.com](http://www.asuengineeringonline.com).

## COURSES

For disciplinary courses, refer to the catalog section for the major.

### 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.

### ENGINEERING CORE (ECE)

#### ECE 500 Research Methods. (1-12)

*selected semesters*

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

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## Engineering Science

### Master's and Doctoral Programs

[www.eas.asu.edu/~cme](http://www.eas.asu.edu/~cme)  
480/965-3313

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**Subhash Mahajan, Chair**

**Regents' Professor:** Mayer

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

**Associate Professors:** Chawla, Van Schilfgaarde

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The faculty of the Ira A. Fulton 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.

Executive focused programs are offered through the M.S.E. in Engineering Sciences with a concentration in executive embedded systems engineering. For more information, access the Web site at [asuengineeringonline.com](http://asuengineeringonline.com).

**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; see “**Materials Science and Engineering,**” page 265.

For more information call 480/965-3313, send e-mail to [cmerec@asu.edu](mailto: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 Ira A. Fulton School of Engineering that apply to degree requirements are listed under degree majors in this catalog.

For students in the area of materials science and engineering, see “**Materials Engineering,**” page 264.

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## English

### Master's and Doctoral Programs

[www.asu.edu/clas/english/gradstudies/enggrad.htm](http://www.asu.edu/clas/english/gradstudies/enggrad.htm)  
480/965-3168  
LL 542

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**Neal Lester, Chair**

**Regents' Professors:** Carlson, Dubie, Rios

**Professors:** Adams, Bjork, Boyer, Brack, Candelaria, Crowley, Goldberg, Gutierrez, Helms, Hogue, Horan, Kehl, Lester, Major, Miller, A. Nilsen, D. Nilsen, Rhodes, Roen, Tobin, van Gelderen

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

**Assistant Professors:** Blasingame, Fox, P. Goggin, Lockard, Milun, Parchesky, Webb

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

**Lecturers:** Binkley, Duttagupta, Stancliff

**Academic Professionals:** Glau, McNeil

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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 more information, see “**Master of Education,**” page 189.

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 172.

## 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 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 a concentration in linguistics and with a concentration in 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 hours being taken in the Department of Languages and Literatures. Included in the hours must be ENG 500 Research Methods; ENG 503 Comparative Literature, Theory, and Practice; and ENG 599 Thesis.

For the concentration in English linguistics, a candidate must complete a minimum of 30 semester hours of graduate-level courses. Two tracks are available. The general linguistics track must include LIN 500, 511, 514, and 515 and

one advanced linguistics course. The Applied Linguistics track must include LIN 500; 511 or 514; 515 or 516; and 520 and a course from a selection of advanced linguistics courses. Both tracks require six hours of 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; and a nine-hour distribution requirement. Two courses selected must be graduate seminars at the 600-level. Electives are chosen in consultation with the advisor.

For the concentration in rhetoric and composition, a candidate must complete a minimum of 30 hours of graduate courses. These hours must include ENG 500 Research Methods, a course in rhetoric theory, a course in composition theory, a six-hour thesis, and 15 elective course hours that must include six semester hours of graduate seminars at the 600-level. Electives are chosen in consultation with the advisor.

**Foreign Language Requirements.** A reading knowledge of a suitable natural language is required and must be approved by the student’s advisor.

**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 338.

## DOCTOR OF PHILOSOPHY

See “[Doctor of Philosophy](#),” page 96, for general requirements.

**Admission Requirements.** Applicants for the Ph.D. degree in English must submit three letters of recommendation, a personal statement of aims and purposes, and an academic writing sample. GRE general scores are required for both concentrations. The GRE advanced literature section is required for the literature concentration. 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 six semester hours in theory courses and ENG 500 Research Methods. Students must complete (or have completed at the master’s level or its equivalent) one

## GRADUATE PROGRAMS AND COURSES

graduate course in eight of the following 10 categories: Literature to 1500, Literature 1500-1660, Literature 1660-1900, Literature since 1900, Genre, Gender Studies, Ethnic Studies, Postcolonial/Anglophone literatures, Cultural Studies, and History/Structure of the English Language. Students must take at least five graduate seminars at the 600-level en route to the Ph.D. degree, at least three of which must be taken in the Ph.D. program. Up to 12 semester hours taken outside the department may be counted toward the degree. Students should consult with their supervisory committees when choosing electives.

**Foreign Language Requirements.** Students must demonstrate evidence of a competent reading knowledge of two languages other than modern English. These are to be selected by the student, subject to the approval of the chair of the dissertation committee. The language requirement must be completed before the student is eligible to take part in the Ph.D. exams.

*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 ENG 500 Research Methods, a 12-semester-hour foundation distribution (one course in rhetoric, one course in composition studies, and two courses in linguistics), and a 12-semester-hour advanced studies distribution requirement that consists of courses at the 600-level required by the distribution from one area of study (rhetoric, composition, or linguistics), or a combination of areas in which the student would like to concentrate. Up to 12 semester hours of course work taken outside the department may be counted toward the degree. Students should consult with an advisor when choosing these courses.

**Foreign Language Requirements.** Students must demonstrate evidence of a competent reading knowledge of a language other than modern English. The language can be selected by the student, in consultation with the supervisory committee. The language requirement must be completed before the student is eligible to take Part I of the Ph.D. exams. This requirement may be met by:

1. earning a "B" (3.00) or higher in a 400- or 500-level course in an appropriate (approved) language;
2. demonstrating comparable proficiency by taking a language examination approved by the student's supervisory committee;
3. demonstrating native speaker proficiency in a language approved by the student's supervisory committee;
4. earning a "B" (3.00) or higher in both ENG 530 Old English and ENG 531 Old English Literature or their equivalent.

**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 language and literature interact in the subdisciplines and within wider spheres of cultural authority. For more information about faculty publications and specializations, access the Web site at [www.asu.edu/clas/english/who/name.html](http://www.asu.edu/clas/english/who/name.html).

### ENGLISH (ENG)

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**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" (2.00) 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.

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#### **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.

**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. Topics may include the following:

- Feminist Political Writing in Contemporary Europe. (3)  
Examines the discourse of gender-politics in Central Eastern Europe before and after Soviet hegemony. Cross-listed as FLA 461. Credit is allowed for only ENG 429 or FLA 461.
- Literature and Film in 20th-Century Eastern Europe. (3)  
Evaluates literary texts and films as a massive propaganda machine of the totalitarian state. Cross-listed as FLA 476. Credit is allowed for only ENG 429 or FLA 476.
- Literature and Politics in Pre- and Post-Communist Europe. (3)  
Interdisciplinary examination of the cultures of Eastern Europe from WWI to the present. Cross-listed as FLA 472. Credit is allowed for only ENG 429 or FLA 472.
- Politics of Drama in 20th-Century Europe. (3)  
Interdisciplinary examination of European drama before and after WWII. Cross-listed as FLA 464. Credit is allowed for only ENG 429 or FLA 464.

**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.

## GRADUATE PROGRAMS AND COURSES

### **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. Topics may include the following:

- African American Short Story

### **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 470 Symbols and Archetypes in Children's Literature. (3)**

*fall*

Various critical approaches and recurring themes studied in relation to classical and contemporary children's literature. Lecture, discussion, reading. 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" (2.00) 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*

Studies the methods and practices of the disciplines within the Department of English. Offered in discipline-specific formats. Lecture, discussion.

### **ENG 502 Contemporary Critical Theories. (3)**

*once a year*

Studies the principles and techniques of contemporary theory and criticism.

### **ENG 503 Comparative Literature, Theory, and Practice. (3)**

*selected semesters*

Problems, methods, and principles of comparative analysis, illustrated by selected critical essays and literary/cultural texts. Lecture, discussion.

### **ENG 504 Cross-Cultural Studies. (3)**

*selected semesters*

Theoretical and analytical issues for comparative research across distinct cultural regions and traditions. May be repeated for credit when topics vary.

### **ENG 505 Writing Workshops. (3)**

*selected semesters*

Intense poetry and fiction workshops for experienced writers, emphasizing individual style. May be repeated for credit when topics vary. Studio.

### **ENG 506 Methods and Issues in Teaching Language. (3)**

*selected semesters*

Methods, issues, and practices in teaching appropriate content in language usage for junior and senior high schools.

### **ENG 507 Methods and Issues in Teaching Composition. (3)**

*fall and spring*

Up-to-date theory, practice, and implementation of secondary writing instruction. Prerequisites: teaching experience; instructor approval.

### **ENG 517 History of the English Language. (3)**

*selected semesters*

Surveys the development of the English language, with an emphasis on major linguistic transformations. Cross-listed as LIN 517. Credit is allowed for only ENG 517 or LIN 517.

### **ENG 530 Old English. (3)**

*selected semesters*

Study of Old English grammar, syntax, and phonology, with selected readings.

### **ENG 531 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 530.

### **ENG 532 Middle English Dialects. (3)**

*selected semesters*

Study of the principal dialects of Middle English, with selected readings. Prerequisite: graduate standing.

### **ENG 533 Studies in Medieval Literature. (3)**

*selected semesters*

Selected topics in English literature from the 11th through the 15th centuries. May be repeated for credit when topics vary. Prerequisite: graduate standing.

### **ENG 534 Studies in Renaissance Literature. (3)**

*selected semesters*

Selected topics and literary works studied in the contexts of English Renaissance culture. May be repeated for credit when topics vary.

### **ENG 535 Studies in 18th- and 19th-Century British Literature. (3)**

*selected semesters*

Selected topics, issues, figures, and genres in British literature and culture of the 18th and 19th centuries. May be repeated for credit when topics vary.

### **ENG 536 Studies in American Literature Before 1900. (3)**

*selected semesters*

Selected topics, issues, figures, and genres in 17th-, 18th-, and 19th-century American literature, including the literature of conquest and contact. May be repeated for credit when topics vary.

### **ENG 537 Studies in Modern and Contemporary British Literature. (3)**

*selected semesters*

Selected topics, issues, figures, and genres in British literature and culture after 1900. May be repeated for credit when topics vary.

**ENG 538 Studies in Modern and Contemporary American Literature. (3)***selected semesters*

Selected topics, issues, figures, and genres in American literature and culture after 1900. May be repeated for credit when topics vary.

**ENG 539 Studies in Modernist and Postmodernist Literature and Theory. (3)***selected semesters*

Selected topics in Modernist and Postmodernist studies. May include literary and theoretical texts. May be repeated for credit when topics vary.

**ENG 540 Issues in Teaching Literature to Adolescents. (3)***selected semesters*

Issues and new approaches in teaching contemporary literature in high school.

**ENG 542 Studies in North American Ethnic Literatures. (3)***selected semesters*

Selected works studied in their cultural contexts from authors representing ethnic experiences in the United States. May be repeated for credit when topics vary.

**ENG 543 Studies in Anglophone Literatures. (3)***selected semesters*

Selected topics, texts, periods, literary trends in works by world authors writing in English. May be repeated for credit when topics vary.

**ENG 544 Studies in Colonial and Postcolonial Literature. (3)***selected semesters*

Selected topics, periods, theories, and figures in works by authors representing colonial and postcolonial regions and/or experiences. May be repeated for credit when topics vary.

**ENG 545 Studies in Women's Literatures. (3)***selected semesters*

Selected topics, texts, periods, and figures in works written by and/or about women, studied in their cultural contexts. May be repeated for credit when topics vary.

**ENG 546 Gender Studies. (3)***selected semesters*

Selected topics, periods, and themes in the study of gender and sexuality, including attention to theoretical issues. May be repeated for credit when topics vary.

**ENG 550 Translation. (3)***selected semesters*

Surveys theories and practices of translation into English. Considers target, audience and market. May be repeated for credit when topics vary. Lecture, studio.

**ENG 551 Rhetorical Traditions. (3)***fall*

Examines rhetorical traditions spanning ancient to contemporary rhetorics. May be repeated for credit when topics vary. Lecture, discussion.

**ENG 552 Composition Studies. (3)***selected semesters*

Selected topics in the history and theories of composition. May be repeated for credit when topics vary. Lecture, discussion.

**ENG 553 Technologies of Writing. (3)***selected semesters*

Critical study and cultural analysis of information technologies and their effects on various writing practices. May be repeated for credit when topics vary.

**ENG 554 Rhetorics of Race, Class, and Gender. (3)***selected semesters*

Study of interdependent relationships of race, class, and gender in rhetorical constructions of self and community. May be repeated for credit when topics vary. Lecture, discussion.

**ENG 556 Theories of Literacy. (3)***once a year*

Examines various theories of literacy, their embedded values and assumptions, and their influences on academic scholarship and pedagogy. May be repeated for credit when topics vary. Lecture, discussion.

**ENG 560 Genre Studies. (3)***selected semesters*

Critical analysis and study of works from a single genre or comparative analysis and study of multiple genres. May be repeated for credit when topics vary.

**ENG 561 Film Studies. (3)***selected semesters*

Analysis and study of film genres, cinematic techniques, and problems of interpretation and representation. May be repeated for credit when topics vary.

**ENG 562 Forms of Poetry. (3)***selected semesters*

Types, history, criticism, and schools of theory of metrical form. Analyzes lyric, narrative, and dramatic poetry. May be repeated for credit when topics vary.

**ENG 563 Forms of Fiction. (3)***selected semesters*

Types, history, criticism, and schools of theory in the forms of fiction. Analyzes narrative and dramatic structure. May be repeated for credit when topics vary.

**ENG 580 Practicum. (1–12)***selected semesters***ENG 591 Seminar. (3)***fall and spring*

Selected topics regularly offered in 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***ENG 602 Advanced Studies in Theory and/or Criticism. (3)***selected semesters*

Seminar courses on the principles, strategies, and applications of critical, cultural, and/or literary theory and/or criticism. May be repeated for credit when topics vary.

**ENG 603 Advanced Studies in Comparative Literature. (3)***selected semesters*

Seminar courses on the problems, methods, and principles of comparative analysis. May be repeated for credit when topics vary.

**ENG 604 Interdisciplinary Cultural Studies. (3)***selected semesters*

Seminar courses on work from literature, anthropology, and/or other disciplines, with an emphasis on cultural influences and functions. May be repeated for credit when topics vary.

**ENG 606 Advanced Studies in English Education. (3)***once a year*

Current research, issues, and trends in English education. May be repeated for credit when topics vary.

**ENG 632 Advanced Studies in Medieval and Renaissance Literature and Culture. (3)***selected semesters*

Seminar in works of the Medieval or Renaissance periods, studied in their cultural contexts. May be repeated for credit when topics vary.

**ENG 635 Advanced Studies in British Literature. (3)***selected semesters*

Seminar courses on works produced in or about England, Scotland, and Wales, studied in their cultural contexts. May be repeated for credit when topics vary.

**ENG 636 Advanced Studies in American Literature. (3)***selected semesters*

Seminar courses on works produced in or about the United States, studied in their cultural contexts. May be repeated for credit when topics vary.

**ENG 639 Advanced Studies in Modernism and Postmodernism. (3)***selected semesters*

Seminar courses on topics in Modernist and Postmodernist studies. May include literary and theoretical texts. May be repeated for credit when topics vary.

## GRADUATE PROGRAMS AND COURSES



Lattie F. Coor Hall, which opened in January 2004, is named in honor of the university's 15th president.

Tim Trumble photo

### **ENG 642 Advanced Studies in Ethnic, Anglophone, or Post-Colonial Literatures. (3)**

*selected semesters*

Seminar courses that consider the influence of cultural or geopolitical developments on the production and circulation of texts. May be repeated for credit when topics vary.

### **ENG 645 Advanced Studies in Gender Issues. (3)**

*selected semesters*

Seminar courses that consider the influence of gender on the production and circulation of texts. May be repeated for credit when topics vary.

### **ENG 651 Advanced Studies in History and Theories of Rhetoric. (3)**

*selected semesters*

Selected topics in the history and/or theory of rhetoric. May be repeated for credit when topics vary.

### **ENG 652 Advanced Composition Studies. (3)**

*selected semesters*

Selected topics on particular composition theories, practices, pedagogies, and figures. May be repeated for credit when topics vary.

### **ENG 654 Advanced Studies in Rhetoric, Writing, Technology, and Culture. (3)**

*selected semesters*

Advanced study of theoretical, methodological, and pedagogical issues concerning the interrelationships among rhetoric, culture, writing, and writing technologies. May be repeated for credit when topics vary. Seminar.

### **ENG 655 Disciplinary Discourses. (3)**

*selected semesters*

Investigation of professional and disciplinary issues related to English studies. May be repeated for credit when topics vary. Cross-listed as LIN 655. Credit is allowed for only ENG 655 or LIN 655.

### **ENG 656 Studies in Cross-Cultural Discourse. (3)**

*selected semesters*

Theoretical and methodological issues in the comparative study of discourses between cultures and communities of practice. May be repeated for credit when topics vary. Seminar. Cross-listed as LIN 656. Credit is allowed for only ENG 656 or LIN 656.

### **ENG 661 Advanced Studies in Film. (3)**

*selected semesters*

Seminar courses on topics, genres, and figures in film studies, including technical and theoretical issues. May be repeated for credit when topics vary.

### **ENG 662 Poetic Genres. (3)**

*selected semesters*

Creative writing courses in the long poem, the erotic image, death and transfiguration, reading and influence, and others. May be repeated for credit when topics vary.

### **ENG 663 Fiction Genres. (3)**

*selected semesters*

Creative writing courses in time and fiction, gothic fiction, myth in fiction, science fiction, and others. May be repeated for credit when topics vary.

### **ENG 664 Mixed Genres. (3)**

*selected semesters*

Creative writing courses in the prose poem, magical realism, the literature of obsession. May be repeated for credit when topics vary.

### **ENG 665 Creative Methods. (3)**

*selected semesters*

Creative writing courses in theory of the novel, poetics, story into film, and others. May be repeated for credit when topics vary.

### **ENG 667 Issues in the Writing Professions. (3)**

*selected semesters*

Focuses on career preparation, resources, the role of writing in the community, creative writing, and the Internet. May be repeated for credit when topics vary.

### **ENG 680 Practicum. (1–12)**

*fall, spring, summer*

Topics may include the following:

- First Book Seminar/Applied Project. (3–6)

### **ENG 792 Research. (1–15)**

*selected semesters*

### **ENG 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.

## LINGUISTICS (LIN)

### **LIN 500 Research Methods. (3)**

*fall*

Studies the methods and practices of the disciplines within the Department of English. Offered in discipline-specific formats. Lecture, discussion.

### **LIN 510 Linguistics. (3)**

*fall*

Overview of linguistics, its subfields, and some of its applications.

### **LIN 511 Phonetics and Phonology. (3)**

*spring*

Current trends in phonological theory and its basis in acoustic and articulatory phonetics. Prerequisite: LIN 510.

### **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 structures using a generative theoretical model with a focus on English. Prerequisite: LIN 510 or instructor approval.

### **LIN 515 American English. (3)**

*spring*

Development of the English language in America, including regional and social varieties, and its relationship to other immigrant and native languages.

**LIN 516 Pragmatics and Discourse Analysis. (3)**

*fall*

Studies language use in context and language structures in spoken and written texts. Prerequisite: LIN 510 (or its equivalent) or instructor approval.

**LIN 517 History of the English Language. (3)**

*selected semesters*

Surveys the development of the English language, with an emphasis on major linguistic transformations. Cross-listed as ENG 517. Credit is allowed for only ENG 517 or LIN 517.

**LIN 520 Second Language Acquisition Theories. (3)**

*fall*

Theories of second language acquisition, including the linguistic, cognitive, and sociocultural aspects.

**LIN 521 Methods of Teaching 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 520 or instructor approval.

**LIN 522 Grammar for TESL. (3)**

*selected semesters*

Survey of major grammatical structures in English and how they can be taught to ESL speakers. Prerequisite: LIN 510.

**LIN 523 Language Testing and Assessment. (3)**

*selected semesters*

Introduction to the theory and practice of language test construction. Prerequisite: LIN 520 or instructor approval.

**LIN 524 Curriculum Design and Materials Development. (3)**

*once a year*

Practical guide to curriculum and materials development. Lecture, studio. Prerequisite: LIN 520 or instructor approval.

**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*

**LIN 610 Advanced Studies in Linguistics. (3)**

*selected semesters*

Different topics such as morphology, semantics, typology, history of linguistics. May be repeated for credit when topics vary.

**LIN 614 Advanced Studies in Syntax. (3)**

*selected semesters*

Focuses on morphosyntactic feature checking, movement, phrase structure, and their crosslinguistic differences. May be repeated for credit when topics vary.

**LIN 615 Advanced Studies in Sociolinguistics. (3)**

*selected semesters*

Language in its social setting, e.g., social variation among native speakers, sociolinguistics aspects of second language acquisition, and language policy. May be repeated for credit when topics vary.

**LIN 616 Advanced Studies in Discourse Analysis. (3)**

*selected semesters*

Advanced analysis of spoken and written discourse emphasizing different methodological and theoretical issues. May be repeated for credit when topics vary.

**LIN 617 Advanced Studies in Historical Linguistics. (3)**

*selected semesters*

Overview of theories on language change, the history of languages, and of methods in historical linguistics. May be repeated for credit when topics vary.

**LIN 620 Advanced Studies in Second Language Acquisition. (3)**

*selected semesters*

Selected topics in second language acquisition, such as phonetics and phonology, morphology, syntax, and discourse. May be repeated for credit when topics vary.

**LIN 655 Disciplinary Discourses. (3)**

*selected semesters*

Investigation of professional and disciplinary issues related to English studies. May be repeated for credit when topics vary. Cross-listed as ENG 655. Credit is allowed for only ENG 655 or LIN 655.

**LIN 656 Studies in Cross-Cultural Discourse. (3)**

*selected semesters*

Theoretical and methodological issues in the comparative study of discourses between cultures and communities of practice. May be repeated for credit when topics vary. Seminar. Cross-listed as ENG 656. Credit is allowed for only ENG 656 or LIN 656.

**LIN 792 Research. (1–15)**

*selected semesters*

**LIN 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.

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## Environmental Design and Planning

### Interdisciplinary Doctoral Program

[www.asu.edu/caed/PHD.html](http://www.asu.edu/caed/PHD.html)

480/965-4620

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**K. David Pijawka, Director, Executive Committee**

**Applied Biological Sciences (ASU East)**

Professors: Brady, Brock, Mushkatel

Associate Professors: Green, Miller, Whyson

**Architecture**

Professors: Bryan, Ozel

Associate Professors: Ellin, Zygas

Assistant Professors: Hejduk, Kobayashi, Lerum

**Design**

Professors: Brandt, Giard

Assistant Professors: Bender, McCoy, Thibeau Catsis

**Planning and Landscape Architecture**

Professors: Kihl, Lai, Pijawka

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

Assistant Professor: Crewe

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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.

## GRADUATE PROGRAMS AND COURSES

For more information, access the program Web site at [www.asu.edu/caed/PHD.html](http://www.asu.edu/caed/PHD.html), or send e-mail to [caed.phd@asu.edu](mailto: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 experience for students wishing to pursue careers in academe and in industry as members of interdisciplinary design and planning teams on environmental and energy issues, as well as for those wishing to teach in the architecture, design, or planning fields.

#### Areas of Concentration

The Ph.D. degree in Environmental Design and Planning offers concentrations in the following areas based on the research and teaching expertise of participating faculty.

**Design.** Design—microscale issues in the designed environment—includes the study of architecture, building science, graphic design, industrial design, interior design, and landscape architecture. Research fields include acoustics, affordable housing, climate-responsive building, computer-aided design, energy modeling, exhibit design, facilities planning and management, fire protection, human factors in design, industrialized housing, landscape architecture, lighting, passive solar energy and conservation, and site planning and wayfinding.

**History, Theory, and Criticism.** History, theory, and criticism—cultural and theoretical issues in the history of the environment—includes the study of architecture, environmental planning, industrial design, interior design, landscape architecture, and urbanism. Research fields include study of the arts and crafts movement, contemporary criticism and analysis, design theories and methods, history of architecture and design, history of building science, history of city planning, and landscape theory and criticism.

**Planning.** Planning—macroscale issues in the planned environment—includes the study of environmental resource management, landscape architecture, planning, and urban design. Research fields include contemporary urban design, economic development, environmental assessment, environmental planning, ethics in planning, housing and urban development, international development planning, landscape ecology, legal aspects of planning, planning for ethnically diverse populations, the protection of environmentally sensitive areas, public participation, social dimensions of planning, urban design policy, urban planning, and urban and regional development.

**Admission Requirements.** Students are admitted to the Ph.D. program only upon completion of a master's degree in architecture, environmental resources, design, landscape architecture, or planning or upon the demonstration of equivalent standing.

In addition to meeting Graduate College admission requirements, applicants must submit the following to:

PH.D. PROGRAM IN ENVIRONMENTAL DESIGN  
AND PLANNING  
COLLEGE OF ARCHITECTURE AND  
ENVIRONMENTAL DESIGN  
ARIZONA STATE UNIVERSITY  
PO BOX 871905  
TEMPE AZ 85287-1905

1. a minimum of three letters of reference;
2. a sample of written work and any other evidence relevant to admission to the program;
3. a statement of purpose (summarizing career objectives, the reasons for pursuing a doctoral education, an indication of the proposed area of concentration, and a potential mentor in the College of Architecture and Environmental Design); and
4. Graduate Record Examination (GRE) scores.

A Test of English as a Foreign Language score of at least 600 is required of all applicants whose native language is not English. International applicants who are interested in receiving funding as Teaching Associates (TAs), must also submit a Test of Spoken English (TSE) score of at least 50.

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 degree 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 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 commit-

tee 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](http://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)

*spring*

Introduces the philosophy and methodology of interdisciplinary research in environmental design and planning. Seminar. Fee.

##### EPD 710 Current Research in Design. (3)

*fall*

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)

*fall*

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)

*fall*

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*

## GRADUATE PROGRAMS AND COURSES

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.

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### Environmental Planning

#### Master’s Program

[www.asu.edu/caed](http://www.asu.edu/caed)

480/965-7167

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**Hemalata Dandekar, Director, School of Planning and Landscape Architecture**

**Professors:** Dandekar, Kihl, Lai, Mushkatel, Pijawka

**Associate Professors:** Cameron, Cook, Fish Ewan, Guhathakurta, Kim, Yabes

**Assistant Professors:** Crewe, Ewan

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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 that 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. Students have 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 ASU academic units 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 Graduate College. For spring enrollment, application materials are due on October 15. However, applicants who submit their materials after the semester deadline are 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.



**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. Students must also select a capstone studio, professional project, or a thesis option. All students are expected to have taken at least one course in statistics. Inquiries about 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.

For more information about the School of Planning and Landscape Architecture research activities, access the school’s Web site at [www.asu.edu/caed/SPLA](http://www.asu.edu/caed/SPLA).

**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)**

*fall and 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.

## GRADUATE PROGRAMS AND COURSES

### **PUP 525 Urban Housing Analysis. (3)**

*fall*

Nature, dimensions, and problems of urban housing, government policy environment, and underlying economics of the housing market.

### **PUP 531 Planning and Development Control Law. (3)**

*spring*

Case studies on police power, eminent domain, zoning, subdivision controls, exclusion, preservation, urban redevelopment, and aesthetic and design regulation.

### **PUP 532 Advanced Urban Planning Law. (3)**

*spring*

Advanced study on selected issues in planning law, such as urban design controls, exclusionary practices, compensable regulation, and tax policy. Prerequisite: PUP 432 or instructor approval.

### **PUP 542 Environmental Administration and Planning. (3)**

*spring*

Environmental administration of policies and their relationship to environmental planning practices. Prerequisite: PUP 442.

### **PUP 544 Urban Land Use Planning. (3)**

*spring*

Theory and methods of urban land use planning, including the rational planning process, comprehensive, functional, and neighborhood plans. Pre- or corequisite: PUP 501 or instructor approval.

### **PUP 546 Urban Design Policy. (3)**

*selected semesters*

Advanced study of local, state, and federal urban design policy. Prerequisite: PLA 420 or PUP 420.

### **PUP 561 Urban Design Studio. (4)**

*selected semesters*

Current urban form and urban landscape design problems within the Phoenix-centered region. Studio.

### **PUP 572 Planning Studio I: Data Inventory and Analysis. (4)**

*fall*

Comprehensive planning workshop dealing with real community problems. Focuses on the data gathering and analysis steps of the planning process. Fee. Prerequisite: Master of Environmental Planning major or instructor approval.

### **PUP 574 Planning Studio II: Options and Implementation. (4)**

*spring*

Comprehensive planning workshop dealing with real community problems. Focuses on the development of options, plan making, and plan implementation. Studio. Fee. Prerequisite: PUP 572 or instructor approval.

### **PUP 575 Environmental Impact Assessment. (3)**

*spring*

Criteria and methods for compliance with environmental laws; develops skills and techniques needed to prepare environmental impact statements/assessments.

### **PUP 576 GIS Studio. (3)**

*spring*

GIS as a tool to address large, multifaceted planning problems. Prerequisites: a combination of GPH 373 (or 598) and PAF 591 and PUP 322 or only instructor approval.

### **PUP 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:

- 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.

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## Exercise and Wellness

### Master's Program

[www.east.asu.edu/ecollege/wellness](http://www.east.asu.edu/ecollege/wellness)

480/727-1945

EAW 109

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William J. Stone, Chair

**Professors:** Burkett, Stone

**Associate Professors:** Phillips, Swan

**Assistant Professors:** Adams, Tudor-Locke

**Lecturer:** Woodruff

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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 179.

### 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)

*fall*  
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. Integrated 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 540 Psychosocial Issues in Exercise and Wellness: Stress, Coping, and Resilience. (3)

*fall*  
Critically explores the impact of psychological and social factors on human wellness. Lecture, seminar, group discussion.

### 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.

## GRADUATE PROGRAMS AND COURSES

### 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.

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## Exercise Science

### Interdisciplinary Doctoral Program

[espe.la.asu.edu/PhDprog.htm](http://espe.la.asu.edu/PhDprog.htm)

480/965-7906

PEBW M201

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### Daniel Landers, Interim Chair, Department of Kinesiology

#### Bioengineering

Professor: He

Associate Professor: Sweeney

#### Kinesiology

Regents' Professor: Landers

Professors: Matt, Stelmach

Associate Professors: Hinrichs, Morgan, Treasure, Willis

Assistant Professors: Etnier, Ringenbach, Santello

#### Life Sciences

Professors: Harrison, Satterlie

#### Psychology

Professors: Karoly, Linder

Associate Professor: McBeath

Assistant Professors: E. Amazeen, P. Amazeen

#### Psychology in Education

Regents' Professor: Glass

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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 December 1.

**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 graduate studies. 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 graduate studies 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, Kinesiology, and Psychology. A limited number of applicable courses are also available through other departments.*

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**Family and Human Development**

**Master's Program**

[www.asu.edu/clas/fhd](http://www.asu.edu/clas/fhd)

480/965-6978

COWDN 106

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**Richard A. Fabes, Chair**

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

**Associate Professors:** Dumka, Hanish, Madden-Derdich, Neff, Updegraff

**Assistant Professors:** Gager, Liu, Spinrad, Valiente

**Senior Lecturers:** Bodman, Weigand

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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 degree 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 the AAMFT accreditation standards and 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. For more information, access the Web site at [www.asu.edu/clas/fhd](http://www.asu.edu/clas/fhd).

In addition, FHD faculty research focuses on topics related to family and marital functioning. Specific areas

## GRADUATE PROGRAMS AND COURSES

include marital interaction, parenting and parent-child relationships, sexuality, dating relationships, family diversity, approaches to marital and family therapy, divorce, step families, and public policy. Research topics related to children, adolescents, and infants include the development of emotion, gender-role development, early intervention for children who are biologically or socially at risk, the factors that promote positive infant development, the causes and treatment of childhood autism, sibling and peer relationships, and how family relationships influence childhood development. Strong emphasis is placed on the acquisition of sophisticated theoretical, methodological, and statistical skills necessary to conduct and evaluate basic and applied research.

### CHILD DEVELOPMENT (CDE)

#### **CDE 430 Infant/Toddler Development in the Family. (3)**

*fall and spring*

Examines the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 (or its equivalent).

#### **CDE 437 Infant Family Assessment and Observation. (3)**

*fall*

Examines strategies for implementing developmental assessments and observations of young children and their families. Cross-listed as SWU 437. Credit is allowed for only CDE 437 or SWU 437. Prerequisite: CDE 232 or SWU 301 (or their equivalents).

#### **CDE 444 Risk and Variation in Child Development. (3)**

*fall and spring*

Impact that constitutional and environmental risk factors have on young children and their families. Cross-listed as SWU 446. Credit is allowed for only CDE 444 or SWU 446. Prerequisite: CDE 232 or SWU 331 (or their equivalents).

#### **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 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.

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## Family Science

### Doctoral Program

[www.asu.edu/clas/fhd](http://www.asu.edu/clas/fhd)

480/965-6978

COWDN 106

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#### Richard A. Fabes, Chair

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

**Associate Professors:** Dumka, Hanish, Madden-Derdich, Updegraaf

**Assistant Professors:** Gager, Liu, Spinrad, Valiente

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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 (MFT courses—postbaccalaureate only),
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 minimum of 14 semester hours (postbaccalaureate) is required in clinical supervision and practicum. Students must remain enrolled continuously in practicum until they have completed 500 client contact hours and 100 hours of clinical supervision.

**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 221.*

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## Fine Arts

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

### COLLEGE OF FINE ARTS (CFA)

#### **CFA 522 Concepts in Collaborative Multimedia. (3)**

*spring*

Designed to bring students from different disciplines throughout the Katherine K. 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.

#### **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.

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## French

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See “Languages and Literatures,” page 253.

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## Geographic Information Science

### Interdisciplinary Certificate Programs

[www.asu.edu/giscert](http://www.asu.edu/giscert)

480/727-7360

LSE 218

480/727-1288

QUAD 2 114

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**John M. Briggs, Director, Executive Committee**

**William Miller, Director, Executive Committee**

#### **Geography**

Professor: Burns

Associate Professor: Wentz

#### **Life Sciences**

Professor: Klopatek

Associate Professor: Briggs

#### **Planning and Landscape Architecture**

Associate Professor: Guhathakurta

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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](http://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.

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## Geographic Information Systems

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See “Master of Advanced Study,” page 225.



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## Geography

### Master's and Doctoral Programs

[geography.asu.edu](http://geography.asu.edu)

480/965-7533

SCOB 330

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#### Richard J. Aspinall, Chair

**Professors:** Arreola, Aspinall, Balling, Brazel, Burns, Cerveny, Dorn, Gober, Ó hUallacháin, Pasqualetti, Zehnder

**Associate Professors:** Ellis, Fall, Kuby, McHugh, Wentz

**Assistant Professors:** Edsall, Keys, Li, Lukinbeal, Schmeeckle

**Lecturer:** Shaeffer

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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 189, 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)	
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.

### MASTER OF ADVANCED STUDY

The Master of Advanced Study (M.A.S.) degree in Geographic Information Systems (GIS) program is a compact one-year nonthesis degree fostering advanced study in management and the use of GIS technology in public and corporate environments. The degree meets important educational needs of working professionals and recent college graduates seeking to improve their career standing. The program provides a comprehensive professional degree that balances work in the theoretical aspects of GIS, the technical side of the discipline, and the applications domain. Students are exposed to cutting edge technology, management theory and practice, and several societal dimensions associated with the application of GIS technology. Courses are held in the evenings and on weekends, the curriculum is highly adaptable to the work environment, and thus the M.A.S. degree is achievable in a one-year time period.

**Admission.** In addition to ASU Graduate College standards, prospective students seeking the degree must (1) have successfully completed a bachelor's degree in a related area with a minimum GPA of 3.00 (4.00 scale) or (2) demonstrate a minimum of three years of related professional experience and the successful completion of a bachelor's degree in an unrelated area as determined by the M.A.S.-GIS Steering Committee. Applicants must submit two letters indicating support from any combination of current/former instructors, supervisors, or professionals currently employed within GIS or a related discipline. Applicants must prepare a formal, written statement regarding relevant academic experience, professional experience, and overall interest in GIS. Application materials for the coming academic year are accepted and reviewed on a rolling basis until June 30. Applicants are notified of their status within six weeks of receipt of their application materials.

**Program of Study.** Enrolling students must complete three sequential semesters of course work totaling 30 semester hours. The first semester, offered during the fall, is composed of six two-semester-hour modules (12 hours total). Each module has a minimum of 30 hours of instructor contact time and 60 hours of out-of-class assignments; each module lasts two weeks. Students in the spring semester must complete one mandatory and three elective 15-week

## GRADUATE PROGRAMS AND COURSES

advanced courses, each worth three semester hours (12 hours total). During the final semester, offered through the eight-week summer session, students must complete six semester hours of internship in a GIS or closely allied position approved by the M.A.S.-GIS Steering Committee.

### 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).

**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.

**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)

*selected semesters*

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)

*selected semesters*

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)***selected semesters*

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)***selected semesters*

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)***once a year*

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. Prerequisite: 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)***selected semesters*

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)***selected semesters*

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)***selected semesters*

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)***selected semesters*

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)***once a year*

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***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 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

## GRADUATE PROGRAMS AND COURSES

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:

- Energy and Environment  
Fee.

### **GPH 599 Thesis. (6)**

*fall and spring*

### **GPH 601 Introduction to Geographic Information Systems. (2)**

*fall*

Introduces GIS theory and practice for professionals. Module 1 of the fall semester for M.A.S.-GIS professional degree program. Lecture, lab. Prerequisite: acceptance into the M.A.S.-GIS program.

### **GPH 602 Intermediate GIS. (2)**

*spring*

Intermediate GIS for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 601.

### **GPH 603 Spatial Statistics and Modeling. (2)**

*fall*

Spatial statistics and modeling for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 602.

### **GPH 604 GIS Implementation in the Corporate and Public Sectors. (2)**

*fall*

Uses GIS in the corporate and public sectors. GIS ethics. Required for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 603.

### **GPH 605 GIS Project: Real-World GIS Project Planning and Implementation for Public Sector Agencies. (2)**

*fall*

GIS project development for the public sector. Required for the M.A.S.-GIS program. Lecture, lab. Prerequisite: GPH 604.

### **GPH 606 GIS Project Presentation. (2)**

*fall*

Mastering technical project presentation for GIS professionals. Required for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 605.

### **GPH 610 Programming the GIS Environment. (3)**

*spring*

Programming the GIS environment for the M.A.S.-GIS program. Required for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 606.

### **GPH 620 Remote Sensing. (3)**

*spring*

Remote sensing for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 606.

### **GPH 630 Air Photo Interpretation for M.A.S.-GIS. (3)**

*spring*

Air photo interpretation for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 606.

### **GPH 640 GIS for Business. (3)**

*spring*

Uses GIS in business for the M.A.S.-GIS program. Lecture, hands-on training. Prerequisite: GPH 606.

### **GPH 650 GIS for the Internet. (3)**

*spring*

GIS for the Internet. Lecture, hands-on training. Prerequisite: GPH 606.

### **GPH 684 M.A.S.-GIS Internship. (6)**

*summer*

Internship for the M.A.S.-GIS program. Prerequisite: instructor approval.

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see [“Omnibus Courses,” page 50.](#)

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## Geological Sciences

### Master's and Doctoral Programs

[geology.asu.edu](http://geology.asu.edu)

480/965-5081

PS F686

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### James A. Tyburczy, Chair

**Regents' Professors:** Buseck, Christensen, Greeley

**Edgar and Helen Korrick Presidential Professor:**  
Christensen

**Dee and John Whiteman Dean's Distinguished  
Professor:** Leshin

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

**Associate Professors:** Anbar, Arrowsmith, Leshin, Sharp

**Assistant Professors:** Clarke, Fouch, Garner, Hartnett,  
Semken

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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 189](#), 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 287](#), 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.

### 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.

*Biogeochemistry.* Sources, cycles, and fates of biogenic elements; cycles of metals and trace nutrients; signatures of microbial life preserved in the rock record; organic geochemistry; microbial geochemistry; combining genomics and proteomics with geochemical processes; subsurface biosphere; hydrothermal ecosystems; abiotic organic syn-

thesis; development of sensors for continuous observation of biogeochemical reactions; application of thermodynamics to bioenergetics; impact of human activities on natural biogeochemical processes; urban biogeochemical fluxes and processes; dynamics of transport of organic compounds, nutrients, and cells; life detection; habitability; astrobiology; characterization of dissolved organic matter in aquatic and marine systems; bioavailability of dissolved organic compounds in surface waters; electrospray-ionization mass spectrometric methods for quantifying dissolved organic compounds; correlation of in situ rates of geochemical processes; and molecular measures of microbial genetic expression.

*Geochemistry.* Isotope geochemistry; environmental and aqueous geochemistry; geochemistry and microbiology of hydrothermal systems; paleoclimate records; thermodynamics of fluid-mineral interfaces; synchrotron-based X-ray spectroscopies; secondary ion mass spectrometry; analytical and theoretical chemical studies of meteorites with application to Mars and early solar system evolution; geochemical exploration for ore deposits; trace element partitioning between minerals, fluids, and magmas; atmospheric geochemistry; paleoceanography; and stable isotopic applications in geobiology.

*Geomorphology.* Fault zone landforms and structure; earthquake surface rupture and paleoseismology; theoretical studies of faulting and hillslope development; engineering geologic field methods.

*Geophysics.* Seismology; mantle anisotropy; core-mantle boundary region; geodynamics, mantle flow and rheology; seismotectonics; earthquake surface rupture and paleoseismology; environmental geophysics; high pressure experimental geophysics; mantle structure; physics and chemistry of earth and planetary interiors; thermal modeling of subduction zones.

*Geoscience Education.* Educational research on the learning and teaching of geoscience; studies of geoscience learning in the field, lab, classroom, and online environments; innovative teaching methods; applications of instructional technologies; design of competencies and assessment instruments; spatial and temporal visualization; place-based and culturally-mediated teaching; ethnogeology; mathematics in the geoscience curriculum; teacher preparation and enhancement; curriculum development; and geoscience reform.

*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

## GRADUATE PROGRAMS AND COURSES

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](http://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 Astron-

omy, 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 ( $\leq 1.7$  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.

**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 404 Fundamentals of Planetary Geology. (3)

*fall*

Surveys planetary topics, including impacts, tectonics, and volcanism on planetary objects, and use of spacecraft data, including geological mapping. Lectures, problem sets, weekend field trip. Fee. Prerequisite: Geology major or degree or instructor approval.

#### 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. Fee. Prerequisites: GLG 310, 321.

**GLG 452 Field Geology II. (3)***summer*

Continuation of GLG 451. Lab. Fee. 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 460 Astrobiology. (3)***fall and spring*

Origin, early evolution, distribution, and future of life on Earth and elsewhere in the cosmos. May be repeated for credit. Lecture, discussion, video conferences, possible field trips. Cross-listed as AST 460/

BIO 460/CHM 483/MIC 475. Credit is allowed for only AST 460 or BIO 460 or CHM 483 or GLG 460 or MIC 475. Prerequisite: 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.

## GRADUATE PROGRAMS AND COURSES

### **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.

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## German

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See "Languages and Literatures," page 253.

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## Gerontology

### Interdisciplinary Certificate Program

[www.west.asu.edu/chs/grn](http://www.west.asu.edu/chs/grn)

602/543-6642

FAB S121

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Richard Gitelson, Director

### **American Studies (ASU West)**

Associate Professor: Hattenhauer

### **Anthropology (ASU Main)**

Professor: Carr

### **Communication (ASU Main)**

Professor: Arnold

### **Communication Studies (ASU West)**

Professor: V. Waldron

Associate Professors: Di Mare, Kelley

### **Design (ASU Main)**

Associate Professor: Cutler

### **Economics (ASU Main)**

Professor: Hogan

### **Education (ASU West)**

Associate Professor: Achilles

### **English (ASU Main)**

Professor: Kehl

### **Exercise and Wellness (ASU East)**

Associate Professors: Phillips, Swan

### **Geography (ASU Main)**

Associate Professor: McHugh

### **Gerontology (ASU West)**

Lecturer: K. Waldron

### **Health Administration and Policy (ASU Main)**

Professor: Schneller

### **History (ASU Main)**

Professor: Gratton

### **Kinesiology (ASU Main)**

Regents' Professor: Landers

Professor: Stelmach

Assistant Professor: Etnier

### **Marketing (ASU Main)**

Associate Professor: Stephens

### **Music (ASU Main)**

Professor: Crowe

Assistant Professor: Rio



**Nursing (ASU Main)**

Professor: Komnenich  
Associate Professors: Killeen, McCarthy

**Nutrition (ASU East)**

Professor: Vaughan  
Assistant Professor: Woolf

**Psychology (ASU Main)**

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

**Psychology in Education (ASU Main)**

Professor: Strom

**Recreation and Tourism Management (ASU West)**

Professors: Gitelson, Knopf, Searle

**Social and Behavioral Sciences (ASU West)**

Professors: McGovern, Nájuez  
Associate Professor: Bureson  
Assistant Professors: Anastasi, Carter

**Social Work (ASU Main)**

Assistant Professor: Kang

**Social Work (ASU West)**

Associate Professor: Fitzpatrick  
Assistant Professors: Bushfield, McCabe  
Lecturer: Ealy

**Sociology (ASU Main)**

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

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The Gerontology Program is a university-wide, multidisciplinary program designed so that students may take course work at any of the four ASU campuses and apply it toward the graduate Certificate in Gerontology. The program has an affiliated faculty of more than 50 members housed in 25 different departments throughout the university. Courses related to aging are taught by faculty who are active contributors to research, theory, and public policy and practice.

Program activities are designed for students who wish to study the psychological, sociological, biological, and policy-related aspects of aging, as well as for those interested in the health, economic, and social concerns of older people. Students study the aging process from multiple perspectives and develop knowledge and skills to prepare them for careers in an aging society. Students may also gain practical experience in working with older adults through field-based experiences and internships.

Since older Americans are becoming an increasing percentage of the population, there is a growing need for professionals with gerontology expertise. This is especially the case in Arizona due to the large number of retirement communities located here. Careers are available in a broad range of fields, including recreation, social work, nursing, counseling, public policy, and long-term care administration.

**Certificate in Gerontology**

An interdisciplinary, 21-semester-hour Certificate in Gerontology, administered by the Committee on Gerontology, is open to individuals with an earned baccalaureate degree. Students enrolled in the certificate program may simultaneously pursue a major in an academic unit offering a graduate degree or may enter the program as nondegree graduate students.

The course work is composed of six semester hours of required courses, a capstone experience, and 12 hours of aging-related elective courses chosen in consultation with an advisor. For more information on program requirements, contact the Gerontology Program office.

For more information, call 602/543-6642, or access the program Web site at [www.west.asu.edu/chs/grn](http://www.west.asu.edu/chs/grn).

**GERONTOLOGY (GRN)****ASU Main and West****W GRN 400 Perspectives on Aging. (3)**

*selected semesters*

Multidisciplinary introduction to the study of aging in individuals, families, and society. Cross-listed as W SOC 400. Credit is allowed for only W GRN 400 or W SOC 400.

**W GRN 420 Health Aspects of Aging. (3)**

*spring*

Examines biological, social, and behavioral aspects of health in the later years. Considers the organization and delivery of care.

**M GRN 450 Biology of Aging. (3)**

*selected semesters*

Examines normal biological aging and changes in functional capabilities in the elderly. Lecture, lab.

**M GRN 530 Multidisciplinary Approaches to Gerontology. (3)**

*selected semesters*

Examines literature that each discipline brings to the study of gerontology. Covers both theory and practice. Lecture, discussion.

**M GRN 531 Caregiving. (3)**

*selected semesters*

Examines theory and practice of caregiving for the senior population. Lecture, discussion.

**M GRN 540 Aging and Wellness. (3)**

*selected semesters*

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.

**M GRN 550 Biology of Aging. (3)**

*selected semesters*

Examines normal biological aging and changes in functional capabilities in the elderly. Lecture, lab.

**M GRN 560 Alzheimer's and Related Dementias. (3)**

*selected semesters*

Familiarization with Alzheimer's disease and related dementias from a caregiver's perspective. Lecture, lab.

**M/W GRN 584 Graduate Internship. (3–6)**

*fall, spring, summer*

**M/W GRN 590 Graduate Reading and Conference. (3)**

*fall, spring, summer*

**M/W GRN 591 Graduate Seminar. (1–6)**

*fall and spring*

**M/W GRN 598 Special Topics. (3)**

*selected semesters*

Selected topics in gerontology.

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

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## Health Industry Leadership

### Graduate Certificate Program

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For information on the new Graduate Certificate in Health Industry Leadership, call the School of Health Management and Policy at 480/965-7778.

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## Health Sector Management

### Master's Program

[wpcarey.asu.edu/mba/ft\\_mhsm/mhsm\\_info.cfm](http://wpcarey.asu.edu/mba/ft_mhsm/mhsm_info.cfm)

480/965-7778

BA 318

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Jeffrey R. Wilson, Director

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

**Assistant Professor:** Rivers

**Clinical Professor:** Warne

**Associate Research Professor:** Schwenke

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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 Sector Management. This degree is offered only in conjunction with the M.B.A.

### MASTER OF HEALTH SECTOR MANAGEMENT

The M.B.A./M.H.S.M. 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.M. 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 85. Applicants are required to submit evi-

dence 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, or write

EDUCATIONAL TESTING SERVICE  
ROSEDALE ROAD  
PRINCETON NJ 08541-6108

Students must apply separately to the M.B.A. and M.H.S.M. 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 includes the M.B.A. supplemental application, which contains a box that must be checked, indicating your interest in the M.H.S.M. degree program. In addition, applicants are required to submit a statement of personal objectives and a 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.M. 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.M. faculty member when the application file is complete. Materials describing the M.H.S.M. are available by calling 480/965-7778, accessing the Web site at [wpcarey.asu.edu/mba/asu\\_mba\\_day.cfm](http://wpcarey.asu.edu/mba/asu_mba_day.cfm), 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.M. 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.M. degree.

**Thesis Requirements.** None.

### HEALTH SECTOR MANAGEMENT (HSM)

#### **HSM 502 Health Care Organization. (3)**

*once a year*

Concepts, structures, functions, and values that characterize contemporary health care systems in the United States.

#### **HSM 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: HSM 561 or a course in basic statistics.

#### **HSM 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: HSM 502.

#### **HSM 520 Pharmaceutical, Biotechnology, and Medical Technology Industries. (3)**

*once a year*

In-depth background on the pharmaceutical, biotechnology, and medical equipment industries. Negotiation of alliances among pharmaceutical and biotechnology firms and understanding of global health care markets. Prerequisite: HSM 502.

#### **HSM 522 Health Sector Information and Knowledge Management. (3)**

*once a year*

Information technology and knowledge management applications in the health sector, including care delivery and financing institutions and in the pharmaceutical and biotechnology industries. Prerequisites: HSM 505; QBA 502.

#### **HSM 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; HSM 502.

#### **HSM 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: HSM 505, 520.

#### **HSM 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.

#### **HSM 561 Biostatistics. (3)**

*fall*

Aspects of descriptive statistics and statistical inference most relevant to health issues, including data, rates, and confidence intervals.

#### **HSM 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.

#### **HSM 563 Economics for Public Health Management. (3)**

*fall*

Introduces concepts and methods used to direct and understand production and distribution of health care services.

#### **HSM 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.

#### **HSM 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.

#### **HSM 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.

#### **HSM 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.

#### **HSM 575 Chronic Care Administration. (3)**

*selected semesters*

Management of long-term care services and facilities, including behavioral health and rehabilitation programs.

#### **HSM 589 Integrative Seminar. (3)**

*fall, spring, summer*

Capstone assessment of current policies, problems, and controversies across the broad spectrum of health services administration. Prerequisites: HSM 505, 520, 522, 532.

#### **HSM 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)

#### **HSM 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.

#### **HSM 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](http://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,  
Ph.D., 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 “[Educational Leadership and Policy Studies](#),” page 193. 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 189.

### DOCTOR OF EDUCATION

Applicants for admission to the Doctor of Education program must submit scores on the GRE. For more information, see “[Doctor of Education](#),” page 190.

#### HED 689 Leadership in Higher Education. (3)

*fall*

Theory and practice of leadership and administration in higher education institutions.

## 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, faculty development, organizational influences on the community college, Hispanic studies, legal aspects of higher education, assessment and program evaluation, faculty diversity, women of color and leadership in higher education, quality approaches to policy research, 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 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 611 Curriculum and Instruction. (3)

*spring*

Curriculum development, instructional organization, and improvement of instruction in higher education. Prerequisite: HED 510.

#### HED 620 Diversity in Higher Education. (3)

*spring*

Overview of the demographic profile of college students, faculty, and staff. Addresses issues of access, retention, and development. Lecture, collaborative learning, group projects.

#### 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.

#### 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.

tion institutions.

**HED 691 Seminar. (1–12)***selected semesters*

Topics may include the following:

- Approaches to Higher Education Policy Research
- Critical Policy Issues in Higher Education. (3)
- Cultural Diversity in Education. (3)
- Information Technology
- Qualitative Case Study
- Special Policy Issues. (3)

**HED 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.

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## History

**Master’s and Doctoral Programs**

[www.asu.edu/clas/history/graduate/graduate.html](http://www.asu.edu/clas/history/graduate/graduate.html)

480/965-5778

COOR 4595

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Noel J. Stowe, Chair

**CORE FACULTY**

Regents’ Professor: Iverson

Professors: Adelson, Batalden, Burg, Davis, Fuchs, Gratton, Green, Hirt, Lavrin, MacKinnon, Rosales, Simpson, Stowe, Tillman, Warnicke

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

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

Senior Instructional Professional: Luey

**AFFILIATED FACULTY****Art**

Associate Professor: Brown

**Chicana and Chicano Studies**

Associate Professor: Escobar

**Humanities**

Associate Professor: Taylor

**Women’s Studies**

Professor: Rothschild

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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 recommendation from faculty members or others who are qualified to judge the applicant’s potential for advanced study in history; a résumé; a writing sample; and a statement of purpose.

Forms and instructions for filling them out are available from the graduate administrative assistant, the Graduate College Web site ([www.asu.edu/graduate](http://www.asu.edu/graduate)), and the Department of History Web site ([www.asu.edu/clas/history](http://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 238.

All applications and supporting materials are reviewed by the graduate committee of the department. The committee recommends to the Graduate College that the student be granted regular or provisional admission or be denied admission.

**Areas of Concentration.** In consultation with the supervisory committee, the candidate may select a field of history from the following: Asian, British, European, Latin American, public history, United States, and U.S. Western. For information on the concentration in public history, see “Public History Concentration,” page 238. 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

## GRADUATE PROGRAMS AND COURSES

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 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 319, 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

## GRADUATE PROGRAMS AND COURSES

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 443 The United States and Latin America. (3)**

*once a year*

Latin American struggle for diplomatic recognition, attempts at political union, participation in international organizations since 1810, and relations between the United States and Latin America.



**HST 445 20th-Century Cuba. (3)***once a year*

History of Cuba from colonial era to formation of the early republic; political, economic, social development in late 20th century. Lecture, discussion.

**HST 446 Colonial Mexico. (3)***once a year*

Political, economic, social, and cultural developments from pre-Columbian times to 1810.

**HST 447 Modern Mexico. (3)***once a year*

Political, economic, social, and cultural developments from 1810 to the present.

**HST 451 Chinese Cultural History. (3)***selected semesters*

China's classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought.

**HST 452 Chinese Cultural History. (3)***selected semesters*

Evolution of Confucian thought, its synthesis with Taoism and Buddhism, and modern reactions against, and uses of, Confucian traditions.

**HST 453 The People's Republic of China. (3)***selected semesters*

Analyzes major political, social, economic, and intellectual trends in China since the founding of the People's Republic in 1949.

**HST 455 The United States and Japan. (3)***fall*

Cultural, political, and economic relations in the 19th and 20th centuries. Emphasizes post-World War II period.

**HST 456 The Vietnam War. (3)***once a year*

Intersection of American and Asian histories in Vietnam, viewed from as many sides as possible.

**HST 460 History of Fire. (3)***fall*

Global survey of the natural and cultural history of fire. Lecture, discussion.

**HST 480 Methods of Teaching History: Classroom Resources. (3)***fall*

Methods in instruction, organization, and presentation of the subject matter of history and closely allied fields. Prerequisites: HST 300; ITC admission. Pre- or corequisites: SED 403, 598.

**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. Prerequisite: HST 480.

**HST 484 Internship. (1–6)***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 Investigation. (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)

## GRADUATE PROGRAMS AND COURSES

- 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.

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## History and Theory of Art

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See “Ph.D. in History and Theory of Art,” page 123.

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## Humanities

### Interdisciplinary Master’s Program

[www.asu.edu/clas/humanities](http://www.asu.edu/clas/humanities)

480/965-6747

LL 641

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Peter Lehman, Director

#### Humanities

Professors: Kugelmass, Lehman

Associate Professors: Baker, Privateer, Taylor

Assistant Professors: Duncan, Lund, Romeyn

#### Languages and Literatures

Regents’ Professor: Foster

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The Graduate Committee on Humanities offers an interdisciplinary program leading to the M.A. degree in Humanities. One of the unique features of this interdisciplinary program is that, because it uses faculty research/teaching interests from a number of disciplines, a student may tailor a course of study to fit individual needs and goals. The committee is chaired by Humanities core faculty and may

include members from several departments. At the same time, the individualized program is balanced by a required core of several courses emphasizing interdisciplinary methodology and theory. Faculty and courses are not limited, however, to the departments and schools listed, since it is understood that many fields may be approached from a humanistic perspective.

## MASTER OF ARTS

Among the small number of humanities M.A. programs in the U.S., the ASU program stands out in terms of its substance and breadth. The core of the curriculum, a sequence of three required courses, provides students with an introduction to an extremely wide range of classical and contemporary cultural theory. At the same time, the large number of elective classes at their disposal permits students to fashion a specialized field for themselves, typically combining work in two or more of the traditional humanities disciplines. The thesis—the capstone of the requirements for the degree—gives students the opportunity to make an original and substantial contribution to scholarship in their chosen field. This combination—a solid grounding in cultural theory, interdisciplinary specialization, and advanced research and writing—makes this M.A. program unique among its peers.

**Admission.** Students who fulfill the general requirements of the Graduate College and who have a B.A. in any of the humanities disciplines listed by the National Endowment for the Humanities are invited to apply. This invitation, however, does not preclude students who have bachelor’s degrees in the social and natural sciences. In addition to meeting Graduate College requirements, students must submit Graduate Record Examination scores; a writing sample; 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 are notified of their admission status by April 15. Qualified students applying after March 1 are admitted depending on the availability of space.

**Program of Study.** M.A. students must complete a minimum of 30 hours of course work, including six hours of thesis preparation. In most cases, this involves a two-year program of study, focused on the following requirements: *Core Courses.* Students take a sequence of three core courses, one in each of their first three semesters. Contact an advisor for details.

*Area of Study.* Beyond the core courses, students use their remaining electives to develop a specific area of study, whose ultimate expression is the thesis, but which is also grounded in course work. The areas of study sponsored by the faculty include, but are not limited to American studies; art and society; classical studies; comparative literatures and cultures; film and media studies; gender and sexuality; intellectual history and philosophy; Jewish studies; performance studies; post-colonial studies; science, technology, and culture.

**Foreign Language Exam.** M.A. students are required to pass a foreign language reading examination during the first three semesters.

**Master's Thesis.** The centerpiece of the master's degree is a written thesis that makes an original and substantial contribution to scholarship in the humanities. Most students are expected to work toward a thesis proposal and the formation of a thesis committee (consisting of a chair drawn from the Humanities faculty and two other members) during their first two semesters; to finalize their committee and receive its approval of their proposal in their third semester; and to complete the thesis in the fourth semester. A final oral defense of the thesis is required.

**Faculty Research Interests.** Social and intellectual history; 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 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.

#### 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.

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## Indian Law

### Certificate Program

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The Certificate in Indian Law is available only to students in the College of Law. For more information, see "College of Law," page 73.

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## Industrial Engineering

### Master's and Doctoral Programs

[ceaspub.eas.asu.edu/ie](http://ceaspub.eas.asu.edu/ie)

480/965-3185

GWC 502

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Gary L. Hogg, Chair

**Professors:** Cochran, Fowler, Henderson, Hogg, Hubele, Montgomery, Runger, Shunk, Wolfe, Ye

**Associate Professors:** Anderson-Rowland, Mackulak, Moor, Roberts, Villalobos

**Assistant Professors:** Gel, Keha, Kulahci, Wu

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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 M.S. 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 204, for more information.

### 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's Web site at [ceaspub.eas.asu.edu/ie](http://ceaspub.eas.asu.edu/ie).

### INDUSTRIAL ENGINEERING (IEE)

#### 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. Fee. 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 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 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 376.

**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 376. Pre- or corequisite: IEE 385.

**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. Fee. 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 376, 385.

**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. Fee. 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 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 385.

**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 376 or 385.

**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 376, 385.

**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 376, 385.

**IEE 577 Advanced Information System Operations. (3)**

*fall*

Industrial engineering knowledge and skills for information system operations, including aspects (security, quality of service, user interface, information modeling), problems, and solutions. Prerequisite: IEE 505.

**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 385.

**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 385.

**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.

## GRADUATE PROGRAMS AND COURSES

### IEE 584 Internship. (3)

*spring*

Work performed in an industrial setting that provides practical experience and adds value to the classroom and research learning process. Practice.

### 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)
- Data Mining: Analysis of Massive Data Sets. (3)
- Design and Manufacturing. (3)
- Embedded Systems. (3)
- Engineering Approaches to Information Systems Security. (3)
- Enterprise Internet/Intranet. (3)
- Enterprise Modeling/Integration. (3)
- Entrepreneurship for Engineers. (3)
- Introduction to Rapid Prototyping and Mechatronics. (3)
- Manufacturing and Logistics Systems. (3)
- Multicriteria Decision Making. (3)
- Performance-Based Decision Support Systems. (3)
- Six-Sigma Methodology. (3)
- Strategic Technical Management. (3)
- Strategic Issues in Manufacturing. (3)
- Supply Chain Modeling and Analysis. (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.

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see “[Omnibus Courses](#),” page 50.

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## Information Management

### Master’s Program

[wpcarey.asu.edu/is](http://wpcarey.asu.edu/is)

480/965-3252

BA 223

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### Robert St. Louis, Chair

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

**Associate Professors:** Boyd, David, Golen, Gupta, Hwang, Iyer, Keim, Kulkarni, O’Leary, Regier, Whitecotton

**Assistant Professors:** Chen, Comprix, Dowling, Lee, O’Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

**Senior Lecturers:** Goldman, Maccracken, Shrednick

**Lecturers:** J.L. Boatsman, Geiger, Hayes

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The faculty in the Department of Information Systems, W. P. Carey School of Business, offer a specialized professional program leading to the M.S. degree in Information Management. The faculty also participate in programs leading to the Master of Business Administration (see “[Master of Business Administration](#),” page 138) and Ph.D. degree in Business Administration (see “[Doctor of Philosophy](#),” page 139). For more information, access the department’s Web site at [wpcarey.asu.edu/is](http://wpcarey.asu.edu/is).

### MASTER OF SCIENCE

The program leading to the M.S. degree in Information Management educates working professionals to develop and apply quantitative and computer methods to support business decision making. The program prepares graduates to progress in careers in computer information systems/management, systems development and business consulting.

**Admission.** All applicants are required to submit the supplemental application materials required by the department. Complete application instructions may be obtained from the department’s Web site at [wpcarey.asu.edu/is](http://wpcarey.asu.edu/is).

Applicants must also submit scores from the Graduate Management Admission Test or the Graduate Record Examination. International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language and Test of Spoken English exams.

**Prerequisites.** Applicants must complete the program prerequisites. Refer to the department’s Web site for a current list of required course prerequisites.

**Program of Study.** The program of study consists of a minimum of 30 semester hours and is continually updated. Access the department’s Web site for a list of courses.

**Foreign Language Requirements.** None.

**Thesis Requirements.** None.

**Final Examination.** For the M.S. degree, all students must successfully complete the comprehensive requirement established by the department and the Graduate College. The comprehensive requirement may take the 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 department's Web site at [wpcarey.asu.edu/is](http://wpcarey.asu.edu/is).

### COMPUTER INFORMATION SYSTEMS (CIS)

#### **CIS 502 Management Information and Decision Support Systems. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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. (1–4)**

*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.

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## Institutional Research

### Certificate Program

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For information on the new Graduate Certificate in Institutional Research, call the Division of Educational Leadership and Policy Studies at 480/965-6357.

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## Interdisciplinary Studies

### Master's Program

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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](http://www.west.asu.edu) on the Web.

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## Justice Studies

### Master's Program

[www.asu.edu/copp/justice](http://www.asu.edu/copp/justice)

480/965-7682

WILSN 331

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**Doris Marie Provine, Director, School of 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, Kupchik, Lopez, Milun, Monahan

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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

## GRADUATE PROGRAMS AND COURSES

Studies may be obtained from the graduate coordinator's office. See "Justice Studies," page 249.

### 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 85, 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 graduate studies 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 theo-

ries, 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.

### 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 521 Qualitative Data Analysis and Evaluation. (3)**

*once a year*

Analyzes qualitative data, e.g., field notes, in-depth interview transcripts, document analysis, coding, and retrieval with a microcomputer; qualitative evaluation.

**JUS 542 American Indian Justice. (3)**

*once a year*

Provides a broad overview of American Indian and Alaskan Native issues of justice and injustice in contemporary society.

**JUS 555 Migration/Immigration and Justice. (3)**

*selected semesters*

Explores the causes and consequences of immigration to the United States and the incorporation of immigrants into the American economy and society. Seminar.

**JUS 560 Women, Law, and Social Control. (3)**

*once a year*

Gender issues in the exercise of formal and informal mechanisms of social control, including economic, social, legal factors, both violent and nonviolent.

**JUS 570 Juvenile Delinquency. (3)**

*once a year*

Study of delinquency, including causation theories. Alternative definitions of delinquency, official statistics, and the critique and analysis of the interaction between social institutions and youth.

**JUS 575 Race, Gender, and Crime. (3)**

*fall and spring*

Current theoretical and methodological debates and controversies regarding race, ethnicity, gender, class, crime, and the criminal justice system; policy implications. Seminar.

**JUS 579 Political Deviance. (3)**

*once a year*

Seminar examines the politics of deviance by integrating the study of conflict with aspects of social organization, especially state formation.

**JUS 584 Internship. (3 or 6)**

*fall, spring, summer*

Assignments in a justice agency designed to further the integration of theory and practice. Placements are arranged through consultation with students and agencies.

**JUS 588 Justice and the Mass Media. (3)**

*once a year*

Analyzes the nature and impact of mass media messages about justice concerns for social order. Lecture, discussion.

**JUS 591 Seminar. (1–3)**

*once a year*

Topics chosen from various fields of justice studies. May be repeated for credit.

**JUS 593 Applied Project. (1–12)**

*selected semesters*

**JUS 610 Law and the Social Sciences. (3)**

*once a year*

Analyzes the theoretical grounds underlying diverse studies of law and society; creation and administration of law; and jurisprudence and politics.

**JUS 620 Justice Research and Methods. (3)**

*once a year*

Concept development, research design, data collection strategies, legal research, and building computer databases relevant to the study of justice.

**JUS 630 Data Analysis for Justice Research. (3)**

*once a year*

Bivariate and multivariate techniques of data analysis and hypothesis testing for justice-related research and use of information and statistical programs.

**JUS 640 Theoretical Perspectives on Justice. (3)**

*once a year*

Analyzes philosophical perspectives of justice; linkages between social science theory and justice constructs; application of justice to social issues.

**JUS 650 Advanced Qualitative Data Analysis. (3)**

*spring*

Advanced qualitative data collection and analysis techniques, including ethnography, in-depth interviews, field notes, coding, transcribing, content analysis, textual analysis. Seminar.

**JUS 669 Political Trials and Indigenous Justice. (3)**

*once a year*

Focuses upon research on political trials, deviance, and conceptions of indigenous and contemporary justice. Lecture, discussion.

**JUS 691 Seminar. (1–3)**

*fall, spring, summer*

Topics chosen from various fields of justice studies. May be repeated for credit.

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

## Justice Studies

### Interdisciplinary Doctoral Program

[www.asu.edu/copp/justice](http://www.asu.edu/copp/justice)

480/965-7685

WILSN 331

**Doris Marie Provine, Director, School of Justice Studies**

The School of Justice Studies 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 students with an opportunity to tailor their courses of study to fit individual needs and goals. Committee members represent the College of Law; the Departments of Anthropology, History, Languages and Literatures, Management, Philosophy, Political Science, Psychology, Recreation Management and Tourism, Religious Studies, and Sociology; the Hugh Downs School of Human Communication; and the Schools of Justice Studies, Public Affairs, and Social Work.

### 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

## GRADUATE PROGRAMS AND COURSES

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 the Graduate Programs committee. Recommendations for admission are made by the director of the committee to the dean of graduate studies. 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 and the School of Justice Studies 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 graduate studies, upon the recommendation of the director of graduate programs, appoints this committee. The advisory committee assists 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.

**Program of Study.** Students entering the program with a master's degree in the social sciences, philosophy, a relevant interdisciplinary field, or a Juris Doctor (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 graduate studies upon the recommendation of the director of graduate programs. The dissertation committee must consist of at least three faculty members, including the dissertation committee chair. At least one member of the dissertation committee must be a faculty member from the School of Justice Studies. The three-member committee must represent at least two disciplines and two different academic units. The dissertation and advisory committees may have different memberships.

**Advancement to Candidacy.** Ph.D. students will achieve candidacy status in a letter from the Graduate College dean upon (1) passing the comprehensive examination, and (2) successfully defending the dissertation prospectus.

**Dissertation Requirements.** The dissertation consists of a fully documented written analysis demonstrating an appropriate level of interdisciplinary skills and competence associated with a justice issue. Each student must register for a minimum of 24 semester hours of dissertation and research,

12 of 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 248.

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## Kinesiology

### Master's Programs

[www.asu.edu/clas/kines](http://www.asu.edu/clas/kines)

480/965-3591

PEBW 218

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**Daniel M. Landers, Interim Chair**

**Regents' Professor:** Landers

**Professors:** Darst, Matt, Pangrazi, Stelmach

**Associate Professors:** Hinrichs, Morgan, Treasure, Willis

**Assistant Professors:** Etnier, Kulinna, Ringenbach, Santello

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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 220.

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 174.

## 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 December 1. 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 courses, and nine hours of recommended electives. A total of 58 semester hours is required of

## GRADUATE PROGRAMS AND COURSES

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 450 Biopsychosocial Perspectives on Physical Activity and Health. (3)**

*fall*

Uses a biopsychosocial perspective to examine the interrelationships on physical activity and health (physical and mental). Prerequisite: KIN 352.

#### **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 2-D 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.

#### **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*

3-D 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.

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## Languages and Literatures

### Master’s and Doctoral Programs

[www.asu.edu/clas/dll](http://www.asu.edu/clas/dll)

480/965-6281

LL 440

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**Deborah N. Losse, Chair**

**Regents’ Professors:** Foster, Keller

**Professors:** Alexander, Baldini, Ballon-Aguirre, Chambers, Croft, Carlos Garcia-Fernández, Honegger, Horwath, Losse, Volek, Wetsel, Williams, T. Wong

**Associate Professors:** Acereda, Candela, Canovas, Choi, Colina, Carmen Garcia-Fernández, Hernández-G., Lafford, Orlich, Ossipov, Rees, Reiman, Sanchez, Suwarno, Tompkins, Urioste-Azcorra, Vitullo

**Assistant Professors:** Cashman, George, Gilfillan, Ginsburg, Gruzinska, Haberman, Siegel-Valdes

**Senior Lecturer:** Foard

**Lecturers:** Deal, Hendrickson, Lage, Le, Martinez, Oh, Pang, Petersen, Poudrier, Shimomura, Siriprakob, Stiffel, Walton-Ramirez, E. Wong, Zhang

**Academic Associate:** Glessner-Calkins

**Research Associate Professor:** Sipka

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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 77.

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 189, 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 PROGRAMS AND COURSES

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. A thesis is required of students seeking an M.A. degree in Spanish. Consult the *Spanish Graduate Handbook* for more 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 more information, see the *ASU General Catalog* (accessible on the Web at [www.asu.edu/catalog](http://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 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, second language acquisition, applied linguistics, discourse analysis, 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 461 Feminist Political Writing in Contemporary Europe. (3)**

*selected semesters*

Examines the discourse of gender-politics in Central Eastern Europe before and after Soviet hegemony. Cross-listed as ENG 429. Credit is allowed for only ENG 429 or FLA 461.

**FLA 464 Politics of Drama in 20th-Century Europe. (3)**

*selected semesters*

Interdisciplinary examination of European drama before and after WWII. Cross-listed as ENG 429. Credit is allowed for only ENG 429 or FLA 464.

**FLA 472 Literature and Politics in Pre- and Post-Communist Europe. (3)**

*selected semesters*

Interdisciplinary examination of the cultures of Eastern Europe from WWI to the present. Cross-listed as ENG 429. Credit is allowed for only ENG 429 or FLA 472.

**FLA 476 Literature and Film in 20th-Century Eastern Europe. (3)**  
*selected semesters*

Evaluates literary texts and films as a massive propaganda machine of the totalitarian state. Cross-listed as ENG 429. Credit is allowed for only ENG 429 or FLA 476.

**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 432 Gay Identities in Modern French Literature. (3)**

*spring*

Examines the representation of homosexuals as well as the emergence of homosexuality as a theme in modern French literature. Lecture, discussion. Prerequisites: both FRE 322 and 6 hours of 300-level French 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.

## GRADUATE PROGRAMS AND COURSES

### **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 485 Literary Translation. (3)**

*spring*

Theory and practice of literary translation with emphasis on application through individual translation project. Prerequisite: FRE 480.

### **FRE 500 Research and Critical Methods. (3)**

*fall*

Overview of major critical and theoretical frameworks used to study French and Francophone literature. Required of all French graduate students in French literature.

### **FRE 510 Introduction to Textual Analysis. (3)**

*fall*

Introduces various oral and written techniques aimed at explicating literary texts. Required of all French graduate students focusing on literature. Lecture, discussion.

### **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 Identity, Gender, and Society in Early Modern French Literature. (3)**

*fall*

Readings in French Renaissance literature with special focus on Rabelais, Montaigne, Marguerite de Navarre. Lecture, discussion.

### **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 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 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 527 The *Novelle*. (3)**

*selected semesters*

Special studies in the German short story.

### **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).

### **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 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.

**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.

## GRADUATE PROGRAMS AND COURSES

### 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.

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see "[Omnibus Courses](#)," page 50.

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## Law

### Doctoral and Certificate Programs

[law.asu.edu](http://law.asu.edu)

480/965-6181

LAW 201

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**Patricia D. White, Dean**

**Andrew Askland, Director**

**Center for the Study of Law, Science, and Technology**

**Catherine O'Grady, Executive Director,  
Clinical Programs**

**Jeffrie G. Murphy and James Nickel, Codirectors,  
Committee on Law and Philosophy**

**Kathlene Rosier, Director,  
Indian Legal Program**

**Judith M. Stinson, Director,  
Legal Research and Writing and Academic Success  
Programs**

**Regents' Professors:** Kaye, Murphy

**Professors:** Bartels, Bender, Berch, Brennan, Calleros, Clinton, Ellman, Feller, Fidel, Gorman, Gover, Grey, Guerin, Herrera, Jones, Kader, Karjala, Lowenthal, Lynk, Matheson, Nickel, O'Grady, Rose, Saks, Schatzki, Schroeder, Stanton, Strouse, Trotta, Tsosie, Tucker, Weinstein, M. White, P. White, Winer, Woodley

**Visiting Professor:** Spritzer

**Associate Professors:** Marchant, Noreuil, Sigler, Sylvester

**Clinical Professors:** Dallyn, Dauber

**Legal Writing Instructors:** Davis, Popko

**Senior Instructional Professional:** Stinson

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For more information, see "[College of Law](#)," page 73.

## LAW (LAW)

### LAW 500 Holding Registration. (1–16)

*fall and spring*

### LAW 515 Contracts I. (3)

*fall*

Explores common law legal method and the structure of Article 2 of the U.C.C. in the context of issues of contract formation.

### LAW 516 Criminal Law. (3)

*fall*

Substantive law of crimes.

### LAW 517 Torts I. (2–4)

*spring*

Legal protections of personality, property, and relational interests against physical, economic, and emotional harms.

### LAW 518 Civil Procedure I. (3)

*fall*

Explores the structure of a lawsuit and techniques of alternative dispute resolution. Specific topics include commencement of suit, joinder of parties, discovery, pretrial motions, and subject matter jurisdiction.

### LAW 519 Legal Method and Writing. (2)

*fall*

Examines methods used to analyze legal problems. Reviews precedent statutory construction and basic res judicata problems. Use of basic legal writing formats.

### LAW 520 Contracts II. (2)

*spring*

Continuation of LAW 515 focusing on contract interpretation.

### LAW 522 Constitutional Law I. (3)

*spring*

Role of courts in the federal system, distribution of powers between state and federal governments, and the role of procedure in litigation of constitutional questions.

### LAW 523 Property I. (2–3)

*fall*

Indicia of ownership, found property, estates in land, landlord tenant.

### LAW 524 Legal Research and Writing. (2)

*spring*

Continuation of LAW 519.

### LAW 525 Torts II. (2)

*spring*

Continuation of LAW 517 with emphasis on strict and products liability.

### LAW 526 Property II. (2–3)

*spring*

Nonpossessory interests in property (easements, covenants, servitudes); nuisance; land use planning; and transfers of interests in property.

### LAW 527 Civil Procedure II. (3)

*spring*

Continuation of LAW 518; subjects in LAW 518 are addressed in greater depth as well as personal jurisdiction, res judicata, collateral estoppel, and choice of law under the *Erie* doctrine.

### LAW 600 Administrative Law. (3)

*once a year*

Administrative process, emphasizing nature of powers exercised by administrative agencies of government, problems of procedure, and scope of judicial review.

### LAW 601 Antitrust Law. (3)

*once a year*

Legislation and its implementation to prevent monopoly and business practices in restraint of trade, including restrictive agreements involv-

ing price-fixing, trade association activities, and resale price maintenance.

**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 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. (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 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 617 Genetics and the Law. (2–3)**

*once a year*

Provides background on genetics and recent genetic advances; addresses the legal consequences and issues associated with such advances.

**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 626 Law, Biology, and Human Behavior. (1–3)**

*once a year*

Considers whether recent advances in biology can usefully contribute to our understanding of behaviors that are relevant to law.

**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 633 Law, Litigation, and Science. (2–3)**

*once a year*

Fills a gap in the education of most lawyers, namely, how to effectively think about and use empirical evidence.

## GRADUATE PROGRAMS AND COURSES

### **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 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 648 International Intellectual Property. (2–3)**

*once a year*

Considers patents, copyrights, and trademarks under international law and the major international treaties.

### **LAW 649 Scientific Evidence. (2–3)**

*once a year*

Examines the use of scientists and scientific tests or studies in criminal and civil litigation. Pre- or corequisite: LAW 605.

### **LAW 650 Health Law. (2–3)**

*once a year*

Introduction to health law.

### **LAW 651 Public Health Law. (2–3)**

*once a year*

Addresses the relationship between the state and the population's health.

### **LAW 701 Arbitration. (2–3)**

*once a year*

Examines the Federal Arbitration Act and the Uniform Arbitration Act as it has been adopted in Arizona.

### **LAW 702 Alternative Dispute Resolution. (2–3)**

*once a year*

Broad exposure to methods of settling disputes in our society such as mediation, arbitration/conciliation, and negotiation, including examination of the current litigation model.

### **LAW 703 Law, Science, and Technology. (2–3)**

*once a year*

Legal mechanisms used in dealing with various issues raised by contemporary science and technology. Explores current legal responses to science and technology.

### **LAW 705 Media Law. (2–3)**

*once a year*

Examines First Amendment principles and statutory and regulatory requirements with respect to the conventional print and broadcast media, as well as recent technologies such as cable.

### **LAW 706 Immigration Law. (2–3)**

*selected semesters*

Explores political, economic, social, and legal issues concerning immigration. Specific topics covered include citizenship and naturalization, denaturalization, deportation, and refugee rights and asylum.

### **LAW 707 Elder Law. (2–3)**

*once a year*

Looks at legal and policy questions related to aging individuals and an older society. Seminar.

### **LAW 708 Gender, Sexuality, and the Law. (2–3)**

*once a year*

Examines assumptions made in the law about gender and sexuality and the impact of those assumptions on the application of the law. Seminar.

### **LAW 709 International Human Rights. (2–3)**

*selected semesters*

International rules and procedures governing the protection of human rights.

### **LAW 710 Real Estate Tax Planning. (2–3)**

*once a year*

Discusses topics, including but not limited to real estate investments as tax shelters, alternative acquisition finance devices, refinancing techniques, and nontaxable exchanges.

### **LAW 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 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 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 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.

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## Law, Science, and Technology

### Certificate Program

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The Certificate in Law, Science, and Technology is available only to students in the College of Law. For more information, see “College of Law,” page 73.

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## Linguistics

### Certificate Program

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For information on the Graduate Certificate in Linguistics, access the Web site at [linguistics.asu.edu](http://linguistics.asu.edu), or call 480/965-0792. For LIN courses, see “Linguistics (LIN),” page 212.

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## Mass Communication

### Master’s Program

[cronkite.asu.edu/graduate.html](http://cronkite.asu.edu/graduate.html)

480/965-5011

STAUF A231B

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**Stephen K. Doig, Interim Director**

**Professors:** Craft, Cronkite, Doig, Foote, Godfrey, Goldstein, Merrill, Sylvester, Watson

**Associate Professors:** Allen, Barrett, Bramlett-Solomon, Galician, Matera, Russell, Russomanno

**Assistant Professors:** Gavrilos, Keith, Schwalbe, Silcock

**Clinical Professors:** Itule, Leigh

**Lecturers:** Casavantes, Nichols

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## 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

## GRADUATE PROGRAMS AND COURSES

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 to 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 semester 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 semester 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 semester 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. Prerequisites for undergraduates: JMC 270; JMC professional status.

#### **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; JMC professional status.

#### **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; JMC 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; JMC 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; JMC 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: JMC 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; JMC 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. Prerequisites: JMC 201 (or its equivalent); JMC professional status.

#### **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; JMC 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; JMC professional status.

**JMC 440 Magazine Writing. (3)**

*fall and spring*

Writing and marketing magazine articles for publication. Prerequisites for undergraduates: JMC 301; JMC 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. Prerequisites: student in B.A. in Journalism and Mass Communication or M.M.C. in Mass Communication; instructor approval.

**JMC 451 Photojournalism II. (3)**

*fall and spring*

Emphasizes shooting and Photoshop skills for newspaper and magazine assignments. Film and digital photography, flash and studio lighting. Fee. Prerequisite: JMC 351. Prerequisite for undergraduates: JMC professional status.

**JMC 452 Photojournalism III. (3)**

*fall and spring*

Continued practice in shooting (film and digital) and Photoshop skills for newspapers and magazines. Emphasizes single images, picture stories, editorial illustrations, and portfolio development. 2 hours lecture, 2 hours lab. Fee. Prerequisite: JMC 451. Prerequisite for undergraduates: JMC professional status.

**JMC 465 Precision Journalism. (3)**

*fall and spring*

Advanced reporting methods using Internet research and data analysis tools for beat and investigative stories. Lecture, lab. Fee. Prerequisites for undergraduates: JMC 301; JMC 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; JMC 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; JMC 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: JMC professional status.

**JMC 494 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.

**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)**

*once a year*

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. Prerequisite: professional status.

**MCO 450 Visual Communication. (3)**

*fall, spring, summer*

Theory and tradition of communication through the visual media with emphasis on the continuity of traditions common to modern visual media.

**MCO 456 Political Communication. (3)**

*fall and spring*

Theory and research related to political campaign communication. The persuasive process of political campaigning, the role of the media, the candidate, and image creation.

**MCO 460 Race, Gender, and Media. (3)**

*spring and summer*

Reading seminar designed to give a probing examination of the interface between AHANA Americans and the mass media in the United States. Lecture, discussion. Cross-listed as AFR 460. Credit is allowed for only AFR 460 or MCO 460.

**MCO 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 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 to first amendment issues, media access, libel, confidentiality, and invasion of privacy as applied to media organizations in Arizona. Lecture, seminar.

## GRADUATE PROGRAMS AND COURSES

**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.

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### Materials Engineering

#### Master’s and Doctoral Programs

[www.eas.asu.edu/~cme](http://www.eas.asu.edu/~cme)

480/965-3313

ECG 202

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Subhash Mahajan, Chair

**Regents’ Professor:** Mayer

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

**Associate Professors:** Chawla, Van Schilfgaarde

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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 206, 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](http://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 320, 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 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 SCIENCE IN ENGINEERING

See “[Master of Science in Engineering](#),” page 204, 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](http://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 electronic components. Prerequisite: transition student with instructor approval.

### MSE 513 Polymers and Composites. (3)

*fall*  
Relationship between chemistry, structure, and properties of engineering polymers. Design, properties, and behavior of fiber composite systems.

### MSE 514 Physical Metallurgy. (3)

*spring*  
Crystal structure and defects. Phase diagrams, metallography, solidification and casting, and deformation and annealing. Prerequisite: transition student with instructor approval.

### MSE 515 Thermodynamics of Materials. (3)

*spring*  
Principles of statistical mechanics, statistical thermodynamics of single crystals, solutions, phase equilibrium, free energy of reactions, free electron theory, and thermodynamics of defects. Prerequisite: transition student with instructor approval.

### MSE 516 Mechanical Properties of Solids. (3)

*fall*  
Effects of environmental and microstructural variables of mechanical properties, including plastic deformation, fatigue, creep, brittle fracture, and internal friction. Prerequisite: transition student with instructor approval.

### MSE 517 Introduction to Ceramics. (3)

*fall*  
Principles of structure, property relations in ceramic materials. Processing techniques. Applications in mechanical, electronic, and superconducting systems. Prerequisite: transition student with instructor approval.

### MSE 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. Defect structure and composition using STEM imaging, x-ray and electron-energy-loss spectroscopy. 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. Novel developments and applications. Cross-listed as PHY 554/SEM 554. Credit is allowed for only MSE 554 or PHY 554 or SEM 554. Prerequisite: instructor approval.

## GRADUATE PROGRAMS AND COURSES

### **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 displative 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.

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## Materials Science

### Interdisciplinary Master’s Program

[www.asu.edu/graduate/SEM](http://www.asu.edu/graduate/SEM)

480/965-2460

PS A323

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**James B. Adams, Codirector**

**William T. Petuskey, Codirector**

#### **Chemical and Materials Engineering**

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

#### **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

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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 Ira A. Fulton School of Engineering: 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 on 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](http://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. résumé;
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 Materials Physics I.....	3
SEM 500 Research Methods.....	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 graduate studies.

**COURSES**

For courses, see “*Science and Engineering of Materials (SEM)*,” page 321.

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**Mathematics**

**Master’s and Doctoral Programs**

[math.la.asu.edu](http://math.la.asu.edu)

480/965-3951

PS A216

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**Andrew Bremner, Chair**

**Professors:** Armbruster, Bremner, Castillo-Chavez, Gardner, Hoppensteadt, Ihrig, Jackiewicz, Kadell, Kawski, Kierstead, Kostelich, Kuang, Kuiper, Lai, Lohr, Lopez, Mahalov, Mittelman, Nicolaenko, Quigg, Renaut, Ringhofer, Smith, Thieme, Young

**Associate Professors:** Baer, Barcelo, Blount, Carlson, Childress, Farmer, Gelb, Hurlbert, D. Jones, J. Jones, McCarter, Moore, Nikitin, Prewitt, Spielberg, Suslov, Taylor, Welfert

**Assistant Professors:** Czygrinow, Kaliszewski, Oehrtman, Oleson, Zandieh

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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 335).

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 189) or Doctor of Education (see “*Doctor of Education*,” page 190) degree program in Secondary Education may elect mathematics as the subject matter field. These programs are offered 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. 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, the student’s preparation must 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.

## GRADUATE PROGRAMS AND COURSES

Students pursuing the M.A. degree in Mathematics may choose one of the following areas: general mathematics, applied mathematics, statistics and probability, mathematics education, and computational mathematics. Information concerning the requirements for each area may be obtained from the department.

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.

**Comprehensive Examinations.** Written examinations are required for both thesis and nonthesis options—one for the thesis option and two for the nonthesis option. For the thesis option, course work can be substituted for the exam. For more information, contact the department.

**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 287). 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. One option of the M.N.S. degree leads to high school certification and another focuses on mathematics education. 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 49 faculty members in the Department of Mathematics and Statistics, 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 faculty may be seen by accessing the department’s Web site at [math.la.asu.edu](http://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 343) 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 343) 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 343) 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 (or 275) and 342 (or 343) (or their equivalents) or only instructor approval.

#### **MAT 421 Applied Computational Methods. (3)**

*fall and spring*

Numerical methods for quadrature, differential equations, roots of nonlinear equations, interpolation, approximation, linear equations, float-

ing-point arithmetic, and roundoff error. Prerequisites: both MAT 271 (or its equivalent) and fluency in computer programming (preferably FORTRAN) or only instructor approval.

**MAT 423 Numerical Analysis I. (3)**

*fall*

Analysis and algorithms for numerical solutions linear/nonlinear equations, direct solvers, iterative procedures, optimization. Determination of eigenvalues. Elementary computer arithmetic. Prerequisites: both MAT 342 (or 343) 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 (or 275) 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 343) 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 343) 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 343) 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: CSE 100 (or 110); MAT 242 (or 342 or 343), 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 or 343) and 274 (or 275) 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 (or 275), 342 (or 242 or 343); 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 (or 275), 342 (or 242 or 343); 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 or 343), 272, 274 (or 275).

**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 or 343), 274 (or 275).

**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 (or 343).

**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, Poincaré-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 or 275.

**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 func-

## GRADUATE PROGRAMS AND COURSES

tions, and selected special topics. Prerequisite: MAT 514 or instructor approval.

### **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 (or 343) and 421 (or 423) 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 343 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. Prerequisite: 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, 2-D order processes, and other topics in stochastic processes. Prerequisite: 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)

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see ["Omnibus Courses," page 50.](#)

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## Mechanical Engineering

### Master's and Doctoral Programs

[www.fulton.asu.edu/~mae](http://www.fulton.asu.edu/~mae)

480/965-3291

ECG 346

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**Robert E. Peck, Chair**

**Professors:** Boyer, Davidson, Fernando, Peck, Roy, Shah, Sieradzki, Squires, Tseng, Yao

**Associate Professors:** Chen, Kuo, McNeill, Phelan, Van Schilfgaarde

**Assistant Professors:** Calhoun, Peralta, Sugar

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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 mechanical design, manufacturing, thermal sciences, engineering mechanics, and system dynamics and controls.

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 204, 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—M.Eng.](#),” page 204.

### 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 “[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 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 in mechanical design includes CAD/CAM/CAE, design automation, engineering informatics, geometric modeling, and knowledge-based design. Research in manufacturing includes rapid prototyping and MEMS. Research undertaken in thermal sciences includes combustion and emission control, computational fluid dynamics, cryogenics, electronic cooling, energy conversion and management, environmental and geophysical fluid dynamics, heat transfer in complex flows, hydrodynamic stability, micro-/nanoscale transport processes, non-Newtonian fluid mechanics, noise control, pollution monitoring and transport, superconductivity, turbulence modeling, and two-phase flow modeling and experiments. Research undertaken in engineering mechanics includes corrosion, crystallography, damage and fracture mechanics, failure analysis and reliability, multidisciplinary optimization, nanomechanics of materials, precision materials processing, rotor-bearing system design, smart structures, and thin film growth. Research undertaken in system dynamics and controls includes intelligent control, mechatronics, and robotics.

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 [www.fulton.asu.edu/~mae](http://www.fulton.asu.edu/~mae).



**MECHANICAL AND AEROSPACE ENGINEERING (MAE)****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. Fee. 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. Fee. 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. Fee. 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. Fee. 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. Fee. Prerequisite: instructor approval.

**MAE 471 Computational Fluid Dynamics. (3)***once a year*

Numerical solutions for selected problems in fluid mechanics. Fee. Prerequisites: ECE 384; MAE 361 (or 371).

**MAE 504 Experimental Methods for Thermal and Fluid Processes. (3)***spring*

Theory and application of optical diagnostics and microsensors for characterizing thermofluid processes. Measurements include laser spectroscopy, velocimetry, particle sizing, and surface properties.

**MAE 505 Perturbation Methods. (3)***selected semesters*

Nonlinear oscillations, strained coordinates, renormalization, multiple scales, boundary layers, matched asymptotic expansions, turning point problems, and WKBJ method. Cross-listed as MAT 505. Credit is allowed for only MAE 505 or MAT 505.

**MAE 506 Advanced System Modeling, Dynamics, and Control. (3)***spring*

Lumped-parameter modeling of physical systems with examples. State variable representations and dynamic response. Introduces modern control. Prerequisite: ASE 582 or MAT 442.

**MAE 507 Optimal Control. (3)***fall*

Optimal control of systems. Calculus of variations, dynamic programming, linear quadratic regulator, numerical methods, and Pontryagin's principle. Cross-listed as EEE 587. Credit is allowed for only EEE 587 or MAE 507. Prerequisite: EEE 482 or MAE 506.

**MAE 510 Dynamics and Vibrations. (3)***fall*

Lagrange's and Hamilton's equations, rigid body dynamics, gyroscopic motion, and small oscillation theory.

**MAE 511 Acoustics. (3)***fall*

Principles underlying the generation, transmission, and reception of acoustic waves. Applications to noise control, architectural acoustics, random vibrations, and acoustic fatigue.

**MAE 512 Random Vibrations. (3)***spring*

Reviews probability theory, random processes, stationarity, power spectrum, white noise process, random response of single and

## GRADUATE PROGRAMS AND COURSES

multiple DOF systems, and Markov processes simulation. Prerequisite: CEE 536 or MAE 515.

### **MAE 515 Structural Dynamics. (3)**

*selected semesters*

Free vibration and forced response of discrete and continuous systems, exact and approximate methods of solution, response spectra, computational techniques, special topics. Lecture, recitation. Cross-listed as CEE 536. Credit is allowed for only CEE 536 or MAE 515.

### **MAE 520 Stress Analysis. (3)**

*fall*

Introduces tensors: kinematics, stress analysis, and constitutive assumptions leading to elastic and plastic behavior. Strain energy and energy methods; applications. Cross-listed as CEE 521. Credit is allowed for only CEE 521 or MAE 520.

### **MAE 521 Structural Optimization. (3)**

*selected semesters*

Linear and nonlinear programming. Problem formulation. Design sensitivity analysis. FEM-based optimal design of structural and mechanical systems. Cross-listed as CEE 533. Credit is allowed for only CEE 533 or MAE 521. Prerequisites: ASE 582; CEE 526 (or MAE 527).

### **MAE 523 Fracture Mechanics. (3)**

*fall*

Linear elastic fracture mechanics. Nonlinear problems. Fatigue fracture. Experimental methods in fracture. Prerequisite: CEE 521 or 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 525 Mechanics of Smart Materials and Structures. (3)**

*once a year*

Modeling and analysis of smart materials and adaptive structures. Application areas include vibration and shape control and damage detection. Pre- or corequisite: MAE 510 (or its equivalent) or instructor approval.

### **MAE 527 Finite Elements for Engineers. (3)**

*fall*

Direct stiffness, method of weighted residuals, weak formulation, and variational techniques in the solution of engineering problems. Cross-listed as CEE 526. Credit is allowed for only CEE 526 or MAE 527. Prerequisite: CEE 432 or MAE 404 (or their equivalents).

### **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 Advanced Product Design Methodology. (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-D algorithms and user interface techniques. Fee.

### **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. Fee. Prerequisites: ECE 384; MAE 422, 441 (or 444).

### **MAE 547 Mechanical Design and Control of Robots. (3)**

*selected semesters*

Homogeneous transformations, 3-D kinematics, geometry of motion, forward and inverse kinematics, workspace and motion trajectories, dynamics, control, and static forces.

### **MAE 557 Mechanics of Composite Materials. (3)**

*spring*

Analysis, design, and applications of laminated and chopped fiber reinforced composites. Micro- and macromechanical analysis of elastic constants, failure, and environmental degradation. Design project.

### **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, 1- 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 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*

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.

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## Medieval and Renaissance Studies

### Interdisciplinary Certificate Programs

[www.asu.edu/clas/acmrs](http://www.asu.edu/clas/acmrs)

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COOR 4429

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**Robert E. Bjork, Director**

**American Studies (ASU West)**

Associate Professor: Moulton

**Architecture**

Professor: Meunier

**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

Associate Professors: Candela, Sanchez, Vitullo

Assistant Professor: George

**Law**

Professors: Brennan, Kader, Rose

**Music**

Associate Professors: Haefer, Holbrook

**Philosophy**

Professor: White

**Religious Studies**

Professor: Coudert

Associate Professor: Clay

**Theatre**

Professor: Knapp

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Graduate students admitted to a degree program in any field may earn one of two M.A.- or Ph.D.-level certificates: the Certificate in Medieval Studies or the Certificate in Renaissance Studies. Since medieval and Renaissance studies are by nature interdisciplinary, students in the certificate program receive interdisciplinary training. Besides the course work and examinations required in their major field, students take six to nine semester hours outside their discipline and receive training in a medieval vernacular language or a modern European language.

The core of the program has two components: (1) Latin, the international language for both the Middle Ages and Renaissance, and (2) paleography, the study of the physical medium through which Latin and other languages were transmitted.

The certificate program prepares students for advanced study or for academic positions by augmenting their skills and knowledge, thereby making them more equipped to handle the demands of their fields. For more information, contact the Arizona Center for Medieval and Renaissance Studies.

**COURSES**

*For course information, contact the Arizona Center for Medieval and Renaissance Studies.*

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## Microbiology

### Master's and Doctoral Programs

[sols.asu.edu](http://sols.asu.edu)

480/965-1768

LSE 229

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**Morton E. Munk, Interim Director,  
School of Life Sciences**

**Andrew N. Webber,  
Associate Director for Graduate Programs**

**Willem F.J. Vermaas,  
Associate Director for Research Initiatives**

**Regents' Professors:** Alcock, Arntzen, Maienschein, Pyne

**Professors:** Burke, Capco, Chandler, Collins, Creath, Deviche, Dowling, Elser, Faeth, Fisher, Frasch, Grimm, Harrison, Hedrick, Jacobs, Klopatek, Lawson, Misra, Moore, Mossman, Munk, Nash, Rutowski, Satterlie, Schmidt, Smith, Sommerfeld, Trelease, Vermaas, Walsberg, Webber

**Associate Professors:** Armendt, Briggs, Chang, Clark, Day, Fewell, Garcia-Pichel, Goldstein, Hoffman, Hogue, Kumar, Joshi, McGregor, Orchinik, Pigg, Ramakrishna, Rawls, Roberson, Stout, Stromberg, Szarek, Towill, Wu

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

**Research Professors:** Cardineau, Davidson, Mahoney, Pearson

**Associate Research Professor:** Lopez

**Assistant Research Professors:** Bertram, Hope, Hu, Langland, Minteer, Neuer, Walmsley

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The 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 287).

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 due December 15 for the following fall.

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.

### 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 428 Immunophilosophy. (3)***selected semesters*

Integrates immunology and philosophy, including psychoneuroimmunology and the mind-body problem, and immunologic/psychologic perspectives on self and self-identity. May be repeated for credit.

Discussion, original literature readings and written assignments.

Cross-listed as PHI 428. Credit is allowed for only MIC 428 or PHI 428. Pre- or corequisite: MIC 420 or PHI 317 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 475 Astrobiology. (3)***fall and spring*

Origin, early evolution, distribution, and future of life on Earth and elsewhere in the cosmos. May be repeated for credit. Lecture, discussion, video conferences, possible field trips. Cross-listed as AST 460/ BIO 460/CHM 483/GLG 460. Credit is allowed for only AST 460 or BIO 460 or CHM 483 or GLG 460 or MIC 475. Prerequisite: instructor approval.

**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 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 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.



Regents' Professor Charles Arntzen uses modern biotechnology to merge agriculture and medicine in an effort to prevent and treat disease.

Tim Trumble photo

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## Molecular and Cellular Biology

### Interdisciplinary Master's and Doctoral Programs

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LSE 229

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**Andrew N. Webber,**  
Associate Director for Graduate Programs

#### Anthropology

Professor: Williams

#### Bioengineering

Associate Professors: Joshi, 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, Jacobs, McGaughey, Misra, Satterlie, Schmidt,  
Trelease, Vermaas, Webber

Associate Professors: Chang, Day, Garcia-Pichel, Goldstein,

Hoffman, Hogue, Kumar, Orchinik, Rawls, Roberson,  
Stout, Stutz

Assistant Professors: Mor, Newfeld, Rhoads, Wilson-Rawls

Research Professors: Davidson, Lyubchenko

Senior Research Scientists: Bingham, LoBrutto

#### Physics and Astronomy

Professor: Lindsay

#### Psychology

Associate Professors: Castaneda, Conrad

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The interdisciplinary M.S. and Ph.D. degrees in Molecular and Cellular Biology are administered by the School of Life Sciences. 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, Kinesiology, 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 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](http://www.east.asu.edu/ecollege/multimedia) on the Web.

**MULTIMEDIA WRITING AND TECHNICAL COMMUNICATION (TWC)**

**TWC 401 Principles of Technical Communication. (3)**

*fall and spring*

Basic information design principles to produce effective written, oral, and electronic technical communication. Understanding of rhetorical and audience analysis. Pre- or corequisite: TWC 301.

**TWC 403 Writing for Professional Publication. (3)**

*selected semesters*

Analyzes the market and examines the publication process, including the roles of the author, editor, and reviewer. Pre- or corequisite: TWC 401.

**TWC 411 Principles of Visual Communication. (3)**

*fall and spring*

Basic principles of visual communication in print and electronic media. Understanding graphic and document design, including typography and color. Pre- or corequisite: TWC 401.

**TWC 421 Principles of Writing with Technology. (3)**

*fall and spring*

Understanding historical and social impact of technology on writing, with emphasis on multimedia design, computer-mediated communication, and hypertext. Pre- or corequisite: TWC 401.

**TWC 431 Principles of Technical Editing. (3)**

*fall and spring*

Basic principles of technical editing (for print and electronic media), including copyediting, reviews, standards, style, and project management. Pre- or corequisite: TWC 401.

**TWC 443 Proposal Writing. (3)**

*once a year*

Develops persuasive strategies and themes for researching and writing professional proposals. Pre- or corequisite: TWC 401.

**TWC 444 Manual and Instructional Writing. (3)**

*once a year*

Design and development of a user manual, writing instructions, improving graphics and page design, and usability testing. Pre- or corequisite: TWC 401.

**TWC 445 Computer Documentation. (3)**

*once a year*

Introduces writing documentation for the computer industry. Pre- or corequisite: TWC 401.

**TWC 446 Technical and Scientific Reports. (3)**

*once a year*

Introduces strategies, formats, and techniques of presenting information to technical and scientific audiences. Pre- or corequisite: TWC 401.

**TWC 447 Business Reports. (3)**

*once a year*

Introduces strategies, formats, and techniques of presenting information to business and other workplace audiences. Pre- or corequisite: TWC 401.

**TWC 484 Internship. (3)**

*fall and spring*

Applies classroom work in a supervised workplace environment. Pre- or corequisite: TWC 411 or 421 or 431.

## GRADUATE PROGRAMS AND COURSES

### **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.

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## Museum Studies

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See “Certificate in Museum Studies,” page 107.

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## Music

### Master’s, Doctoral, and Certificate Programs

[herberger.asu.edu/music](http://herberger.asu.edu/music)

480/965-3371

MUSIC E185

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Wayne A. Bailey, Director

Kimberly Marshall, Associate Director for  
Graduate Studies

**Regents’ Professors:** Hickman, Pagano

**Professors:** Britton, Cosand, Crowe, DeMars, Doan, Dreyfoos, Hackbarth, Hamilton, Hill, Humphreys, Koonce, Marshall, Oldani, Pilafian, Reber, Rogers, Russell, Schildkret, Sellheim, Shinn, Solís, Spring, Stauffer, Sunkett, Swaim, Thompson, Williamson, Wytko

**Associate Professors:** E. Buck, N. Buck, Bush, Carpenter, Haefer, Holbrook, Kopta, Lyman, May, McLin, Rockmaker, Schuring, Smith, Wilson

**Assistant Professors:** Barefield, Bryan, A. Campbell, Cuciurean, Ericson, Feisst, Jiang, Landschoot, Lingas, Meir, Norton, Province, Rio, Schmidt, Sullivan, Swartz

**Senior Lecturer:** Shellans

**Lecturer:** Tongret

**Associate Fine Arts Specialist:** G. Campbell

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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 take these examinations. The results of the exams are advisory only; however,



students cannot take graduate-level history and theory courses until they have taken the exams. 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.

**Dismissal Policy.** Any student whose academic or musical work falls below expectations for the successful completion of the degree is notified by the chair of his or her graduate committee. This faculty advisor describes the concerns and outlines for the student a specific course of action to improve the student's progress through the degree. If the quality of the work does not improve within the specified time, the student is dismissed from the degree program.

## 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.

Two years of French or German language study at the university level are highly recommended for admission to the M.A. degree program.

**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.

**Qualifying Evaluation.** In order for the student to continue graduate study in the M.A. programs, a qualifying research paper (or analytical paper for M.A. students pursuing the concentration in music theory), and completed course work must be judged satisfactory by the area faculty at the end of the spring semester of the first year of study. If the paper and course work are not found satisfactory, the student may be asked to revise the written work or to leave the program.

**Foreign Language Requirements.** A passing grade on the foreign language reading examination in French or German is required. M.A. students are to take the foreign language exam during their first year at ASU and must pass it before taking the written final examination.

**Thesis Requirements.** A written thesis is required. Students should write a 10 to 15 page thesis proposal no later

than fall of the second year. This proposal is discussed as part of their oral final exam.

**Final Examinations.** A final examination (written, oral, or both) is required. An oral examination in defense of the thesis is also required.

## 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.** MHL 532, 591 (two semesters), 599 (Thesis), six hours of music theory, and two semester hours of course work approved by the school.

**Music Theory.** MTC 520, 525, 527, 528, 599 (Thesis); six semester hours of music history.

## 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. Students majoring in composition may pursue a traditional composition curriculum or choose a concentration in interdisciplinary digital media 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. interdisciplinary digital media and performance
2. music theatre/opera musical direction,
3. music theatre/opera performance,
4. performance,
5. performance pedagogy, and
6. piano accompanying.

## GRADUATE PROGRAMS AND COURSES

**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.

Students majoring in Performance with a concentration in 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 graduate studies upon recommendation of the associate director for graduate studies 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.

**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 graduate studies. 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 graduate studies 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 education concentrations require a dissertation of an original and creative nature. The music composition concentration requires the creation of a significant original work of music (considered to be a dissertation) and either two article-length research papers or one more substantial paper. The conducting concentration requires the completion of research paper(s)/project(s) in conjunction with performances (one of which must be a lecture-recital). The performance concentration requires at least three recitals after admission to the program and a research paper/project. All candidates must enroll for a total of 24 semester hours in research (MUP 792), solo performance (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 graduate studies. 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

## GRADUATE PROGRAMS AND COURSES

supervisory committee, the school's associate director for graduate studies, and the dean of graduate studies.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

**Maximum Time Limit.** D.M.A. candidates must complete all requirements within five years after the comprehensive exams have been passed.

### POST-BACHELOR'S ARTIST DIPLOMA

The Post-Bachelor's Artist Diploma graduate certificate program is intended for a very limited number of the most gifted performers who demonstrate strong potential for successful careers in musical performance.

**Admission.** Students seeking admission must hold at least a bachelor's degree in music or an equivalent conservatory credential at the time of entrance. All applicants whose native language is not English must submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL). For preliminary screening, every applicant must submit a letter of application, official transcripts, four letters of recommendation, and an audio recording containing works representing a variety of musical styles and composers. Those applicants recommended for a full audition must perform an audition recital and be interviewed on the ASU campus.

**Program of Study.** The Post-Bachelor's Artist Diploma program is a two-year course of study requiring at least two consecutive semesters of residence. A total of 32 semester hours, including four public recitals, is required. Three of the recitals must be presented on the ASU campus, and one at a venue outside of the metropolitan Phoenix area.

**Course Requirements.** MUP 527 (sixteen semester hours), 551 (four semester hours), and 581; performing ensembles (two semester hours) and four recitals (eight semester hours).

**Related Requirements.** The School of Music graduate diagnostic examinations in music theory and music history must be taken during the first semester of study. 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 591 Seminar. (1–12)

*fall and spring*

#### MHL 592 Research. (1–12)

*fall and spring*

#### MHL 599 Thesis. (1–12)

*fall and spring*

#### MHL 647 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 657 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 664 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 668 Introduction to Ethnomusicology. (3)

*fall in odd years*

Introduces the theory and methodology of the discipline, including bibliography, fieldwork, transcription, analysis, and organology.

#### MHL 670 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 675 History of Choral Music. (3)

*fall*

Major choral works.

**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 591 Seminar. (1–12)***fall and spring***MTC 592 Research. (1–12)***fall and spring***MTC 599 Thesis. (1–12)***fall and spring***MTC 723 Advanced Composition. (3)***fall and spring*

Special problems in writing in complex forms and textures. May be repeated for credit. Studio.

**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 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 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.

**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.

## GRADUATE PROGRAMS AND COURSES

### **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 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 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.

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## Music Education

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See “Music,” page 280.

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## Natural Science

### Master’s Program

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The Master of Natural Science (M.N.S.) degree offers the opportunity for interdisciplinary graduate training in the natural sciences (biological sciences, mathematics, and physical sciences) and cognate areas. The degree program is especially suited for individuals who desire professional training rather than research training. Because of designed flexibility, the degree also offers the opportunity for individualized professional graduate programs depending upon the backgrounds and goals of the students. The major is Natural Science. Students are expected to emphasize course work in two or more areas of concentration. The program must be interdisciplinary.

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 85. 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 graduate studies 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. concentrations.*

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## Nonprofit Leadership and Management

### Certificate Program

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**Robert F. Ashcraft, Director, Center for Nonprofit Leadership and Management**

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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.

## GRADUATE PROGRAMS AND COURSES

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 40, or call 480/965-0607.

### NONPROFIT LEADERSHIP AND MANAGEMENT (NLM)

**NLM 510 Historical and Philosophical Foundations of Nonprofits in America. (3)**

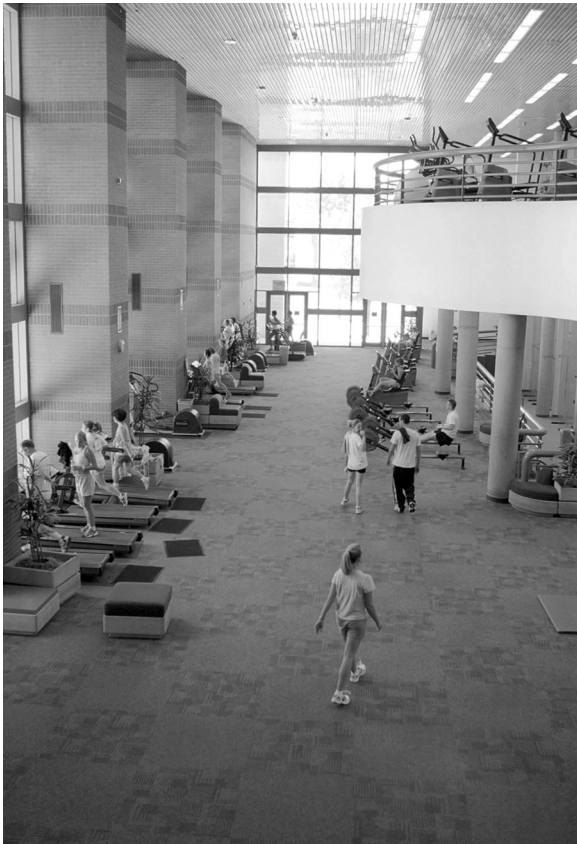
*fall*

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.



The Student Recreation Complex offers students many workout possibilities.

Tim Trumble photo

**NLM 540 Volunteer and Human Resources in Nonprofit Organization. (3)**

*fall*

Managing the volunteer and paid staff human resources in nonprofit organizations; practices and theories. Lecture, case study.

**Omnibus Courses.** For an explanation of courses offered but not specifically listed in this catalog, see “[Omnibus Courses](#),” page 50.

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## Nursing

### Master’s, Doctoral, and Certificate Programs

[nursing.asu.edu](http://nursing.asu.edu)

480/965-3948

NUR 444

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**Karen H. Sousa, Associate Dean  
for Graduate Programs and Research**

**Professors:** Fleury, Komnenich, Mattson

**Associate Professors:** Alpers, Brillhart, Cesarotti, Dirksen, Ismeurt, Killeen, McCarthy, Ruiz, Sousa

**Assistant Professors:** McGrath, Pickens, Shearer, Tann

**Clinical Professor:** Bell

**Clinical Associate Professors:** Armbruster, Fargotstein, Hagler, Jasper, W. Johnson, Kastenbaum, Link, Morris, Nuñez, Stillwell, White

**Clinical Assistant Professors:** P. Johnson, Sayles, Wotring

**Faculty Associate:** Rosdahl

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The faculty in the College of Nursing offer graduate programs leading to the M.S. degree in Nursing, a post-master’s certificate, and the Doctor of Nursing Science. 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), children with special needs, 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, neonatal, 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 85.

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 unencumbered 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" (2.00) or higher, and an inferential statistics course with a grade of "B" (3.00) 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 in January. For more information, contact the Student Services Office in the College of Nursing at 480/965-2987 or access the college's Web site at [nursing.asu.edu](http://nursing.asu.edu).

A separate application for admission to the graduate program, for students who have completed the RN-B.S.N.-M.S. track in the undergraduate degree program, is due September 1. For more information, contact the Student Services Office in the College of Nursing at 480/965-2987 or access the college's Web site at [nursing.asu.edu](http://nursing.asu.edu).

**Supervisory Committee.** The dean of graduate studies, upon recommendation of the College of Nursing associate dean for Graduate Program 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 511, NUR 512, NUR 513, NUR 521, NUR 524, NUR 528, NUR 553, NUR 554, NUR 526 or NUR 558 or NUR 559, 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 HSM 566.

## GRADUATE PROGRAMS AND COURSES

**Foreign Language Requirements.** None.

**Degree Requirements.** The student must successfully complete the following as defined by the supervisory committee and as approved by the dean of graduate studies: (1) the program of study and (2) a thesis and final oral examination in defense of the thesis *or* a nonthesis option project.

### POST-MASTER'S PROGRAM

The college offers a Post-Master's Nurse Practitioner Certificate program in all specialty concentrations and the Clinical Nurse Specialist and Nurse Practitioner roles on a space-available basis. Completion of course work toward this academic certificate does not lead to medical certification.

### DOCTOR OF NURSING SCIENCE

For information on the new Doctor of Nursing Science (D.N.S.) degree, call the dean's office at 480/965-3244.

### FEEES

In addition to tuition, program fees apply for the M.S., post-master's certificate, and D.N.S. For more information, call 480/965-3948.

### RESEARCH ACTIVITY

Research within the college focuses on understanding and addressing risk behaviors in vulnerable populations for the purpose of optimizing health. For research interests of the faculty, access [nursing.asu.edu/facultystaff](http://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.

#### 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: admission to graduate Nursing program or admission to the Master of Public Health degree or instructor approval. Prerequisite: CHP 500. 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. Lec-

ture, 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 Adult Acute: Advanced Theory I. (4)

*fall*

Focuses on theoretical, research, and advanced assessment skills required for advanced practice across the acute care continuum. Lecture, lab. Prerequisites: NUR 500, 551, 582, 586. Corequisite: NUR 508.

#### NUR 504 Adult Acute: Advanced Theory II. (4)

*spring*

Second required theory course for advanced practice across the acute care continuum, focusing on acute episodic and common chronic dysfunctions. Lecture, lab. Prerequisites: NUR 500, 503, 551, 582, 586. 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 concentration area. Lecture, lab, seminar, conferences. Fee. Prerequisites: NUR 506; admission to graduate Nursing program. Corequisite: NUR 502.

#### NUR 508 Advanced Nursing Practicum I: Adult Acute Nursing. (2-6)

*fall*

Required practicum for preparation for advanced practice across the acute care continuum. Lecture, lab. Fee. Prerequisites: NUR 500, 551, 582, 586; all core courses. Corequisite: NUR 503.

#### NUR 509 Advanced Nursing Practicum II: Adult Acute Nursing. (2-6)

*spring*

Required practicum for preparation for advanced practice across the acute care continuum. Lecture, lab. Fee. Prerequisites: NUR 503, 508. 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 511 Advanced Practice Nursing Role I. (1)

*once a year*

First of three courses that focus on the examination and implementation of the advanced practice nurse role, emphasizing its major components and subcomponents. Prerequisite: admission to graduate Nursing program or instructor approval.

#### NUR 512 Advanced Practice Nursing Role II. (1)

*summer*

Second of three courses that focus on the examination and implementation of the advanced practice nurse role, emphasizing its major components and subcomponents. Prerequisite: NUR 511.

#### NUR 513 Advanced Practice Nursing Role III. (1)

*fall*

Third of three courses that focus on the examination and implementation of the advanced practice nurse role, emphasizing its major components and subcomponents. Prerequisite: NUR 512.

#### 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. Prerequisites: NUR 525, 526, 527, 528. Corequisites: NUR 513, 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. Prerequisites: NUR 525, 526, 527, 528. Corequisites: NUR 513, 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. Prerequisites: NUR 515, 516; admission to graduate Nursing program. Corequisites: 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. Prerequisites: NUR 515, 516; admission to graduate Nursing program. Corequisite: NUR 517.

**NUR 519 Advanced Nursing Practicum I: Psychiatric/Mental Health Nursing. (2–6)***fall*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Prerequisites: NUR 500, 521, 551, 552, 554, 559, 564, 565. Corequisites: NUR 513, 522.

**NUR 520 Advanced Nursing Practicum II: Psychiatric/Mental Health Nursing. (2–6)***spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Prerequisites: NUR 519, 522; 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. Pre- or corequisites: 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: admission to graduate Nursing program; a course in undergraduate anatomy and a course in undergraduate physiology. Corequisite: NUR 526 or 558.

**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. Pre- or corequisite: NUR 525 or instructor approval.

**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. Corequisite: NUR 528. 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. Corequisite: NUR 527. 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. Prerequisites: admission to graduate Nursing program; all core and flexible core courses. 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. Prerequisites: NUR 529, 531; 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. Prerequisites: admission to graduate Nursing program; all core and flexible core courses except thesis/project. Corequisite: NUR 534.

## GRADUATE PROGRAMS AND COURSES

### **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. Prerequisites: NUR 534, 536; 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. Pre- or corequisites: all core and flexible core courses except thesis/project.

### **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. Pre- or corequisites: all core courses.

### **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. Pre- or corequisites: all core courses.

### **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. Pre- or corequisites: all core courses.

### **NUR 565 Applied Physiology/Pathophysiology in Advanced Practice. (3)**

*fall*

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. Pre- or corequisites: all core courses.

### **NUR 568 Advanced Nursing Practicum I: Family Health Nursing. (2-6)**

*fall*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisites: admission to graduate Nursing program; all core and flexible core courses except thesis/project. Corequisite: NUR 562.

### **NUR 569 Advanced Nursing Practicum II: Family Health Nursing. (2-6)**

*spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Fee. Prerequisites: NUR 562, 568; 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: admission to graduate Nursing program.

### **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.
- Practicum for Teaching. (2-4)  
Prerequisites: NUR 571, 591.

### **NUR 581 Advanced Nursing Practicum I: Community Health Nursing. (3)**

*spring*

Clinical application of theories, concepts, and principles in area of concentration. Lecture, lab, seminar, conferences. Prerequisites: CHP 500; 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. Pre- or corequisites: all core courses except thesis/project.

**NUR 584 Community Health Nursing Internship. (3–6)***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 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. Prerequisites: NUR 581; 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 513.

**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 513.

**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:

- Cultural Competence and Health. (3)  
*summer in even years*  
Relationship between cultures and health, illness, communication, healing practices, child rearing, aging, and end of life. Lecture, cooperative learning strategies, immersion community experience.
- 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 6 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.

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## Nutrition

### Master's Program

[www.east.asu.edu/ecollege/nutrition](http://www.east.asu.edu/ecollege/nutrition)

480/727-1728

HSC 1386

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**Linda A. Vaughan, Chair****Professors:** Johnston, Vaughan**Associate Professor:** Hamp**Assistant Professors:** Hutchins, Winham, Woolf**Lecturers:** Dixon, Hall, Shepard

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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, limited to current M.S. in Nutrition students, which is currently granted accreditation by the

COMMISSION ON ACCREDITATION FOR  
DIETETICS EDUCATION OF THE AMERICAN  
DIETETIC ASSOCIATION  
120 SOUTH RIVERSIDE PLAZA, SUITE 2000  
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. For admission procedures for the optional Dietetic Internship, see "Dietetic Internship," page 294.

**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 I and II (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

## GRADUATE PROGRAMS AND COURSES

must also complete six semester hours of NTR 580 Dietetics Practicum; only three semester hours of NTR 580 may be applied toward the M.S. degree. Additional courses may be selected upon consultation with an advisor.

**Foreign Language Requirements.** None.

**Thesis Requirements.** A thesis is required.

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

### RESEARCH ACTIVITY

The faculty in the Department of Nutrition are engaged in a broad range of research activities. Undergraduate students are encouraged to collaborate with faculty and graduate students in the research process. Department faculty are well recognized for their research in the areas of Vitamin C 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](http://www.east.asu.edu/ecollege/nutrition).

**Dietetic Internship.** Admission to the Dietetic Internship is limited to the following students with regular or unconditional admission to the Department of Nutrition's graduate program: (1) graduate students who are currently in good academic standing in the M.S. degree program in Nutrition at ASU East and who have completed at least six graduate semester hours from the ASU Department of Nutrition; and (2) students who have already completed the M.S. degree in Nutrition from ASU in the past and meet all other admission requirements. 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. 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 201; NTR 241. Corequisite: BIO 202.

#### **NTR 441 Advanced Human Nutrition II. (3)**

*spring*

Metabolic reactions and interrelationships of carbohydrate, lipid, and protein. Prerequisites: BCH 361 and BIO 202 and NTR 241 (or their equivalents).

#### **NTR 442 Experimental Foods. (3)**

*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 Management of Food Service Systems. (3)**

*fall and spring*

Standardized methods of quantity food preparation, operation of institutional equipment, institutional menu planning, quantity food experiences. Integrated lecture/lab. Fee. Prerequisites: NTR 142 and 344 (or their equivalents).

#### **NTR 446 Human Nutrition Assessment Lecture/Laboratory. (3)**

*fall and spring*

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Fee. Prerequisites: BCH 361, 367; NTR 440 (or 441).

#### **NTR 448 Community Nutrition. (3)**

*fall and spring*

Food-related behaviors; organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutrition assessment of populations. Prerequisite: NTR 241 (or its equivalent).

#### **NTR 450 Nutrition in the Life Cycle I. (3)**

*fall*

Emphasizes nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: NTR 100 or 241 (or its equivalent).

#### **NTR 451 Nutrition in the Life Cycle II. (3)**

*spring*

Nutritional needs and problems of adults, particularly the elderly. 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. Integrated 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 Management of Institutional Food Service Systems. (3)***fall and spring*

Standardizes methods of quantity food preparation, operation of institutional equipment, institutional menu planning, quantity food experiences. May require field trips. Integrated lecture/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. Fee. 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. Prerequisites: a course each in advanced nutrition, biochemistry, and physiology.

**NTR 792 Research. (1–15)***selected semesters***NTR 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.

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## Performance

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See "Music," page 280.

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## Philosophy

**Master's and Doctoral Programs**

[www.asu.edu/philosophy](http://www.asu.edu/philosophy)

480/965-3394

COOR 3307

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**Steven L. Reynolds, Interim Chair**

**Regents' Professor:** Murphy

**Professors:** Cohen, Creath, Fitch, French, Humphrey, White

**Associate Professors:** Armendt, Blackson, de Marneffe, Guleserian, Kobes, McGregor, Reynolds

**Assistant Professor:** Devlin

**Senior Lecturer:** Bolton

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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" (3.00) 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 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 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 graduate director and the supervisory committee.

**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" (3.00) 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" (3.00) 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 graduate director and 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" (3.00) 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 are 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 prepares a prospectus of four to seven pages for the dissertation. The format and design of the prospectus are 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 428 Immunophilosophy. (3)***selected semesters*

Integrates immunology and philosophy, including psychoneuroimmunology and the mind-body problem, and immunologic/psychologic perspectives on self and self-identity. May be repeated for credit.

Discussion, original literature readings and written assignments.

Cross-listed as MIC 428. Credit is allowed for only MIC 428 or PHI 428. Pre- or corequisite: MIC 420 or PHI 317 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.](#)

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## Physical Education

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See [“Master of Physical Education,” page 251.](#)

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## Physics

### Master’s and Doctoral Programs

[phy.asu.edu](http://phy.asu.edu)

480/965-9152

PS F470

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**Barry G. Ritchie, Chair**

**Regents’ Professors:** Smith, Spence, Starrfield

**Professors:** Alarcon, Bauer, Bennett, Burstein, Chamberlin, Comfort, Cowley, Doak, Dow, Hester, Lindsay, Menéndez, Ponce, Rez, Ritchie, Sankey, Schmidt, Thorpe, Tillery, Treacy, Tsen, Tsong, Venables, Windhorst, Wyckoff

**Associate Professors:** Culbertson, Drucker, Herbots, Marzke, Morse, Newman

**Assistant Professors:** Desch, Lebed, Ortiz, Shumway

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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 287](#)) 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 320](#)).

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 189](#)) and Ed.D. (see [“Doctor of Education,” page 190](#)) 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 90). 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, 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 287, for Master’s of Natural Science degrees based in subjects other than physics.

**Admission.** Requirements 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](http://phy.asu.edu).

**Supervisory Committee.** The supervisory committee, consisting of three faculty members, is appointed by the dean of graduate studies 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](http://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 300.

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 need 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 designated core courses, within a total of at least 30 semester hours, and passing a written comprehensive examination. The courses selected may include 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 3.00 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.

PHY 511 Materials Physics I.....	3
PHY 512 Materials Physics II.....	3
PHY 576 Quantum Theory.....	3

## GRADUATE PROGRAMS AND COURSES

PHY 577 Quantum Theory .....	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 .....	3
PHY 577 Quantum Theory .....	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 (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](http://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 460 Astrobiology. (3)

*fall and spring*

Origin, early evolution, distribution, and future of life on Earth and elsewhere in the cosmos. May be repeated for credit. Lecture, discussion, video conferences, possible field trips. Cross-listed as BIO 460/CHM 483/GLG 460/MIC 475. Credit is allowed for only AST 460 or BIO 460 or CHM 483 or GLG 460 or MIC 475. Prerequisite: instructor approval.

**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 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.

**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.

## GRADUATE PROGRAMS AND COURSES

### **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*

### **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 micros-

copy/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. Defect structure and composition using STEM imaging, x-ray and electron-energy-loss spectroscopy. 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. Novel developments and applications. 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)**

*selected semesters*

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)**

*selected semesters*

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:

- Surface and Thin Films. (3)

*spring*

See ASU Online or [phy.asu.edu/classes](http://phy.asu.edu/classes) for details. Internet course.

- Topics in Biophysics. (3)

*fall*

See [phy.asu.edu/classes](http://phy.asu.edu/classes) for details.

**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

[sols.asu.edu](http://sols.asu.edu)

480/965-1768

LSE 229

**Morton E. Munk, Interim Director,  
School of Life Sciences**

**Andrew N. Webber,  
Associate Director for Graduate Programs**

**Willem F.J. Vermaas,  
Associate Director for Research Initiatives**

**Regents' Professors:** Alcock, Arntzen, Maienschein, Pyne

**Professors:** Burke, Capco, Chandler, Collins, Creath, Deviche, Dowling, Elser, Faeth, Fisher, Frasch, Grimm, Harrison, Hedrick, Jacobs, Klopatek, Lawson, Misra, Moore, Mossman, Munk, Nash, Rutowski, Satterlie, Schmidt, Smith, Sommerfeld, Trelease, Vermaas, Walsberg, Webber

**Associate Professors:** Armendt, Briggs, Chang, Clark, Day, Fewell, Garcia-Pichel, Goldstein, Hoffman, Hogue, Kumar, Joshi, McGregor, Orchinik, Pigg, Ramakrishna, Rawls, Roberson, Stout, Stromberg, Szarek, Towill, Wu

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

**Research Professors:** Cardineau, Davidson, Mahoney, Pearson

**Associate Research Professor:** Lopez

**Assistant Research Professors:** Bertram, Hope, Hu, Langland, Minter, Neuer, Walmsley

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 278).

The faculty participate in the programs leading to the Master of Natural Science (M.N.S.) degree (see "Natural Science," page 287) 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.

**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

## GRADUATE PROGRAMS AND COURSES

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" (2.00) 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, and characterization; PCR; mutageneses; hybridization and sequence analysis; protein quantitation; immunologic detection and electrophoresis. Cross-listed as MIC 446. Credit is allowed for only MBB 446 or MIC 446. Pre- or corequisite: MBB 445 or MIC 445.

#### MBB 484 Internship. (3)

*selected semesters*

#### MBB 490 Capstone: Issues in Biotechnology. (2)

*fall and spring*

Integrates science and humanities within problem-solving exercises dealing with intellectual property, ethics, regulatory issues, business practices, and commercialization. May be repeated for credit. 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.

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**Political Science****Master's and Doctoral Programs**[www.asu.edu/clas/polisci](http://www.asu.edu/clas/polisci)

480/965-7667

COOR 6782

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**Patrick J. Kenney, Chair**

**Professors:** Ball, Dagger, Fridkin, Jones, Kenney, Simon, Youngblood

**Associate Professors:** Ashley, Crittenden, Dantico, Doty, M. Elman, Herrera, Keating, Mitchell, Simhony, Warner

**Assistant Professors:** Chin, C. Elman, Goren, Hoekstra

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The faculty in the Department of Political Science offer graduate programs leading to the M.A. and Ph.D. degrees in Political Science. Concentrations are available in American politics, comparative politics, international relations, and political theory.

Students admitted to the Master of Education degree with a major in Secondary Education may also elect political science as the subject matter field.

**MASTER OF ARTS**

See "Master's Degrees," page 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:

## GRADUATE PROGRAMS AND COURSES

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 early 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 toward 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" (4.00), "B" (3.00), 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 examination and have completed 30 semester hours of course work toward the Ph.D. are then awarded the M.A.

**Research Skills/Foreign Language Requirements.** All Ph.D. students must show proficiency in research and methodological skills. This requirement may be met by showing proficiency in one or more of the following areas: foreign language, quantitative, or qualitative methods. Supervisory committees determine which among those research tools are appropriate for students in their fields of study.

**Comprehensive 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*

#### 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).

## GRADUATE PROGRAMS AND COURSES

### **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.](#)

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## Post-Bachelor’s Artist Diploma

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See [“Post-Bachelor’s Artist Diploma,” page 284.](#)

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## Post-Master’s Nurse Practitioner

### Certificate Program

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For information, see [“Nursing,” page 288,](#) or call the College of Nursing Student Services Office at 480/965-2987.

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## Professional Accountancy

### Certificate Program

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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](http://www.west.asu.edu) on the Web.

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## Psychology

### Doctoral Program

[psych.la.asu.edu](http://psych.la.asu.edu)

480/965-3326

PSY 237C

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#### Darwyn E. Linder, Chair

**Regents' Professors:** Cialdini, Eisenberg, Russo, Sandler

**Professors:** Aiken, Barrera, Braver, Castro, Chassin, Homa, Karoly, Kenrick, Killeen, Knight, Lanyon, Linder, MacKinnon, Millsap, Neisewander, Neuberg, Okun, Parkinson, Presson, Reich, Sadalla, 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, Wosinski

**Lecturer:** Palmer

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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 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 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 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.

#### PSYCHOLOGY (SCIENCE AND MATHEMATICS) (PSY)

*For more PSY courses, see the list of E PSY courses under "Applied Psychology."*

##### M PSY 420 Analysis of Behavior. (3)

*selected semesters*

Research, applications, and philosophy of the analysis and control of human behavior. Prerequisite: PSY 320.

## GRADUATE PROGRAMS AND COURSES

### **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 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 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.



Music Building courtyard

Jean Laaninen photo

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## Public Administration

**Master's Program**

[spa.asu.edu/Acadprog/mpa.htm](http://spa.asu.edu/Acadprog/mpa.htm)

480/965-3926

WILSN 208

**Robert Denhart****Interim Director, School of Public Affairs****Heather E. Campbell****Director, Master's Program**

**Professors:** Alozie, Cayer, Chapman, Coor, Crow, J. Denhardt, R. Denhardt, Hall, Lan, Perry

**Associate Professors:** Campbell, DeGraw

**Assistant Professors:** Catlaw, Corley, McCabe, Peck, Voorhees

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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.

**Admission.** Applicants to the M.P.A. program are considered for admission irrespective of undergraduate major, although students may be required to complete additional courses and/or workshops to prepare themselves for the core courses.

The applicant's undergraduate GPA, GRE scores (verbal, quantitative, and analytical), letters of recommendation, statement of educational and career goals, and professional experience are all considered in the admissions process. In addition, TOEFL scores (550 or higher) are required for international students. Admission may be limited by space availability.

Applications for admission can be sent at any time. Students requesting graduate assistantships and tuition scholarships should have their application files completed by March 1.

All applicants must submit the following materials to the Graduate College:

1. an official application;

## GRADUATE PROGRAMS AND COURSES

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 and American government. 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" (3.00) or higher in approved courses (PAF 401, POS 401, PSY 230, QBA 221, and SOC 390) within the last two years or passing a diagnostic test approved by the M.P.A. Committee. Other courses taken within the last two years may be substituted upon approval of the M.P.A. director. Competency in American government is a demonstrated understanding of American government institutions and processes. Students may be required to take an undergraduate class in American government (PAF 300, PAF 340, POS 110, or POS 310). In addition, competency in computer use is expected of all students.

**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 syn-

thesizing and applying core course knowledge, skills, and abilities to public service problems. Students demonstrate their public service competency by earning an "A" (4.00) or a "B" (3.00) 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 551 Computers in Administration. (3)**

*selected semesters*

Experience in use of computer technology for public administration problem solving.

**PAF 552 Public Information Systems. (3)**

*selected semesters*

Systems analysis concepts and theory as applied to administration. Alternative modes of information organization and their impact on public decision making.

**PAF 556 Database Management Systems. (3)**

*selected semesters*

Concept and use of modern database management systems in an administrative organization. Advantages and disadvantages of this approach.

**PAF 561 Comparative Administration. (3)**

*selected semesters*

Literature on comparative public administration theory. Bureaucracies and their impact on the political development process. Studies selected nations.

**PAF 562 Intergovernmental Relations. (3)**

*once a year*

Evolution, growth, present status, and characteristics of the U.S. federal system of government. Federal-state relations, state-local relations, regionalism, councils of government, interstate cooperation, grants-in-aid, and revenue sharing.

**PAF 563 Report Preparation. (3)**

*selected semesters*

Intensive practice in written and oral presentation of reports to conferences with problems in public administration. Visual aid techniques.

**PAF 564 Political Economy. (3)**

*once a year*

Classical and contemporary literature and historical development of governmental and economic arrangements, with special emphasis on the role of the state.

**PAF 591 Seminar. (1–12)**

*fall and spring*

Topics may include the following:

- Business and Government
- Emergency Management
- General Public Administration

## GRADUATE PROGRAMS AND COURSES

- 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.



The ASU baseball team has a rich tradition. Many Sun Devils have gone on to play in the major leagues.

Tim Trumble photo

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## Public Administration

### Interdisciplinary Doctoral Program

[spa.asu.edu](http://spa.asu.edu)

480/965-3926

WILSN 208

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Jeffrey Chapman

Director, School of Public Affairs

Robert Denhardt

Director, Doctoral Program

### **Agribusiness and Resource Management (ASU East)**

Professors: Edwards, Thor

### **Geography**

Professor: Burns

### **Health Administration and Policy**

Professor: Johnson

### **Journalism and Mass Communication**

Professor: Merrill

### **Justice Studies**

Regents' Professor: Altheide

Professors: Hepburn, Schneider

### **Planning and Landscape Architecture**

Professor: Pijawka

### **Psychology**

Professor: Castro

### **Public Affairs**

Professors: Alozie, Cayer, Chapman, Crow, J. Denhardt, R. Denhardt, Hall, Lan, Perry

Associate Professor: Campbell

Assistant Professors: Catlaw, Corley, McCabe, Peck, Voorhees

### **Recreation Management and Tourism**

Associate Professor: Virden

### **Social Work**

Professor: MacEachron

### **Sociology**

Associate Professor: Benin

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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 graduate studies. Minimum Graduate College admission requirements must be met. See “[Admission to the Graduate College](#),” page 85, 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 graduate studies 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 graduate studies. 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 graduate studies.

**Final Examination.** The final oral examination in defense of the dissertation is scheduled by the dean of graduate studies 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 graduate studies.

**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 graduate studies.

Applications for graduation should be made no later than the date specified in the Graduate College calendar.

## RESEARCH ACTIVITY

The school engages in an extensive research program including individual faculty research, applied public service, and contract and grant-funded research. Several units exist in the school for the purpose of furthering research in the public sector and linking that research to the effective management of public organizations. One aspect of that research-service-management link has been the participation on and/or coordination of several Arizona Academy Town Hall research reports. Chief among the research linkages is the Morrison Institute for Public Policy. The Morrison Institute analyzes current and proposed public policies that are important to the future of greater Phoenix, Arizona, and the nation. Its mission is to conduct research that informs, advises, and assists Arizona’s state and community leaders. For more information on research activity in the School of Public Affairs, access [spa.asu.edu](http://spa.asu.edu).

## COURSES

For courses, see “[Public Affairs \(PAF\)](#),” page 312.

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**Public Art**  
**Certificate Program**

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For information on the new Graduate Certificate in Public Art, call the School of Art at 480/965-3468.

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**Recreation**  
**Master's Program**

[www.asu.edu/copp/recreation](http://www.asu.edu/copp/recreation)  
480/965-7291  
AG 281

**Randy J. Virden, Chair, Department of Recreation  
Management and Tourism**

**Carlton F. Yoshioka, Graduate Coordinator**

**Professors:** Allison, Yoshioka

**Associate Professors:** Ashcraft, Sonmez, Teye, Timothy, Virden

**Assistant Professors:** Barry, Brown, Guo, Leclerc, Pritchard, White

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**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 300-hour 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.

**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 reflects 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; and nonprofit agency leadership/management. For more information, access the department's Web site at [www.asu.edu/copp/recreation](http://www.asu.edu/copp/recreation).

### 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.

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## Religious Studies

### Master's Program

[www.asu.edu/clas/religious\\_studies](http://www.asu.edu/clas/religious_studies)

480/965-7145

ECA 377

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Joel D. Gereboff, Chair

**Professors:** Cady, Coudert, Feldhaus, Foard, Morrison, Samuelson

**Associate Professors:** Clay, Fessenden, Gereboff, Moore, Schober, Swanson, Woodward

**Assistant Professors:** Aguilera, Benn, Damrel, Leon, Park, Umar

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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.** 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 85, 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).

## GRADUATE PROGRAMS AND COURSES

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](mailto: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 toward completing the portfolio may be earned as part of the required credit hours outlined in (2); and
4. an oral defense of the portfolio.

## RESEARCH ACTIVITY

For information on current research activity, access the Department of Religious Studies Web site at [www.asu.edu/clas/religious\\_studies](http://www.asu.edu/clas/religious_studies).

### RELIGIOUS STUDIES (REL)

#### REL 410 Judaism in Modern Times. (3)

*selected semesters*

Variety of expressions of Judaism and Jewishness in the modern period. Topics may include American Judaism or religious responses to the Holocaust.

#### REL 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 427 American Religious Thought. (3)

*selected semesters*

Thought of representative American religious thinkers, e.g., 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.

#### 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. (1–12)**

*selected semesters*

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



The W. P. Carey School of Business features a snack and beverage lounge.

Tim Trumble photo

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## Renaissance Studies

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See "Medieval and Renaissance Studies," page 275.

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## Scholarly Publishing

### Certificate Program

[www.asu.edu/clas/history/graduate/area\\_publishing.html](http://www.asu.edu/clas/history/graduate/area_publishing.html)

480/965-5775

COOR 4497

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**Beth Luey, Director**

**Senior Instructional Professional: Luey**

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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.

## GRADUATE PROGRAMS AND COURSES

### **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.

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## Science and Engineering of Materials

### Interdisciplinary Doctoral Program

[www.asu.edu/graduate/SEM](http://www.asu.edu/graduate/SEM)

480/965-2460

PS A323

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**James B. Adams, Codirector**

**William T. Petuskey, Codirector**

#### **Chemical and Materials Engineering**

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

#### **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

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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 Ira A. Fulton School of Engineering: the Center for Solid State Science and 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 511 Materials Physics I.....	3
or PHY 512 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 or (2) solid-state device materials design. Students may tailor a program of study in the science and engineering of materials to meet their professional and academic needs. Students achieve the desired concentration by completing three or more of the courses in the appropriate concentration group of courses. The courses in these concentrations are a part of the elective portion of the degree course requirements.

**High-Resolution Nanostructure Analysis.** The courses 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 the university's strongest materials research and education specialties and is an important part of the SEM program. Required courses are as follows:

SEM 552 Electron Microscopy I.....	3
SEM 553 Electron Microscopy Laboratory I.....	3
SEM 554 Electron Microscopy II .....	3
SEM 555 Electron Microscopy Laboratory 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 Semiconductors.....	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 compo-

nent 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 problem and proposed solution before the faculty supervisory committee. The proposed problem may be from any area of materials research but it may not be part of the student's dissertation topic. The student must prepare and deliver to the members of the supervisory committee the written proposal describing the research proposition not less than seven business days before the scheduled examination date. The comprehensive exams may be taken no more than twice upon formal application to, and under conditions specified by, the student's faculty committee, the director of the supervisory program, and the dean of graduate studies. 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 graduate studies.

### 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. Defect structure and composition using STEM imaging, x-ray and electron-energy-loss spectroscopy. 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.

## GRADUATE PROGRAMS AND COURSES

### SEM 554 Electron Microscopy II. (3)

*spring*

Determination of structure and composition of materials using high-resolution imaging, convergent-beam diffraction, and electron holography. Novel developments and applications. 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.

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## Social and Philosophical Foundations of Education

### Master's Program

[coe.asu.edu/elps/spf.php](http://coe.asu.edu/elps/spf.php)

480/965-6357

ED 120

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**Nicholas R. Appleton, Academic Program Coordinator**

**Regents' Professors:** Berliner, Glass, Smith

**Professors:** Appleton, Barone, Tobin, Webb, Wiley

**Associate Professors:** Hunnicutt, Margolis

**Assistant Professors:** Moses, Powers

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## 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.

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## Secondary Education

### Master's Program

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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](http://www.west.asu.edu) on the Web.

**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 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 591 Seminar. (1–12)***selected semesters***SPF 598 Special Topics. (1–4)***selected semesters***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](http://sww.asu.edu)

480/965-3304

WHALL 135

#### Leslie Leighninger, Director, School of Social Work

**Professors:** Ashford, LeCroy, Leighninger, MacEachron, Moroney, Segal

**Associate Professors:** Brzuzy, Gerdes, Gustavsson, Marsiglia, Montero, Napoli, Nichols, Paz, Risley-Curtiss, Steiner, Stromwall, Waller, Yellow Bird

**Assistant Professors:** Holley, Holschuh, Kang, Larson, Okamoto

**Visiting Assistant Professor:** Bacchus

**Senior Instructional Professional:** Gonzalez-Santin

**Academic Professionals:** Knutson-Woods, Rountree-Antar

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

## GRADUATE PROGRAMS AND COURSES

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
SWG 598 ST: Advanced Standing Bridge Seminar.....	3
Total .....	6

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 approved advanced courses .....	3

SWG 613 Social Work with Individuals (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 85). Advanced Standing 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.

A combination of academic and professional references is desirable. References from friends, family members, or personal therapists are not accepted.

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. a completed Graduate College application form;
2. the 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
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 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 12 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 approved advanced courses .....3  
     SWG 613 Social Work with Individuals (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 85). 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.

A combination of academic and professional references is desirable. References from friends, family members, or personal therapists are not accepted.

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 be successfully completed either 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 more information or to request an application to the Tucson component, call 520/884-5507.

## GRADUATE PROGRAMS AND COURSES

**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” (3.00) 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 toward the degree by (1) exempting up to 15 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 CSWE 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” (4.00) in SWU 301 or an equivalent social work course;

2. SWG 502, if the student has an “A” (4.00) in SWU 340 or an equivalent social work course;
3. SWG 519, if the student has an “A” (4.00) in SWU 320 or an equivalent social work course;
4. SWG 531, if the student has an “A” (4.00) in SWU 171 and 432 or equivalent social work courses;
5. SWG 533, if the student has an “A” (4.00) 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 the 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.

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.

**Advising.** 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 graduate studies.

**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 graduate studies 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

## GRADUATE PROGRAMS AND COURSES

final examination within five years after completing the comprehensive examination.

### RESEARCH ACTIVITY

Research within the School of Social Work is multifaceted. The faculty research agendas emphasize an understanding for the unique social, political, and cultural issues of importance to populations of the Southwest. For more details about the research interests of the faculty of the School of Social Work, access the school's Web site at [ssw.asu.edu](http://ssw.asu.edu).

#### Drug Resistance Strategies Project

This is a school-based substance abuse program funded by the National Institute on Drug Abuse. 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, Drug Resistance Strategies (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.

#### Southwest Interdisciplinary Research Consortium

The mission of the Southwest Interdisciplinary Research Consortium (SIRC) is to develop a research infrastructure for conducting multidisciplinary, community-based social work research on family and youth drug use prevention and services. SIRC is funded through a five-year National Institutes of Health/National Institute on Drug Abuse research development grant. Interdisciplinary teams composed of faculty from the Schools of Social Work and Justice Studies; the Departments of Psychology and Sociology; and the College of Education, plus community-based partnerships, collaborate on state-of-the-art research projects. A Community Advisory Board, representing 22 community and government agencies, provides a forum for current research and identification of areas in need of study.

#### 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.

### 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. Fee. Pre- or corequisite: SWG 510.

#### SWG 542 Field Practicum II. (3)

*fall and spring*

See SWG 541. Fee. Prerequisite: SWG 541. Pre- or corequisite: SWG 511.

#### SWG 550 Co-occurring Disorders. (3)

*fall*

Provides sound theoretical and practical orientations to working with persons who have co-occurring disorders. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

#### SWG 551 Crisis Intervention. (3)

*fall*

Covers the basics of crisis intervention in social work practice, along with applications to several different populations. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

#### SWG 552 Issues in School Social Work. (3)

*fall and spring*

Provides knowledge and skills necessary to implement effective social work services in a school setting. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

#### SWG 553 Social Work with American Indians. (3)

*spring*

Introduces social work issues relevant to Native Americans. Explores effective methods with native American clients. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

#### SWG 554 Substance Abuse. (3)

*fall*

Psychological and sociocultural determinants of substance abuse. Overview of social policies and treatment approaches. Lecture, cooperative learning, small group activity.

#### 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 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 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 sub-systems. 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 630 Brief Social Work Intervention. (3)***fall and spring*

Concepts and techniques of solution-focused, systematic, and strategic approaches to therapy in the context of brief therapy. Lecture, cooperative learning, small group activity. Prerequisite: instructor approval.

**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 that 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. Fee. Prerequisites: SWG 541, 542. Pre- or corequisite: SWG 611.

**SWG 642 Advanced Practicum: Direct Practice II. (3)***fall and spring*

See SWG 641. Fee. Prerequisites: SWG 541, 542, 611, 641. Pre- or corequisite: SWG 613 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. Fee. 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. Fee. Prerequisites: SWG 681 (or 682), 643. Pre- or corequisite: SWG 680.

**SWG 650 Social Work Ethics and the Law. (3)***fall*

Identifies the laws and ethics that regulate social work practice; utilizes two models of ethical decision making. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

**SWG 653 Introduction to Holistic Therapies. (3)***spring*

Introduces the theory and history of holistic therapies; demonstrates how to use the therapies with clients. Lecture, cooperative learning, guest speakers. Prerequisite: graduate standing.

**SWG 654 Introduction to Sexual Abuse. (3)***spring*

Develops general knowledge and skills for working with persons who have been impacted by sexual abuse. Lecture, cooperative learning, small group activity. Prerequisite: graduate standing.

**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 a 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.

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

## GRADUATE PROGRAMS AND COURSES

### SOCIAL WORK (UNDERGRADUATE PROGRAM) (SWU)

#### SWU 437 Infant Family Assessment and Observation. (3)

fall

Examines strategies for implementing developmental assessments and observations of young children and their families. Cross-listed as CDE 437. Credit is allowed for only CDE 437 or SWU 437. Prerequisite: CDE 232 or SWU 301 (or their equivalents).

#### SWU 444 Issues in School Social Work. (3)

fall and spring

Demonstrates how community, family, and school are interdependent using an ecological metaphor, and introduces school social work. Lecture, cooperative learning. Prerequisites: SWU 410, 412, 413; Social Work major.

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

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## Social Work

### Master's Program

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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](http://www.west.asu.edu/chs/msw) on the Web.

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## Sociology

### Master's and Doctoral Programs

[www.asu.edu/clas/sociology/graduate](http://www.asu.edu/clas/sociology/graduate)

480/965-3735

COOR 5679

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Verna M. Keith, Chair

**Professors:** Bolin, Cobas, Hackett, Jacobson, Kronenfeld, Kulis, Thomas, Weitz

**Associate Professors:** Agadjanian, Benin, Harlan, Keith, Miller-Loessi, Sullivan

**Assistant Professors:** Glick, Padilla

**Senior Lecturer:** Fine

**Associate Research Administrator:** Wolf

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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 statement of purpose provided by the applicant. The application deadlines are January 31 for preferential consideration for funding, March 31 for fall admission, and October 15 for spring admission, which is limited to students who have completed at least six semester hours of graduate-level course work in sociology.

**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), six hours of research methods (SOC 500 and 505), and 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.

### 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 family, global political and cultural processes, health, and work issues. A detailed description of this program (including opportunities in teaching and research assistantships) may be obtained from the graduate secretary or viewed on the department's Web site. 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 applicant's academic record, and a statement of purpose 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. Exams are currently offered in family, global, political and cultural processes, health, and work. Statistics is an option to one written exam. 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 laboratory with linkages to the mainframe computer. The survey research laboratory conducts campus, community, state, and national surveys. Among the topics studied are health care utilization, neighborhood quality of life, probation outcomes, outdoor recreation, and statewide school evaluation.

### 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 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.](#)

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## Spanish

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See [“Languages and Literatures,” page 253.](#)

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## Special Education

### Master's Programs

[coe.asu.edu/programs](http://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

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The faculty in the Division of Curriculum and Instruction offer graduate programs leading to the M.A. and Master of Education (M.Ed.) degrees in Special Education. 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](#)

## GRADUATE PROGRAMS AND COURSES

**Instruction,”** page 179, 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 that includes four content/theme areas: learning and instruction, diversity, foundations and values, and research and technology.

M.Ed. initial teacher certification sequences leading to standard certificates by the State of Arizona in mental retardation and learning and emotional disabilities, as well as an endorsement in gifted education, are available.

Concurrent admission to the 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.

### 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.



Metalworking is just one of the wide variety of course offerings within the M.F.A. degree program.

Tim Trumble photo

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## Special Education

### Master's Program

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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](http://www.west.asu.edu) on the Web.

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## Speech and Hearing Science

### Interdisciplinary Doctoral Program

[www.asu.edu/clas/shs](http://www.asu.edu/clas/shs)

480/965-9136

COOR 3412

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**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 Professors: Liss, Restrepo

Assistant Professors: Azuma, Edgar, Gray

Clinical Professor: Wiley

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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.

Note: The Department of Speech and Hearing Science offers the M.S. degree in Communications Disorders and the Doctor of Audiology degree.

#### 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. an 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. a 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 graduate studies. 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 graduate studies 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 graduate studies appoints the student’s dissertation committee, consisting of a chair and at least two other members. The dissertation committee must consist of members from more than one academic discipline. This committee approves the design and implementation of the dissertation. Members of the program committee also may serve as members of the dissertation committee.

**Preliminary Examination.** The preliminary examination is composed minimally of the first-year research project. This project, to be completed by the end of the second semester of the first year, consists of an oral presentation and defense of the research, as well as a written manuscript. The

program committee decides whether an optional written examination is necessary. The format of that examination is determined by the program committee and depends, in part, upon the background of the student. Results of the preliminary examination are used to determine shortcomings that should be offset by course electives, the level at which the student is capable of pursuing various topic areas, and whether deficiencies are of sufficient magnitude to preclude recommendation for continued doctoral study.

**Research Methods and Statistics.** The student is required to demonstrate proficiency in research methods (research design, statistics, computer languages). Evidence of required proficiency may be demonstrated by examination or by successful completion of a sequence of courses designated by the program committee.

**Program of Study.** The program consists of a minimum of 54 semester hours of graduate work beyond the master's degree or 84 semester hours of graduate work beyond the bachelor's degree. Of the required semester hours, at least 24 must be research (SHS 792) and dissertation (SHS 799) credit completed at ASU. A minimum of 30 hours of the approved Ph.D. program, exclusive of dissertation and research hours, must be completed after admission to the Ph.D. program 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 to enhance the quality of the dissertation research.

**Research and Dissertation Proposals.** Before conducting the programmatic research, the student is advised by the program committee on the appropriateness of the planned research. 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 origi-

nal 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 159.*

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## Statistics

### Interdisciplinary Master's and Certificate Programs

[www.asu.edu/graduate/statistics](http://www.asu.edu/graduate/statistics)

480/965-5003

BAC 570

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**Dennis L. Young, Interim Director, Executive Committee**

#### Economics

Professors: Burdick, Mayer  
Associate Professor: Reiser

#### Health Administration and Policy

Associate Professor: Wilson

#### Industrial Engineering

Professors: Hubele, Montgomery, Runger  
Assistant Professor: Kulahci

#### Information Systems

Professor: St. Louis

#### Mathematics and Statistics

Professors: Lohr, Young  
Associate Professor: Prewitt  
Assistant Professor: Oleson

#### Supply Chain Management

Associate Professor: Brooks

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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 Ira A. Fulton School of Engineering, the College of Liberal Arts and Sciences, and the W. P. Carey School of Business.

**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

## GRADUATE PROGRAMS AND COURSES

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 a programming language, a spreadsheet program, or a statistical software program.

For more information, access the Web site at [www.asu.edu/graduate/statistics](http://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 85) 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 pro-

gram 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 244, "Quantitative Business Analysis (QBA)," page 144, and "Statistics and Probability (STP)," page 271.



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## Taxation

### Master's Program

[wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc)

480/965-3631

BA 223

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#### James R. Boatsman, Director

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

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

**Assistant Professors:** Chen, Comprix, Dowling, Lee, O'Donnell, Petersen, Ravindran, Robinson, Roussinov, Rowe, Santanam, Shao, Weiss

**Senior Lecturers:** Geiger, Goldman, Hayes, Maccracken, Shrednick

**Lecturer:** J.L. Boatsman

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### MASTER OF TAXATION

The faculty in the School of Accountancy 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). 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 138) and Ph.D. degree in Business Administration (see "[Doctor of Philosophy](#)," page 139).

For more information on faculty, programs, and courses, access the school's Web site at [wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc).

**Admission.** All applicants are required to submit the supplemental application materials required by 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. International applicants whose native language is not English must submit scores from the Test of English as a Foreign Language and the Test of Spoken English 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 Master of Taxation consists of a minimum of 30 semester hours and is continually updated. Students acquire core knowledge and a set of professional skills from course work drawn from financial and managerial accounting, auditing, taxation, and information systems. These core courses, recommended by the American Institute of Certified Public Accountants as "a fundamental part of any graduate level accounting curriculum," build on a base level of knowledge and skills that students are presumed to have acquired from an undergraduate degree. Additionally, students take a sequence of courses on tax research, corporate and shareholder taxation, the taxation of flow-through entities, family tax planning, multijurisdictional taxation, and other special topics in taxation. Completion of the program results in students possessing an expanded understanding of the strategic role of accounting in business organizations and society. The significance of taxes in business decisions and tax compliance are also emphasized. Professional responsibilities and the ethical standards of the accounting profession, and especially the tax practice, are highlighted as well. Access 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 Web site at [wpcarey.asu.edu/acc](http://wpcarey.asu.edu/acc).

### COURSES

For courses, see "[Accountancy \(ACC\)](#)," page 100.

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## Teaching English as a Second Language

Master's Program

[www.asu.edu/clas/english/linguistics](http://www.asu.edu/clas/english/linguistics)

480/965-2563

LL 226C

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**Elly van Gelderen, Director**

**Professors:** Adams, Major, Nilsen, van Gelderen

**Associate Professors:** Bates, Johnson

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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 advi-

sor 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 85). 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 Linguistics, LIN 520 Second Language Acquisition Theories, LIN 521 Methods of Teaching 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) that 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 212.



Steve Hilton, a ceramic artist pursuing an M.F.A. degree, installs an interactive clay model of Mars' surface.

Jessica Slater photo

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## Technology

### Master's Programs

#### Department of Aeronautical Management Technology

[eastair.east.asu.edu](http://eastair.east.asu.edu)

480/727-1381

SIM 201

#### Department of Electronics and Computer Engineering Technology

[www.east.asu.edu/ctas/ecet](http://www.east.asu.edu/ctas/ecet)

480/727-1137

SUTTON 140

#### Department of Information and Management Technology

[www.east.asu.edu/ctas/imt](http://www.east.asu.edu/ctas/imt)

480/727-1781

TECH 102

#### Department of Mechanical and Manufacturing Engineering Technology

[www.east.asu.edu/ctas/mmet](http://www.east.asu.edu/ctas/mmet)

480/727-1584

SIM 295

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#### William K. McCurry, Chair, Department of Aeronautical Management Technology

**Professors:** Gesell, McCurry

**Associate Professors:** Karp, Turney

**Assistant Professors:** Niemczyk, 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, Schildgen

**Associate Professors:** Grossman, Hirata, Humble, Matson, Olson, Peterson

**Assistant Professor:** Kime

**Senior Lecturer:** Wilson

**Lecturers:** Dolin, Harris, Lestar

#### Scott G. Danielson, Chair, Department of Mechanical and Manufacturing Engineering Technology

**Associate Professors:** Biekert, Danielson, Nam, Palmgren, Rajadas, Rogers

**Assistant Professor:** Post

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The Master of Science in Technology (M.S.Tech.) degree program is offered by the faculty in four departments of the College of Technology and Applied Sciences—Aeronautical Management Technology, Electronics and Computer Engineering Technology, Information and Management Technology, and Mechanical and Manufacturing Engineering Technology—and the newly formed Division of Computing Studies. 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 technological area and a supporting area to meet individual career goals.

## GRADUATE PROGRAMS AND COURSES

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 minimum semester hours required.....	33

### Applied Project Option

Technical area of emphasis .....	15–18
Supporting area .....	9–12
Research writing course.....	3
Research/applied project.....	3
Total minimum semester hours required.....	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 or aviation human factors.

The Department of Electronics and Computer Engineering Technology offers concentrations in 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.

The Division of Computing Studies offers the concentration in computer systems.

The college offers two other 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 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. Integrated 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. Integrated 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.

## 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. Integrated lecture/lab. Prerequisite: senior standing.

**AMT 520 Airline Pricing and Yield Management. (3)***selected semesters*

Airline economics at the operating level; historical and current operational strategies; demand, traffic, price, yield, revenues, and costs. Prerequisite: admission to M.S. in Technology program.

**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 522 Aviation Law. (3)***selected semesters*

Examines the U.S. legal system with a focus on the aviation perspective, administrative agencies, FAA enforcement, and case law. Prerequisite: admission to M.S. in Technology program.

**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).

## GRADUATE PROGRAMS AND COURSES

### **AMT 524 Airport Management and Operations. (3)**

*selected semesters*

Overview of planning, funding, and development of airport facilities; legal and ethical considerations associated with airport management operations. Prerequisite: admission to M.S. in Technology program.

### **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 526 Aviation Labor Relations. (3)**

*selected semesters*

Investigates labor-management relations in the aviation industry, including laws, unionism, collective bargaining, public sector relationships, grievance procedures, and conflict. Prerequisite: admission to M.S. in Technology program.

### **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 532 Managing Diversity in Aviation. (3)**

*selected semesters*

Examines group identity and cognitive styles, cross-cultural issues, language and diversity, and effects of aviation culture on management of diversity. Lecture, discussion. Prerequisite: admission to M.S. in Technology program.

### **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 542 Human Factors in Automation. (3)**

*selected semesters*

Examines human factors issues associated with automation. Includes impact of automation design, workload, stress, and system complexity on human operators. Prerequisite: admission to M.S. in Technology program.

### **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 549 Applied 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. Three concentrations are available: 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. A concentration in computer systems is offered by the newly formed Division of Computing Studies.

**Admission and Proficiency Requirements.** For general admission requirements, see ["Admission to the Graduate College," page 85,](#) and ["Technology," page 339.](#) 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](http://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)	

Total minimum semester hours required.....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)	—
Total minimum semester hours required.....	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 339.

#### 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](http://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.

#### 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; CST 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.

## GRADUATE PROGRAMS AND COURSES

### **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. Integrated lecture/lab. Prerequisites: CET 383; CST 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:

- Applied Software Process. (3)
- 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 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; CST 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 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: CST 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***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. Fee. 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. 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. Fee. 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. Fee. Credit is allowed for only UET 511 or 411. Corequisite: UET 417.

## GRADUATE PROGRAMS AND COURSES

### 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. Fee. 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, information technology, or management of technology.

**Information Technology.** The information technology concentration provides students with a seamless graphic user interface from traditional printing and publishing applications to digital/printing/photography/multimedia, 3-D modeling, animation, database management, and Internet/Intranet Web development. Computer hardware/software config-

urations, 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](http://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.

Applicants must submit the following materials for admission review:

1. an online application for admission to the Graduate College and official transcripts of all undergraduate and graduate study;
2. a professional résumé;
3. a statement describing academic and professional goals, specifying the focus of study desired in the M.S.Tech.; and
4. three letters of recommendation required in cases where minimum Graduate College requirements are not satisfied.

All applicants whose native language is not English must submit a score from the Test of English as a Foreign

Language (TOEFL). Expected minimum scores are 550 on the paper test or a score of 213 on the computer-based TOEFL.

**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.

#### Thesis Option

Technical area of emphasis .....	18
Supporting area .....	9
Research course .....	3
Thesis .....	3
Total .....	33

#### Applied Project Option

Technical area of emphasis .....	18
Supporting area .....	9
Research course .....	3
Applied project.....	3
Total .....	33

**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 339.

## 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.

#### 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.

## GRADUATE PROGRAMS AND COURSES

### **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 mining 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*

2-D and 3-D computer animation methods: project planning, scripting, storyboards, advanced modeling, lighting, materials mapping, and motion. Integrated 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. Integrated lecture/lab. Prerequisite: GIT 314.

### **GIT 413 Professional Portfolio Design and Presentation. (3)**

*spring*

Digital media portfolio design and production: planning, audience analysis, media selection, authoring, media formats, production, copyright considerations, marketing, and delivery. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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. Integrated 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).

**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.

## GRADUATE PROGRAMS AND COURSES

### **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 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 selects courses 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
<b>Total .....</b>	<b>33</b>

**Applied Project Option**

Technical area of emphasis .....	18
Supporting area .....	9
Research writing course .....	3
Applied project.....	3
<b>Total .....</b>	<b>33</b>

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 manufacturing, aeronautical- and mechanical-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, automation, 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, CNC-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](http://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. Integrated 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)**

*fall*  
Mechanics and thermodynamics of propulsion systems. Solid, liquid propellant rocket design performance. Electrical nuclear propulsion systems. Space missions. Prerequisites: both AET 415 and 420 (or MET 434) or only instructor approval.

**AET 560 Numerical Methods in Engineering Technology. (3)**

*selected semesters*  
Analyzes problems in physical sciences, models physical problems, perturbation techniques, curvefitting, data analysis, numerical solutions, ordinary and partial differential equations.

**AET 580 Practicum. (1–12)**

*selected semesters*

**AET 583 Field Work. (1–12)**

*selected semesters*

**AET 584 Internship. (1–12)**

*selected semesters*

**AET 590 Reading and Conference. (1–12)**

*selected semesters*

**AET 591 Seminar. (1–12)**

*selected semesters*

**AET 592 Research. (1–12)**

*selected semesters*

**AET 593 Applied Project. (1–12)**

*selected semesters*

**AET 594 Conference and Workshop. (1–12)**

*selected semesters*

**AET 595 Continuing Registration. (1)**

*selected semesters*

**AET 598 Special Topics. (1–4)**

*selected semesters*

**AET 599 Thesis. (1–12)**

*selected semesters*

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

## GRADUATE PROGRAMS AND COURSES

### **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)**

*spring*

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)**

*spring*

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.

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## Theatre

### Master’s and Doctoral Programs

[herbergercollege.asu.edu/theatre](http://herbergercollege.asu.edu/theatre)

480/965-5337

GHALL 232

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**Professors:** Barker, Bedard, Eckard, Giner, Honegger, Knapp, Saldaña, Thomson, Wills

**Associate Professors:** Acker, Edwards, Furr-Soloman, Holloway, Reyes, Riske

**Assistant Professors:** Gharavi, Rivera-Servera, Steenerson, Sterling, Underiner, Woodson

**Senior Lecturer:** McMahon

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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 interdisciplinary digital media, performance, scenography, and theatre for youth at the M.F.A. level and theatre for youth at the Ph.D. level. Students may also pursue an interdisciplinary program in playwriting leading to the M.F.A. degree in Creative Writing (see “[Creative Writing](#),” page 172). This program is offered by the faculties in the Departments of English and Theatre (see “[English](#),” page 206).

### 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. 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.

**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” (3.00) 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 interdisciplinary digital media, performance, scenography, and theatre for youth.

The concentration in interdisciplinary digital media trains students to become sophisticated makers, evaluators, and entrepreneurs of digital media, while providing a focused series of classes in one of the departments’s other M.F.A. specialties: performance, scenography, or 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

## GRADUATE PROGRAMS AND COURSES

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 interdisciplinary digital media concentration consists of a minimum of 60 semester hours distributed as follows: 18 hours in art, media, and engineering core courses; 13 to 15 hours in theatre research, history, and theory; an additional 17 to 26 hours of theatre requirements to complete one of the department's other concentrations; and 12 hours of research/applied project credits.

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" (3.00) 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; a writing sample; transcripts; and a 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. program 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 on 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 48, and "Assistantships and Associateships," page 92. 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 the following:

*An Interpretive Study of the Play Production Process at an Urban Southwest High School*, by Barbara Jo Maier

*An Interrogation of Drama in Colonial Educational Contexts: Three Boys' Schools in Queensland, Australia*, by Janet McDonald.

*Borderland Children's Theatre: The Roles and Representations of Mexican-American Children in Chicano/a Drama for Young Audiences*, by Cecilia Josephine Aragón

*Constructing Community: Youth Arts and Drama, Federal Funding Policy, and Social Services*, by Lori L. Hager

*Drama Activities at the Ethical Culture School, 1878–1930*, by Virginia Page Tennyson.

*Longevity and the Secondary Theatre Arts Teacher: A Case Study*, by Cynthia Brown.

*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.

## THEATRE (THE)

### THE 400 Focus on Film. (3)

*fall and spring*

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 102 or 105 or 108.

### 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)

*fall and spring*

Films and filmmakers from Europe, Asia, Australia, the Far East, South America, and the 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 when topics vary. Topics may include the following:

- Alfred Hitchcock  
Fee.
- Hollywood Rebels  
Fee.

Prerequisite: THE 300.

## GRADUATE PROGRAMS AND COURSES

### **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. Fee. Prerequisite: ENG 102 or 105 or 108.

### **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 or 108.

### **THE 423 African American Theatre. (3)**

*selected semesters*

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 or 108.

### **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 or 105 or 108.

### **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: 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. Prerequisite: THP 318 or 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" (3.00) 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.

**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 518 Advanced Directing Lab. (3)***once a year*

Active discovery of directing concepts through practical exercises and collaboration; deconstruction of contemporary/classic literature. Explores director as primary artist. Lab. Prerequisite: written instructor approval.

**THP 519 Directing: Works in Progress. (3)***once a year*

Advanced projects in directing concentrating on a collaborative process between director, playwright, actors, and designers. Focuses primarily on new scripts or adaptations of literature. May be repeated for credit. Studio, on-site practicum. Prerequisites: THP 418; instructor approval.

**THP 530 Advanced Costume Design. (3)***selected semesters*

Advanced studio projects in costume design for a variety of production forms. Prerequisite: written instructor approval.

## GRADUATE PROGRAMS AND COURSES

### **THP 540 Scene Design Applications. (3)**

*selected semesters*

Conceptual and practical application of the design process, including graphic and sculptural projects. Practical design problems investigated in laboratory. Lecture, lab. Lab fee. Prerequisite: written instructor approval.

### **THP 545 Lighting Design Applications. (3)**

*selected semesters*

Advanced studio projects in stage lighting design. Prerequisite: written instructor approval.

### **THP 560 Playwright's Workshop. (3)**

*fall and spring*

Practice and study of creating characters, dialogue, scenes, plays, and monologues for the stage. May be repeated for credit. Studio. Prerequisite: written instructor approval.

### **THP 561 Scripts in Progress. (3)**

*fall and spring*

Studio work with the instructor centered on revisions of original plays. May be repeated for credit. Studio. Prerequisite: THP 560 or written instructor approval.

### **THP 584 Internship. (1–3)**

*selected semesters*

Field research and on-site training in theatre for youth, community theatre, and production techniques. Prerequisite: written instructor approval.

### **THP 592 Research. (1–12)**

*selected semesters*

### **THP 593 Applied Project. (1–12)**

*selected semesters*

Prerequisite: written instructor approval.

### **THP 594 Conference and Workshop in Child Drama. (3)**

*once a year*

Prerequisite: written instructor approval.

### **THP 598 Special Topics. (1–4)**

*once a year*

Lecture, studio. Topics may include the following:

- Advanced Screenwriting
- College Teaching:
  - Acting
  - Improvisation with Youth
  - Movement
  - Puppetry
  - Theatre for Social Change
  - Voice
- Performance and Technology
- 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.

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## Translation

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See "Undergraduate Certificate in Translation," page 254.

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## Transportation Systems

### Interdisciplinary Certificate Program

[www.asu.edu/caed/transportation](http://www.asu.edu/caed/transportation)

480/965-6395

ARCH 119

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Mary Kihl, Director

#### **Aeronautical Management Technology (ASU East)**

Professor: Gesell

Associate Professor: Karp

#### **Civil and Environmental Engineering**

Professor: Mamlouk

Assistant Professor: Owusu-Antwi

#### **Geography**

Professor: Burns

Associate Professor: Kuby

#### **Planning and Landscape Architecture**

Professors: Kihl, Pijawka

Associate Professor: Guhathakurta

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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 pro-seminar 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 Geographics: Interactive and Animated Cartography and Geovisualization.....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.**

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**Women’s Studies**

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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, call the Women’s Studies academic advisor at 480/965-2358.

**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.**



ASU East graduates celebrate their accomplishments during spring commencement.

Tim Trumble photo

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# International Programs

[ipo.asu.edu](http://ipo.asu.edu)

William G. Davey, Ph.D., Director

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## 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 twenty 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. 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. 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](http://ipo.asu.edu), or by phone at 480/965-5965.

**How to Apply.** Before participating in a study abroad or an exchange program, students must complete an IPO Eligibility Application, available on the Web at [ipo.asu.edu](http://ipo.asu.edu). Eligible students are then directed to attend an advising session with IPO or the specialty program sponsoring academic unit. Applicants are guided through additional application procedures that are specific to the student's particular international program. After the application process is completed, students attend predeparture orientations conducted by IPO. These presentations are designed to prepare participants for a comfortable and 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.



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# Summer Sessions

[www.asu.edu/summer](http://www.asu.edu/summer)

Carol Switzer, M.S., Director

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## PURPOSE

Summer Sessions offers more than 4,000 fully accredited courses and provides 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.

The program offers two five-week sessions and one eight-week session. See “[Graduate College Calendar](#),” page 17, 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.

Through various summer study programs, ASU also offers students the opportunity to earn credit while studying in foreign countries. These programs are directed by ASU faculty and have been approved by the appropriate academic unit.

For more information, access the Summer Sessions Web site at [www.asu.edu/summer](http://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 during the previous spring semester. New 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 87.

**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](http://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 870601  
TEMPE AZ 85287-0601

**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 residence halls are available for ASU Main students. For more information, call 480/965-3515, or write

RESIDENTIAL LIFE  
ARIZONA STATE UNIVERSITY  
PO BOX 870801  
TEMPE AZ 85287-0801

**Immunization.** Students born after December 31, 1956, are not permitted to register without proof of measles (rubeola) immunity or immunization given after January 1, 1980. See “[Immunization](#),” page 21.

**Parking.** A decal is required to park at ASU. For more information, call 480/965-6124, or write

PARKING SERVICES  
ARIZONA STATE UNIVERSITY  
PO BOX 870704  
TEMPE AZ 85287-0704

**Registration.** Registration may be completed in person or by using SunDial. For more information, 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. For more information, see the *Summer Sessions Bulletin*.

# ASU Main Directory

For the “ASU East Directory,” page 448. For the “ASU West Directory,” page 459. For the “ASU Extended Campus Directory,” see page 476.

Organization	Location	Telephone	Web Address
Admissions	—	—	—
Graduate	WILSN 101	480/965-6113	<a href="http://www.asu.edu/graduate/admissions">www.asu.edu/graduate/admissions</a>
Law	LAW 120	480/965-1474	<a href="http://www.law.asu.edu">www.law.asu.edu</a>
Readmissions (undergraduate)	SSV 142	480/965-7550	<a href="http://www.asu.edu/registrar/readmissions">www.asu.edu/registrar/readmissions</a>
Undergraduate	SSV 112	480/965-7788	<a href="http://www.asu.edu/admissions">www.asu.edu/admissions</a>
Adult Re-Entry	MU 14	480/965-2252	<a href="http://www.asu.edu/studentlife/reentry">www.asu.edu/studentlife/reentry</a>
Architecture and Environmental Design, College of	ARCH 134	480/965-8169	<a href="http://www.asu.edu/caed">www.asu.edu/caed</a>
Architecture, School of	AED 162	480/965-3536	<a href="http://www.asu.edu/caed/SOA">www.asu.edu/caed/SOA</a>
Design, School of	AED 154	480/965-4135	<a href="http://www.asu.edu/caed/SOD">www.asu.edu/caed/SOD</a>
Herberger Center for Design Excellence	ARCH 119	480/965-6693	<a href="http://www.asu.edu/caed/HCDE">www.asu.edu/caed/HCDE</a>
Planning and Landscape Architecture, School of	AED 158	480/965-7167	<a href="http://www.asu.edu/caed/SPLA">www.asu.edu/caed/SPLA</a>
Arizona Drug and Gang Prevention Resource Center	ASUDC Bldg. D	480/727-5015 1-888-432-2347	<a href="http://www.asu.edu/adgprc">www.asu.edu/adgprc</a>
Arizona Prevention Resource Center	ASUDC Bldg. D	480/727-2772 1-800-432-2772	<a href="http://www.azprevention.org">www.azprevention.org</a>
Associated Students of ASU (ASASU)	MU 310	480/965-3161	<a href="http://www.asu.edu/asasu">www.asu.edu/asasu</a>
ASU Alumni Association	MAIN 200	480/965-2586 1-800-258-6687	<a href="http://www.asu.edu/alumni">www.asu.edu/alumni</a>
ASU East (See “ASU East Directory,” page 448.)	—	480/727-3278	<a href="http://www.east.asu.edu">www.east.asu.edu</a>
ASU Extended Campus (See “ASU Extended Campus Directory,” page 476.)	ASUDC C319	480/965-9696	<a href="http://www.asu.edu/xed">www.asu.edu/xed</a>
ASU Main	—	480/965-9011	<a href="http://www.asu.edu">www.asu.edu</a>
ASU West (See “ASU West Directory,” page 459.)	—	602/543-5500	<a href="http://www.west.asu.edu">www.west.asu.edu</a>
ASU West Library	FLHLB	602/543-8500	<a href="http://www.west.asu.edu/library">www.west.asu.edu/library</a>
Bookstore, ASU	BKSTR	480/965-7928	<a href="http://bookstore.asu.edu/index.php">bookstore.asu.edu/index.php</a>
Business, W. P. Carey School of	BA 109	480/965-4227	<a href="http://wpcarey.asu.edu">wpcarey.asu.edu</a>
Accountancy, School of	BA 223	480/965-3631	<a href="http://wpcarey.asu.edu/acc">wpcarey.asu.edu/acc</a>
Business Administration (M.B.A.)	BA 160	480/965-3332	<a href="http://wpcarey.asu.edu/mba">wpcarey.asu.edu/mba</a>
Business Administration (Ph.D.)	BA 151	480/965-3368	<a href="http://wpcarey.asu.edu/grad/phd">wpcarey.asu.edu/grad/phd</a>
Economics, Department of	BAC 659	480/965-3531	<a href="http://wpcarey.asu.edu/ecn">wpcarey.asu.edu/ecn</a>
Finance, Department of	BAC 519	480/965-3131	<a href="http://wpcarey.asu.edu/fin">wpcarey.asu.edu/fin</a>
Health Administration and Policy, School of	BA 318	480/965-7778	<a href="http://wpcarey.asu.edu/hap">wpcarey.asu.edu/hap</a>
Information Systems, Department of	BA 223	480/965-3252	<a href="http://wpcarey.asu.edu/is">wpcarey.asu.edu/is</a>
International Business Studies	BA 109	480/965-0596	<a href="http://wpcarey.asu.edu/up/ipo.cfm">wpcarey.asu.edu/up/ipo.cfm</a>
Management, Department of	BA 323	480/965-3431	<a href="http://wpcarey.asu.edu/mgt">wpcarey.asu.edu/mgt</a>
Marketing, Department of	BAC 460	480/965-3621	<a href="http://wpcarey.asu.edu/mkt">wpcarey.asu.edu/mkt</a>
Supply Chain Management, Department of	BA 446	480/965-6044	<a href="http://wpcarey.asu.edu/scm">wpcarey.asu.edu/scm</a>
Campus Dining at ASU	—	—	<a href="http://www.asucampusdining.com">www.asucampusdining.com</a>
Administrative Office	MU 138	480/965-2305	—
Distinctive Catering Sales Office	MU 182	480/965-6508	—
Meal Plan Sales	MU 138	480/965-3464	—
Career Services	SSV 329	480/965-2350	<a href="http://www.asu.edu/career">www.asu.edu/career</a>

## ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
Career Testing Services	SSV 340	480/965-6777	—
Cashiering Services	SSV 244	480/965-7468	<a href="http://fs.asu.edu/office/cashier.asp">fs.asu.edu/office/cashier.asp</a>
Child and Family Services	MU 14C	480/965-9515	<a href="http://www.asu.edu/mu/family">www.asu.edu/mu/family</a>
Co-Curricular Programs	MU Third Floor	480/965-9600	<a href="http://www.asu.edu/partnerships">www.asu.edu/partnerships</a>
Community Service Program	MU 303	480/965-2255	<a href="http://www.asu.edu/mu/community">www.asu.edu/mu/community</a>
Counseling and Consultation	SSV 334	480/965-6146	<a href="http://www.asu.edu/counseling_center">www.asu.edu/counseling_center</a>
Creative Writing (M.F.A.)	LL 307C	480/965-3528	<a href="http://www.asu.edu/clas/english/creativewriting">www.asu.edu/clas/english/creativewriting</a>
Danforth Chapel	CHAPL	480/965-3570	<a href="http://www.asu.edu/studentlife/danforth">www.asu.edu/studentlife/danforth</a>
Disability Resources for Students	MCENT	—	<a href="http://www.asu.edu/drs">www.asu.edu/drs</a>
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	<a href="http://coe.asu.edu">coe.asu.edu</a>
Computer Support/Student Computer Lab	EDB 122	480/965-2126	<a href="http://coecs.asu.edu">coecs.asu.edu</a>
Curriculum and Instruction, Division of	ED 426	480/965-1644	<a href="http://coe.asu.edu/programs.html">coe.asu.edu/programs.html</a>
Graduate Program Office	ED 434	480/965-4602	<a href="http://coe.asu.edu/programs.html">coe.asu.edu/programs.html</a>
Dean's Office	EDB 104	480/965-3306	<a href="http://coe.asu.edu">coe.asu.edu</a>
Education Policy Studies Laboratory	EDB L1-01	480/965-1886	<a href="http://www.asu.edu/educ/eps1">www.asu.edu/educ/eps1</a>
Educational Leadership and Policy Studies, Division of	ED 120	480/965-6357	<a href="http://coe.asu.edu/elps">coe.asu.edu/elps</a>
Educational Research and Services, Bureau of	ED 140	480/965-3538	<a href="http://bers.asu.edu">bers.asu.edu</a>
Indian Education, Center for	ED 402	480/965-6292	<a href="http://www.ed.asu.edu/cie">www.ed.asu.edu/cie</a>
Psychology in Education, Division of	EDB 302	480/965-3384	<a href="http://coe.asu.edu/programs">coe.asu.edu/programs</a>
Admissions information (recording, voice mail)	—	480/965-6420	—
Counselor Training Center	EDB 401	480/965-5067	<a href="http://coe.asu.edu/ctc">coe.asu.edu/ctc</a>
Southwest Center for Education Equity and Language Diversity	ED 440	480/965-7134	<a href="http://www.asu.edu/educ/sceed">www.asu.edu/educ/sceed</a>
Student Services, Office of			
Academic Advising	EDB L1-13	480/965-5555	<a href="http://coe.asu.edu/oss">coe.asu.edu/oss</a>
Living and Learning Residential Floor	MANZH	480/965-9706	<a href="http://coe.asu.edu/oss">coe.asu.edu/oss</a>
New Student Recruitment	EDB L1-12	480/965-5555	<a href="http://coe.asu.edu/oss">coe.asu.edu/oss</a>
Professional Field Experiences	EDB L1-14	480/965-6255	<a href="http://coe.asu.edu/pfe">coe.asu.edu/pfe</a>
Vice President for University-School Partnerships	EDB 104	480/965-3306	<a href="http://coe.asu.edu">coe.asu.edu</a>
Educational Opportunity Center	1000 E. Apache No. 118	480/894-8451	<a href="http://www.asu.edu/studentlife/eoc">www.asu.edu/studentlife/eoc</a>
Engineering, Ira A. Fulton School of	—	480/965-1722	<a href="http://www.fulton.asu.edu">www.fulton.asu.edu</a>
Bioengineering, Harrington Department of	ECG 334	480/965-3028	<a href="http://www.fulton.asu.edu/~bme">www.fulton.asu.edu/~bme</a>
Chemical and Materials Engineering, Department of	ECG 202	480/965-3313	<a href="http://www.fulton.asu.edu/~cme">www.fulton.asu.edu/~cme</a>
Civil and Environmental Engineering, Department of	ECG 252	480/965-3589	<a href="http://www.fulton.asu.edu/~civil">www.fulton.asu.edu/~civil</a>
Computer Science and Engineering, Department of	BYENG	480/965-3190	<a href="http://cse.asu.edu">cse.asu.edu</a>
Construction, Del E. Webb School of	USE 138	480/965-3615	<a href="http://construction.asu.edu">construction.asu.edu</a>
Electrical Engineering, Department of	ENGRC 552	480/965-3424	<a href="http://www.fulton.asu.edu/ee">www.fulton.asu.edu/ee</a>
Industrial Engineering, Department of	GWC 502	480/965-3185	<a href="http://www.fulton.asu.edu/~ie">www.fulton.asu.edu/~ie</a>
Mechanical and Aerospace Engineering, Department of	ECG 346	480/965-3291	<a href="http://www.fulton.asu.edu/~mae">www.fulton.asu.edu/~mae</a>
Equal Opportunity/ Affirmative Action	ADM B171	480/965-5057	<a href="http://www.eoaa.asu.edu">www.eoaa.asu.edu</a>
TTY	—	480/965-0471	—
Exercise Science (Ph.D.)	PEBW M201	480/965-7906	<a href="http://www.asu.edu/clas/espe">www.asu.edu/clas/espe</a>
Extended Education, College of (See "ASU Extended Campus Directory," page 514.)	ASUDC C319	480/965-9696	<a href="http://www.asu.edu/xed">www.asu.edu/xed</a>

Organization	Location	Telephone	Web Address
Fine Arts Box Office	FAC	480/965-6447	—
Fine Arts, Katherine K. Herberger College of	GHALL 132	480/965-6536	<a href="http://herbergercollege.asu.edu">herbergercollege.asu.edu</a>
Art, School of	ART 102	480/965-3468	<a href="http://herbergercollege.asu.edu/art">herbergercollege.asu.edu/art</a>
Dance, Department of	PEBE 107A	480/965-5029	<a href="http://herbergercollege.asu.edu/dance">herbergercollege.asu.edu/dance</a>
Music, School of	MUSIC E185	480/965-3371	<a href="http://music.asu.edu/home.html">music.asu.edu/home.html</a>
Theatre, Department of	GHALL 232	480/965-5337	<a href="http://herbergercollege.asu.edu/theatre">herbergercollege.asu.edu/theatre</a>
Freshman Year Experience	PVW	480/965-1512	<a href="http://www.asu.edu/fye">www.asu.edu/fye</a>
Gerontology Program	FAB S121	602/543-6642	<a href="http://www.west.asu.edu/chs/grn">www.west.asu.edu/chs/grn</a>
Graduate College	WILSN lobby	480/965-3521	<a href="http://www.asu.edu/graduate">www.asu.edu/graduate</a>
Admissions	WILSN 101	480/965-6113	<a href="http://www.asu.edu/graduate/admissions">www.asu.edu/graduate/admissions</a>
Advising/Referral Office	WILSN lobby	480/965-3521	<a href="http://www.asu.edu/graduate">www.asu.edu/graduate</a>
Financial Support	WILSN lobby	480/965-3521	<a href="http://www.asu.edu/graduate/financial">www.asu.edu/graduate/financial</a>
Format Office	WILSN lobby	480/965-3521	<a href="http://www.asu.edu/graduate/format">www.asu.edu/graduate/format</a>
Graduation Section	SSV 140	480/965-6980	<a href="http://www.asu.edu/registrar/graduation">www.asu.edu/registrar/graduation</a>
Commencement Office	RITT B160	480/965-6611	<a href="http://www.asu.edu/ssc/commence">www.asu.edu/ssc/commence</a>
Graduate Division	SSV 140	480/965-6980	—
Greek Life (Fraternities and Sororities)	MU 305	480/965-2255	<a href="http://www.asu.edu/mu/greeklife">www.asu.edu/mu/greeklife</a>
Human Resources Customer Service Center	USB	480/965-2701	<a href="http://www.asu.edu/hr">www.asu.edu/hr</a>
Information Technology			<a href="http://www.asu.edu/it">www.asu.edu/it</a>
Classroom Support Centers	CPCOM 105	480/965-3342	<a href="http://www.asu.edu/classroomsupport">www.asu.edu/classroomsupport</a>
Computer Accounts Office	CPCOM 202	480/965-1211	<a href="http://www.asu.edu/computeraccounts">www.asu.edu/computeraccounts</a>
Computing Site hours	—	480/965-6500	<a href="http://www.asu.edu/siteschedules">www.asu.edu/siteschedules</a>
Computing Sites	CPCOM Atrium	480/965-4459	<a href="http://www.asu.edu/it/fyi/sites">www.asu.edu/it/fyi/sites</a>
	BAC 16	480/965-3074	—
	ECG 150	480/965-6280	—
	GWC 185	480/965-4307	—
Customer Assistance Center	CPCOM 202	480/965-5939	<a href="http://www.asu.edu/cacenter">www.asu.edu/cacenter</a>
Geographic Information Services	—	480/965-4007	<a href="http://www.asu.edu/gis">www.asu.edu/gis</a>
Help Desk	CPCOM 202	480/965-6500	<a href="http://www.asu.edu/helpdesk">www.asu.edu/helpdesk</a>
Instruction Support Lab	CPCOM 213	480/965-6739	<a href="http://is.asu.edu/islab">is.asu.edu/islab</a>
Intergroup Relations Center	SSV 278	480/965-1574	<a href="http://www.asu.edu/provost/intergroup">www.asu.edu/provost/intergroup</a>
International Programs Office	TMPCT 198	480/965-5965	<a href="http://ipo.asu.edu">ipo.asu.edu</a>
International Student Office	SSV 265	480/965-7451	<a href="http://www.asu.edu/studentlife/iso">www.asu.edu/studentlife/iso</a>
Justice Studies (Ph.D.)	WILSN 316	480/965-7682	<a href="http://www.asu.edu/copp/justice">www.asu.edu/copp/justice</a>
Law, College of	LAW 101	480/965-6181	<a href="http://www.law.asu.edu">www.law.asu.edu</a>
Admissions Office	LAW 120	480/965-1474	—
John J. Ross–William C. Blakley Law Library	LAWLB	480/965-6144	<a href="http://www.lawlib.asu.edu">www.lawlib.asu.edu</a>
Learning Resource Center	MU 14	480/965-7728	<a href="http://www.asu.edu/lrc">www.asu.edu/lrc</a>
	PVW	480/965-6254	

## ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
Liberal Arts and Sciences, College of	SS 111	480/965-6506	<a href="http://www.asu.edu/clas">www.asu.edu/clas</a>
Aerospace Studies, Department of	PSYN 324	480/965-3181	<a href="http://www.asu.edu/clas/afrotc">www.asu.edu/clas/afrotc</a>
African American Studies Program	COWDN 227	480/965-4399	<a href="http://www.asu.edu/clas/aframstu">www.asu.edu/clas/aframstu</a>
Anthropology, Department of	ANTH 233	480/965-6213	<a href="http://www.asu.edu/clas/anthropology">www.asu.edu/clas/anthropology</a>
Chemistry and Biochemistry, Department of	PS D102	480/965-3461	<a href="http://www.asu.edu/clas/chemistry">www.asu.edu/clas/chemistry</a>
Chicana and Chicano Studies, Department of	COOR 6633	480/965-5091	<a href="http://www.asu.edu/clas/chicana">www.asu.edu/clas/chicana</a>
Computational Biosciences Program	PS A216	480/965-5519	<a href="http://www.asu.edu/compbiosci">www.asu.edu/compbiosci</a>
English, Department of	LL 542	480/965-3168	<a href="http://www.asu.edu/clas/english">www.asu.edu/clas/english</a>
Family and Human Development, Department of	COWDN 106	480/965-6978	<a href="http://www.asu.edu/clas/fhd">www.asu.edu/clas/fhd</a>
Geography, Department of	SCOB 330	480/965-7533	<a href="http://geography.asu.edu">geography.asu.edu</a>
Geological Sciences, Department of	PS F686	480/965-5081	<a href="http://geology.asu.edu">geology.asu.edu</a>
History, Department of	COOR 4595	480/965-5778	<a href="http://www.asu.edu/clas/history">www.asu.edu/clas/history</a>
Interdisciplinary Humanities Program	LL 641	480/965-6747	<a href="http://www.asu.edu/clas/humanities">www.asu.edu/clas/humanities</a>
Kinesiology, Department of	PEBW 218	480/965-3875	<a href="http://www.asu.edu/clas/kines">www.asu.edu/clas/kines</a>
Languages and Literatures, Department of	LL 440	480/965-6281	<a href="http://www.asu.edu/languages/">www.asu.edu/languages/</a>
Life Sciences, School of	LSE 207	—	—
Graduate Programs	LSE 229	480/965-1768	<a href="http://sols.asu.edu/grad/gdegrees.htm">sols.asu.edu/grad/gdegrees.htm</a>
Research and Training Initiatives	LSE 205	480/965-2543	<a href="http://sols.asu.edu/rti">sols.asu.edu/rti</a>
Student Services/advising	LSC 206	480/727-6277	<a href="http://sols.asu.edu/ugrad/uadvising.php">sols.asu.edu/ugrad/uadvising.php</a>
Undergraduate Programs	LSC 226	480/965-9537	<a href="http://sols.asu.edu/ugrad/udegrees.htm">sols.asu.edu/ugrad/udegrees.htm</a>
Mathematics and Statistics, Department of	PS A216	480/965-3951	<a href="http://math.la.asu.edu">math.la.asu.edu</a>
Military Science, Department of	SS 330	480/965-3318	<a href="http://www.asu.edu/clas/military">www.asu.edu/clas/military</a>
Philosophy, Department of	COOR 3307	480/965-3394	<a href="http://www.asu.edu/clas/philosophy">www.asu.edu/clas/philosophy</a>
Physics and Astronomy, Department of	PS F470	480/965-3561	<a href="http://phy.asu.edu">phy.asu.edu</a>
Political Science, Department of	COOR 6801	480/965-6551	<a href="http://www.asu.edu/clas/polisci">www.asu.edu/clas/polisci</a>
Psychology, Department of	PSY 237	480/965-3326	<a href="http://psych.la.asu.edu">psych.la.asu.edu</a>
Religious Studies, Department of	ECA 377	480/965-7145	<a href="http://www.asu.edu/clas/religious_studies">www.asu.edu/clas/religious_studies</a>
Sociology, Department of	COOR 5681	480/965-3546	<a href="http://www.asu.edu/clas/sociology">www.asu.edu/clas/sociology</a>
Speech and Hearing Science, Department of	COOR 2211	480/965-2374	<a href="http://www.asu.edu/clas/shs">www.asu.edu/clas/shs</a>
Women's Studies Program	ECA 209	480/965-2358	<a href="http://www.asu.edu/clas/womens_studies">www.asu.edu/clas/womens_studies</a>
<b>Libraries</b>			
John J. Ross–William C. Blakley Law Library	LAWLB	480/965-6144	<a href="http://www.lawlib.asu.edu">www.lawlib.asu.edu</a>
University Libraries	LIB	480/965-6164	<a href="http://www.asu.edu/libraries">www.asu.edu/libraries</a>
Architecture and Environmental Design Library	AED 153	480/965-6400	<a href="http://www.asu.edu/lib/arch">www.asu.edu/lib/arch</a>
Archives and Manuscripts, Department of	LIB 413	480/965-3145	<a href="http://www.asu.edu/lib/archives">www.asu.edu/lib/archives</a>
Hayden Library (Circulation Desk)	LIB	480/965-3605	<a href="http://www.asu.edu/lib/hayden">www.asu.edu/lib/hayden</a>
Library Administration	LIB	480/965-3417	—
Music Library	MUSIC W302	480/965-3513	<a href="http://www.asu.edu/lib/music">www.asu.edu/lib/music</a>
Noble Science and Engineering Library	NOBLE	480/965-7607	<a href="http://www.asu.edu/lib/noble">www.asu.edu/lib/noble</a>
Reference questions	—	480/965-6164	<a href="http://www.asu.edu/lib/hayden/ref">www.asu.edu/lib/hayden/ref</a>
<b>Memorial Union</b>			
Administrative offices	MU mezzanine	480/965-5310	—
Event and Meeting Services	MU 182	480/965-3406	—
Information Desk	MU first level	480/965-5728	—
Lost and Found	MU first level	480/965-5728	—
Montgomery Instructional Lab	MU 178	480/727-6663	—
Sparky's Den	MU lower level	480/965-3642	—
Sun Devil Involvement Center	MU third level	480/965-2255	<a href="http://www.asu.edu/mu/sdic">www.asu.edu/mu/sdic</a>
Multicultural Student Center	SSV 394	480/965-6060	<a href="http://www.asu.edu/studentlife/msc">www.asu.edu/studentlife/msc</a>

Organization	Location	Telephone	Web Address
Nursing, College of	NUR 344	480/965-3244	<a href="http://nursing.asu.edu">nursing.asu.edu</a>
Community Health Services Clinic	—	480/941-9283	<a href="http://nursing.asu.edu/anc/chsc/">nursing.asu.edu/anc/chsc/</a>
Continuing and Extended Education	CSB 334	480/965-7431	<a href="http://nursing.asu.edu/ce">nursing.asu.edu/ce</a>
Graduate program	NUR 444	480/965-3948	<a href="http://nursing.asu.edu/programs/graduate">nursing.asu.edu/programs/graduate</a>
Student Services Office	NUR 108	480/965-2987	<a href="http://nursing.asu.edu/studentsservices">nursing.asu.edu/studentsservices</a>
Operator, University	—	480/965-9011	—
Parents Association (programs)	SSV 110	480/965-7625	—
Parking and Transit Services	University Towers	480/965-6406	<a href="http://www.asu.edu/dps/pts">www.asu.edu/dps/pts</a>
Public Programs, College of	WILSN 234	480/965-1034	<a href="http://www.asu.edu/copp">www.asu.edu/copp</a>
Advanced Public Executive Program	ASUDC C110	480/965-4006	<a href="http://spa.asu.edu/apep">spa.asu.edu/apep</a>
American Humanics Program	AG 213	480/965-5726	<a href="http://www.asu.edu/copp/recreation/emphasis/ah">www.asu.edu/copp/recreation/emphasis/ah</a>
American Indian Studies Program	AG 372	480/965-3634	<a href="http://www.asu.edu/copp/americanindian">www.asu.edu/copp/americanindian</a>
Asian Pacific American Studies Program	AG 352	480/965-9711	<a href="http://www.asu.edu/copp/asianamerican">www.asu.edu/copp/asianamerican</a>
Human Communication, Hugh Downs School of	STAUF A412	480/965-5095	<a href="http://com.pp.asu.edu">com.pp.asu.edu</a>
Journalism and Mass Communication, Walter Cronkite School of	STAUF A231	480/965-5011	<a href="http://cronkite.asu.edu">cronkite.asu.edu</a>
Justice Studies, School of	WILSN 331	480/965-7682	<a href="http://www.asu.edu/copp/justice">www.asu.edu/copp/justice</a>
Morrison Institute for Public Policy	UVCMN 203	480/965-4525	<a href="http://www.asu.edu/copp/morrison">www.asu.edu/copp/morrison</a>
Nonprofit Leadership and Management, Center for	AG 356	480/965-0607	<a href="http://www.asu.edu/copp/nonprofit">www.asu.edu/copp/nonprofit</a>
Public Affairs, School of	WILSN 208	480/965-3926	<a href="http://spa.asu.edu">spa.asu.edu</a>
Recreation Management and Tourism, Department of	AG 281	480/965-7291	<a href="http://www.asu.edu/copp/recreation">www.asu.edu/copp/recreation</a>
Social Work, School of	WHALL 135	480/965-3304	<a href="http://ssw.asu.edu">ssw.asu.edu</a>
Urban Inquiry, Center for	AG 320	480/965-9216	<a href="http://www.asu.edu/copp/urban">www.asu.edu/copp/urban</a>
Registrar	SSV 144	—	<a href="http://www.asu.edu/registrar">www.asu.edu/registrar</a>
General information (recorded)	—	480/965-4747	—
TTY	—	480/965-3236	—
Voice	—	480/965-3124	—
Residency Classification	SSV 146	480/965-7712	<a href="http://www.asu.edu/registrar/residency">www.asu.edu/registrar/residency</a>
Residential Life	SSV 170	480/965-3515	<a href="http://www.asu.edu/reslife">www.asu.edu/reslife</a>
Science and Engineering of Materials (Ph.D.)	PS A323	480/965-2460	<a href="http://www.asu.edu/graduate/SEM">www.asu.edu/graduate/SEM</a>
Speech and Hearing Science (Ph.D.)	CSB 146	480/965-9396	<a href="http://www.asu.edu/clas/shs">www.asu.edu/clas/shs</a>
Statistics (M.S.)	BAC 570	480/965-2671	<a href="http://www.asu.edu/graduate/statistics">www.asu.edu/graduate/statistics</a>
Student Accounts	SSV 230	480/965-6341	<a href="http://www.asu.edu/sbs">www.asu.edu/sbs</a>
Student Advocacy and Assistance	SSV 263	480/965-6547	<a href="http://www.asu.edu/studentlife/advocacy">www.asu.edu/studentlife/advocacy</a>
Student Business Services	ADM A105	480/965-6301	<a href="http://www.asu.edu/sbs">www.asu.edu/sbs</a>
Student Development and Memorial Union	MU mezzanine	480/965-5310	<a href="http://www.asu.edu/mu">www.asu.edu/mu</a>
Student Employment	SSV 202	—	<a href="http://www.asu.edu/fa/studemp">www.asu.edu/fa/studemp</a>
Off-Campus	—	480/965-6318	—
On-Campus	—	480/965-5186	—
Student Financial Assistance	SSV 216A	480/965-3355	<a href="http://www.asu.edu/fa">www.asu.edu/fa</a>
Student Health and Wellness Center	SHS	480/965-3346	<a href="http://www.asu.edu/health">www.asu.edu/health</a>
Appointments	—	480/965-3349	—
Fax	—	480/965-8914	—
Insurance	—	480/965-2411	—
Measles information	—	480/965-1358	—
Student ID (Sun Card)	MU 15	480/965-2273	<a href="http://www.suncard1.com">www.suncard1.com</a>
Student Judicial Affairs	SSV 263	480/965-6547	<a href="http://www.asu.edu/studentlife/judicial">www.asu.edu/studentlife/judicial</a>
Student Leadership Programs	MU 340	480/965-2255	<a href="http://www.asu.edu/mu/slp">www.asu.edu/mu/slp</a>
Student Legal Assistance	MU 329	480/965-6307	<a href="http://www.asu.edu/studentlife/legal">www.asu.edu/studentlife/legal</a>
Student Life	SSV 263	480/965-6547	<a href="http://www.asu.edu/studentlife">www.asu.edu/studentlife</a>

## ASU MAIN DIRECTORY

Organization	Location	Telephone	Web Address
Student Media	MCENT 2	480/965-7572	<a href="http://www.statepress.com">www.statepress.com</a>
<i>State Press</i> Advertising	—	480/965-6555	<a href="http://www.statepress.com">www.statepress.com</a>
<i>State Press</i> Information	—	480/965-7572	—
<i>State Press</i> Newsroom	—	480/965-2292	—
Web Devil	—	480/727-6941	<a href="http://www.asuwebdevil.com">www.asuwebdevil.com</a>
Student Organization Resource Center	MU 340	480/965-2255	<a href="http://www.asu.edu/clubs">www.asu.edu/clubs</a>
Student Recreation Complex and Recreational Sports	SRC 220	480/965-8900	<a href="http://www.asu.edu/src">www.asu.edu/src</a>
Summer Sessions/University Ceremonies	RITT B160	480/965-6611	<a href="http://www.asu.edu/summer">www.asu.edu/summer</a>
	—	480/965-6611	<a href="http://www.asu.edu/ssc/StudyAbroad">www.asu.edu/ssc/StudyAbroad</a>
SunDial	—	480/350-1500	<a href="http://www.asu.edu/registrar/registration/intouch.html">www.asu.edu/registrar/registration/intouch.html</a>
Testing Support Services	SSV 340	480/965-6777	<a href="http://www.asu.edu/vpsa/tss">www.asu.edu/vpsa/tss</a>
Tickets	—	—	—
Athletic Events, Intercollegiate (Sun Devil Ticket Office)	—	480/965-2381	—
Gammage Auditorium Box Office	GGMA	480/965-3434	—
Public Events Administrative Offices	—	480/965-5062	—
Transcripts (outgoing)	SSV 140B	480/965-7276	<a href="http://www.asu.edu/registrar/transcripts">www.asu.edu/registrar/transcripts</a>
Transportation Systems (certificate)	ARCH 119	480/965-6395	<a href="http://www.asu.edu/caed/transportation">www.asu.edu/caed/transportation</a>
Tuition Payment Office	SSV 230	480/965-4347	<a href="http://www.asu.edu/sbs">www.asu.edu/sbs</a>
University Evaluation, Office of	AG 281	480/965-9291	<a href="http://www.asu.edu/oue">www.asu.edu/oue</a>
University Libraries (See " <a href="#">Libraries</a> ," page 365.)	—	—	—
University Testing Services	EDB 301	480/965-7146	<a href="http://www.asu.edu/uts">www.asu.edu/uts</a>
Upward Bound	SSV 276	480/965-6483	<a href="http://www.asu.edu/studentlife/ub">www.asu.edu/studentlife/ub</a>
Veterans Services section	SSV 148	480/965-7723	<a href="http://www.asu.edu/registrar/veterans">www.asu.edu/registrar/veterans</a>
Veterans Upward Bound	1000 E. Apache No. 106	480/965-3944	<a href="http://www.asu.edu/studentlife/vub">www.asu.edu/studentlife/vub</a>
Winter Session (See " <a href="#">ASU Extended Campus Directory</a> ," page 514.)	RITT B132	480/727-9900	<a href="http://www.asu.edu/xed/winter">www.asu.edu/xed/winter</a>

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# Regents' Professors

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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**

*Life Sciences*

**DAVID L. ALTHEIDE**

*Justice Studies*

**C. AUSTEN ANGELL**

*Chemistry and Biochemistry*

**CHARLES J. ARNTZEN**

*Life Sciences*

**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*

**RON CARLSON**

*English*

**PHILLIP R. CHRISTENSEN**

*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**

*Languages and Literatures*

**GENE V GLASS**

*Educational Leadership and Policy Studies  
and Psychology in Education*

**LUIS R. GOMEZ-MEJIA**

*Management*

**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**

*Languages and Literatures*



**MARK C. KLETT**

*Art*

**RAYMOND W. KULHAVY**

*Psychology in Education, Emeritus*

**DANIEL M. LANDERS**

*Kinesiology*

**SHENG H. LIN**

*Chemistry and Biochemistry, Emeritus*

**JANE MAIENSCHIEIN**

*Biology and Society*

**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, Emeritus*

**CAIO PAGANO**

*Music*

**DENNIS J. PALUMBO**

*Justice Studies, Emeritus*

**G. ROBERT PETTIT**

*Chemistry and Biochemistry*

**STEPHEN J. PYNE**

*Life Sciences*

**ALBERTO ALVARO RÍOS**

*English*

**NANCY FELIPE RUSSO**

*Psychology*

**IRWIN N. SANDLER**

*Psychology*

**DAVID J. SMITH**

*Physics and Astronomy and Solid State Science*

**MARY LEE SMITH**

*Educational Leadership and Policy Studies and Psychology in Education*

**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, Emeritus*

**J. BRUCE WAGNER JR.**

*Chemistry and Biochemistry and Solid State Science, Emeritus*

**KURT WEISER**

*Art*

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# ASU Main Faculty and Academic Professionals

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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

**Aannestad, Per** (1975), Professor Emeritus 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 Professor of Life Sciences; 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

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**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

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**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), Clinical Associate Professor 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., Ph.D., Arizona State University

**Agadjanian, Victor** (1995), Associate Professor of Sociology; B.A., Moscow State University (Russia); M.S., Ph.D., University of Southern California

**Aguiar, John L.** (1976), Professor Emeritus of Anthropology; B.A., University of California, Los Angeles; M.A., California State University, Los Angeles; Ph.D., University of California, San Diego

**Ahn, Seung C.** (1990), Associate Professor of Economics; B.A., Sogang University (South Korea); M.A., Ph.D., Michigan State University

**Ahrendt, Laurie** (2000), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University

**Aiken, Leona S.** (1985), Professor of Psychology; B.S., Virginia Commonwealth University; M.S., Ph.D., Purdue University

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**Alarcon, Ricardo O.** (1989), Professor of Physics and Astronomy; B.S., M.S., University of Chile; Ph.D., Ohio University

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Regents' Professor of Life Sciences; B.A., Amherst College; Ph.D., Harvard University

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**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, Gene** (2003), Associate Professor of Psychology; B.A., Pomona College; M.A., Ph.D., Loyola University Chicago

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**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; Vice Provost and Dean of Graduate Studies; 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



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**Alvarado, Ronald H.** (1974), Professor Emeritus of Life Sciences; Dean Emeritus, College of Extended Education; B.A., University of California, Riverside; M.S., Ph.D., Washington State University

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**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

**Anbar, Ariel** (2003), Associate Professor of Geological Sciences; A.B., Harvard University; M.S., Ph.D., California Institute of Technology

**Anderies, J. Marty** (2002), Assistant Professor of Life Sciences; 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, Ira. A. Fulton School of Engineering; 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



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(1989)

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**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

**Arce, Leslie** (2001), Lecturer of Mathematics and Statistics; B.S., Kansas State University; M.A., 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, Samuel** (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 Life Sciences and 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

## ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

**Arnold, William E.** (1973), Professor of Communication; B.S., M.A., Northern Illinois University; Ph.D., Pennsylvania State University



**Arntzen, Charles J.** (2000)

Regents' Professor of Life Sciences; Florence Ely Nelson Presidential Chair; Director, Center for Infectious Diseases and Vaccinology, Arizona Biodesign Institute at Arizona State University; B.S., M.S., University of Minnesota; Ph.D., Purdue University

**Arnonson, Jerome M.** (1966), Professor Emeritus of Life Sciences; B.A., Ph.D., University of California, Berkeley

**Arredondo, Patricia** (1999), Associate Professor of Psychology in Education and Women Studies; Academic Program Leader, Counselor Education and Counseling Psychology; 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

**Artibise, Alan** (2004), Divisional Dean of Social Sciences; B.A., University of Manitoba (Canada); Ph.D., University of British Columbia (Canada)

**Arzubiaga, Angela** (2004), Assistant Professor of Psychology in Education; B.A., Hamline University; Ph.D., University of California, Los Angeles

**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), Jerry and Mary Ann Chapman Professorship in Business; 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

**Aspinall, Richard** (2004), Professor of Geography; Chair, Department of Geography; B.Sc., University of Birmingham (United Kingdom); Ph.D., University of Null (United Kingdom)

**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), Senior 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

**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

**Bacchus, Denise N.A.** (2003), Visiting Assistant Professor of Social Work; B.A., Ithaca College; M.A., Ph.D., State University of New York, Albany

**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 Emeritus of Anthropology; A.B., M.A., Ph.D., Harvard University

**Baier, Leslie** (1995), Adjunct Professor of Life Sciences; 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), Associate 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 Professor of Life Sciences; 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



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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, Hélène** (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

**Barefield, Robert** (2003), Assistant Professor of Music; B.A., Washington University, St. Louis; M.B.A., University of Maryland, College Park; M.M., D.M.A., University of Cincinnati

**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; Associate Dean, Teacher Education; Interim Director, Division of Curriculum and Instruction; B.A., M.A., Loyola University, 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

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**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

**Bartolomei, Carmen** (1999), Faculty Associate of Nursing; B.S.N., M.P.S., C.W. Post College, Long Island 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 Supply Chain Management; B.S., Southwest Missouri State College; M.A., Northwestern University; Ph.D., University of Southern California

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**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

**Béarat, Hamdallah** (2003), Adjunct Professor of Anthropology; B.S., Birzeit University (Palestine); D.E.A., Ph.D., Caen University (France)

**Beardmore, Gary D.** (1979), Associate Research Technologist of Geological Sciences; B.A., Arizona 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

**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

**Beer, Lawrence** (2003), Lecturer of Management; B.S., Boston University; J.D., St. John's University

**Begaye, Timothy** (2003), Assistant Professor of Educational Leadership and Policy Studies; B.S., Northeastern University; M.Ed., Ed.D., Harvard 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

**Bell, George H.** (1976–82; 1989), Librarian Emeritus, 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

**Bender, Bert A.** (1971), Professor Emeritus 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 Life Sciences; 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

**Benesh, Susan** (1999), Faculty Associate of Nursing; B.S.N., M.S., Arizona State 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

**Benzing, 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 Professor of Life Sciences; B.S., Arizona State University; Ph.D., University of Arizona



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(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 Emeritus 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

**Bernardi, Jose** (1995), Associate Professor of Design; B.Arch., National University of Cordoba; M.S., University of Cincinnati

**Bernstein, Bianca L.** (1987), Professor of Counseling and Counseling Psychology; 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

**Bertram, Susan M.** (1998), Assistant Research Professor; H.B.Sc., M.Sc., Trent University (Canada); Ph.D., Arizona State University

**Bess, Vicki** (1994), Adjunct Professor of Life Sciences; 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
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- 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), Senior Research Scientist of Life Sciences; 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
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- Bohlander, George W.** (1977), Professor Emeritus of Management; B.A., San Francisco State College; M.B.A., University of Southern California; Ph.D., University of California, Los Angeles
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- 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 Emeritus, Collection Development; M.L.S., Ph.D., Charles University, Prague (Czechoslovakia)
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- Boswell, Jacquelyn** (1982), Professor Emerita of Music; B.M.E., Murray State University; M.M.E., Louisiana State University; Ed.D., University of Illinois
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- 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
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- Bryant, Edwin H.** (2000), Adjunct Professor of Life Sciences; 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
- Bruzy, 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, Elizabeth** (2000), Associate Professor of Flute; B.A., M.M., The Juilliard School; D.M.A., Rice University
- Buck, Nancy** (2002), Associate Professor of Music; B.M., Oberlin College; M.M., The Cleveland Institute of Music
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- 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, Recruiting, the Barrett Honors College; B.A., Wells College; M.A., Syracuse University; Ph.D., Arizona State University
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**Chakrabarti, Chaitali** (1990), Associate Professor of Electrical Engineering; B.Tech., Indian Institute of Technology (India); M.S., Ph.D., University of Maryland, College Park

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**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; A.B., University of Pennsylvania; A.M., Ph.D., University of Illinois

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**Chang, Yung** (1996), Associate Professor of Life Sciences; M.D., Beijing Medical College (China); Ph.D., University of Iowa

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**Chapuis, Jean-Charles** (1991), Senior 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, Joyotpaul** (1985), Professor Emeritus of Political Science; B.A., Central State University, Oklahoma; M.A., Ph.D., University of Oklahoma

**Chawla, Nikhilesh** (2000), Associate Professor of Materials Engineering; B.S., New Mexico Institute of Mining and Technology; M.S., University of Tennessee, Knoxville; Ph.D., University of Michigan, Ann Arbor

**Chen, Kang Ping** (1991), Associate Professor of Engineering; B.S., Peking University (China); Ph.D., University of Minnesota, Twin Cities

**Chen, Nai-Kuang** (1998), Assistant Professor of Computer Information Systems; B.B.A., Soochow University (Taiwan); M.S., George Washington University; Ph.D., University of Connecticut

**Chen, Sandy** (2003), Assistant Librarian, Technical Services Department; B.A., Fu Jen Catholic University (Taiwan); M.A., University of Missouri; M.L.S., Emporia State University

**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)

**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

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**Clay, J. Eugene** (1993), Associate Professor of Religious Studies; A.B., A.M., Ph.D., University of Chicago

**Clinton, Robert N.** (2001), Professor of Law; B.A., University of Michigan; J.D., University of Chicago

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**Cluff, Gordon L.** (1963), Professor Emeritus of Speech and Hearing Science; B.A., Arizona State University; M.S., Ph.D., Southern Illinois University

**Cobas, José A.** (1975), Professor of Sociology; B.A., Maryville College; M.A., University of Tennessee, Knoxville; Ph.D., University of Texas, Austin

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**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; Associate Chair, Department of Industrial Engineering; B.S.E., M.S.N.E., M.S.I.E., Ph.D., Purdue University

**Cocke, Robert D.** (1983), Professor Emeritus of Art; B.F.A., University of Arizona; M.F.A., University of Iowa

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**Conrow, Jane A.** (1968), Associate Dean Emerita, 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

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**Corey, Constance H.** (1973), Librarian Emerita; B.A., Denison University; M.L.S., University of Arizona; M.B.A., Arizona State University

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**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

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**Coudroglou, Alike** (1971), Professor Emerita of Social Work; B.A., College of Saint Benedict; M.S.W., University of Minnesota, Twin Cities; D.S.W., Columbia University

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**Crafts-Brandner, Steven** (1996), Adjunct Professor of Life Sciences; B.S., Western Kentucky University; M.S., Ph.D., University of Illinois

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**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

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**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

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**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, Ira A. Fulton School of Engineering; 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

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**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

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**Cruz, Rhodora** (2001), Faculty Associate of Nursing; B.S.N., Georgia Southwestern State University; M.S.N., University of Phoenix

**Cuciurean, John Daniel** (2003), Assistant Professor of Music Theory; B.Eng., McMaster University, Ontario (Canada); B.M., Royal Conservatory of Music, Toronto (Canada); Ph.D., State University of New York

**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

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## D

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**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 Emeritus 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

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**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

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**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

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- 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), Lecturer of Portuguese; B.A., Saint Marese 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), Associate Professor of Public Affairs; B.A., Thiel College; M.S.W., Rutgers, The State University of New Jersey; Ph.D., Arizona State University
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- Denhardt, Janet Vinzant** (1995), Professor of Public Affairs; B.A., Washington State University; M.P.A., D.P.A., University of Southern California
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- DeSerpa, Allan C.** (1975), Professor of Economics; B.A., University of Santa Clara; Ph.D., University of California, Santa Barbara
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- Dietrich, Suzanne Wagner** (1988), Associate Professor of Computer Science and Engineering; B.S., M.S., Ph.D., State University of New York, Stony Brook
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## ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

### E

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## G

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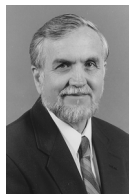
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## H

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- 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
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- 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 Emeritus 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

## ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

**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), Professor Emeritus 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)

**Hermann, Ria** (1986), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.A., B.S., M.S., Ph.D., Arizona State University

**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

**Herrendorf, Berthold** (2003), Associate Professor of Economics; B.S., University of Bonn (Germany); M.A., Indiana University; Ph.D., European University Institute (Italy)

**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

**Hertz, 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**  
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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 Professor of Design; B.F.A., Minneapolis College of Art and Design; M.S., Arizona State University; Ph.D., Fielding Institute



**Hickman, David R.**  
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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 Emeritus 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, Vanessa** (2002), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University

**Hillman, Amy** (2001), Associate Professor of Management; B.A., Trinity University; M.B.A., University of the Incarnate Word; Ph.D., Texas A&M 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

**Hirt, Paul W.** (2004), Professor of History; B.A., M.A., Ph.D., University of Arizona

**Hiryak, Christopher D.** (2000), Faculty Associate of Public Affairs; B.S.E., Lock Haven University; M.P.A., Arizona State University

- 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 Emeritus 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 Life Sciences; 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 Emeritus of Economics; 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 Life Sciences; 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 Emerita 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
- Holian, Anna Marta** (2004), Assistant Professor of History; B.A., M.A., Ph.D., University of Chicago
- Holle, Ronald L.** (2003), Adjunct Professor of Geography; B.S., M.S., Florida State University
- 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
- 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; Ph.D., University of Vienna (Austria)
- Hooper, J. Kenneth** (1991), Professor Emeritus of Life Sciences; Director, Molecular Biosciences and Biotechnology Program; B.A., Goshen College; M.S., Ph.D., University of Michigan
- Hood, Stafford** (1992), Associate Professor of Counseling and Counseling Psychology; Associate Director, Division of Psychology in 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 Life Sciences; CAP LTER Field Project Manager, Center for Environmental Studies; 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; 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 Emeritus 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 Life Sciences; 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

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**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; Senior Associate Dean; 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, Ira. A. Fulton School of Engineering; B.S., Harding College; M.S., Ph.D., University of Arizona

**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; B.S.B.A., M.B.A., University of Denver; Ph.D., University of Michigan; C.P.A., Arizona, Colorado

**Humphrey, Ted** (1966), Barrett Professor and Professor of Philosophy; 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

**Hunnicut, 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), Associate Librarian, Hayden Reference Services; B.A., McMaster University (Canada); M.L.S., Dalhousie University (Canada)

**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 Computer Information Systems; B.S.C., M.A., Ph.D., University of Iowa

**Hutt, Michael D.** (1982), Ford Motor Company Distinguished Professor of Marketing; B.B.A., M.B.A., Ohio University; Ph.D., Michigan State University

**Hwang, Yuhchang** (1995), Associate Professor of Accountancy; 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 Life Sciences; 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

**Iheduru, Okechukwu** (2004), Director, African and African American Studies; B.Sc., University of Nigeria (Nigeria); M.A., University of Akron; Ph.D., University of Connecticut

**Ihrig, Edwin** (1979), Professor of Mathematics and Statistics; B.S., M.A., University of Maryland; Ph.D., University of Toronto (Canada)

**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)

**Inskip, Gordon C.** (1968), Professor Emeritus of Management; B.Ch.E., Ohio State University; Ph.D., Columbia University

**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



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(1986)

Regents' Professor of History; B.A., Carleton College; M.A., Ph.D., University of Wisconsin, Madison

**Iyer, Govind** (1998), Associate Professor of Computer Information Systems; B.S., University of Bombay (India); M.Tx., Ph.D., Georgia State University

## J

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**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 Supply Chain Management; 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, 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 Life Sciences; 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
- Jacobs, Mark** (2003), Professor of Life Sciences; Dean, the Barrett Honors College; B.A., Harvard University; Ph.D., Stanford University
- 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), 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), 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
- Jankowski, Daniel F.** (1964), Professor Emeritus 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
- Jarrell, Kay** (2002), Faculty Associate of Nursing; B.S.N., West Virginia University; M.S., Arizona State University
- 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, Danwen** (2003), Assistant Professor of Violin; B.M., St. Louis Conservatory of Music; M.M., Rutgers, The State University of New Jersey; A.D., Oberlin College
- 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; 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), Associate Professor of English; B.A., Saint Francis College, Brooklyn; M.A., Monterey Institute of International Studies; Ph.D., Georgetown University
- Johnson, Paul C.** (1994), Professor of Civil and Environmental Engineering; Associate Dean, Research, Ira. A. Fulton School of Engineering; 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 Life Sciences; B.S., M.S., University of Illinois, Urbana-Champaign; Ph.D., Arizona State University
- Johnson, Roy M.** (1952–53; 1955), Professor Emeritus of Life Sciences; A.B., M.S., University of Chicago; Ph.D., University of New Mexico
- Johnson, Sue M.** (1994), Faculty Associate of Nursing; B.S.N., M.S., Arizona State University
- Johnson, Wendee** (1990), Clinical Associate Professor of Nursing; B.S.N., Gustavus Adolphus College; M.S.N., University of Pennsylvania

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**Johnson, William S.** (1990), Executive Director Emeritus, 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, 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, Nancy** (2003), Academic Associate, Center for Environmental Studies; B.S., Old Dominion 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; 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), Associate Professor of Bioengineering; B.S., M.S., University of Rajasthan (India); Ph.D., University of Bath (United Kingdom)

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**Jurik, Nancy** (1981), Professor of Justice Studies; B.A., M.A., Southern Methodist University; Ph.D., University of California, Santa Barbara

**Jurs, James E.** (2003), Clinical Associate Professor of Educational Leadership and Policy Studies; Academic Program Coordinator, M.Ed. in Educational Administration and Supervision; B.A., Western Illinois University; M.S.Ed., Northern Illinois University; Ed.D., Arizona State University

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## K

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**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

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**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 Emerita of Art; B.A., Goddard College; M.F.A., State University of New York, Buffalo

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**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

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**Karoly, Paul** (1982), Professor of Psychology; B.A., City College of New York; Ph.D., University of Rochester

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**Killeen, Mary** (1982–84; 1986), Associate Professor of Nursing; Associate Dean for Undergraduate Programs and Extended Education, College of Nursing; B.S.N., M.S., Arizona State University; Ph.D., University of Texas, Austin

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- Kroelinger, Michael D.** (1980), Professor Emeritus of Design; B.S., University of Alabama; M.S., Ph.D., University of Tennessee, Knoxville
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- Kronengold, Eric A.** (1970), Professor Emeritus of Art; B.A., M.A., San Francisco State University
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- 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
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- Kuby, Michael** (1988), Associate Professor of Geography; B.A., University of Chicago; Ph.D., Boston University
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- Laubichler, Manfred** (2001), Assistant Professor of Life Sciences; 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 Life Sciences; B.S., University of Arizona; M.A., University of Oregon; Ph.D., University of Oklahoma
- Le, Thuy-Kim Pham** (1997), Lecturer of Vietnamese; B.A., Saigon University (Vietnam); B.A., M.Ed., Arizona State University
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- Lebed, Richard F.** (2000), Assistant Professor of Physics and Astronomy; B.S., Michigan State University; M.A., Ph.D., University of California, Berkeley
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- 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
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- 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), Professor Emeritus 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 Emeritus 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
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- 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; Chair, Department 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

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- Lowe, Robert W.** (1966), Professor Emeritus of Romance Languages; M.A., Columbia University; Doctorat, University of Paris (France)
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- 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
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- 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), Professor Emeritus 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
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- 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
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- 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
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- Magaña, Lisa** (1997), Assistant Professor of Chicana and Chicano Studies; B.A., California Polytechnic University; M.A., Ph.D., Claremont Graduate School
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- 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; B.S., Miami University; M.S., University of Illinois
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- McGrath, Jacqueline** (1999), Assistant Professor of Nursing; B.S.N., University of Akron; M.S.N., Kent State University; Ph.D., University of Pennsylvania
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## O

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- 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 Life Sciences; 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; 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
- Reiter, Wellington** (2003), Professor of Architecture; Dean, College of Architecture and Environmental Design; B.S.D., Tulane University; M.Arch., Harvard University
- Renaut, Rosemary** (1987), Professor of Mathematics and Statistics; Director, Computational Biosciences Program; B.S., Durham University; Ph.D., University of Cambridge (United Kingdom)
- Reneau, J. Hal** (1975), Professor Emeritus of Accountancy; B.B.A., M.S., Texas Tech University; Ph.D., University of Missouri, Columbia
- Restrepo, Maria Adelaida** (2004), Associate Professor of Speech and Hearing Science; Ph.D., University of Arizona
- Reuter, Vincent G.** (1961), Professor Emeritus of Operations Management; B.S.C., M.A., Ph.D., University of Iowa

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**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 Life Sciences; 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 Emerita 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)

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**Rikakis, Thanassis** (2001), Professor of Music; Director, Institute for Studies in the Arts; B.A., Ithaca College; M.A., D.M.A., Columbia University

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**Ringenoldus, Garrit M.** (1989), Instructor of Military Science; B.S., Illinois State University

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**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

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**Rivers, Patrick** (1998), Assistant Professor of Health Administration and Policy; B.A., University of Ghana; M.B.A., University of Wisconsin, Madison; Ph.D., University of Alabama

**Roanhorse-Dineyazhe, Maxine** (2003), Lecturer of Curriculum and Instruction; B.A., M.Ed., Ed.D., Arizona State University

**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 Life Sciences; 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; Director of Engineering Program Development; B.A., M.S., University of Utah; Ph.D., Virginia Polytechnic Institute and State University
- Roberts, Lauren C.** (1984), Clinical Associate Professor of Life 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, Dahlia M.** (2000), Assistant Professor of Accountancy; 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, Ira A. Fulton 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 Life Sciences; 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 Life Sciences; M.D., National University of Mexico School of Medicine; Ph.D., University of Cambridge (United Kingdom)
- Rollins, George, Major** (2000), Assistant Professor of Military Science; B.A., St. Leo 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), Faculty Associate of Nursing; B.S.N., Montana State University; M.S., Arizona State University; Ph.D., University of Arizona
- 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 Life Sciences; 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), Associate 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

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**Rowe, Casey** (2001), Assistant Professor of Accountancy; 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

**Ruedemann, Richard** (1997), Senior 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; Vice President, University Undergraduate Initiatives; 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

**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

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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

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**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 Life Sciences; 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

**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

**St. Louis, Robert D.** (1982), Professor of Computer Information Systems; Chair, Department of Information Systems; A.B., Rockhurst College; M.S., Ph.D., Purdue University

**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, Environmental Education Coordinator, Center for Environmental Studies; B.A., Emory University; M.S., Antioch New England Graduate School

**Salvatore, Joseph Raphael** (1998), Adjunct Professor of Life Sciences; M.D., Autonomous University of Guadalajara (Mexico)

**Salvucci, Michael E.** (1995), Adjunct Professor of Life Sciences; 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; 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 N.**  
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Regents' Professor of Psychology; B.A., Brooklyn College; Ph.D., University of Rochester

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**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)

**Santorico, Ann** (2003), Academic Associate, Division of Undergraduate Academic Services; Academic Advisor; B.A., University of Phoenix; M.Ed., Arizona State University

**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 Life Sciences; 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 Professor of Life Sciences; 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

**Scheatzle, David G.** (1979), Professor Emeritus of Architecture; B.S., Kent State University; M.S.E., Arizona State University; Arch.D., University of Michigan

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**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 Life Sciences; B.S., M.S., Ph.D., University of Chicago

**Schexnayder, Clifford J.** (1994), Visiting Eminent Scholar 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, Bloomington

**Schlacter, John L.** (1969), Professor Emeritus of Marketing; B.B.A., Case Western Reserve University; M.B.A., Ph.D., Ohio State University

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- Schleifer, Thomas** (2001), Visiting Eminent Scholar of Construction; B.S., M.S., East Carolina University; Ph.D., Heriot-Watt University (United Kingdom)
- Schmeekle, Mark W.** (2003), Assistant Professor of Geography; B.S., M.S., University of Washington; Ph.D., University of Colorado, Boulder
- 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 Life Sciences; Associate Director, Cancer Research Institute; 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 Emerita; B.A., Viterbo College; M.L.S., Emporia State University
- Schneider, Anne L.** (1989), Professor of Justice Studies; 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), 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; 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
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- Schwartz, Andrew B.** (1993), Research Professor of Bioengineering; B.A., Ph.D., University of Minnesota
- Schwenke, Dawn C.** (2002), Associate Research Professor of Health Administration and Policy; B.A., Whitman College; M.S., Wake Forest University; Ph.D., Cornell University
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- 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
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- Segal, Elizabeth A.** (1995), Professor of Social Work; B.A., Brandeis University; M.S.W., Boston University; Ph.D., University of Illinois, Chicago
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- 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
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- Sensibar, Judith L.** (1985), Professor Emerita of English; B.A., Vassar College; M.A., Ph.D., University of Chicago

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- 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
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- Sharer, Jon W.** (1975), Professor of Art; Director, School of Art; B.A., Roosevelt University; M.S., Illinois Institute of Technology; Ph.D., Ohio State University
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- 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 Life Sciences; 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
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- Shen, Jun** (1996), Professor of Electrical Engineering; B.S., South China University of Science and Technology; 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
- Shimansky, Yuri** (2000), Assistant Research Professor of Bioengineering; M.S., Polytechnic Institute of Kiev (Ukraine); Ph.D., Institute of Physiology of Kiev (Ukraine)
- 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 Professor of Life Sciences; 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
- Shrednick, Harvey R.** (1995), Senior Lecturer of Computer Information Systems; B.S., City College of New York; M.B.A., Bernard M. Baruch College
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- 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
- Sigler, Mary** (2003), Associate Professor of Law; B.A., M.A., Arizona State University; J.D., University of Pennsylvania
- 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
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**Simon, Arleyn W.** (1989), Associate Research Professor of Anthropology; B.A., Montana State University; M.A., Oregon State University; Ph.D., Arizona State University

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**Simonson, Mark** (1998), Clinical Assistant Professor of Finance; B.S., University of Northern Colorado; M.S., Ph.D., University of Oregon

**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, Amarjit** (2002), Associate Research Professor of Bioengineering; B.Sc., Ranchi University (India); M.Sc., Ph.D., University of Bombay (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)

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**Spinosa, 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

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**Stites, William H.** (1954), Professor Emeritus of Communication; B.A., Louisiana Polytechnic Institute; M.A., Ph.D., University of Denver

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**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

**Streufer, Hildegarde** (1961), Professor Emerita of Design; B.S., University of Minnesota, Twin Cities; M.S., Iowa State University

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**Strittmatter, Connie** (2000), Assistant Law Librarian; B.A., Indiana University of Pennsylvania; M.L.S., Kent State University

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**Stromberg, Juliet C.** (1988), Associate Professor of Life Sciences; 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

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- Stump, Glenda** (2000), Faculty Associate of Nursing; B.S., University of Pittsburgh; M.S., Wayne State University
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- 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
- Suiter, Scott** (2003), Instructor of Military Science
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- 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), Senior 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 Life Sciences; B.S., M.S., Arizona State University
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- 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
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- 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)
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## T

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- 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.S.W., University of Louisville; Ph.D., 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), Associate Professor of Interdisciplinary Humanities and History; B.A., Brown University; M.A., Ph.D., Cornell University

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- Tepedelenioglu, 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; 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
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- 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), Senior 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
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- Tidwell, Victor H.** (1971), Professor Emeritus of Accountancy; B.S., Illinois College; M.B.A., D.B.A., Indiana University; C.P.A., Arizona, Iowa
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- Torrest, Robert S.** (1980), Professor Emeritus of Chemical Engineering; B.S., Polytechnic Institute of Brooklyn; Ph.D., University of Minnesota, Twin Cities
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- Towill, Leslie R.** (1975), Associate Professor of Life Sciences; B.S., M.S., University of Wisconsin, Milwaukee; Ph.D., University of Michigan
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**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

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**Turk, Rudy H.** (1967), Professor Emeritus of Art; B.S., University of Wisconsin; M.A., University of Tennessee

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## U

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**Umberger, Emily** (1982), Associate Professor of Art; B.A., University of Pennsylvania; M.A., University of Texas, Austin; Ph.D., Columbia University

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**Underhill, Michael J.** (1990), Professor 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

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**Urioste-Azcorra, Carmen** (1995), Associate Professor of Spanish; Licenciatura, University of Seville (Spain); M.A., Ph.D., Arizona State University

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### V

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**Valverde, Leonard A.** (1992), Professor of Educational Leadership and Policy Studies; B.A., California State University, Los Angeles; Ph.D., Claremont Graduate School

**van der Leeuw, Sander** (2004), Professor of Anthropology; Chair, Department of Anthropology; B.A., Ph.D., University of Amsterdam (Netherlands)

**Van Duzer, Leslie** (1996), Associate Professor of Architecture; B.Arch., M.Arch., University of California, Berkeley

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**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

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**Vana, Kimberly** (2001), Faculty Associate of Nursing; B.S.N., Arizona State University; M.S., University of Arizona

**Vanacour, Martin** (1987), Faculty Associate of Public Affairs; B.A., State University of New York, Buffalo; M.P.A., New York University; Ph.D., 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

**Vasileska, 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

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**Virgillo, Carmelo** (1965), Professor Emeritus of Romance Languages; A.B., State University of New York, Albany; A.M., Ph.D., Indiana University

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**Vissicaro, Pegge** (1983), Assistant Professor of Dance; B.F.A., University of Michigan; M.F.A., University of North Carolina, Greensboro

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**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

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## W

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**Walton-Ramirez, Anne** (1999), Lecturer of Spanish; B.A., University of South Alabama; M.A., Arizona State University

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**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, 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 Life Sciences; Associate Director, School of Life Sciences Graduate Programs; Director, Center for the Study of Early Events in Photosynthesis; Director, Interdisciplinary Committee for Molecular and Cellular Biology; B.Sc., Ph.D., University of Essex (United Kingdom)

## ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

**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)

**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, Jane** (2000), Assistant Professor of Accountancy; B.B.A., University of Wisconsin, Whitewater; M.Acc., University of Georgia; Ph.D., University of Wisconsin

**Weiss, Karl H.** (1984), Senior Research Professional, Center for Solid State Science; B.Sc., Ursinus College; M.Sc., University of Arizona

**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 Professor of Life Sciences; 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

**Wellner, Karen** (2003), Lecturer of Curriculum and Instruction; B.S., State University of New York, Oneonta; M.A., Ph.D., University of Iowa

**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 Aerospace Engineering; Vice Chair, Undergraduate Programs in Mechanical and Aerospace 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), Associate 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



- Whitecotton, Stacey** (1997), Associate Professor of Accountancy; B.A., Texas Tech University; M.Acc., Ph.D., University of Oklahoma
- Whitehurst, Harry B.** (1958), Professor Emeritus of Chemistry and Biochemistry; B.A., M.A., Ph.D., Rice University
- Whitley, David S.** (2003), Adjunct Professor of Geography; A.B., M.A., Ph.D., University of California, Los Angeles
- 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)
- Wigal, Kathy D.** (2000), Lecturer of Accountancy; 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
- Wiley, Terry L.** (2002), Clinical Professor of Speech and Hearing Science; B.A., University of Northern Iowa; M.S., Colorado State University; Ph.D., University of Iowa
- 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; 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; Assistant Director, Academic Success Programs; 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; 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; 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 Life Sciences; 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
- Witzczak, 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 Emeritus of Asian Languages; B.A., University of Toronto (Canada); A.M., Stanford University; D.Phil., University of Oxford (United Kingdom)

## ASU MAIN FACULTY AND ACADEMIC PROFESSIONALS

- 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 Life Sciences; 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; Assistant Chair for Graduate Studies, Department 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
- Wolftal, 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 Life Sciences; 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)
- Wotrung, 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 Life Sciences; 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 Emerita of Physics and Astronomy; B.A., Mount Holyoke College; Ph.D., Case Western Reserve University
- Wyndelts, Robert W.** (1974), Professor Emeritus of Accountancy; 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), Associate 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), Research 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

**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

**Yepez, Eleanor** (1984), Academic Professional Emerita 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 Life Sciences; 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; Interim Director, Executive Committee on 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; Director, Southwest Center for Environmental Research and Policy; Codirector, Executive Committee, Atmospheric Science; 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., Huazong 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 Economics; 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

**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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# Administrative Personnel

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## Arizona Board of Regents

Governor of Arizona	Janet Napolitano
Superintendent of Public Instruction	Tom Horne
Student Regent (voting), appointed to June 2004	Danelle Kelling
Student Regent (nonvoting), appointed to June 2005	Wesley McCalley
Regent, appointed to January 2006	Chris Herstam
Regent, appointed to January 2006	Jack Jewett
Regent, appointed to January 2008	Christina Palacios
Regent, appointed to January 2008	Gary L. Stuart
Regent, appointed to January 2010	Fred T. Boice
Regent, appointed to January 2010	Robert B. Bulla
Regent, appointed to January 2012	Ernest Calderon
Regent, appointed to January 2012	Lorraine Frank
Executive Director	Joel Sideman
Counsel to the Board	<i>To Be Appointed</i>

## President's Office

President	Michael M. Crow
Senior Vice President and Secretary of the University	Christine K. Wilkinson
Senior Vice President and University Planner	Richard Stanley
Senior Advisor to the President	James O'Brien
Director, Office of the President and Special Assistant to the President	Joyce Smitheran
Executive Director, Office of University Initiatives	Kimberly Loui
Director, Office of Pan-American Initiatives and Special Advisor to the President	Jorge De Los Santos
Director, Strategic Projects and Special Assistant to the President	Mariko Silver
Advisor to the President on American Indian Affairs	Peterson Zah
Vice President and General Counsel	Paul J. Ward
Executive Director of Athletics	Gene Smith
Director, Equal Opportunity/Affirmative Action	Barbara A. Mawhiney
ICA Faculty Representative	Michael P. Mokwa

## ASU Main

### Academic Affairs

Executive Vice President and Provost of the University	Milton D. Glick
Vice Provost	Kathleen K. Church
Vice Provost	Nancy A. Gutierrez
Vice Provost	Gail Hackett
Vice Provost	Ruth S. Jones
University Chief Information Officer and Vice Provost for Information Technology	William E. Lewis
Assistant Vice President for Academic Affairs	Louis Olivas
Assistant to the Executive Vice President and Provost of the University	Linda Van Scoy
Assistant to the Executive Vice President and Provost of the University	Lynn Carpenter
Special Assistant to the Executive Vice President and Provost for Web Development	Jake Kupiec
Director, Academic Articulation	Zoila Gamero de Tovar
Director, Data Warehousing and Data Administration	John Rome
Executive Director, Institutional Analysis/Data Administration/Strategic Planning	<i>To Be Appointed</i>
Director, International Programs	William G. Davey
Director, Center for Learning and Teaching Excellence	Duane Roen
Director, Summer Sessions	Carol Switzer
Executive Director, Division of Undergraduate Academic Services	<i>To Be Appointed</i>
Director, University Evaluation	<i>To Be Appointed</i>

**Barrett Honors College**

Dean, the Barrett Honors College . . . . . Mark Jacobs  
 Associate Dean . . . . . Margaret Nelson  
 Associate Dean, Recruiting . . . . . Janet M. Burke

**College of Architecture and Environmental Design**

Dean, College of Architecture and Environmental Design . . . . . Wellington Reiter  
 Associate Dean, College of Architecture and Environmental Design . . . . . Lorraine M. Cutler  
 Associate Dean for Academic Affairs, College of Architecture and Environmental Design . . . . . *To Be Appointed*  
 Director, Ph.D. Program in Environmental Design and Planning . . . . . K. David Pijawka  
 Director, School of Architecture . . . . . Ronald McCoy  
 Director, School of Design . . . . . Jacques Giard  
 Director, School of Planning and Landscape Architecture . . . . . Hemalata Dandekar  
 Director, Herberger Center for Design Excellence . . . . . *To Be Appointed*  
 Coordinator, Joint Urban Design Program . . . . . John McIntosh  
 Coordinator, Joint Urban Design Studio . . . . . Michael Dollin

**College of Education**

Vice President for University-School Partnerships and Dean, College of Education . . . . . Eugene E. García  
 Senior Associate Dean . . . . . Sarah J. Hudelson  
 Associate Dean, Teacher Education . . . . . Thomas E. Barone  
 Associate Dean for Research . . . . . James Arthur Middleton  
 Assistant Dean, Office of Student Services . . . . . Inta “Maggie” Tolan  
 Interim Director, Division of Curriculum and Instruction . . . . . Thomas E. Barone  
 Associate Director of Research and Graduate Education, Division of Curriculum  
 and Instruction . . . . . Robert B. Rutherford Jr.  
 Associate Director for Professional Development and Induction, Division of Curriculum  
 and Instruction . . . . . Billie J. Enz  
 Associate Director of Initial Teacher Certification, Division of Curriculum and Instruction . . . . . Elaine Surbeck  
 Director, Division of Educational Leadership and Policy Studies . . . . . Terrence G. Wiley  
 Assistant Director, Division of Educational Leadership and Policy Studies . . . . . Kay Hartwell Hunnicutt  
 Director, Education Policy Studies Laboratory . . . . . Alex Molnar  
 Academic Program Coordinator, DELTA Doctorate . . . . . Kay Hartwell Hunnicutt  
 Academic Program Coordinator, Ed.D. in Higher and  
 Postsecondary Education . . . . . Caroline Sotella Vienes Turner  
 Academic Program Coordinator, Educational Leadership and Policy Studies . . . . . Gene V Glass  
 Academic Program Coordinator, M.Ed. in Educational Administration and Supervision . . . . . James E. Jurs  
 Academic Program Coordinator, M.Ed. in Higher and Postsecondary Education . . . . . Gary Hanson  
 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  
 Associate Director, Division of Psychology in Education . . . . . Stafford Hood  
 Training Director, Counseling Psychology . . . . . Richard T. Kinnier  
 Academic Program Leader, Counselor Education and Counseling Psychology . . . . . Patricia Arredondo  
 Academic Program Leader, Educational Technology . . . . . Wilhelmina C. Savenye  
 Academic Program Leader, Educational Psychology . . . . . Samuel B. Green  
 Training Director, School Psychology . . . . . Mary E. Stafford  
 Director, Counselor Training Center . . . . . Judith Homer  
 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, Office of Professional Field Experiences . . . . . Karen Kimerer

**College of Extended Education**

See “ASU Extended Campus Administrative Personnel,” page 476.

**College of Law**

Dean, College of Law . . . . . Patricia D. White  
 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 . . . . . Christopher Baier  
 Assistant Dean and Director of Admissions . . . . . Brenda Brock  
 Assistant Dean, Student Services . . . . . Leslie Mamaghani  
 Executive Director, Indian Legal Program . . . . . Rebecca A. Tsosie

## ADMINISTRATIVE PERSONNEL

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

### College of Liberal Arts and Sciences

Dean, College of Liberal Arts and Sciences . . . . .	David A. Young
Divisional Dean of Humanities . . . . .	Deborah Losse
Divisional Dean of Social Sciences . . . . .	Alan Artibise
Divisional Dean of Natural Sciences and Mathematics . . . . .	Simon Peacock
Divisional Dean of Undergraduate Programs . . . . .	Daniel Bivona
Interim Associate Dean, Administration and Personnel . . . . .	Simon M. Peacock
Chair, Department of Aerospace Studies . . . . .	Colonel David W. Guthrie
Chair, Department of Anthropology . . . . .	Sander van der Leeuw
Chair, Department of Chemistry and Biochemistry . . . . .	Robert E. Blankenship
Chair, Department of Chicana and Chicano Studies . . . . .	Cordelia C. Candelaria
Chair, Department of English . . . . .	Neal Lester
Chair, Department of Family and Human Development . . . . .	Richard A. Fabes
Chair, Department of Geography . . . . .	Richard Aspinall
Chair, Department of Geological Sciences . . . . .	James A. Tyburczy
Chair, Department of History . . . . .	Noel J. Stowe
Interim Chair, Department of Kinesiology . . . . .	Daniel M. Landers
Chair, Department of Languages and Literatures . . . . .	Deborah N. Losse
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 J. Kenney
Chair, Department of Psychology . . . . .	Darwyn E. Linder
Chair, Department of Religious Studies . . . . .	Joel D. Gereboff
Director, School of Life Sciences . . . . .	Robert Page
Chair, Department of Sociology . . . . .	Verna M. Keith
Chair, Department of Speech and Hearing Science . . . . .	David Ingram
Director, African and African American Studies . . . . .	Okechukwu Iheduru
Director, Center for Asian Studies . . . . .	Claudia Brown
Director, Cancer Research Institute . . . . .	G. Robert Pettit
Director, Center for the Study of Early Events in Photosynthesis . . . . .	Andrew N. Webber
Director, Climatology Laboratory . . . . .	Robert C. Balling
Director, Computational Biosciences Program . . . . .	Rosemary Renaut
Director, Hispanic Research Center . . . . .	Gary D. Keller
Director, Interdisciplinary Humanities Program . . . . .	Peter Lehman
Director, Interdisciplinary Committee for Molecular and Cellular Biology . . . . .	Andrew N. Webber
Director, Institute of Human Origins . . . . .	Donald C. Johanson
Director, Latin American Studies Center . . . . .	Tod D. Swanson
Director, Arizona Center for Medieval and Renaissance Studies . . . . .	Robert E. Bjork
Director, Center for Meteorite Studies . . . . .	Laurie Leshin
Director, Center for Solid State Science . . . . .	David J. Smith
Director, Program for Southeast Asian Studies . . . . .	James F. Eder Jr.
Director, Women's Studies Program . . . . .	Mary M. Fonow

### College of Nursing

Dean, College of Nursing . . . . .	<i>To Be Appointed</i>
Associate Dean for Graduate Programs and Research . . . . .	Karen H. Sousa
Associate Dean for Undergraduate Programs and Extended Education . . . . .	Mary Killen
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 . . . . .	M. Christina Lyons

**College of Public Programs**

Interim Dean, College of Public Programs . . . . .	Jeffrey Chapman
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 . . . . .	Harold Goodall
Interim Director, Walter Cronkite School of Journalism and Mass Communication . . . . .	Stephen K. Doig
Director, School of Justice Studies . . . . .	Doris Marie Provine
Interim Director, School of Public Affairs . . . . .	Robert Denhart
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 Chiago 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 . . . . .	<i>To Be Appointed</i>
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 . . . . .	Kevin H. Ellsworth
Senior Program Coordinator, General Studies . . . . .	Phyllis Lucie
Senior Business Manager . . . . .	Kathleen Renshaw

**Graduate College**

Vice Provost and Dean of Graduate Studies . . . . .	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
Director, Graduate Admissions . . . . .	Michael A. Dickson

**Ira A. Fulton School of Engineering**

Dean, Ira A. Fulton School of Engineering . . . . .	Peter E. Crouch
Associate Dean, Academic Affairs . . . . .	Ronald J. Roedel
Associate Dean, Planning and Administration . . . . .	Ben M. Huey
Associate Dean, Research . . . . .	Paul C. Johnson
Associate Dean, Student Affairs . . . . .	Mary R. Anderson-Rowland
Director, Del E. Webb School of Construction . . . . .	William W. Badger
Chair, Harrington Department of Bioengineering . . . . .	Eric J. Guilbeau
Chair, Department of Chemical and Materials Engineering . . . . .	Subhash Mahajan
Chair, Department of Civil and Environmental Engineering . . . . .	Sandra L. Houston
Chair, Department of Computer Science and Engineering . . . . .	Sethuraman Panchanathan
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
Director, Engineering Core and Special Studies . . . . .	Ronald J. Roedel
Interim Director, Center for Research on Education in Science, Mathematics, Engineering, and Technology . . . . .	Marilyn P. Carlson
Codirector, Center for Low Power Electronics Research . . . . .	Dieter K. Schroder
Director, Center for Professional Development . . . . .	Jeffrey S. Goss
Director, Center for Solid State Electronics Research . . . . .	Trevor John Thornton
Director, Institute for Manufacturing Enterprise Systems . . . . .	Thomas E. Callarman

**The Katherine K. Herberger College of Fine Arts**

Dean, The Katherine K. Herberger College of Fine Arts . . . . .	J. Robert Wills
Associate Dean, Research and Administration . . . . .	Margaret M. Knapp
Assistant Dean, Student Services . . . . .	Gina Stephens
Director, School of Art . . . . .	Jon W. Sharer

## ADMINISTRATIVE PERSONNEL

Chair, Department of Dance	<i>To Be Appointed</i>
Director, School of Music	Wayne A. Bailey
Chair, Department of Theatre	<i>To Be Appointed</i>
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	<i>To Be Appointed</i>
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	<i>To Be Appointed</i>
Management Team, Technical Services Department	Betsy J. Redman, Ronda L. Ridenour, and Rebecca S. Uhl
Team Leader, Noble Science Reference Services	Linda A. Shackle
Team Leader, Collection Development	Jeanne Richardson
Team Leader, Hayden Reference Services	Rosalinda DeFato

### W. P. Carey School of Business

Dean, W. P. Carey School of Business	Robert E. Mittelstaedt, Jr.
Associate Dean, Asia Pacific Programs	Ker-Wei Pei
Associate Dean, Executive and Professional Programs	Lee R. McPheters
Associate Dean, Graduate Programs	Dennis L. Hoffman
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	James R. Boatsman
Chair, Department of Economics	Arthur E. Blakemore
Chair, Department of Finance	Herbert M. Kaufman
Director, School of Health Administration and Policy	Jeffery R. Wilson
Chair, Department of Information Systems	Robert D. St. Louis
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
Director, Center for Advancing Business through Information Technology	Ajay Vinze
Director, Arizona Real Estate Center	Jay Q. Butler
Director, Center for Business Research	<i>To Be Appointed</i>
Director, Center for Services Leadership	Stephen W. Brown
Director, Bank One Economic Outlook Center	Lee R. McPheters
Director, L. William Seidman Research Institute	<i>To Be Appointed</i>

### Administration and Finance

Executive Vice President, Administration and Finance	Mernoy E. Harrison
Senior Executive Assistant to the Executive Vice President, Administration and Finance	Sheila Stokes
Associate Vice President, Administration and Finance	LeEtta Overmyer
Director, Internal Audit and Management Services	Walter B. Silva
Director, Administration and Finance Information Technology	Susan Madden
Associate Vice President, Financial Services, and Treasurer	Gerald E. Snyder
Director, Student Business Services	Joanne Wamsley
Associate Director, Financial Services	Terri Deasey
Associate Director, Financial Services	Marilyn Mulhollan
Assistant Director, Financial Services	Laura James



**ADMINISTRATIVE PERSONNEL**

Assistant Director, Financial Services . . . . .	Edalia Kousari
Assistant Director, Financial Services . . . . .	Kathleen Rogers
Deputy Executive Vice President, University Services . . . . .	Scott Cole
Director, Campus Physical Planning . . . . .	Steve Nielsen
Director, Capital Programs Management Group . . . . .	Ted Cary
Director, Facilities Planning and Space Management . . . . .	David Techau
Director, Facilities Management . . . . .	Dave Brixen
Director, Risk Management . . . . .	<i>To Be Appointed</i>
University Architect . . . . .	Ron McCoy
Associate Vice President, Human Resources . . . . .	David Butler
Director, Consulting Services . . . . .	<i>To Be Appointed</i>
Director, Employee Assistance Office/Wellness/Worklife Balance Programs . . . . .	Phillip Potter
Director, Human Resources . . . . .	Christine Cervantes
Associate Vice President, Administration and Business Services . . . . .	Ray Jensen
Director, Purchasing and Business Services . . . . .	John Riley
Director, Auxiliary Business Services . . . . .	Greg Rush
Director, ASU Bookstore . . . . .	Val Ross
Associate Director, Real Estate . . . . .	Karen Honeycutt
Associate Director, Document Production Services . . . . .	Robert Lane
Associate Director, Purchasing and Business Services . . . . .	Gina Webber
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, Budget Planning and Management . . . . .	Alan Carroll
Director, Budget Planning and Management . . . . .	James Sliwicki

**ASU Foundation Board of Directors**

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Stanley Weithorn	Milton Whiting				

**Alumni Association, Ex Officio**

R.J. Machulies	Sister Lynn M. Winsor
----------------	-----------------------

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Chairwoman of the Board . . . . .	Sister Lynn Winsor
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Patricia Z. Packard	Margot Richardson	Anne Sawkiw	Richard Scherr	Brian Jay Scott	Brian Wales
Kristy Westphal					

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Vice President for Public Affairs . . . . .	Virgil Renzulli
Deputy Vice President for Public Affairs . . . . .	Charles S. Miller
Associate Vice President for Community Development . . . . .	Nancy Jordan
Assistant Vice President for Strategic Communication . . . . .	Nancy Neff
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Assistant Vice President for Cultural Affairs and Executive Director, Public Events . . . . .	Colleen Jennings-Roggensack
Director, Community Relations . . . . .	Neil Giuliano
Director, Public Relations . . . . .	Wilma Mathews
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## ADMINISTRATIVE PERSONNEL

Director, Special Events . . . . . Tye Thede  
 Executive Director, Community Development . . . . . Sandra Ferniza  
 General Manager, Television Station KAET . . . . . Greg Giczi

### KAET Community Advisory Board, 2004

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 Vice Chairs . . . . . Maurine Karabatsos, Heidi Kimball, Michael Straneva  
 Chair for the Nominating Committee . . . . . Sandy Werthman  
 Chair, Volunteer Friends of Channel 8 . . . . . Bill Waldron  
 Ex Officio, General Manager for KAET . . . . . Greg Giczi  
 Ex Officio, Deputy Vice President, Office of Public Affairs . . . . . Charles S. Miller  
 Emeritus . . . . . Robert Ellis  
 Emerita . . . . . Kathy Zatz

### MEMBERS, KAET Community Advisory Board, 2004

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Shelly Esque	Andrew Federhar	Grady Gammage Jr.	Susan Gerard	Max Gonzales	Alicia Harrison
Meghan Hughes Hirsch	Scott Jacobson	Jacqueline Norton	Herbert Paine	Mitchell Rosen	Dan Santy
Martin Shultz	Julie Stanton	Kathleen Turken	Peter Valenzuela	John Whiteman	Rip Wilson

## Intercollegiate Athletics

Executive Director, Athletics . . . . . Gene Smith

### ASU Head Coaches

Baseball—Men . . . . . Pat Murphy  
 Basketball—Men . . . . . Rob Evans  
 Basketball—Women . . . . . Charli Turner Thorne  
 Cross Country—Men and Women . . . . . Walt Drenth  
 Diving—Men and Women . . . . . Mark Bradshaw  
 Football—Men . . . . . Dirk Koetter  
 Golf—Men . . . . . Randy Lein  
 Golf—Women . . . . . Melissa Luellen  
 Gymnastics—Women . . . . . John Spini  
 Soccer—Women . . . . . Ray Leone  
 Softball—Women . . . . . Linda Wells  
 Swimming—Men and Women . . . . . Michael Chasson  
 Tennis—Men . . . . . Lou Belken  
 Tennis—Women . . . . . Sheila McInerney  
 Track and Field—Men and Women . . . . . Greg Kraft  
 Volleyball—Women . . . . . Brad Saindon  
 Water Polo—Women . . . . . Vicki Gorman  
 Wrestling—Men . . . . . Thom Ortiz

## Research and Economic Affairs

Vice President for Research and Economic Affairs . . . . . Jonathan Fink  
 Associate Vice President for Research . . . . . Paul Johnson  
 Associate Vice President, Economic Affairs . . . . . Rob Melnick  
 Assistant to the Vice President . . . . . Cynthia Ryan  
 Director, Fiscal and Business Services . . . . . Rich Fill  
 Executive Director, Financial Services . . . . . Jay Murphy  
 Director, AZ Biodesign Institute . . . . . George H. Poste  
 Director, Office of Research and Sponsored Projects Administration . . . . . Randall Draper  
 Director, Office of Research Publications . . . . . Conrad Storad  
 Director, Center for Environmental Studies . . . . . Charles L. Redman  
 Director, Partnership for Research in Spatial Modeling Program (PRISM) . . . . . Anshuman Razdan  
 Director, Animal Care and Technology . . . . . Michael McGarry  
 Director, Southwest Center for Environmental Research and Policy . . . . . Joseph Zehnder  
 Director, Radiation Safety Office . . . . . Kenneth L. Mossman

**Student Affairs**

Vice President for Student Affairs . . . . . Juan C. Gonzalez  
 Associate Vice President and Dean of Students . . . . . Bob Soza  
 Associate Vice President for Facility Development and Residential Life . . . . . Kevin Cook  
 Associate Vice President for Fiscal and Program Development . . . . . Sally Ramage  
 Director, Arizona Prevention Resource Center . . . . . Gail Chadwick  
 Director, Career Services . . . . . Raymond I. Castillo  
 Director, Counseling and Consultation . . . . . Martha Dennis Christiansen  
 Director, Recreational Sports . . . . . Howard Taylor  
 Director, Student Health and Wellness Center . . . . . Mary Rimsza  
 Director, Student Media . . . . . Kristin Gilger

**Sun Angel Foundation**

Chair . . . . . Mike Gallagher  
 Vice Chair . . . . . Bob Matthews  
 Treasurer . . . . . Bill Post  
 Secretary . . . . . Dean Jacobson

**AT-LARGE DIRECTORS, Sun Angel Foundation**

Richard Barr	Jim Barrett	Patricia Boyd Gentry	Stephen Butterfield	Martin Calfee	Don Carson
Nadine Carson	Pep Cooney	Eric Crown	Verde Dickey	Gene Drake	Geoffrey Edmunds
Mike Gallagher	Greg Hancock	Bob Hobbs Sr.	Bob Holman	Stewart Horejsi	Guy Inzalaco
Dean Jacobson	Steve Johnson	Wally Kelly	Nap Lawrence	Lydia Lee	Steve Loy
Steve Matlock	Robert Matthews	Nathan Norris	Guthrie Packard	Michael Polachek	Bill Post
Bill Schaefer	Cindy Slick	Phillippi Sparks	Scott Tonn	Greg Tryhus	Steve Wood

**University Undergraduate Initiatives**

Vice President for University Undergraduate Initiatives . . . . . James A. Rund  
 Director, Undergraduate Initiatives Technology Services. . . . . Mike Schaefer  
 Interim Director, Student Financial Assistance. . . . . Craig Fennell  
 Dean, Undergraduate Admissions. . . . . Tim Desch  
 Registrar . . . . . Lou Ann Denny

**ASU East**

See “ASU East Administrative Personnel,” page 454.

**ASU Extended Campus**

See “ASU Extended Campus Administrative Personnel,” page 476.

**ASU West**

See “ASU West Administrative Personnel,” page 467.

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# ASU East

[www.east.asu.edu](http://www.east.asu.edu)

Charles E. Backus, Ph.D., Provost, ASU East; Vice President, ASU

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Arizona State University East, one of the four ASU campuses, is distinguished by the academic programs it offers and by its residential setting. As the university's polytechnic campus, ASU East offers a variety of professionally oriented undergraduate and graduate programs that are applicable to the real world and require high levels of technological literacy and skill.

The Morrison School of Agribusiness and Resource Management offers bachelor's and master's degrees in Agribusiness that prepare students for careers that are in sectors of global business that are in high demand. The College of Technology and Applied Sciences offers bachelor's programs and a master's degree in several specialized areas of technology. East College offers a broad range of undergraduate and graduate degrees that teach students how to apply professional and liberal arts studies to real life. East College also provides the general education courses for all the ASU East degree programs.

All three academic units at ASU East offer the Bachelor of Applied Science (B.A.S.) degree, a program designed specifically as a career progression degree for students holding the Associate of Applied Science (A.A.S) degree. The B.A.S. emphasizes management, leadership, and communication skills along with additional technical course work.

Eighteen baccalaureate degree programs, six master's degree programs, and two certificate programs are currently offered at ASU East. Through partnerships with programs at ASU Main, select doctoral programs are also offered.

Located 23 miles southeast of ASU Main and with a student population of fewer than 5,000, the 600-acre campus offers a small residential college environment. ASU East students learn in high-tech, mediated classrooms and practice in fully equipped laboratories. They enjoy small classes, friendly and accessible faculty, opportunities for student leadership, and academic support services dedicated to helping them grow, learn, and graduate. ASU East graduates move into the world of work with knowledge and skills that help them succeed in their careers and in their personal and civic lives.

The campus is easily accessible via major interstate routes. See the "ASU East Map," page 447. For information, call 480/727-EAST (3278) or access the Web site at [www.east.asu.edu](http://www.east.asu.edu).

## ACADEMIC ORGANIZATION

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 449.

## ACCREDITATION

The North Central Association of Colleges and Schools accreditation of ASU Main includes ASU East.

In addition, the M.S. degree in Nutrition offers an optional Dietetic Internship, which is accredited by the Commission on Accreditation for Dietetics Education of the American Dietetic Association. For more information, call 312/899-0040 or write

COMMISSION ON ACCREDITATION FOR  
DIETETICS EDUCATION  
AMERICAN DIETETIC ASSOCIATION  
120 S RIVERSIDE PLAZA, SUITE 2000  
CHICAGO IL 60606-6995

## 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

Enrollment Services provides one-stop services for admission, financial aid, business services, and registration. Conveniently located in QUAD 2, students find personnel ready to assist them with registration processes, tuition payment, financial assistance information, student employment, ASU Sun Cards (photo IDs), and parking decals.

## 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](http://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](http://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, sub shop, and a full-service dining facility in the Student Union. Catering services are also available. 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 ASU East, call 480/727-1439.

### 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 in QUAD 4.

### 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](http://www.east.asu.edu/sta/career.html).

### Student Union

The Student 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, dining facilities, a game room, a bookstore, 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;
2. two aerobic studios and equipment for step aerobics, fitness cycling, and kickboxing;
3. a martial arts and yoga 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–September) with lights.

At the fitness center, trained exercise and wellness professionals are available to perform assessments, develop

## ASU EAST

programs, and provide expert advice and personal training assistance.

In addition to the facilities, the PAC operates 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 (in season), 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](http://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 Head Start and Early Head Start and the Boys & Girls Club of the East Valley, Williams Campus Branch. Head Start and Early Head Start 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 Williams Campus Child Development Center at 480/988-3644, 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](http://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, microwave, and, in some cases, stoves.

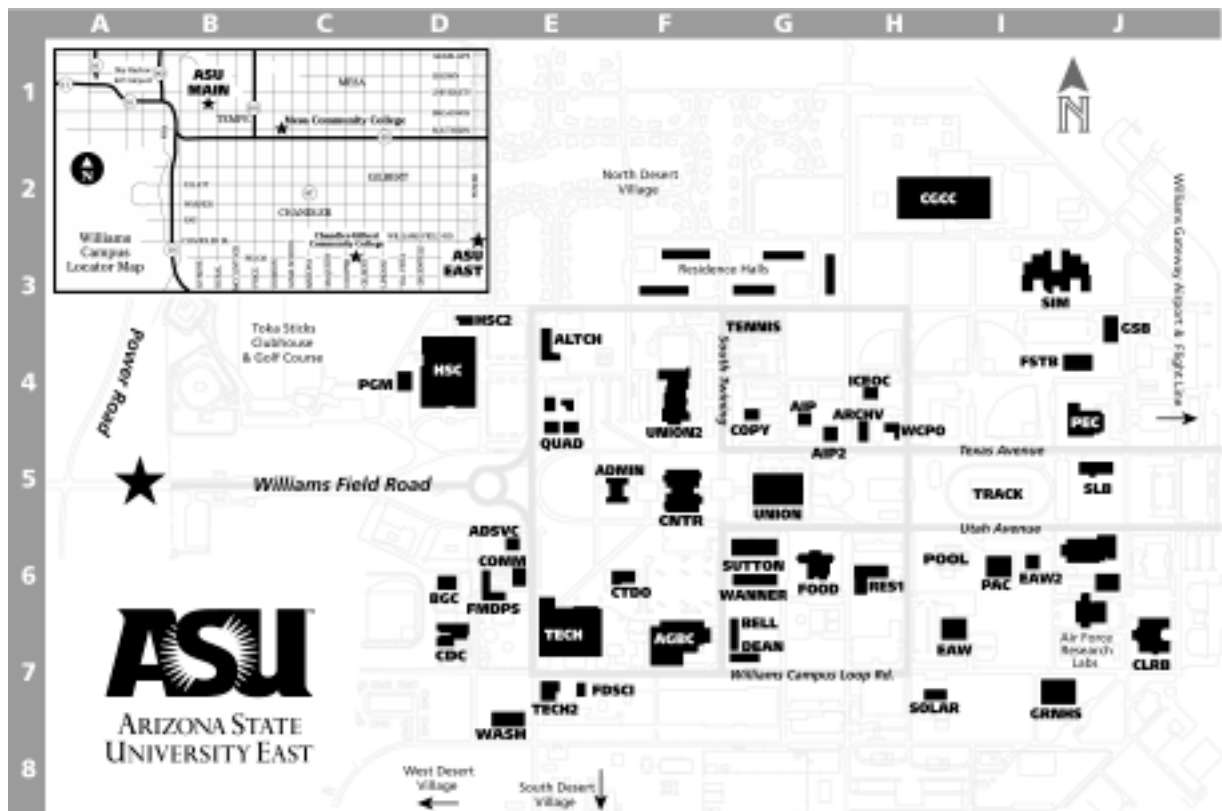
**Houses.** A large number of two- to four-bedroom houses are available for students with families or for groups of single undergraduate or graduate students. Each house includes basic appliances.

**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 M.S.Tech. degree program at ASU East encompasses a wide range of career paths, including professional piloting, aviation maintenance, and aviation management technology.

Tim Trumble photo



ADMIN	Administration Building (F5)	GSB	General Studies Building (J4)
ADSV	Administrative Services (E5)	HSC	Health Sciences Center (D4)
AGBC	Agribusiness Center (F7)	HSC2	Health Sciences Center Research (D4)
AIP	American Indian Programs (G4)	ICEOC	Incident Command/ Emergency Operations Center (H4)
AIP2	American Indian Programs Annex (G4)	PAC	Physical Activity Center (I6)
ALTCH	Altitude Chamber (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)	QUAD	Student Affairs (1,2,4), CERTT Lab (3) (E4)
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 Laboratory (H7)
COMM	Telecommunications (D6)	SUTTON	Sutton Hall (G6)
COPY	Williams Express Copy Services (G4)	TECH	Technology Center (E7)
CTDO	College of Technology Dean's Office (E6)	TECH2	Technology Center Annex (E7)
DEAN	Dean Hall (F7)	TENNIS	Tennis Courts (G4)
EAW	Exercise and Wellness Center (I7)	UNION	Student Union (G5)
EAW2	Exercise Instructional Lab Building (I6)	UNION2	Student Union Annex (F4)
FDSCI	Agribusiness Food Science Lab (E7)	WANNER	Wanner Hall (G6)
FMDPS	Facilities Management/DP5 (D6)	WASH	Launderette (D7)
FOOD	Williams Campus Dining Hall (G6)	WCPO	Williams Campus Post Office (H4)
FSTB	Fire Science Technology Building (I4)		
GRNHS	Greenhouses (I7)		

# ASU East Directory

For the “ASU Main Directory,” see page 362. For the “ASU West Directory,” see page 459. For the “ASU Extended Campus Directory,” see page 476.

Organization	Location	Telephone	Web Address
Agribusiness and Resource Management, Morrison School of Professional Golf Management	WANNER PGM	480/727-1585 480/727-1017	<a href="http://www.east.asu.edu/msabr">www.east.asu.edu/msabr</a> <a href="http://www.east.asu.edu/msabr/pgm">www.east.asu.edu/msabr/pgm</a>
American Indian Programs	AIP	480/727-1161 480/727-1075	<a href="http://www.east.asu.edu/aip">www.east.asu.edu/aip</a>
Bookstore	UNION	480/727-1168	<a href="http://www.asu.edu/east/admin/business.htm">www.asu.edu/east/admin/business.htm</a>
Campus Copy Center, Williams	COPY	480/727-1600	<a href="http://www.asu.edu/east/admin/business.htm">www.asu.edu/east/admin/business.htm</a>
Cashiering Services	QUAD 2	480/727-1081	<a href="http://www.asu.edu/east/admin/business.htm">www.asu.edu/east/admin/business.htm</a>
Computing Commons, ASU East	CNTR 150	480/727-1118	<a href="http://www.east.asu.edu/infotech/labs">www.east.asu.edu/infotech/labs</a>
East College Advising	SUTTON	480/727-1515 480/727-1333	<a href="http://www.east.asu.edu/ecollege">www.east.asu.edu/ecollege</a> —
Applied Biological Sciences, Department of	WANNER	480/727-1444	<a href="http://www.east.asu.edu/ecollege/appliedbiologicalsciences">www.east.asu.edu/ecollege/ appliedbiologicalsciences</a>
Applied Psychology, Faculty of	SUTTON	480/727-1515	<a href="http://www.east.asu.edu/ecollege/appliedpsych">www.east.asu.edu/ecollege/appliedpsych</a>
Business Administration, Faculty of	SUTTON	480/727-1515	<a href="http://www.east.asu.edu/ecollege/businessadmin">www.east.asu.edu/ecollege/businessadmin</a>
Education, Faculty of	SUTTON	480/727-1103	<a href="http://www.east.asu.edu/ecollege/education">www.east.asu.edu/ecollege/education</a>
Exercise and Wellness, Department of	EAW 109	480/727-1945	<a href="http://www.east.asu.edu/ecollege/wellness">www.east.asu.edu/ecollege/wellness</a>
Human Health Studies, Faculty of	CLRB 102	480/727-1065	<a href="http://www.east.asu.edu/ecollege/humanhealth">www.east.asu.edu/ecollege/humanhealth</a>
Multimedia Writing and Technical Communication, Faculty of	SUTTON	480/727-1515	<a href="http://www.east.asu.edu/ecollege/multimedia">www.east.asu.edu/ecollege/multimedia</a>
Nutrition, Department of	HSC 1386	480/727-1728	<a href="http://www.east.asu.edu/ecollege/nutrition">www.east.asu.edu/ecollege/nutrition</a>
Fitness Center, Williams Campus	WCFC Bldg.	480/988-8400	<a href="http://www.asu.edu/east/cls/recreation.htm">www.asu.edu/east/cls/recreation.htm</a>
General Information	QUAD 2	480/727-3278	<a href="http://www.east.asu.edu">www.east.asu.edu</a>
Housing, Williams Campus	BELL	480/727-1700	<a href="http://www.asu.edu/east/cls/housing">www.asu.edu/east/cls/housing</a>
Learning Center	CNTR 160	480/727-1452	<a href="http://www.east.asu.edu/learningcenter">www.east.asu.edu/learningcenter</a>
Library Services	CNTR 30	480/727-1037	<a href="http://eastlib.east.asu.edu">eastlib.east.asu.edu</a>
Parking	QUAD 2	480/727-1081	<a href="http://www.east.asu.edu/admin/pts">www.east.asu.edu/admin/pts</a>
Provost, Office of the	ADMIN	480/727-1028	—
Student Health Services	HSC	602/222-6568	<a href="http://www.asu.edu/east/student/stuheal.html">www.asu.edu/east/student/stuheal.html</a>
Student Union	UNION	480/727-1098	<a href="http://www.asu.edu/east/cls/union.htm">www.asu.edu/east/cls/union.htm</a>
Student Services*	QUAD 2	480/727-3278	<a href="http://www.east.asu.edu/students">www.east.asu.edu/students</a>
Technology and Applied Sciences, College of	CTDO	480/727-1874	<a href="http://www.east.asu.edu/ctas">www.east.asu.edu/ctas</a>
Aeronautical Management Technology, Department of	SIM 201	480/727-1381	<a href="http://eastair.east.asu.edu">eastair.east.asu.edu</a>
Electronics and Computer Engineering Technology, Department of	SUTTON 140	480/727-1976	<a href="http://www.east.asu.edu/ctas/ecet">www.east.asu.edu/ctas/ecet</a>
Information and Management Technology, Department of	TECH 102	480/727-1781	<a href="http://www.east.asu.edu/ctas/imt">www.east.asu.edu/ctas/imt</a>
Mechanical and Manufacturing Engineering Technology, Department of	SIM 295	480/727-1189	<a href="http://www.east.asu.edu/ctas/mmet">www.east.asu.edu/ctas/mmet</a>

\* Student Services includes ASU Sun Cards, Office of the Registrar, Student Business Services, Student Financial Assistance, and Undergraduate Admissions.



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# ASU East Faculty and Academic Professionals

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## 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; Chair, Department of 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 Emeritus 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 Emeritus 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

**Eaves, James E.** (2003), Assistant Professor of Agribusiness and Resource Management; B.A., University of Connecticut, Storrs; Ph.D., University of California, Davis

**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

**Foley, Dawn** (2003), Lecturer of Education; B.A., M.A., Arizona State University

**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

**Gomez, Conrado L.** (2003), Lecturer of Education; B.A., M.Ed., University of Arizona; Ed.D., Northern Arizona 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.A., Humbolt State University; 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

### H

**Hall, Richard E. III** (2002), Lecturer of Nutrition; B.S., Northern Arizona University; M.S., Arizona State University

**Hampf, Jeffrey** (1998), Associate 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, Morrison School of Agribusiness and Resource Management; B.S., Illinois State University; M.S., Arizona State University

**Hild, Nicholas R.** (1983), Professor of Information and Management Technology; B.S.M.E., M.S.Enve., University of Iowa; Ph.D., Union Graduate School

**Hirata, Ernest T.** (1974), Associate Professor of Information and Management Technology; B.A., San Diego State College; Ed.D., Arizona State University

**Hopper, Lee Ann** (2001), Lecturer of 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

### I

**Irvin, Glenn W.** (1997), Professor of English; Dean, East College; B.A., M.A., Ph.D., Arizona State University

### J

**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 Henry** (2000), Assistant Professor of Information and Management Technology; B.S., Arizona State University; M.B.A., University of Phoenix; Ph.D., 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

**Lefler, Scott** (2003), Lecturer of Applied Biological Sciences; B.S., California Polytechnic State University, San Luis Obispo; Ph.D., Arizona State University

**Lestar, Dot J.** (1995), Lecturer of Information and Management Technology; B.S., M.Tech., Arizona State University

**Lindley, James** (2001), Faculty Associate of Preveterinary Medicine; B.S., D.V.M., University of Missouri, Kansas City

**Lindquist, Timothy E.** (1985), Professor of Electronics and Computer Engineering Technology; Associate Dean and Director, Computing Studies; 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

**Marcum, Kenneth** (2003), Assistant Professor of Applied Biological Sciences; B.S., Ohio State University; M.S., New Mexico State University; Ph.D., University of Hawaii, Manoa

**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 Management 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 Studies; 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; Director, Executive Committee, Geographic Information Science; 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

**Mushkatel, Alvin H.** (1980), Professor of Applied Biological Sciences; B.A., Ohio State University; M.S., Ph.D., University of Oregon

## 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

**Niemczyk, Mary C.** (2003), Assistant Professor of Aeronautical Management Technology; B.A., Benedictine College; M.B.A., Embry-Riddle Aeronautical University; Ph.D., Arizona State University

## O

**O'Brien, Marc H.** (1997), Lecturer of Aeronautical Management Technology; B.A., Boston University; M.S., Indiana State University

**Odom, Mary Catherine** (2003), Senior Lecturer of Preveterinary Medicine; D.V.M., Iowa State University of Science and Technology

**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

## ASU EAST FACULTY AND ACADEMIC PROFESSIONALS

**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), Associate 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

**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 Aeronautical Management Technology; B.S., University of Oklahoma; M.S., Arizona State University

**Richards, Timothy J.** (1994), Associate Professor of Agribusiness and Resource Management; Power Chair Distinguished Professor of Agribusiness; 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

**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

**Roberts, Chell** (2003), Associate Professor of Mathematics; Director, Engineering Program Development; B.A., M.S., University of Utah; Ph.D., Virginia Polytechnic Institute and State University

**Robertson, John M.** (2001), Professor of Electronics and Computer Engineering Technology; B.S., University of St. Andrews (United Kingdom); M.S., University of Dundee (United Kingdom); Ph.D., University of Edinburgh (United Kingdom)

**Roe, Keith B.** (1979), Professor Emeritus of Technology; B.S., Wisconsin State College; M.A., University of Michigan

**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 Management Technology; B.S., Utah State University; M.S., Arizona State University

## S

**Salmirs, Seymour** (1981), Professor Emeritus of Technology; B.A.E., M.S.A.E., Georgia Institute of Technology

**Schildgen, Thomas E.** (1981), Professor of Information and Management Technology; Chair, Department of Information and Management Technology; B.S., M.S., Illinois State University; Ed.D., Northern Arizona University

**Schmidt, Peter A.** (1978), 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; 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), Lecturer 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

**Stever, Gayle S.** (2003), Senior Lecturer of Education; B.M., M.A., Ph.D., Arizona State University

**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), 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

**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

## V

**Vaughan, Linda A.** (1982), Professor of Nutrition; Chair, Department of Nutrition; B.S., University of California, Davis; M.N.S., Cornell University; Ph.D., University of Arizona

## W

**Watkins, Thomas B.** (1972), Professor Emeritus of Technology; B.S., University of Wyoming; M.S., Arizona State University

**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

**White-Taylor, Janel D.** (2003), Assistant Professor of Education; B.A., Loyola Marymount University; M.Ed., Ph.D., 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, Berkeley; 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

**Wolf, Kathleen** (2002), Assistant Professor of Nutrition; B.S., Arizona State University; M.S., University of California, Los Angeles; Ph.D., Arizona State University

## Z

**Zeng, Guoliang** (1991), Associate Professor of Electronics and Computer Engineering Technology; B.S., Chengdu Telecommunication Institute (China); M.S., University of California, San Diego; M.N.S., Ph.D., Arizona State University

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# ASU East Administrative Personnel

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## 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
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

## 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
Associate Dean and Director, Computing Studies . . . . .	Timothy E. Lindquist
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
Director, Engineering Program Development . . . . .	Chell Roberts

## East College

Dean, East College . . . . .	Glenn W. Irvin
Chair, Department of Exercise and Wellness . . . . .	William J. Stone
Chair, Department of Nutrition . . . . .	Linda A. Vaughan
Chair, Department of 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

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# ASU West

[www.west.asu.edu](http://www.west.asu.edu)

Elaine P. Maimon, Ph.D., Provost, ASU West; Vice President, ASU

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ASU West, a community-focused metropolitan campus of Arizona State University located in Phoenix, serves the community and more than 7,100 residential and commuter students of diverse ages, ethnicity, and experience through 29 baccalaureate programs, nine master's programs, and eight certificate programs. ASU West focuses on developing a learning community that addresses the needs of a diverse metropolitan environment. ASU West does this by offering learner-centered academic programs that enhance learning through teaching, service, and enrichment opportunities; promoting discovery and innovation; pursuing new knowledge; introducing insights and creative ideas through instruction; encouraging direct involvement in new fields of inquiry; investigating important community-based issues; and integrating with the community through service.

ASU West's vision is to enhance the intellectual, social, cultural, and economic qualities of a diverse, urban environment through research and creative activity and to provide access to a quality liberal arts education for undergraduates, professional programs grounded in the liberal arts, and an array of graduate programs. To fulfill this vision, the university offers liberal arts and professional programs, engages in discovering and advancing knowledge, and teaches diverse students in a student-centered, interdisciplinary learning environment as the community-focused metropolitan campus of ASU.

ASU West's commitment to integrated learning extends to Las Casas, an apartment-style, living-learning-based housing facility. Las Casas features faculty and academic advisors who live in the residence, faculty mentors, courses taught on site at the community center, and student affinity groups focusing on topics such as global awareness, leadership, and the arts.

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 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](http://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 and Master of Social Work programs are accredited by the Council on Social Work Education (CSWE). See the “[Academic Accreditation at ASU West](#)” table, page 479.

## 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.

## 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 Criminal Justice and Criminology
Educational Administration and Supervision	M.Ed.	—	Department of Graduate Studies and Professional Development
Elementary Education	M.Ed.	Optional: bilingual education, educational technology, ESL education, or reading*	Department of Graduate Studies and Professional Development
Interdisciplinary Studies	M.A.	—	College of Arts and Sciences
Secondary Education	M.Ed.	Optional: 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

\* If a major offers concentrations, one must be selected unless noted as *optional*.

See “ASU West Faculty and Academic Professionals,” page 461, and “ASU West Administrative Personnel,” page 467.

## 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, access the Web site at [westcgi.west.asu.edu/acadaffairs/gradstudies](http://westcgi.west.asu.edu/acadaffairs/gradstudies), 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 Admissions Services 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

See 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 [westcgi.west.asu.edu/acadaffairs/curriculum/catalog.cfm](http://westcgi.west.asu.edu/acadaffairs/curriculum/catalog.cfm).

### Certificates

ASU West offers postbaccalaureate certificates in Accountancy, Professional Accountancy, and Communication and Human Relations.

**Gerontology.** The ASU Gerontology program is a university-wide multidisciplinary program with its administrative home at ASU West. The graduate Certificate in Gerontology is designed so that students from ASU Main, West, and East may take related course work on any of the three campuses. For program details, see “Gerontology,” page 232.

### 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 [westcgi.west.asu.edu/acadaffairs/curriculum/catalog.cfm](http://westcgi.west.asu.edu/acadaffairs/curriculum/catalog.cfm).

## LIBRARY SERVICES

The ASU West Library provides resources that support the curricula of ASU West with a collection of 325,000 volumes, 1.4 million microforms, 8,780 videos, 15,000 slides, 240 electronic databases, and full or partial access to more than 27,000 print and electronic titles. Approximately 95



percent of electronic databases are available to ASU registered users from home computers.

A wide range of information and research tools are available through the ASU West Library Web site at [www.west.asu.edu/library](http://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.

### 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. admission and enrollment 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. residential life,
10. student employment,
11. student health services,
12. student life, and
13. veterans services.

For more information, visit the University Center Building, access the Web site at [www.west.asu.edu/sa](http://www.west.asu.edu/sa), call 602/543-8152, or write

STUDENT AFFAIRS  
ARIZONA STATE UNIVERSITY WEST  
PO BOX 37100  
PHOENIX AZ 85069-7100

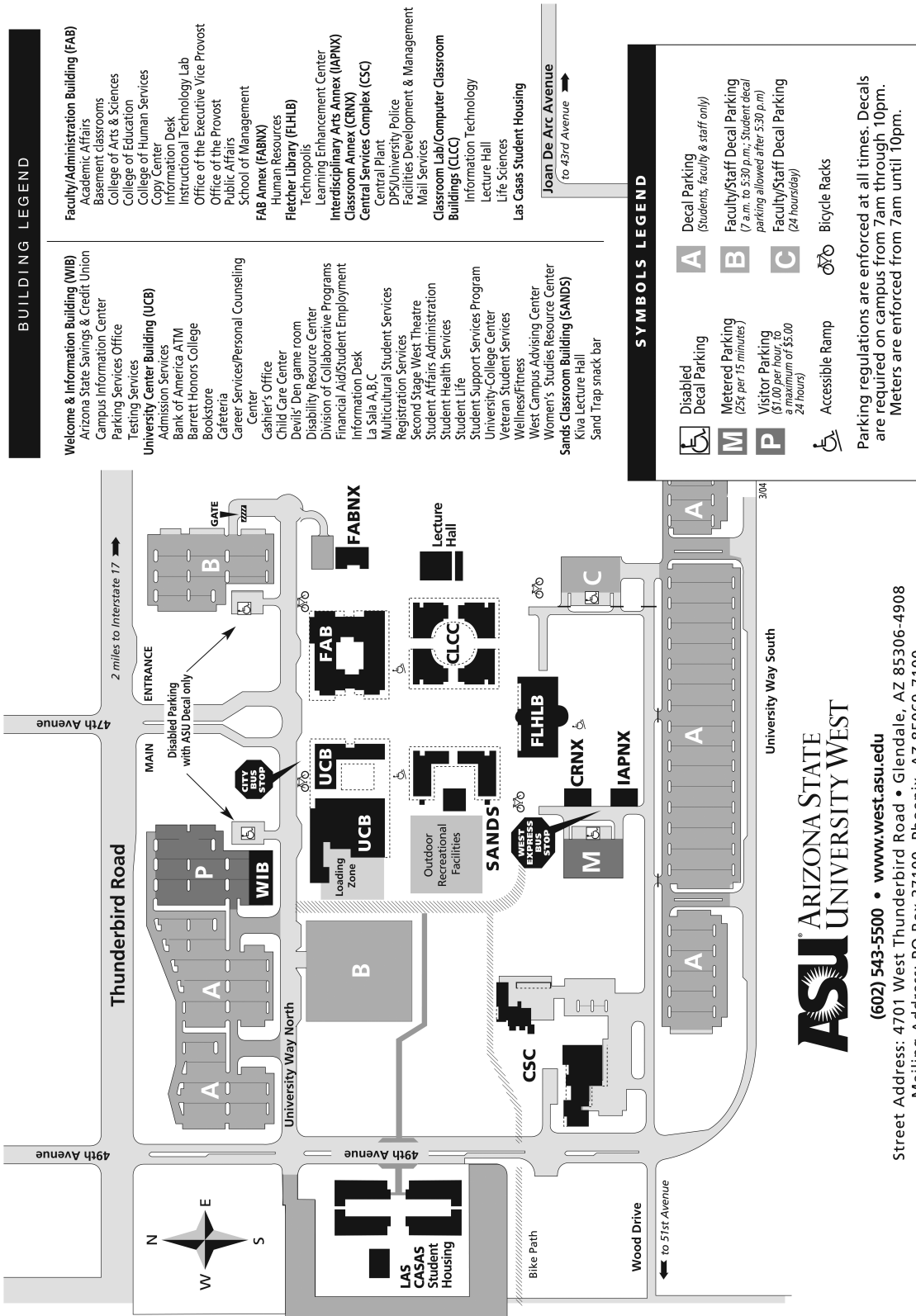
### STUDENT HOUSING

A new 400-bed student housing facility opened at ASU West in August 2003. The facility 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 include tutoring services, academic advising, in-room Internet access, coordinated educational and social activities, and dining services close by on campus. The expense to residents is competitive with the rental costs of nearby apartment complexes. For more information, call 602/543-CASA.



ASU West campus with the University Center Building and Faculty and Administration Building in the foreground

Mark Boisclair photo



# ASU West Directory

For the “ASU Main Directory,” see page 362. For the “ASU East Directory,” see page 448. For the “ASU Extended Campus Directory,” see page 476.

Organization	Location	Telephone	Web Address
Academic Affairs	FAB N301	602/543-4500	<a href="http://westcgi.west.asu.edu/acadaffairs">westcgi.west.asu.edu/acadaffairs</a>
Admission and Enrollment Services	UCB 120	602/543-8203	<a href="http://www.west.asu.edu/admissions">www.west.asu.edu/admissions</a>
Arts and Sciences, College of	FAB N201	602/543-6000	<a href="http://www.west.asu.edu/coas">www.west.asu.edu/coas</a>
American Studies, Department of	FAB N220	602/543-6090	<a href="http://www.west.asu.edu/amerstud">www.west.asu.edu/amerstud</a>
Bachelor of Applied Science Program	FAB N206	602/543-4BAS	<a href="http://www.west.asu.edu/bas">www.west.asu.edu/bas</a>
Ethnic Studies Program	FAB N204	602/543-6007	<a href="http://www.west.asu.edu/ethnic">www.west.asu.edu/ethnic</a>
Integrative Studies, Department of	FAB N279	602/543-6003	<a href="http://www.west.asu.edu/iasweb">www.west.asu.edu/iasweb</a>
Interdisciplinary Arts and Performance, Department of	FAB N205	602/543-6057	<a href="http://www.west.asu.edu/iap">www.west.asu.edu/iap</a>
Life Sciences, Department of	CLCC 217	602/543-6050	<a href="http://www.west.asu.edu/lifesci">www.west.asu.edu/lifesci</a>
M.A. in Interdisciplinary Studies	FABN 230D	602/543-6241	<a href="http://www.west.asu.edu/mais">www.west.asu.edu/mais</a>
Social and Behavioral Sciences, Department of	FAB N250	602/543-6058	<a href="http://www.west.asu.edu/social">www.west.asu.edu/social</a>
Women's Studies Program	FAB N291	602/543-3300	<a href="http://www.west.asu.edu/wsteam">www.west.asu.edu/wsteam</a>
Associated Students of ASU West	UCB 226	602/543-8186	<a href="http://www.west.asu.edu/asasuw">www.west.asu.edu/asasuw</a>
ASU West	—	602/543-5500	<a href="http://www.west.asu.edu">www.west.asu.edu</a>
Barrett Honors College	UCB 201	602/543-3410	<a href="http://www.west.asu.edu/honors">www.west.asu.edu/honors</a>
Bookstore	UCB 140	602/543-6800	<a href="http://www.west.asu.edu/adaff/auxs/bookstore">www.west.asu.edu/adaff/auxs/ bookstore</a>
Career Services and Personal Counseling Center	UCB 320	602/543-8124	<a href="http://www.west.asu.edu/cspc">www.west.asu.edu/cspc</a>
Disability Resource Center	UCB 130	602/543-8145	<a href="http://www.west.asu.edu/drc">www.west.asu.edu/drc</a>
TDD	—	602/543-4327	—
Education, College of	FAB S210A	602/543-6300	<a href="http://www.west.asu.edu/coe">www.west.asu.edu/coe</a>
Elementary Education, Department of	FAB S218	602/543-6315	<a href="http://www.west.asu.edu/coe/elem">www.west.asu.edu/coe/elem</a>
Graduate Studies and Professional Development, Department of	FAB S220	602/543-3634	<a href="http://www.west.asu.edu/coe/graduate">www.west.asu.edu/coe/graduate</a>
Secondary Education, Department of	FAB S251A	602/543-6445	<a href="http://www.west.asu.edu/coe/sed">www.west.asu.edu/coe/sed</a>
Special Education, Department of	FAB S252	602/543-6380	<a href="http://www.west.asu.edu/coe/spe">www.west.asu.edu/coe/spe</a>
Financial Aid Services	UCB 120	602/543-8178	<a href="http://www.west.asu.edu/financialaid">www.west.asu.edu/financialaid</a>
Freshman Experience Office	UCB 201	602/543-4600	<a href="http://www.west.asu.edu/dcp">www.west.asu.edu/dcp</a>
Graduate Studies	FAB S301	602/543-4567	<a href="http://westcgi.west.asu.edu/acadaffairs/gradstudies">westcgi.west.asu.edu/acadaffairs/ gradstudies</a>
Human Services, College of	FAB S105A	602/543-6600	<a href="http://www.west.asu.edu/chs">www.west.asu.edu/chs</a>
Communication Studies, Department of	FAB S141C	602/543-6606	<a href="http://www.west.asu.edu/chs/comm">www.west.asu.edu/chs/comm</a>
Criminal Justice and Criminology, Department of	FAB S270C-1	602/543-6607	<a href="http://www.west.asu.edu/chs/aoj">www.west.asu.edu/chs/aoj</a>
Gerontology Program	FAB S121	602/543-6642	<a href="http://www.west.asu.edu/chs/GRN">www.west.asu.edu/chs/GRN</a>
Nursing (ASU Main program)	FAB N290B	602/543-6605	<a href="http://nursing.asu.edu">nursing.asu.edu</a>
Recreation and Tourism Management, Department of	FAB S115A	602/543-6603	<a href="http://www.west.asu.edu/chs/RTM">www.west.asu.edu/chs/RTM</a>
Social Work, Department of	FAB S126	602/543-6602	<a href="http://www.west.asu.edu/chs/sw">www.west.asu.edu/chs/sw</a>
Information Desk	FAB Lobby	602/543-5500	<a href="http://www.west.asu.edu/adaff/auxs/info">www.west.asu.edu/adaff/auxs/info</a>
Learning Enhancement Center	FLHLB LL2	602/543-6151	<a href="http://www.west.asu.edu/lec">www.west.asu.edu/lec</a>
Library	FLHLB	602/543-8501	<a href="http://www.west.asu.edu/library">www.west.asu.edu/library</a>

## ASU WEST DIRECTORY

Organization	Location	Telephone	Web Address
Management, School of	FAB N101	602/543-6200	<a href="http://www.west.asu.edu/som">www.west.asu.edu/som</a>
Accounting and Information Systems Management, Department of	FAB S190-1	602/543-6275	<a href="http://www.west.asu.edu/som/programs/accountancy/pbcapgmreq.htm">www.west.asu.edu/som/programs/accountancy/pbcapgmreq.htm</a>
Economics, Finance, Marketing and Quantitative Business Analysis, Department of	FAB N120A	602/543-6101	<a href="http://www.west.asu.edu/som">www.west.asu.edu/som</a>
Management, Department of	FAB N120D	602/543-6204	
Master of Business Administration Program	FAB N151	602/543-6201	<a href="http://www.west.asu.edu/som">www.west.asu.edu/som</a> <a href="http://www.west.asu.edu/som/Programs/mba/mba.htm">www.west.asu.edu/som/Programs/mba/mba.htm</a>
Multicultural Student Services	UCB 220	602/543-8148	<a href="http://www.west.asu.edu/multicultural">www.west.asu.edu/multicultural</a>
Native American Support Services Programs	UCB 220	602/543-8138	<a href="http://www.west.asu.edu/nativeamerican">www.west.asu.edu/nativeamerican</a>
Parking Services (Decals, Appeals)	WIB 101	602/543-7275	<a href="http://www.west.asu.edu/adaff/auxs/parking">www.west.asu.edu/adaff/auxs/parking</a>
Provost, Office of the	FAB N303	602/543-7000	<a href="http://westcgi.west.asu.edu/acadaffairs/provost">westcgi.west.asu.edu/acadaffairs/provost</a>
Recruitment and Outreach	UCB 105	602/543-8550	<a href="http://www.west.asu.edu/recruitment">www.west.asu.edu/recruitment</a>
Research Consulting Center	FAB S303	602/543-3411	<a href="http://www.west.asu.edu/rcc">www.west.asu.edu/rcc</a>
Residency Classification	UCB 120	480/965-7712	<a href="http://www.west.asu.edu/admissions">www.west.asu.edu/admissions</a>
Residential Life	LCR	622/543-2272	<a href="http://www.west.asu.edu/reslife">www.west.asu.edu/reslife</a>
Student Employment	UCB 120	602/543-8178	<a href="http://www.west.asu.edu/financialaid">www.west.asu.edu/financialaid</a>
Student Health Services	UCB 170	602/543-8019	<a href="http://www.west.asu.edu/studenthealth">www.west.asu.edu/studenthealth</a>
Student Life	UCB 221	602/543-8200	<a href="http://www.west.asu.edu/studentlife">www.west.asu.edu/studentlife</a>
Student Support Services Program (TRiO)	UCB 220	602/543-8121	<a href="http://www.west.asu.edu/trio">www.west.asu.edu/trio</a>
Testing Services	WIB 102	602/543-8136	<a href="http://www.west.asu.edu/testing">www.west.asu.edu/testing</a>
University-College Center	UCB 201	602/543-4222	<a href="http://www.west.asu.edu/ucc">www.west.asu.edu/ucc</a>
Veteran Student Services	UCB 120	602/543-8220	<a href="http://www.west.asu.edu/veteran/vetinfo.htm">www.west.asu.edu/veteran/vetinfo.htm</a>
West Campus Advising Center	UCB 201	602/543-WCAC	<a href="http://www.west.asu.edu/wcac">www.west.asu.edu/wcac</a>
Women's Studies Resource Center	UCB 323	602/543-3426	<a href="http://www.west.asu.edu/wsteam/resource.htm">www.west.asu.edu/wsteam/resource.htm</a>

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# ASU West Faculty and Academic Professionals

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## A

- Achilles, Elaine R.** (1986), Professor Emerita 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
- Anders, Kathleen K.** (2003), Lecturer of Management; B.A., University of Notre Dame; M.B.A., University of Alaska; Ph.D., Arizona State University
- Anderson, Laurel A.** (1989), Associate Professor of Marketing; B.S.N., University of Minnesota, Twin Cities; M.N., University of Washington; Ph.D., Arizona State University
- 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 Criminal Justice and Criminology; B.A., University of Manitoba (Canada); M.A., Ph.D., University of Maryland
- Armstrong, Todd A.** (1999), Assistant Professor of Criminal Justice and Criminology; 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 Emeritus 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
- Bartle, Elizabeth E.** (2003), Assistant Professor of Social Work; B.S.W., University of Nebraska, Lincoln; M.S.W., University of Nebraska, Omaha; Ph.D., University of Kansas
- 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 Criminal Justice and Criminology; 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 Criminal Justice and Criminology; Chair, Department of Criminal Justice and Criminology; B.S., University of Iowa; M.A., Washington State University; Ph.D., University of Arizona
- Broadus, Dorothy C.** (1990), Associate Professor of English; B.A., Eastern Kentucky University; M.Ed., Ph.D., University of Louisville
- Brown, Lee H.** (2001), Assistant Professor of Secondary Education; B.A., Union College; M.A., Ed.D., State University of New York, Albany
- Buenker, Joe** (2000), Assistant Librarian; B.A., University of Wisconsin, Parkside; M.S., University of Illinois, Urbana
- Burleson, Mary H.** (1997), Associate 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

## ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

**Byam, Dale L.** (2004), Assistant Professor of Interdisciplinary Arts and Performance; B.Admin., Concordia University; M.A., Ph.D., New York University

### 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., Liberator Experimental Pedagogical University (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, Heather Lynn** (2003), Lecturer of Elementary Education; B.S., M.Ed., Arizona State University West

**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

**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), Professor Emerita 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; Chair, Department of Graduate Studies and Professional Development; B.A., Denison University; M.Ed., Boston University; Ph.D., Arizona State University

**Cisler, Sherry A.** (2003), Lecturer of Rhetoric and Composition; B.A., M.A., California State University, San Marcos

**Clark, Patricia** (2003), Assistant Professor of Digital Media; B.F.A., M.F.A., 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; Chair, Department of Integrative Studies; 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

**Cuádriz, Gloria H.** (1994), Associate Professor of American Studies; Director, Ethnic Studies Program; B.A., University of California, Santa Cruz; M.A., Ph.D., University of California, Berkeley

**Cutrer, Emily F.** (1990), 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; 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 Backer, Stephanie Fink** (2003), Assistant Professor of History; B.S.F.S., Georgetown University; M.A., Catholic University of America; 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; Interim Dean, College of Human Services; 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

**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

**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

**Friedrich, Patricia Marques** (2003), Visiting Assistant Professor of American Studies; B.A., University of São Paulo (Brazil); M.A., Ph.D., Purdue University

## G

**Gable, Karla** (2003), Lecturer of Education; B.A., M.A., M.C., 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

**Gilkeson, John S.** (1991), Associate Professor of History; Cochair, Department of American Studies; 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

**Gonzales, David S.** (2002), Associate Professor of Animal Physiology; B.S., Metropolitan State College, Denver; M.S., Ph.D., University of Wisconsin, Madison

**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

**Gopalakrishnan, Mohan** (1998), Associate Professor of Operations Production Management; B.E., College of Engineering (India); M.S., Ph.D., University of Alabama, Tuscaloosa

**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 Criminal Justice and Criminology; B.S., Santa Clara University; Ph.D., Arizona State University

**Gruber, Diane** (1995), Assistant Professor 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 Criminal Justice and Criminology; 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 Emerita of 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

**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; Director, Partnership for Community Development; 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 of Education; 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

**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), Librarian Emerita; 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), Associate 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), Associate Professor of Criminal Justice and Criminology; Director of Graduate Studies, Department of Criminal Justice and Criminology; 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

## ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

**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; B.A., Ph.D., University of Newcastle (United Kingdom)

**Knopf, Richard C.** (1986), Professor of Recreation and Tourism Management; 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

**Larson, Susan E.** (2003), Lecturer of Elementary Education; B.S., Bucknell University; M.S., Fitchburg State College

**Lerman, Richard** (1995), Professor of Media Arts; B.A., M.F.A., Brandeis University

**Limb, Gordon Earl** (2003), Assistant Professor of Social Work; B.S., Brigham Young University; M.S.W., University of Utah; Ph.D., University of California, Berkeley

**Lowe, D. Jordan** (2003), Associate Professor of Accountancy; B.S., M.Acc., Brigham Young University; Ph.D., Arizona State University

## M

**Macfie, Brian P.** (2004), Lecturer of Economics; B.A., Seton Hall University; M.A., M.S., Rutgers, The State University of New Jersey; M.B.A., Monmouth College

**Maimon, Elaine P.** (1996), Professor of English; Provost, ASU West; Vice President, ASU; B.A., M.A., Ph.D., University of Pennsylvania

**Maldonado, Sergio A.** (2003), Lecturer of American Studies; B.A., Brigham Young University; M.Ed., Arizona State University

**Malian, Ida M.** (1990), Professor of Special Education; Chair, Department of Special Education; B.A., Oakland University; M.A., Ph.D., University of Michigan

**Marshall, Pamela A.** (2003), Assistant Professor of Eukaryotic Genetics; B.S., Southern Methodist University; Ph.D., University of Texas Southwestern Medical Center, Dallas

**Martin, Meredith** (2003), Lecturer of Sociology; B.S., M.P.A., Arizona State University; Ph.D., University of New Mexico

**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

**McQuiston, Dawn E.** (2003), Assistant Professor of Psychology; B.S., Eastern New Mexico University; M.A., Ph.D., University of Texas, El Paso

**Meân, Lindsey** (2003), Senior Lecturer of Communication Studies; B.Sc., Plymouth Polytechnic (United Kingdom); Ph.D. University of Sheffield (United Kingdom)

**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 São Paulo (Brazil); M.Sc., Ph.D., Purdue University

**Meznar, Martin** (1994), Associate Professor of International Business; B.A., B.S., Bryan College; M.S., University of Texas, Dallas; Ph.D., University of South Carolina

**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), Lecturer 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), Assistant Professor of Social Work; B.S.W., Adelphi University; M.S.W., Ph.D., 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

**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

**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., Graduate School and University Center, City University of New York

## O

**Olander, George A.** (2000), Lecturer of Finance; B.S., Xavier University; M.B.A., Pepperdine 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; Bacalaureat, German Lyceum (Romania); M.S., University of Bucharest (Romania); Ph.D., University of Michigan

**Paulson, Keith** (2003), Lecturer of Economics; B.A., B.S., University of Minnesota, Moorehead; M.B.A., Marquette University

**Perry, Eleanor A.** (1996), Associate Professor of Educational Administration; 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

**Postelnicu, Valentina** (2003), Lecturer of Mathematics; M.S. University of Bucharest (Romania); M.M.Ed., University of Iassy (Romania)

**Pough, F. Harvey** (1993), Professor of Integrative Biology; B.A., Amherst College; M.A., Ph.D., University of California, Los Angeles

## 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; Associate Dean, 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 Criminal Justice and Criminology; B.S., Sam Houston State 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

**Samuels, Janet A.** (2003), Assistant Professor of Accountancy; B.B.A., University of Wisconsin, Milwaukee; Ph.D., Arizona State University

**Sander-Staudt, Maureen** (2003), Assistant Professor of Philosophy; B.A., Alverno College; M.A., University of Wisconsin, Milwaukee; Ph.D., University of Colorado, Boulder

**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, Jennifer N.** (2003), Assistant Professor of Criminal Justice and Criminology; B.A., University of Oklahoma; M.A., Ph.D., Pennsylvania 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

**Solis, Francisco J.** (2003), Assistant Professor of Life Sciences; B.S., Technological Institute of Pachuca (Mexico); M.S., Center for Research and Advanced Studies (Mexico); Ph.D., University of Chicago

**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 Emerita 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

## ASU WEST FACULTY AND ACADEMIC PROFESSIONALS

**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

**Stanley, Linda L.** (2003), Visiting Assistant Professor of Management; B.A., California State University, Sacramento; B.S., Ph.D., Arizona State University

**Stryker, Linda L.** (1985), Associate Professor of Astronomy; 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

**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, Omaha; M.A., Arizona State University; Ph.D., Indiana University

## 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 Criminal Justice and Criminology; 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

**Whitlock, Monica L.** (2003), Visiting Assistant Professor of Criminal Justice and Criminology; B.A., Point Loma Nazarene College; M.A., M.M.F.T., Ph.D., University of Southern California

**Wilhelm, Lance A.** (2002), Assistant Professor of Technology in Education; B.S., M.S., Ph.D., Iowa State University

**Williams, Julia A.** (2003), Lecturer of Special Education; A.B., M.A.Ed., Washington University, St. Louis; Ed.D., Ohio State University

**Williams, Mia K.** (2002), Lecturer of Technology in Education; B.S., Northern Arizona State University; M.Ed., Arizona State University

**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

**Yoshikawa, Elaine K.** (2003), Lecturer of Philosophy; B.A., University of California, Berkeley; M.A., Ph.D., Arizona State University

**Yungbluth, Stephen C.** (2000), Lecturer of Communication Studies; B.A., Xavier University; M.A., Ph.D., University of Kentucky

## Z

**Zambo, Debby** (2003), Lecturer of Educational Psychology; B.A., University of South Florida; M.Ed., Ph.D., Arizona State University

**Zambo, Ronald W.** (1991), Associate Professor of Mathematics Education; B.S., Indiana University, Bloomington; M.A., Ph.D., University of South Florida

**Zorita, Paz Méndez-Bonito** (1993), Associate Professor of Social Work; A.S., School of Social Work of Gijon (Spain); M.S.S.A., Ph.D., Case Western Reserve University

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# ASU West Administrative Personnel

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## Administration

Provost, ASU West; Vice President, ASU	Elaine P. Maimon
Executive Vice Provost	Gebeyehu Ejigu
Dean of Students	Jo Ann Madonna
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
Associate Dean, Barrett Honors College	R. Eric Ramsey
Director, Curriculum and Academic Articulation	Julia R. Ramsden
Director, Research Consulting Center	Joseph M. Ryan
Faculty Director, Division of Collaborative Programs	Afsaneh Nahavandi
Vice Provost for Planning and Budget	Barry R. Bruns
Vice Provost for Public Affairs	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	John S. Gilkeson
Chair, Department of Integrative Studies	Shari C. Collins-Chobanian
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	Alice A. Christie
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	Lesley Di Mare
Chair, Department of Communication Studies	John Macgregor Wise
Chair, Department of Criminal Justice and Criminology	Chester L. Britt III
Chair, Department of Recreation and Tourism Management	Wendy Hultsman
Chair, Department of Social Work	<i>To Be Appointed</i>
Director, Gerontology Program	Richard Gitelson
Director, Partnership for Community Development	John T. Hultsman
Liaison, Nursing (ASU Main Program)	Brenda Morris

## 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

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# ASU Extended Campus

[www.asu.edu/xed](http://www.asu.edu/xed)

William A. Verdini, D.B.A., Interim Dean, College of Extended Education

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## PURPOSE

The need for higher education is growing every day, and yet balancing work, family, and learning can be challenging. To help students fit higher education into their busy schedules, the university provides additional access to quality education beyond ASU physical campuses through the ASU Extended Campus. The Extended Campus is a combination of flexible scheduling, innovative technologies, and a vast network of off-campus sites that makes it more convenient for students to pursue their education. Programming includes credit classes, degree programs, certificates, and continuing education. Classes are taught by a faculty of full-time professors and experienced professionals.

For more information about the Extended Campus, access the Web site at [www.asu.edu/xed](http://www.asu.edu/xed), or call 480/965-3986.

## ORGANIZATION

The College of Extended Education is a university-wide college that oversees the delivery of the Extended Campus courses. The college forms partnerships with other ASU colleges and community resources to implement quality programs. It is composed of the following departments: Academic and Professional Programs, American English and Culture Program, Communications and Marketing, Distance Learning and Technology, Downtown Center and Property Administration, Extended Campus Programs, and Planning and Business Services.

## Schedule Options

Through the Extended Campus, students have many opportunities to pursue their educational goals. A variety of scheduling options are available for credit courses offered by the university's academic departments. Convenient times, locations, and innovative technologies make it easier for students to earn degrees.

As a convenience to students, courses are conducted off campus in locations throughout the state, on campus in the evening, via the Internet and television, and during Winter Session. Academic credits earned off campus are equivalent in all considerations with those credits earned on campus, and the credits are recorded on students' permanent records. Courses are published each fall and spring semester in the *ASU Schedule of Classes* and on the Web at [www.asu.edu/xed](http://www.asu.edu/xed) and [asuonline.asu.edu](http://asuonline.asu.edu).

### Evening Classes

Evening study is perfect for students with busy schedules. The Extended Campus offers several program options.

The W. P. Carey M.B.A. Evening Program offers working professionals a solid managerial degree from two locations:

the ASU Downtown Center in Phoenix and ASU Main in Tempe. For more information, see "[Master of Business Administration—M.B.A.](#)," page 469.

The Master of Public Administration offers several interdisciplinary courses during the evening at various locations, and the full program is available at the ASU Downtown Center. For more information, see "[Master of Public Administration—M.P.A.](#)," page 470.

### Weekend Courses

Each semester, ASU offers weekend courses that often are in a compressed format and involve meeting for several hours on select weekends. Some course work may be required outside of the regular course sessions. For a listing of the current weekend courses offered, refer to the searchable online course schedule at [www.asu.edu/xed](http://www.asu.edu/xed). A student choosing to enroll in a weekend course should contact the department offering the course for details, including specific dates and requirements.

### Winter Session

This is an intensive, condensed session offered between the fall and spring semesters. Students may enroll in one course and earn up to three semester hours of credit, which are recorded on fall transcripts. Courses are offered on ASU Main campus. Registration begins October 1 and courses start December 30. The College of Extended Education schedules the Winter Session courses in collaboration with ASU Main academic departments.

For more information, call 480/965-9797.

## Distance Learning

ASU offers more than 200 courses each semester through the Internet, television, and independent learning. Distance learning students complete the course work and exams for the same academic credit as students on campuses. However, they experience the added value and flexibility of earning credit at home or work. Distance learning students keep in touch with instructors and classmates through teleconferencing, e-mail, and discussion boards.

### Independent Learning

Independent learning provides an option for students to earn university credit any time, any place. These courses are appropriate for students seeking flexibility in progressing through their ASU program of study or fulfilling degree requirements. Some students may enroll in these courses to enhance their occupational, professional, and intellectual skills.

Anyone with a high school diploma or GED may enroll; however, enrollment in independent learning is not the same as admission to ASU. ASU degree-seeking students must

obtain their advisors' and deans' approvals before enrolling. Students may register for courses at any time during the year and have one year in which to complete course work. Some courses are offered on the Internet while most of them are offered in a mail-based format.

For more information, call 480/965-6563, or access the program Web site at [www.dlt.asu.edu](http://www.dlt.asu.edu).

### Internet

Online courses offer students a great level of scheduling flexibility to participate in ASU courses. Various university departments offer Internet classes. 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. A computer, Internet access, e-mail, and a Web browser are necessary to participate in Web-based courses; however, specific equipment and software requirements may vary by course. Students register for Internet courses through the normal university admissions and registration process.

For more information, visit ASUonline, the university's gateway to an "online campus," at [asuonline.asu.edu](http://asuonline.asu.edu). Interested individuals may also write to [distance@asu.edu](mailto:distance@asu.edu), or call 480/965-6738.

### Television

Televised courses make it possible for students to earn course credits by viewing class sessions and completing work assignments at home or work. Courses are available throughout the Phoenix area via public and cable television providers. Televised courses are also available in university residence halls at ASU Main and ASU East. Most televised courses are available for viewing through University Libraries. Televised courses are listed each fall and spring in the *ASU Schedule of Classes* and online at [asutv.asu.edu](http://asutv.asu.edu).

For more information about televised courses, send e-mail to [asutv@asu.edu](mailto:asutv@asu.edu), or call 480/965-6738.

*Interactive Instructional Television Program.* Students employed by companies participating in this program may take courses for credit at their work sites. The teleconferencing system enables students to interact with other students and instructors in the classroom on campus. Interactive instructional television sites are available at several locations in the Phoenix area. Each site has a coordinator to assist with registration, provide information, and proctor exams, which typically are held at the site. A daily courier service circulates course materials between faculty on campus and their students at remote sites.

*Public Sites.* Certain sites provide the public with access to interactive television courses. Students can participate in most televised courses at locations such as the ASU Downtown Center, ASU East, ASU West, Cactus Shadows High School, and the Gila River Indian Community.

## Off-Campus Locations

Extended Campus classes are held at approximately 250 off-campus sites throughout metropolitan Phoenix, the state, and beyond. Many neighborhood sites, such as community colleges, schools, churches, and businesses, serve as hosts to Extended Campus courses.

The anchor off-campus site is the ASU Downtown Center, located in downtown Phoenix. The center is the educational hub for downtown workers, organizations, and residents, and serves as a meeting site for conferences and seminars.

For more information, see "Locations," page 474.

## DEGREE PROGRAMS

Convenient times and locations, as well as innovative technologies, make it easier for working adults and other nontraditional students to earn a degree. Some of the degrees may be offered in different subject areas or concentrations, at various locations, or through technology. The College of Extended Education facilitates delivery of the courses offered by the university's academic departments. Course listings are published each fall and spring semester in the *ASU Schedule of Classes*.

## Graduate Degrees

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 470.

### D.E.L.T.A. DOCTORATE—ED.D.

This doctorate in Educational Administration and Supervision responds to the increased demand for enhanced educational leadership in Arizona and addresses these critical areas of school instruction and administration: school law, computer applications, school finance, research techniques, and instructional improvement. The program is designed for qualified public school administrators and recognizes the unique needs of full-time employees; it is available as an off-campus degree program.

For an application and more information, call 480/965-7224.

### MASTER OF BUSINESS ADMINISTRATION—M.B.A.

#### connectMBA

The ASU West connectMBA option 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/programs/mba/connmba.htm](http://www.west.asu.edu/som/programs/mba/connmba.htm).

#### W. P. Carey M.B.A. Evening Program

This program offers working professionals a solid managerial degree from two locations: the ASU Downtown Center in Phoenix and the ASU Main campus in Tempe. The program combines theoretical concepts with practical applications. Students at both locations receive the same high-quality instruction and a complete range of student services.

For more information, call 480/965-3332.

## ASU EXTENDED CAMPUS

### Graduate Degrees and Majors Offered in Collaboration with the College of Extended Education

Major	Degree	Concentration*	Administered By
Business Administration	M.B.A.	—	School of Management (ASU West) W. P. Carey School of Business (ASU Main)
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.Eng.	—	Ira A. Fulton School of Engineering
Engineering Science	M.S.E.	Optional: executive embedded systems*	Ira A. Fulton School of Engineering
Nursing	M.S.	—	College of Nursing
Public Administration	M.P.A.	Optional: nonprofit administration*	School of Public Affairs
Social Work	M.S.W.	Advanced direct practice or planning, administration, and community practice	School of Social Work
Technology	M.S.Tech.	Environmental technology management	Department of Information and Management Technology (ASU East)

\* If a major offers concentrations, one must be selected unless noted as *optional*.

#### W. P. Carey M.B.A. in Technology

ASU Main offers this evening program that is designed specifically for technology professionals. Case studies, applications, and examples emphasize technology, global competition, and rapid organizational change. The program is offered at the ASU Research Park.

For more information, call 480/965-3332.

#### W. P. Carey M.B.A. Online Program

This is an ASU Main program that uses computer and communications technologies to offer the highly ranked W. P. Carey M.B.A. degree 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.

#### ScottsdaleMBA

The ASU West ScottsdaleMBA option 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.

#### MASTER OF EDUCATION—M.ED.

##### Curriculum and Instruction

The major in Curriculum and Instruction is offered with a concentration in secondary education. This off-campus degree program is designed for school district audiences.

For more information, call 480/965-1644.

#### MASTER OF ENGINEERING—M.ENG.

The tri-university M.Eng. program is intended to meet the educational needs of Arizona's practicing engineers. With industry input, Arizona's three state universities offer courses through a variety of distance-delivery methods in flexible formats at any of the three universities. Course work will enhance the skills, knowledge, and understanding that are critical to today's practicing engineers.

The M.Eng. degree offers the practicing engineer opportunities to design, in conjunction with an advisory committee, a program of study that reflects the increasingly interdisciplinary nature of engineering practice. The 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 also required.

For more information about the program, access the Ira A. Fulton School of Engineering Center for Professional Development Web site at [cpd.asu.edu](http://cpd.asu.edu).

#### MASTER OF PUBLIC ADMINISTRATION—M.P.A.

This interdisciplinary program provides professional training for careers in public administration and management. The M.P.A. program is available evenings at the ASU Downtown Center in its entirety. Opportunities to complete course work leading to the M.P.A. degree are also offered during evening hours at ASU Main and various off-campus sites.

For more information, call 480/965-3926, or write

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TEMPE AZ 85287-0603

**MASTER OF SCIENCE IN ENGINEERING—M.S.E.****Electrical Engineering**

This professional degree requires no thesis. The M.S.E. program is offered to off-campus students through distance learning and is designed for engineering and technical professionals who require flexible scheduling. The online program offers specialty areas in solid-state electronics, mixed-signal integrated circuit design, signal processing, and communications. A number of courses are offered online each semester.

For more information about the program, access the Ira A. Fulton School of Engineering Center for Professional Development Web site at [cpd.asu.edu/online](http://cpd.asu.edu/online).

**Executive Embedded Systems Program**

This degree program provides an interdisciplinary engineering curriculum and strategically aligns a core business curriculum to prepare engineers for management and leadership positions within technical organizations. The program is designed for engineers on the fast track of leadership advancement and, for their convenience, is delivered via distance learning.

The program is administered as a cohort-based two-year program of study consisting of 42 semester hours and a value-added capstone project. Twelve semester hours of business curriculum are offered in this program. The engineering curriculum is on an accelerated trimester of 10-week sessions, and the business curriculum is delivered with five-week course sessions. Successful students graduate with an M.S.E. degree in Engineering Science with a concentration in executive embedded systems.

For more information, access the Web site at [cpd.asu.edu/online](http://cpd.asu.edu/online).

**MASTER OF SCIENCE IN NURSING—M.S.**

The M.S. degree in Nursing and the certificate program offered by the graduate program in the College of Nursing provide access to quality academic credit and degree concentrations for working RNs through flexible schedules; a vast network of sites; classes scheduled days, evenings, and weekends; and innovative delivery technologies, including television and the Internet.

Concentrations include adult health nursing with options in primary care of chronically ill adults or acute care; community health nursing; psychiatric/mental health nursing; family health nursing; parent-child nursing with options in nursing of children (acute or primary focus), children with special needs, and neonatal nursing; and women's health nursing.

For more information, call the Office of Student Services in the College of Nursing at 480/965-2987.

**MASTER OF SCIENCE IN TECHNOLOGY—M.S.TECH.**

ASU East offers this program with a concentration in environmental technology management through a Web-based distance learning format. Three areas of study are available: environmental management, international environmental management, and emergency management. Students in this program are part of a cohort group that begins

each January and graduates 24 months later at a December ceremony.

Students in the distance learning cohort are expected to be working professionals in fields such as environmental safety and health, environmental engineering, emergency management, national or local regulatory and permitting activities, environmental law, and environmental laboratories. Students should have completed at least one course in inorganic chemistry and one course in organic chemistry as part of their undergraduate degree preparation.

For more information, access the Web site at [www.east.asu.edu/ctas/imt/etm/html/dmasters.html](http://www.east.asu.edu/ctas/imt/etm/html/dmasters.html).

**MASTER OF SOCIAL WORK—M.S.W.**

This program prepares social workers to respond effectively to the needs of the state and other populations of the Southwest. The program is offered in Tucson and Flagstaff.

For more information about the Tucson component, call 520/884-5507. For more information about the Flagstaff component, call 480/965-3304.

**Graduate Certificates****ASIAN STUDIES**

A Graduate Certificate in Asian Studies is offered through the ASU Center for Asian Studies and is designed for graduate students in any department or discipline who wish to earn a transcript credential for an academic specialization in Asian Studies. All graduate students—including those engaged in master's, doctoral, or nondegree studies—are eligible to apply for the certificate.

The certificate requires 18 semester hours of course work made up of classes with Asian studies content, including six hours of advanced language study in one of the following languages: Chinese, Japanese, Korean, Indonesian, Thai, or Vietnamese. In addition to the course work, students must complete a capstone paper, thesis, dissertation, an internship, or overseas experience. Students should make this decision in consultation with the advisor in the Center for Asian Studies.

For more information, call 480/965-7179, send e-mail to [asian.studies@asu.edu](mailto:asian.studies@asu.edu), or access the Web site at [www.asu.edu/asian](http://www.asu.edu/asian).

**GERONTOLOGY**

The Gerontology certificate program brings together faculty from several disciplines to teach courses related to adult development and aging, to collaborate on gerontological research projects, and to participate in projects of service for older adults and the community.

The graduate certificate in Gerontology requires 21 semester hours of course work. Students must complete six semester hours of required courses, a capstone experience of at least three semester hours (internship, individualized instruction, reading and conference, or applied research), and four additional aging-related courses approved as electives.

For more information, see "Gerontology," page 232, call 602/543-6642, or access the program Web site at [www.west.asu.edu/chs/grn](http://www.west.asu.edu/chs/grn).

ASU Extended Campus Certificates

Certificate Program	Administered By
Asian Studies, Graduate Certificate in	Center for Asian Studies
Business English Certificate	College of Extended Education
Gerontology, Certificate in	Gerontology Program
Human Performance Improvement Certificate*	College of Extended Education and American Society of Training and Development
Maintenance Management Certificate*	College of Extended Education
Multimedia Writing and Technical Communication, Postbaccalaureate Certificate in	East College
Professional Purchasing Certificate*	College of Extended Education
Supervisory and Management Skills Certificate*	College of Extended Education
Transportation Systems Certificate	Committee on Transportation Systems and the Graduate College

\* This certificate is not for academic credit.

**MULTIMEDIA WRITING AND TECHNICAL COMMUNICATION**

A Postbaccalaureate Certificate in Multimedia Writing and Technical Communication requires 18 semester hours. Students learn the principles of technical communication, writing with technology, technical editing, and visual communication.

For more information, call 480/727-1515, or access the Web site at [www.east.asu.edu/ecollege/multimedia](http://www.east.asu.edu/ecollege/multimedia).

**TRANSPORTATION SYSTEMS**

This 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-credit nondegree program.

For more information, access the Web site at [www.asu.edu/caed/transportation](http://www.asu.edu/caed/transportation), or call 480/965-6693.

**Professional Development Certificates**

All certificates offered by or in collaboration with the College of Extended Education are shown in the “ASU Extended Campus Certificates” table, on this page.

Certificate programs provide opportunities to those seeking to advance their careers, begin a new career, reenter the workplace, or develop new knowledge. Certificates are a practical choice for career development; in addition, employers recognize them as evidence of professional skill or accomplishment. Some programs may offer academic credit and others may offer continuing education units through professional associations.

For more information, see the *General Catalog*.

**Continuing Education**

Ongoing continuing education programs address current issues and trends and are intended to increase competence

in the topics. These programs are offered throughout the metropolitan Phoenix area.

For more information, see the *General Catalog*.

**Lectures**

The ASU Extended Campus offers a variety of special programs of academic and cultural interest as well as personal enrichment to the general community. These lectures cover an array of topics and are offered at the ASU Downtown Center in central Phoenix.

For more information about these programs, access the Web site at [www.asu.edu/xed/lectures](http://www.asu.edu/xed/lectures), or call 480/965-3046.

**ASU Community Fellows Lecture Program**

This program, offered each spring, is a catalyst in fostering partnerships among neighborhood, university, and business interests seeking to improve the quality of life valley-wide. It also facilitates mutual learning experiences.

**Brown Bag Lunch Lectures**

These lectures feature topics of interest to the general public and cover areas such as fine arts, urban issues, history, and culture. While many are stand-alone lectures, some are part of a series of topics in a particular interest area. Examples of topics include Analyze This..., Matters of the Mind, Health Matters, Here’s to Your Job, Hispanic Heritage Month, Native American Recognition Month, Meet the Authors, Out to Lunch and Into the Arts, Substance Abuse Awareness, and You and Your Money.

**Downtown and Gown**

These lectures are designed to give central Phoenix residents and the business community a greater awareness of the rich array of talent and resources available at the university. ASU faculty and deans from each of the campuses present the lectures each fall and spring semester.

**John F. Roatch Global Lectures in Social Policy and Practice**

This lecture series is an annual event that brings an internationally known scholar to Arizona to lecture on a topic of global reach and social significance to the community. The



John F. and Mary Roatch Endowment supports the lectures and occasionally sponsors additional events. A publication of each lecture is disseminated by the College of Extended Education and is deposited at University Libraries.

**Linda Haskell Memorial Master Class on Current Social Events**

This annual event invites an internationally known expert to lead an interactive forum to discuss current topics of concern to human services practitioners in Arizona.

**Urban Issues Lecture Series**

These lectures encourage discussions of national public policy and its impact on local policy and economic development. The series is offered in partnership with the Phoenix Community Alliance, the ASU College of Public Programs, and the Morrison Institute for Public Policy.

**Downtown Partnerships**

The university provides several services to the downtown Phoenix community.

**Advanced Public Executive Program**

This program is committed to enhancing the effectiveness of government services and operations. The program provides high-quality professional development and interventions tailored to the specific needs of public managers, executives, and elected officials.

For more information, call 480/965-4006.

**Arizona Prevention Resource Center**

This library and distribution center serves as a centralized source for individuals, schools, and communities throughout Arizona to support, enhance, and initiate prevention

efforts. Planning, mobilizing, training, and evaluating community prevention efforts can be coordinated through this center.

For more information, call 480/727-2772.

**Joint Urban Design Studio**

The studio is the Joint Urban Design Program’s physical location at the ASU Downtown Center. It is a place where facilitated discussions among community, civic, and private sector interests can be held. The studio displays ideas and disseminates information on urban issues through models, the Web, and publications of local, regional, and national importance.

For more information, call 480/727-5146.

**Office of Youth Preparation**

This nationally recognized program is committed to increasing the flow of college-eligible minority students into higher education. The program provides academic support to Arizona youth through classroom, university, community, and research programs. The program’s position within the university system allows for the development of diverse partnerships in order to maintain its commitment to positively impact Arizona’s youth.

For more information, call 480/965-8510.

**Urban Data Center**

This center serves as a resource for analysis and implementation of public policy in metropolitan Phoenix and works closely with ASU researchers and organizations as well as local governments, state agencies, and other independent organizations.

For more information, call 480/965-3046.



The ASU Downtown Center

Tim Trumble photo

## ASU EXTENDED CAMPUS

### Locations

Approximately 250 off-campus sites throughout metropolitan Phoenix, the state, and beyond are used to make classes more accessible to students. In addition, various technologies are used to deliver degree programs and credit courses to the workplace and home. Partnerships have been created with public and private organizations to deliver ASU courses off campus. Many neighborhood sites, such as community colleges, schools, churches, and businesses, serve as hosts to many Extended Campus courses.

For more information about off-campus sites, call 480/965-9797. For information about Internet, televised, and independent learning courses, call 480/965-6738.

#### ASU Downtown Center

The ASU Downtown Center, located in central Phoenix, is the Extended Campus's anchor location. The center is an educational, applied research, and community service facility. It is host to traditional and interdisciplinary undergraduate and graduate credit classes, professional and continuing education programs, and lectures and community forums. It is the educational hub for downtown workers, organizations, and residents, and serves as a meeting site for conferences and seminars.

Each classroom is equipped with a sound system, video projection system, and Ethernet connections, and has the ability to receive satellite downlinks. The center has three rooms equipped with a teleconferencing system that allows students at corporate and community receiving sites, such as the center, to interact with instructors during televised class sessions. ASU students, faculty, and staff may take advantage of the center's two state-of-the-art computer labs, as well as Web stations throughout the facility and wireless networking. A lab assistant is available during posted hours. Students, faculty, and staff may also access the ASU University Libraries' online catalog, information, and resources. Students may order and return library books and order copied materials. Textbooks for all courses held at the center are available during the first week of classes each spring and fall semester.

The center provides attractive accommodations for meetings and conferences. Room rentals may include advice in logistics planning, professional equipment, technical support (including two computer classrooms), and food and beverage service. Break-out areas are conveniently located throughout the facility. Rooms are also available to non-university organizations, in accordance with university policies and procedures.

The center's art gallery, the Galleria, features works by ASU faculty, staff, students, and local artists. Exhibits rotate monthly. The Galleria participates in monthly and annual art tours, including First Friday and Art Detour, sponsored by ArtLink, a local artists' group.

Convenient parking is available in the Heritage and Science Park garage on the corner of Fifth and Monroe Streets.

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 center.

The *Advanced Public Executive Program* provides quality professional development and interventions tailored to the specific needs of public organizations.

The *Arizona Prevention Resource Center* is a library and distribution center designed to be a centralized reference and assistance source for individuals, schools, and communities throughout Arizona.

The *Center for the Future of Arizona* works with civic and political leaders to develop a statewide agenda to expand educational opportunities, encourage strategic investments, and achieve a sustainable quality of life for residents.

The *College of Extended Education* has several administrative offices located at the center, including the dean's office.

The *Joint Urban Design Studio* is the Joint Urban Design Program's physical location at the ASU Downtown Center.

The *Office of Youth Preparation* is a nationally recognized program committed to increasing the flow of college-eligible minority students into higher education.

The *Urban Data Center* serves as a resource for analysis and implementation of public policy in metropolitan Phoenix.



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# ASU Extended Campus Faculty and Academic Professionals

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## A

**Alvarado, Ronald H.** (1974), Professor Emeritus of Life Sciences; Dean Emeritus, College of Extended Education; B.A., University of California, Riverside; M.S., Ph.D., Washington State University

## 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

## D

**Dehghanpisheh, Elaine** (1983), Lecturer, College of Extended Education; B.A., M.A., Pahlavi University (Iran)

## 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

**Fountaine, Steven** (1990), Lecturer, College of Extended Education; B.A., Shepherd College; M.A., Temple University; Ph.D., Arizona State University

## H

**Hestrin, Michelle** (2003), Instructional Specialist, College of Extended Education; International Student Advisor, American English and Culture Program, College of Extended Education; B.A., University of Minnesota; M.A., Arizona State University

**Honker, Andrew M.** (2001), Academic Associate of Academic and Professional Programs, College of Extended Education; Academic Advisor, Bachelor of Interdisciplinary Studies, College of Extended Education; B.A., Dartmouth College; M.A., Utah State University; Ph.D., 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

**Mitchell, Marie** (1980), Lecturer, College of Extended Education; B.A., Fort Hays State University; M.A., School for International Training

## N

**Navarrete, Carol** (1994), Lecturer, College of Extended Education; B.A., M.A., University of Colorado

## 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; Interim 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

Interim Dean, College of Extended Education . . . . . 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, ASU Downtown Center and Property Administration . . . . . Cathie Fox  
 Director, Communications and Marketing . . . . . Randy Bailey  
 Interim Director, Distance Learning and Technology . . . . . Marc Van Horne  
 Director, Extended Campus Programs . . . . . Jim Patzer

## ASU Extended Campus Directory

For the “ASU Main Directory,” see page 362. For the “ASU East Directory,” see page 448. For the “ASU West Directory,” see page 459.

Organization	Location	Telephone	Web Address
Extended Education, College of Academic and Professional Programs	ASUDC C319	480/965-3046	<a href="http://www.asu.edu/xed">www.asu.edu/xed</a>
	RITT B132	480/965-9797	—
	ASUDC	480/965-9200	—
American English and Culture Program	MARIP	480/965-2376	<a href="http://www.asu.edu/esl">www.asu.edu/esl</a>
ASU Downtown Center and Property Administration	ASUDC	480/965-3046	<a href="http://www.asu.edu/xed/asudt/">www.asu.edu/xed/asudt/</a>
Communications and Marketing	ASUDC C319	480/965-9696	—
Distance Learning and Technology	RITT A129	480/965-6738	<a href="http://www.dlt.asu.edu">www.dlt.asu.edu</a>
Extended Campus Programs	ASUDC C250	480/965-3046	—
Independent Learning	RITT B132	480/965-6563 or 1-800-533-4806	<a href="http://www.dlt.asu.edu/courses/independent/programinfo.cfm">www.dlt.asu.edu/courses/ independent/programinfo.cfm</a>
Planning and Business Services	ASUDC C319	480/965-3046	—
Property Administration	ASUDC C319	480/965-3046	—
Winter Session	RITT B132	480/965-9797	<a href="http://www.asu.edu/xed/winter">www.asu.edu/xed/winter</a>

# Accreditation and Affiliation

**ASU Main and ASU East.** Arizona State University Main is accredited by the Higher Learning Commission, a Commission of the North Central Association of Colleges and Schools. For more information, call 312/263-0456, access the Web site at [www.ncahigherlearningcommission.org](http://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” table below; the “Academic Accreditation at ASU East” table, page 478; the “Academic Affiliation and Membership at ASU Main” table, page 479; and the “Academic Affiliation and Membership at ASU East” table, page 483. 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 479.

## Academic Accreditation at ASU Main

Unit or Program	Accredited By
<b>College of Architecture and Environmental Design</b> 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
<b>College of Education</b> 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
<b>College of Law</b> J.D.	American Bar Association
<b>College of Liberal Arts and Sciences</b> 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
<b>College of Nursing</b> B.S.N., M.S., Nursing	Arizona State Board of Nursing Commission on Collegiate Nursing Education, initial approval
<b>College of Public Programs</b> B.S., Recreation B.S.W., M.S.W., School of Social Work M.P.A.	Council on Accreditation of the National Recreation and Park Association Council on Social Work Education National Association of Schools of Public Affairs and Administration

## ACCREDITATION AND AFFILIATION

### Academic Accreditation at ASU Main (continued)

Unit or Program	Accredited By
<b>College of Public Programs</b> (continued)	
Walter Cronkite School of Journalism and Mass Communication	Accrediting Council on Education in Journalism and Mass Communications
<b>Ira A. Fulton School of Engineering</b>	
B.S., Computer Science	Computer Science Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Construction	American Council for Construction Education
B.S.E., Aerospace Engineering; Bioengineering; Chemical Engineering; Civil Engineering; Computer Systems Engineering; Electrical Engineering; Industrial Engineering; Materials Science and Engineering; Mechanical Engineering	Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
<b>Katherine K. Herberger College of Fine Arts</b>	
School of Music	National Association of Schools of Music
<b>W. P. Carey School of Business</b>	
All programs	AACSB International, the Association to Advance Collegiate Schools of Business
M.H.S.M., School of Health Management and Policy	Accrediting Commission on Education for Health Services Administration
School of Accountancy	AACSB International, the Association to Advance Collegiate Schools of Business

### Academic Accreditation at ASU East

Unit or Program	Accredited By
<b>College of Technology and Applied Sciences</b>	
B.S., Aeronautical Management Technology, with concentrations in professional flight and air transportation management	Council on Aviation Accreditation
B.S., Aeronautical Engineering Technology; Electronics Engineering Technology; Manufacturing Engineering Technology	Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.
B.S., Industrial Technology, with concentrations in environmental technology management, graphic information technology, and industrial technology management	National Association of Industrial Technology
<b>East College</b>	
B.S., Business Administration*	AACSB International, the Association to Advance Collegiate Schools of Business
B.S., Nutrition (didactic program in dietetics); M.S., Nutrition (dietetic internship)	American Dietetic Association
<b>Morrison School of Agribusiness and Resource Management</b>	
B.S., Agribusiness with a concentration in professional golf management	Professional Golfer's Association of America

\* This program is accredited through the ASU Main W. P. Carey School of Business.

Academic Accreditation at ASU West

Unit or Program	Accredited By
<b>College of Human Services</b>	
B.S., Recreation and Tourism Management	National Recreation and Park Association/American Association for Leisure and Recreation Council on Accreditation
B.S.W., M.S.W., Department of Social Work	Council on Social Work Education
<b>School of Management</b>	
All programs	AACSB International, the Association to Advance Collegiate Schools of Business

Academic Affiliation and Membership at ASU Main

Unit or Program	Affiliation or Membership With
<b>Barrett Honors College</b>	National Collegiate Honors Council
<b>College of Architecture and Environmental Design</b>	
School of Architecture	American Institute of Architects, Central Arizona and Rio Salado Chapters Architectural Research Centers Consortium Association for Computer-Aided Design in Architecture Association of Collegiate Schools of Architecture
School of Design	American Society of Interior Designers Human Factors and Ergonomics Society Industrial Designers Society of America Interior Design Educators Council
School of Planning and Landscape Architecture	Society of Environmental Graphic Designers American Planning Association American Society of Landscape Architects Association of Collegiate Schools of Planning Council of Educators in Landscape Architecture
<b>College of Education</b>	American Association of Colleges for Teacher Education American Educational Research Association University Council for Educational Administration
Ph.D., Counseling Psychology; Educational Psychology, with a concentration in school psychology	National Association of School Psychologists
<b>College of Law</b>	Association of American Law Schools
<b>College of Liberal Arts and Sciences</b>	
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

## ACCREDITATION AND AFFILIATION

### Academic Affiliation and Membership at ASU Main (continued)

Unit or Program	Affiliation or Membership With
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 Society for Experimental Biology Society for Neuroscience
Department of Languages and Literatures	American Council on Teaching Foreign Language International Studies Association Modern Language Association
Department of Mathematics and Statistics	American Mathematical Society Mathematical Association of America Rocky Mountain Mathematics Consortium Society for Industrial and Applied Mathematics
Department of Military Science	Association of U.S. Army
Department of Philosophy	American Philosophical Association
Department of Physics and Astronomy	Acoustical Society of America American Association of Physicists in Medicine American Association of Physics Teachers American Astronomical Society American Crystallographic Association American Physical Society American Vacuum Society International Astronomical Union Materials Research Society Optical Society of America
Department of 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
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 Medical Technology American Society of Naturalists American Society of Plant Physiologists American Society of Plant Taxonomy American Society of Zoologists Animal Behavior Society



## Academic Affiliation and Membership at ASU Main (continued)

Unit or Program	Affiliation or Membership With
School of Life Sciences (continued)	Arizona-Nevada Academy of Science Botanical Society of America Botanical Society of Japan California Botanical Society Ecological Society of America International Association for Study of Plant Succulents International Association of Landscape Ecology International Association of Plant Taxonomy International Association of Wood Anatomists International Organization of Paleobotany International Photosynthesis Society International Phycological Society International Society of Arboriculture International Society of Ecological Modeling International Society of Plant Molecular Biology International Society of Plant Propagators International Union of Woody Plant Physiologists Microscopy Society of America Mycological Society of America Phycological Society of America Phytochemical Society of North America Sigma 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
<b>College of Nursing</b>	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)
<b>College of Public Programs</b>	
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 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

## ACCREDITATION AND AFFILIATION

### Academic Affiliation and Membership at ASU Main (continued)

Unit or Program	Affiliation or Membership With
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 Law and Society 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
Walter Cronkite School of Journalism and Mass Communication	Association of Schools of Journalism and Mass Communication Broadcast Education Association
<b>Graduate College</b>	Council of Graduate Schools
<b>Ira A. Fulton School of Engineering</b>	
Department of Chemical and Materials Engineering	American Association for the Advancement of Science American Association of Aerosol Research American Association of University Women American Chemical Society American Geological Union American Institute of Chemical Engineers American Physical Society American Society for Engineering Education American Society for Microbiology American Vacuum Society ASM International Association of Environmental Engineering and Science Professors Böhmische Physical Society Electrochemical Society Institute of Electrical and Electronic Engineers Iron and Steel Society Materials Research Society Metal Powders Industry Federation Microscopy Society of America Minerals, Metals and Materials Society National Academy of Engineers National Association of Corrosion Engineers National Society of Black Engineers
<b>Katherine K. Herberger College of Fine Arts</b>	
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

Academic Affiliation and Membership at ASU East

Unit or Program	Affiliation or Membership With
<b>East College</b> Department of Applied Biological Sciences Department of Exercise and Wellness	Society for Range Management 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 American Dietetic Association
Department of Nutrition	

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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. ASU Main map coordinates are provided. For the ASU Main map, see the inside back cover. For other locations, see the “ASU East Map,” page 447; “ASU West Map,” page 458; and “ASU Downtown Center” map, page 474. For the locations of campuses, see the “ASU Campus Locations” map, page 25.

**Building Abbreviations**

Abbreviation	Name	Wings	Location (Coordinate)
ADELA	Adelphi II Commons	—	Main (H-8)
ADM	Administration	A, B	Main (F-3)
ADMIN	Administration	—	East
ADPCM	Adelphi Commons	—	Main (G-8)
AED	College of Architecture and Environmental Design/North	—	Main (D-2)
AG	Agriculture Building	—	Main (F-3)
AGBC	Agribusiness Center	—	East
AIP	American Indian Programs	—	East
ALTCH	Altitude Chamber	—	East
ANTH	Anthropology Building	—	Main (D-3)
ANX	Visual Arts Annex	—	Main (B-3)
AQUAT	Mona Plummer Aquatics Center	A, B	Main (B-4)
ARCH	College of Architecture and Environmental Design/South	—	Main (D-2)
ARCV	University Archives	—	Main (D-4)
ART	Art Building	—	Main (D-2)
ARWH	Art Warehouse	—	Main (D-2)
ASUDC	Downtown Center	—	502 E. Monroe St., Phoenix
BA	Business Administration Building	—	Main (F-4)
BAC	Business Administration C-Wing	—	Main (F-4)
BELL	Bell Hall	—	East
BKSTR	ASU Bookstore	—	Main: 525 E. Orange St., Tempe (F-5)
BYAC	Brickyard Artisan Court	—	Main: 30 E. Seventh St., Tempe (B-1)
BYENG	Brickyard Engineering	—	Main: 699 S. Mill Ave., Tempe (B-1)
BYOH	Orchidhouse at the Brickyard	—	Main: 21 E. Sixth St., Tempe (B-1)
CDC	Child Development Center	—	East: 6110 S. Sagewood, Mesa
CERA	Ceramics Annex	A, B	Main (D-8)
CFS	Center for Family Studies	—	Main (D-3)
CHAPL	Danforth Chapel	—	Main (E-3)
CHOLA	Cholla Apartments	A–G	Main (E-9)
CLCC	Classroom Laboratory/Computer Classroom Building	—	West
CLRB	Classroom Building	—	East: 6113 S. Avery, Mesa
CNTR	Academic Center Building	—	East
COOR	Lattie F. Coor Mediated Classroom Building	—	Main (E-2)
COWDN	Cowden Family Resources Building	—	Main (D-3)
CP	Central Plant	—	Main (E-4)
CPCOM	Computing Commons Building	—	Main (F-5)

## BUILDING ABBREVIATIONS

### Building Abbreviations (continued)

Abbreviation	Name	Wings	Location (Coordinate)
CRI	Cancer Research Institute	—	Main (D-5)
CRNX	Classroom Annex	—	West
CSAC	Nadine and Ed Carson Student Athlete Center	—	Main (B-4)
CSB	Community Services Building	—	200 E. Curry Road, Tempe
CSC	Central Services Complex	—	West
DEAN	Dean Hall	—	East
DPSMN	Department of Public Safety	—	Main (G-7)
EAW	Exercise and Wellness Center	—	East: 7350 E. Unity Ave., Mesa
EAW2	Exercise Instructional Lab Building	—	East: 7429 E. Utah Ave., Mesa
ECA	Engineering Center A-Wing	—	Main (E-5)
ECANX	Engineering Center Annex	—	Main (E-5)
ECB	Engineering Center B-Wing	—	Main (E-5)
ECC	Engineering Center C-Wing	—	Main (E-5)
ECD	Engineering Center D-Wing	—	Main (E-5)
ECE	Engineering Center E-Wing	—	Main (E-5)
ECF	Engineering Center F-Wing	—	Main (E-5)
ECG	Engineering Center G-Wing	—	Main (E-5)
ED	Hiram B. Farmer Education Building	—	Main (F-2)
EDB	Ira D. Payne Education Hall	—	Main (E-2)
EDC	Education Lecture Hall	—	Main (F-2)
ELAB	Electronics Laboratory Building	—	West
ENGRC	Engineering Research Center	—	Main (E-5)
FAB	Faculty and Administration Building	—	West
FABNX	Faculty and Administration Building Annex	—	West
FAC	Nelson Fine Arts Center	—	Main (E-1)
FDSC1	Agribusiness Food Science Lab	—	East
FLHLB	Fletcher Library	—	West
FOUND	ASU Foundation	—	Main (C-4)
GGMA	Grady Gammage Memorial Auditorium	—	Main (F-2)
GHALL	Dixie Gammage Hall	—	Main (E-3)
GRNHS	Greenhouses	—	East: 7412 E. Unity Ave., Mesa
GWC	Barry M. Goldwater Center for Science and Engineering Research	—	Main (D-6)
HAYDN	Hayden Hall	—	Main (G-3)
HSC	Health Sciences Center	—	East: 6950 E. Williams Field Road, Mesa
HSC2	Health Sciences Center Research	—	East: 6950 E. Williams Field Road, Mesa
IAPNX	Interdisciplinary Arts and Performance Annex	—	West
ICEOC	Incident Command/Emergency Operations Center	—	East
IRISH	Frederick M. Irish Hall	A–C	Main (G-3)
LAW	John S. Armstrong Hall	—	Main (F-6)
LAWLB	John J. Ross–William C. Blakley Law Library	—	Main (F-6)
LCR	Las Casas Residences	—	West
LIB	Charles T. Hayden Library	—	Main (E-4)
LL	G. Homer Durham Language and Literature Building	—	Main (D-4)
LSA	Life Sciences A-Wing	—	Main (E-4)
LSC	Life Sciences C-Wing	—	Main (E-4)

**Building Abbreviations (continued)**

Abbreviation	Name	Wings	Location (Coordinate)
LSE	Life Sciences E-Wing	—	Main (E-4)
LYC	Lyceum Theatre	—	Main (D-3)
MAIN	Old Main	—	Main (D-4)
MANZH	Manzanita Hall	—	Main (C-6)
MARIP	Mariposa Hall	A–C	Main (G-6)
MB	M.O. Best Hall	A–C	Main (G-3)
MCENT	A.J. Matthews Center	—	Main (E-3)
MCL	James H. McClintock Hall	—	Main (E-3)
MHALL	Carrie Matthews Hall	—	Main (E-3)
MOEUR	B.B. Moeur Administration	—	Main (F-3)
MTCHL	Mitchell School	—	900 S. Mitchell St., Tempe
MU	Memorial Union	—	Main (F-4)
MUR	John Murdock Lecture Hall	—	Main (E-4)
MUSIC	Music Building	E, W	Main (F-1)
NEEB	L.S. Neeb Hall	—	Main (D-2)
NOBLE	Daniel E. Noble Science and Engineering Library	—	Main (E-6)
NUR	Nursing Building	—	Main (D-3)
OCOT	Ocotillo Hall	A–E	Main (G-6)
PABLO	San Pablo Residence Hall	—	Main (C-5)
PAC	Physical Activity Center	—	East: 7411 E. Utah Ave., Mesa
PBS	Packard Baseball Stadium	—	Main (A-7)
PEBE	Physical Education Building East	—	Main (F-6)
PEBW	Physical Education Building West	—	Main (F-4)
PGM	Professional Golf Management	—	East: 5935 S. Edgewater, Mesa
PS	George M. Bateman Physical Sciences Center	A–G	Main (D-5)
PSA	Wexler Hall	—	Main (D-5)
PSH	Physical Sciences H-Wing	—	Main (D-5)
PSY	Psychology Building	—	Main (E-6)
PSYN	Psychology Building North	—	Main (D-6)
PVE	Palo Verde East Hall	—	Main (C-5)
PVM	Palo Verde Main Hall	A–E	Main (C-4)
PVW	Palo Verde West Hall	—	Main (C-4)
QUAD 1, 2, 4	Student Affairs Quads 1, 2, 4	—	East
QUAD 3	CERIT Lab	—	East
RITT	Ritter Building	A, B	Main (E-8)
SAHU	Sahuaro Hall	A–D	Main (H-7)
SANDS	Sands Classroom Building	—	West
SCD	Sonora Center Dormitory	—	Main (H-8)
SCOB	John W. Schwada Classroom Office Building	—	Main (E-6)
SCRED	Sonora Center Residence Education Center	—	Main (H-8)
SDF	Solar Demonstration Facility	—	Main (C-7)
SHS	Student Health Service	A, B	Main (D-4)
SIM	Flight Simulator Building	—	East: 7442 E. Tillman Ave., Mesa
SOLAR	Photovoltaics Testing Laboratory	—	East: 7349 E. Unity Ave., Mesa
SRC	Student Recreation Complex	—	Main (G-5)
SS	Social Sciences Building	—	Main (E-4)

## BUILDING ABBREVIATIONS

### Building Abbreviations (continued)

Abbreviation	Name	Wings	Location (Coordinate)
SSV	Student Services Building	—	Main (F-3)
STAD	Sun Devil Stadium	—	Main (A-4)
STAUF	Charles Stauffer Communication Arts Building	A, B	Main (E-2)
SUTTON	Sutton Hall	—	East
TECH	Technology Center	—	East
TECH2	Technology Center Annex	—	East
TENNIS	Tennis Courts	—	East
TMPECT	Tempe Center	—	Main: 929 (Suite 150) and 951 (Suite 190) S. Mill Ave., Tempe (E-1)
TOWER	Tower Center*	A, B	Main (D-2)
TRACK	Joe Selleh Track	—	Main (A-7)
UASB	Undergraduate Academic Services Building	—	Main (E-4)
UCB	University Center Building	—	West
UCLUB	University Club	—	Main (D-4)
UNION	Student Union	—	East
UNION2	Student Union Annex	—	East
USB	University Services Building	—	Main: 1551 S. Rural Road, Tempe (H-9)
USE	Urban Systems Engineering	—	Main (D-6)
UVCMN	University Commons	—	Main: 215 E. Seventh St., Tempe (C-2)
VISIT	ASU Visitor's Information Center	—	Main (G-8)
WANNER	Wanner Hall	—	East
WFA	Wells Fargo Arena	—	Main (B-5)
WFLD	ASU West Alternate Locations	—	West
WHALL	West Hall	—	Main (E-3)
WIC	Welcome and Information Center	—	West
WILSN	George W. Wilson Hall	—	Main (E-3)
WTC	Whiteman Tennis Center	—	Main (B-7)

\* The Tower Center is different from University Towers, 525 S. Forest Ave., Tempe (B-3), which has no official building abbreviation.