

Arizona State University General Catalog 1994-95/1995-96 **ASU**

ASU BULLETIN



Arizona State University

General Catalog
1994-95/1995-96



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Arizona State University

1994–96 General Catalog

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

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Entrance to Hayden Library by Bill Lynam, photo editor, *Sun Devil Spark*

The Charles Trumbull Hayden Library houses the university's largest multidisciplinary collection. The underground entrance was added in 1989 along with 97,000 additional square feet of service area. See page 18 for more information.

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Dear ASU Students and Prospective Students

It is my personal pleasure to introduce the Arizona State University *1994–96 General Catalog*. It is intended to put a great deal of important information at your fingertips and serve as a guide through your university experience.

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

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

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

Sincerely,

A handwritten signature in black ink, which appears to read "Lattie F. Coor". The signature is written in a cursive, flowing style with a large initial "L" and "C".

Lattie F. Coor
President

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**Attention
Students New to ASU:
See checklist on page 450.**

Academic Organization

ASU West

Academic Units:

Arts and Sciences
Business
Education
Interunit Program: Women's Studies

College of Architecture and Environmental Design

Schools:

Architecture
Design
Planning and Landscape Architecture

College of Business

Schools:

Accountancy
Health Administration and Policy

Departments:

Business Administration
Decision and Information Systems
Economics
Finance
Management
Marketing

College of Education

Division of Curriculum and Instruction

Programs:

Adult Education
Early Childhood Education
Educational Media and Computers
Elementary Education
Multicultural Education
Reading and Library Science
Secondary Education
Special Education

Division of Educational Leadership and Policy Studies

Programs:

Educational Administration and Supervision
Educational Policy Studies
Higher Education

Division of Psychology in Education

Programs:

Counseling Psychology
Counselor Education
Educational Psychology
Learning and Instructional Technology

College of Engineering and Applied Sciences

School of Agribusiness and Environmental Resources

Del E. Webb School of Construction

School of Engineering

Departments:

Chemical, Bio and Materials Engineering
Civil Engineering
Computer Science and Engineering
Electrical Engineering
Industrial and Management Systems Engineering
Mechanical and Aerospace Engineering

School of Technology

Departments:

Aeronautical Technology
Electronics and Computer Technology
Manufacturing and Industrial Technology

College of Extended Education

Academic Organizations:

American Language and Culture Program
Arizona Prevention Resource Center
Center for Lifelong Learning
Distance Learning Technology
Division of Instructional Programs
Downtown Center
Independent Study by Correspondence
Office of Planning and Development

College of Fine Arts

Schools:

Art
Music

Departments:

Dance
Theatre

College of Law

College of Liberal Arts and Sciences

Departments:

Aerospace Studies
Anthropology
Botany
Chemistry and Biochemistry
English
Exercise Science and Physical Education
Family Resources and Human Development
Geography
Geology
History
Humanities Interdisciplinary Program
Languages and Literatures
Mathematics
Microbiology
Military Science
Molecular and Cellular Biology
Philosophy
Physics and Astronomy
Political Science
Psychology
Religious Studies
Sociology
Speech and Hearing Science
Women's Studies (Program)
Zoology

College of Nursing

College of Public Programs

Schools:

Walter Cronkite School of Journalism and Telecommunication
Justice Studies
Public Affairs

Departments:

Communication
Recreation Management and Tourism

Graduate College

School of Social Work

University Honors College

Baccalaureate Degrees, Majors, and Concentrations Offered

Unless otherwise noted, all degrees are offered by ASU Main. See pages 424–425 for degrees offered by ASU West. Graduate degrees, majors, and concentrations are shown on pages 347–349.

Bachelor of Arts

American Studies¹
 Anthropology³
 Latin American studies
 Art²
 Art history
 Photographic studies
 Studio art
 Asian Languages (Chinese/Japanese)
 Broadcasting^{2, 3}
 Broadcast journalism
 Business management
 Chemistry²
 Communication²
 Communication studies^{1, 2}
 Dance²
 Economics^{2, 3}
 Latin American studies
 English
 Family Resources and Human
 Development²
 Family resources and human
 development in business
 Family studies/child development
 Human nutrition dietetics
 French
 Geography^{2, 3}
 Asian studies
 Latin American studies
 Meteorology/climatology
 Urban studies
 German
 History^{2, 3}
 Asian studies
 Latin American studies
 Humanities
 Integrative Studies¹
 Interdisciplinary Arts and Performance
 Interdisciplinary Studies²
 Italian
 Journalism^{2, 3}
 News editorial
 Public relations
 Visual journalism
 Mathematics²
 Music
 Philosophy
 Political Science^{2, 3}
 Asian studies
 Latin American studies
 Psychology²
 Religious Studies
 Russian
 Social and Behavioral Sciences^{1, 2}
 Sociology^{2, 3}
 Public safety

Sociology¹
 Spanish³
 Latin American studies
 Mexican American studies
 Theatre^{2, 3}
 Acting
 Design/technical theatre
 Directing
 History theory and criticism
 Theatre management and production
 Theatre for youth
 Women's Studies²

Bachelor of Arts in Education

Early Childhood Education
 Elementary Education
 Bilingual education/English as
 a second language
 Secondary Education⁴
 Biological sciences
 Business, office, and distributive
 education
 Chemistry
 Chinese
 Communication
 Economics
 English
 Family resources and human
 development (home economics)
 French
 Geography
 German
 History
 Humanities
 Japanese
 Journalism
 Mathematics
 Mathematics/chemistry
 Mathematics/physics
 Physical education
 Physics
 Physics/chemistry
 Political science
 Russian
 Social studies
 Spanish
 Selected Studies in Education
 Special Education

Bachelor of Fine Arts

Art²
 Art education
 Ceramics
 Drawing
 Fibers
 Graphic design
 Intermedia

Metals
 Painting
 Photography
 Printmaking
 Sculpture
 Dance²
 Dance education
 Performance and choreography
 Theatre²
 Theatre education

Bachelor of Music

Choral/General Music
 Instrumental Music
 Instrumental
 String
 Music Therapy
 Performance
 Guitar
 Jazz
 Keyboard
 Music theatre
 Orchestral instrument
 Piano accompanying
 Voice
 Theory and Composition
 Composition
 Theory

Bachelor of Science

Accountancy
 Aeronautical Engineering Technology⁵
 Aeronautical technology
 Aeronautical Management Technology⁵
 Ab initio airline pilot flight
 management
 Airway science aircraft systems
 management
 Airway science management
 Agribusiness
 Agribusiness
 Computer analysis
 Pre veterinary medicine
 Biology
 Botany
 Plant biochemistry and molecular
 biology
 Systematics and ecology
 Urban horticulture
 Chemistry^{2, 3}
 Biochemistry
 Clinical Laboratory Sciences
 Communication²
 Communication studies^{1, 2}
 Computer Information Systems
 Computer Science

¹ The major is offered only by ASU West

² The major is offered toward more than one degree.

³ The major offers emphases, not concentrations.

⁴ The major offers academic specializations, not concentrations.

⁵ The major offers options, not concentrations.

⁶ Not accepting applications

Baccalaureate Degrees, Majors, and Concentrations Offered (continued)

Construction ⁵	Mathematics ^{2, 5}	Chemical Engineering ³
General building construction	Applied mathematics	Biochemical
Heavy construction	Computational mathematics	Biomedical
Military construction	General mathematics	Environmental
Specialty construction	Pure mathematics	Materials
Economics ^{2, 3}	Statistics and probability	Pre medical
Latin American studies	Microbiology	Process engineering
Electronics Engineering Technology ⁵	Physics	Semiconductor processing
Computer systems	Astronomy ³	Civil Engineering ⁷
Electronic systems	Option I ⁵	Construction
Microelectronics	Option II ⁵	Environmental engineering
Telecommunications	Political Science ^{2, 3}	Geotechnical engineering
Engineering Interdisciplinary Studies ⁵	Asian studies	Structural engineering
Geological engineering	Latin American studies	Transportation engineering
Environmental Resources in Agriculture	Psychology ²	Water resources engineering
Natural resource management	Purchasing and Logistics Management	Computer Systems Engineering
Exercise Science/Physical Education	Real Estate	Electrical Engineering
Exercise and sport studies	Recreation	Engineering Special Studies ⁵
Exercise and wellness	Recreation management	Engineering mechanics
Family Resources and Human	Tourism	Manufacturing engineering
Development ²	Speech and Hearing Science	Pre medical engineering
Family resources and human	Social and Behavioral Sciences ^{1, 2}	Industrial Engineering
development in business	Wildlife Conservation Biology ⁵	Materials Science and Engineering ³
Family studies/child development	Aquatic	Chemical processing and energy
Human nutrition dietetics	Terrestrial	systems
Finance	Women's Studies ²	Electronic materials
Geography ^{2, 3}	Zoology	Manufacturing and materials
Asian studies	Bachelor of Science in Design	processing
Latin American studies	Architectural Studies	Mechanical metallurgy
Meteorology climatology	Design Science ⁶	Physical metallurgy
Urban studies	Housing and Urban Development	Polymers and composites
Geology	Industrial Design	Mechanical Engineering ³
History ^{2, 3}	Interior Design	Aerospace
Asian studies	Bachelor of Science in Engineering	Biomechanical
Latin American studies	Aerospace Engineering ³	Computer methods
Industrial Technology ³	Aerodynamics	Control and dynamic systems
Graphic communications	Aerospace materials	Design
Industrial management	Aerospace structures	Energy systems
Interactive computer graphics	Computer methods	Engineering mechanics
Interdisciplinary Studies ²	Design	Manufacturing
Justice Studies	Mechanical	Stress analysis, failure prevention, and
Management	Propulsion	materials
Manufacturing Engineering Technology ³	System dynamics and control	Thermosciences
Computer integrated manufacturing	Bioengineering ³	Bachelor of Science in Landscape
engineering technology	Biochemical engineering	Architecture
Manufacturing engineering	Bioelectrical engineering	Bachelor of Science in Nursing
technology	Biomaterials engineering	Bachelor of Science in Planning
Mechanical engineering technology	Biomechanical engineering	Urban Planning
Robotic and automation engineering	Bionuclear engineering	Bachelor of Social Work
technology	Biosystems engineering	
Welding engineering technology	Molecular and cellular bioengineering	
Marketing	Pre medical engineering	

¹ The major is offered only by ASU West.

² The major is offered toward more than one degree

³ The major offers emphases, not concentrations

⁴ The major offers academic specializations, not concentrations.

⁵ The major offers options, not concentrations.

⁶ Not accepting applications.

University Calendar

July 1994

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 1994

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 1994

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 1994

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 1994

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 1994

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

1994

Check the fall 1994 *Schedule of Classes* for details and to confirm these dates.

Thurs., Mar. 24–
Fri., Apr. 1

Preregistration

Mon., Apr. 18–
Fri., Aug. 26

Drop/add

Wed., Apr. 20–
Fri., Aug. 26

Registration

Wed., Aug. 3

Final fee payment deadline for fall 1994 (For students who register after Aug. 3, fees are due daily.)

Sun. Sat.,
Aug. 14–20

Celebrating ASU: Orientation '94 activities

Thurs., Aug. 18

New Faculty and Academic Professional Orientation and Reception

Mon., Aug. 22

Instruction begins

Mon., Sept. 5

Classes are excused for Labor Day

Fri., Sept. 16

Unrestricted withdrawal deadline

Fri., Oct. 21

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

Fri., Oct. 28

Restricted course withdrawal deadline

Fri., Nov. 11

Classes are excused for Veterans Day

Thurs. Fri.,
Nov. 24–25

Classes are excused for Thanksgiving recess

Thurs., Dec. 1

Restricted complete withdrawal deadline

Wed., Dec. 7

Instruction ends

Thurs., Dec. 8

Reading day

Fri. Sat.,
Dec. 9 10;
Mon. Thurs.,
Dec. 12–15

Final examinations

Fri., Dec. 16

Commencement

Sat., Dec. 17

Midyear recess begins

1995

Spring Semester

Check the spring 1995 *Schedule of Classes* for details and to confirm these dates.

Mon., Oct. 31
Tues., Nov. 8, 1994

Preregistration

Mon., Nov. 28, 1994–
Fri., Jan. 20, 1995

Drop/add

Wed., Nov. 30, 1994–
Fri., Jan. 20, 1995

Registration

Tues., Dec. 27, 1994

Final fee payment deadline for spring 1995 (For students who register after Dec. 27, fees are due daily.)

January 1995

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 1995

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 1995

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 1995

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 1995

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 1995

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	

Thurs., Jan. 12

Fri., Jan. 13

Mon., Jan. 16

Tues., Jan 17

Fri., Feb. 10

Sun. Sun.,
Mar. 12 19

Fri., Mar. 17

Fri., Mar. 31

Thurs., Apr. 27

Wed., May 3

Thurs., May 4

Fri. Sat., May 5-6;

Mon. Thurs.,
May 8 11

Fri., May 12

1995Check the 1995 *Summer Sessions Bulletin* for details and to confirm these dates.Fri., Feb. 10-
Tues., May 30Fri., Feb. 10
Tues., June 6Fri., Feb. 10-
Wed., July 5Fri., Feb. 10-
Tues., July 11

Thurs., Apr. 27

Mon., May 29

Tues., May 30

Mon., June 5

Mon., June 12

Fri., June 16

Fri., June 23

Fri., June 30

Orientation and advisement for new transfer students

Orientation and advisement for new freshmen

Classes are excused for Martin Luther King, Jr., Day

Instruction begins

Unrestricted withdrawal deadline

Classes are excused for spring recess

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

Restricted course withdrawal deadline

Restricted complete withdrawal deadline

Instruction ends

Reading day

Final examinations

Commencement

Summer SessionsRegistration and drop/add for first five week session
and eight week session

Registration and drop/add for first supplemental session

Registration and drop add for second five week session

Registration and drop/add for second supplemental session

Final fee payment deadline for all summer sessions (For
students who register after Apr. 27, fees are due daily.)

Classes are excused for Memorial Day

Instruction begins for first five week session and eight week
sessionUnrestricted withdrawal deadline for first five-week session and
eight week session

Instruction begins for first supplemental session

Unrestricted withdrawal deadline for first supplemental session

Restricted course withdrawal deadline for first five week
session and eight week sessionRestricted complete withdrawal deadline for first five week
sessionRestricted course withdrawal deadline for first supplemental
session

First five week session ends

Restricted complete withdrawal deadline for first supplemental
session

July 1995

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 1995

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 1995

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 1995

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 1995

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 1995

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						

Mon., July 3	Instruction begins for second five week session
Tues., July 4	Classes are excused for Independence Day
Fri., July 7	First supplemental session ends
	August graduation filing deadline (must be met to have name appear in commencement program)
Mon., July 10	Unrestricted withdrawal deadline for second five week session
	Instruction begins for second supplemental session
Fri., July 14	Restricted complete withdrawal deadline for eight week session
Mon., July 17	Unrestricted withdrawal deadline for second supplemental session
Fri., July 21	Eight week session ends
	Restricted course withdrawal deadline for second five week session
Fri., July 28	Restricted complete withdrawal deadline for second five week session
	Restricted course withdrawal deadline for second supplemental session
Fri., Aug. 4	Second five week session ends
	Restricted complete withdrawal deadline for second supplemental session
	Commencement
Fri., Aug. 11	Second supplemental session ends
1995	Fall Semester
	Check the fall 1995 <i>Schedule of Classes</i> for details and to confirm these dates.
Thurs., Mar. 30– Fri., Apr. 7	Preregistration
Mon., Apr. 24– Fri., Aug. 25	Drop/add
Wed., Apr. 26– Fri., Aug. 25	Registration
Wed., Aug. 2	Final fee payment deadline for fall 1995 (For students who register after Aug. 2, fees are due daily.)
Sun. Sat., Aug. 13 19	Celebrating ASU: Orientation '95 activities
Thurs., Aug. 17	New Faculty and Academic Professional Orientation and Reception
Mon., Aug. 21	Instruction begins
Mon., Sept. 4	Classes are excused for Labor Day
Fri., Sept. 15	Unrestricted withdrawal deadline
Fri., Oct. 20	December graduation filing deadline (must be met to have name appear in commencement program)
Fri., Oct. 27	Restricted course withdrawal deadline
Fri., Nov. 10	Classes are excused for Veterans Day

January 1996

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 1996

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March 1996

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31						

April 1996

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May 1996

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June 1996

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30						

Thurs Fri.,
Nov. 23–24

Thurs., Nov. 30

Wed., Dec 6

Thurs , Dec. 7

Fri. Sat.,
Dec. 8 9;
Mon. Thurs.,
Dec. 11 14

Fri., Dec. 15

Sat., Dec 16

1996

Check the spring 1996 *Schedule of Classes* for details and to confirm these dates.

Mon., Oct. 30–
Tues., Nov 7, 1995

Mon., Nov. 27, 1995
Fri , Jan 19, 1996

Wed., Nov. 29, 1995
Fri., Jan. 19, 1996

Wed., Dec. 27, 1995

Thurs., Jan. 11

Fri., Jan 12

Mon., Jan. 15

Tues., Jan 16

Fri., Feb. 9

Sun Sun ,
Mar. 10–17

Fri., Mar. 15

Fri., Mar. 29

Thurs., Apr. 25

Wed., May 1

Thurs , May 2

Fri. Sat., May 3–4;
Mon. Thurs.,
May 6–9

Fri., May 10

1996

Check the 1996 *Summer Sessions Bulletin* for details and to confirm these dates.

Mid Feb.
Tues., June 4

Classes are excused for Thanksgiving recess

Restricted complete withdrawal deadline

Instruction ends

Reading day

Final examinations

Commencement

Midyear recess begins

Spring Semester

Preregistration

Drop/add

Registration

Final fee payment deadline for spring 1996 (For students who register after Dec. 27, fees are due daily.)

Orientation and advisement for new transfer students

Orientation and advisement for new freshmen

Classes are excused for Martin Luther King Jr. Day

Instruction begins

Unrestricted withdrawal deadline

Classes are excused for spring recess

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

Restricted course withdrawal deadline

Restricted complete withdrawal deadline

Instruction ends

Reading day

Final examinations

Commencement

Summer Sessions

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

<p style="text-align: center;">July 1996</p> <p><i>S M T W T F S</i> 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</p>	<p>Mid Feb. Tues , June 11</p> <p>Mid Feb. Tues., July 9</p> <p>Mid Feb. Tues., July 16</p> <p>Thurs., May 2</p>	<p>Registration and drop/add for first supplemental session</p> <p>Registration and drop/add for second five week session</p> <p>Registration and drop/add for second supplemental session</p> <p>Final fee payment deadline for all summer sessions (For students who register after May 2, fees are due daily.)</p>
<p style="text-align: center;">August 1996</p> <p><i>S M T W T F S</i> 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</p>	<p>Mon , June 3</p> <p>Mon., June 10</p> <p>Mon., June 17</p> <p>Fri., June 21</p> <p>Fri., June 28</p>	<p>Instruction begins for first five-week session and eight-week session</p> <p>Unrestricted withdrawal deadline for first five week session and eight week session</p> <p>Instruction begins for first supplemental session</p> <p>Unrestricted withdrawal deadline for first supplemental session</p> <p>Restricted course withdrawal for first five week session and eight week session</p> <p>Restricted complete withdrawal deadline for first five week session</p> <p>Restricted course withdrawal deadline for first supplemental session</p>
<p style="text-align: center;">September 1996</p> <p><i>S M T W T F S</i> 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</p>	<p>Thurs., July 4</p> <p>Fri., July 5</p>	<p>Classes are excused for Independence Day</p> <p>August graduation filing deadline (must be met to have name appear in commencement program)</p>
<p style="text-align: center;">October 1996</p> <p><i>S M T W T F S</i> 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</p>	<p>Mon., July 8</p> <p>Fri., July 12</p> <p>Mon., July 15</p> <p>Fri , July 19</p> <p>Mon., July 22</p> <p>Fri., July 26</p> <p>Fri., Aug. 2</p>	<p>First five week session ends</p> <p>Restricted complete withdrawal deadline for first supplemental session</p> <p>Instruction begins for second five week session</p> <p>First supplemental session ends</p> <p>Unrestricted withdrawal deadline for second five week session</p> <p>Instruction begins for second supplemental session</p> <p>Restricted complete withdrawal deadline for eight week session</p> <p>Unrestricted withdrawal deadline for second supplemental session</p> <p>Eight week session ends</p> <p>Restricted course withdrawal deadline for second five week session</p> <p>Restricted complete withdrawal deadline for second five-week session</p> <p>Restricted course withdrawal deadline for second supplemental session</p>
<p style="text-align: center;">November 1996</p> <p><i>S M T W T F S</i> 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</p>	<p>Fri., Aug. 9</p> <p>Fri., Aug. 16</p>	<p>Second five week session ends</p> <p>Restricted complete withdrawal deadline for second supplemental session</p> <p>Commencement</p> <p>Second supplemental session ends</p>
<p style="text-align: center;">December 1996</p> <p><i>S M T W T F S</i> 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</p>		

General Information

OBJECTIVES

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

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

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

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

MISSION

Arizona State University has emerged as a leading national and international research and teaching institution with a primary focus on Maricopa County, Arizona's dominant population center. This rapidly growing, multi-campus public research university offers programs from the baccalaureate through the doctorate for approximately 43,000 full time and part time students through ASU Main campus in Tempe, the ASU West campus in northwest Phoenix, a major educational center in downtown Phoenix, and other instructional, research, and public service sites throughout Maricopa County. Arizona State University is a modern university that applies the strongest features of the traditional major research university to the rapidly evolving needs of Maricopa County and the state. Arizona State University is governed by the Arizona Board of Regents.

As a leading public university, Arizona State University's goal is to become a world-class university in a multicampus setting, one of the very best public universities in the nation. The university's mission is to provide outstanding programs in instruction, research, and creative activity, to promote and support economic development, and to provide service appropriate for the nation, the state of Arizona, and the state's major metropolitan area. To fulfill its mission, ASU places special emphasis on the core disciplines and offers a full range of degree programs baccalaureate through doctorate. To become competitive with the very best public universities, the institution recognizes that it must offer quality programs at all degree levels in a broad range of fundamental fields of inquiry. Arizona State University 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.

ORGANIZATION

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

The regents select and appoint the president of the university, who is the liaison between the Arizona Board of Regents and the institution. The president is aided in the administrative work of the institution by the senior vice president and provost, other provosts, vice presidents, deans, directors, department chairs, faculty, and other officers. Refer to "Academic Organization," page 6.

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

The faculty and students of the university play an important role in educational policy, with an Academic Senate,

joint university committees and boards, and the Associated Students serving the needs of a large institution.

EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION

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

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

University Policy Prohibiting Discriminatory Harassment

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

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

Freedom of Speech and Academic Freedom. Neither this nor any other university policy is violated by actions that amount to expression protected by the state or federal constitutions or by related principles of academic freedom. This limitation is further described in the ASU First Amendment Guidelines,

the current version of which supplements this policy and is available in the Office of the General Counsel.

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

HISTORY OF ARIZONA STATE UNIVERSITY

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

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

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

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

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

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

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

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

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

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

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

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

Like his predecessor, Dr. Gammage oversaw the construction of a number of buildings. His greatest dream, that of a great auditorium, came five years after his death. He laid the groundwork for it with his contact 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 campus—a 300-acre ASU West campus serves the west side of the Phoenix metropolitan area, and smaller units such as the Downtown Center serve the Phoenix business community—and rising enrollment. With approximately 43,000 students, ASU is the sixth largest university in the nation.

On January 1, 1990, Dr. Lattie F. Coor, a native Arizonan, became 15th in the institution's succession of principals and presidents. He has highlighted undergraduate education, research, cultural diversity, and economic development as the "four pillars" of the university's agenda and has taken steps in these areas by further defining the role of ASU West and by initiating the establishment of the College of Extended Education, approved by the Arizona Board of Regents July 20, 1990.

Athletics

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

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

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

In 1979, the university joined the Pacific 10 Conference. In 1987, ASU became the first Arizona football team to play in the Rose Bowl, defeating the University of Michigan Wolverines 22–15.

ACADEMIC ACCREDITATION AND AFFILIATION

Arizona State University is accredited by the North Central Association of Colleges and Secondary Schools. Programs in the various colleges, schools, divisions, and departments are accredited by or affiliated with the following national bodies.

Architecture and Environmental Design. The Master of Architecture degree program is accredited by the National Architectural Accrediting Board. The Bachelor of Science in Design degree with a major in Interior Design is accredited by the Foundation for Interior Design Education Research. The Master of Environmental Planning degree program is accredited by the Planning Accreditation Board. The programs in Planning are affiliated with the Association of Collegiate Schools of Planning and the Council of Educators in Landscape Architecture. The programs in Industrial Design are affiliated with the Industrial Design Society of America.

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a minimum of five years of study, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. These professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year, preprofessional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program or for employment options in architecturally related areas.

Business. The College of Business and its School of Accountancy are accredited by the American Assembly of Collegiate Schools of Business (AACSB). The AACSB 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.

Education. Various programs in the College of Education are accredited by the American Psychological Association. Some programs are also approved by the State Board of Education (Arizona) and the National Association of School Psychologists and others are affiliated with the University Council for Educational Administration.

Engineering and Applied Sciences. The Construction program is accredited by the American Council for Construction Education (ACCE).

The undergraduate programs in Aeronautical Engineering Technology, Electronics Engineering Technology, and Manufacturing Engineering Technology are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET).

The undergraduate programs in Aerospace Engineering, Bioengineering, Chemical Engineering, Civil Engineering, Computer Systems Engineering, Electrical Engineering, Industrial

Engineering, Mechanical Engineering, Engineering Special Studies, and Engineering Interdisciplinary Studies are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

The Bachelor of Science program in Computer Science is accredited by the Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board (CSAB).

Fine Arts. Programs in the College of Fine Arts are accredited by the National Association of Schools of Dance, the National Association of Schools of Music, and the National Association of Schools of Theatre.

Law. Programs in the College of Law are accredited by the American Bar Association, and the college is a member of the Association of American Law Schools.

Liberal Arts and Sciences. Programs in the College of Liberal Arts and Sciences are accredited by the following agencies: American Psychological Association; American Speech Language Hearing Association; National Accrediting Agency for Clinical Laboratory Sciences.

Additional college scholarly memberships with nationally established standards of scholarly performance include the following: *American Alliance for Health, Physical Education, Recreation and Dance*; *American Anthropological Association*; *American Association for Advancement of Science*; *American Association for State and Local History*; *American Association of Museums*; *American Association of Petroleum Geologists*; *American Association of Plant Physiologists*; *American Chemical Society*; *American College of Sports Medicine*; *American Council on Teaching Foreign Language*; *American Dietetic Association*; *American Geophysical Union*; *American Historical Association*; *American Institute of Biological Sciences*; *American Institute of Professional Geologists*; *American Mathematical Society*; *American Philosophical Association*; *American Physical Society*; *American Political Science Association*; *American Society for Advancement of Science*; *American Society of Clinical Pathologists*; *American Society of Medical Technology*; *American Society of Microbiology*; *American Society of Naturalists*;

American Society of Zoologists; *American Sociological Association*; *Animal Behaviorists' Society*; *Arizona Society of Medical Technology*; *Association for Women in Science*; *Association of American Geographers*; *Association of United States Army*; *Botanical Society of America*; *Committee on Allied Health Education*; *Council for Museum Anthropology*; *Geological Society of America*; *Institute of Historical Research*; *Inter-University Consortium for Political and Social Research*; *International Studies Association*; *Mathematical Association of America*; *Mineralogical Society of America*; *Modern Language Association*; *Mycological Society of America*; *National Association for Physical Education in Higher Education*; *National Women's Studies Association*; *North American Society for Sports History*; *North American Society for Sports Psychology and Physical Activity*; *Phycological Society of America*; *Rocky Mountain Mathematics Consortium*; *Sigma Psi*; *Society for Industrial and Applied Mathematics*; and *Society of Economic Paleontologists and Mineralogists*.

Nursing. 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. The continuing education program is accredited by the American Nurses' Credentialing Center's Commission on Acceleration. 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 Academy of Colleges of Nursing (AACN).

Public Programs. Programs in the College of Public Programs are accredited by the Accrediting Council on Education in Journalism and Mass Communications and the National Association of Schools of Public Affairs and Administration.

Social Work. Programs in the School of Social Work are accredited by the Council on Social Work Education.

UNIVERSITY CAMPUSES AND SITES

Location. Arizona State University is located near the heart of metropolitan Phoenix in the city of Tempe (popula-

tion 149,488). Nearby are the municipalities that make up the fast growing Valley of the Sun: Chandler, Gilbert, Glendale, Mesa, Scottsdale, and other communities.

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

Broad pedestrian malls laid out in an easy-to-follow grid plan, bicycle lanes connecting all parts of the university, and spacious lawns and subtropical landscaping characterize a campus serving the physical, aesthetic, and educational needs of students, faculty, and staff.

ASU Research Park. The mission of the Research Park is to attract to Arizona new corporate and regional headquarters and research and development firms that broaden the base for potential research among ASU departments, interact with graduate students, consult with university faculty, co sponsor high level speakers and seminars on research topics, and provide employment opportunities for graduates of ASU.

Long term excess revenues from ground leases within this 323 acre park will flow back to the ASU Foundation to be used for support of existing and new research programs at ASU. Currently, the Research Park has several major tenants ICI America, VLSI, and the National Association of Purchasing Management a 50,000 square-foot multitenant building developed by Transamerica Corporation, and a 44,000 square foot multitenant building developed by Price-Elliott Research Park. The Research Park is part of the ASU effort to become a major research university by attracting high quality private and public research firms and institutes.

ASU Sun Cities. The Center for Life long Learning at ASU Sun Cities educational facility is located at the Bell Plaza Professional Building South, 17220 Boswell Boulevard, in Sun City, Arizona, the nation's largest retirement community. The courses offered are predominantly noncredit and include a curriculum tailored specifically to the interests of the retirement community. Each year more than 150 courses from approximately 30 disciplines are

taught. Weekly lectures also are available throughout the year in a variety of subjects. See page 363 for more information.

ASU West. ASU West is a campus of Arizona State University that offers only upper division and graduate courses. It is located in northwest Phoenix to serve the higher educational needs of residents of western Maricopa County. As a comprehensive campus, the institution is developing a broad spectrum of professional and academic programs that share a liberal arts foundation and an interdisciplinary emphasis.

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

For more information, see pages 440–443 of the *General Catalog*. For complete information and course listings, see the *ASU West 1994–95 Catalog*.

Camp Tontozona. Located in the famed Mogollon Rim country near Kohl's Ranch, northeast of Payson, this continuing education facility of the university serves the needs of academic departments conducting teaching and research in mountain terrain.

Downtown Center. Located in downtown Phoenix at the Mercado, 502 E. Monroe, the Downtown Center offers credit and noncredit courses of interest to employees in private businesses and government agencies and to individuals seeking personal growth and enrichment. The center's personal computer training program offers noncredit, hands on computer classes. The courses are taught during daytime and evening hours. The Professional and Continuing Education unit offers noncredit and certificate programs for working professionals. The center also provides students with mainframe access through its computer lab and library services. Information about the ASU curricula and programs is available by calling 602/965 3046.

UNIVERSITY LIBRARIES AND COLLECTIONS

The collections of the university's libraries comprise more than 2.8 million volumes, approximately 4.4 million microform units, and more than 31,600 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.

Charles Trumbull Hayden Library. The main library houses the largest multidisciplinary collection. In addition to the open stack areas, separate collections and service areas include Current Periodicals and Microforms, Government Documents, Interlibrary Loan and Document Delivery Services, Labriola National American Indian Data Center, Library Instruction, Reference, Reserve, Special Collections, and Archives and Manuscripts, which includes the Arizona Collection, the Chicano Research Collection, and the Visual Literacy Collection.

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

Entrance to Hayden Library is via a 97,000 square foot underground addition completed in early 1989.

Architecture and Environmental Design Library. This library, located in the College of Architecture and Environmental Design contains books and periodicals pertinent to areas of study within the college.

Arizona Historical Foundation Library. Under a cooperative agreement with ASU, the foundation houses a library of several thousand volumes, manuscript collections, maps, and photographs at the Charles Trumbull Hayden Library. The collections focus on the history of Arizona and the Southwest.

Law Library. This comprehensive collection of legal materials is located in the College of Law.

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

Daniel E. Noble Science and Engineering Library. This major branch library houses books, journals, and microforms in the sciences and geography, the Map Collection, and the U.S. Patent Collection.

University Archives. The records of the university, its official publications, and the publications of its faculty, students, and staff are preserved in this collection, located in the historic President's Home on Tyler Mall. The University Archives building is also the home of the 1907 Gallery, which hosts exhibits of historical photographs from the collections of the Department of Archives and Manuscripts.

PERFORMING AND FINE ARTS FACILITIES

Computing Commons Gallery. One of the unique features of the new Computing Commons building is an art gallery, located off the main lobby in the northwest corner of the building. The gallery has design features that are unique for showcasing technology based artwork and displays. The Commons gallery can support display of national online computer art networks (e.g., via Internet) and holographic displays, as well as more traditional two dimensional graphic presentations. This is an exciting decade for the arts as new technology based tools and techniques open new avenues for creativity, as demonstrated by the exhibits in the Computing Commons Gallery.

Dance Studio Theatre. Located in the Physical Education Building East, the Studio Theatre is a 6,000 square foot dance studio that also serves as a proscenium-style performance space. The 215 seat theatre is devoted to informal and formal showcases of student and faculty choreographic work.

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

Paul V. Galvin Playhouse. Built to stage the largest productions of the ASU Theatre, the 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 Drama City theatres.

Grady Gammage Memorial Auditorium. Designed by Frank Lloyd Wright and named for the late President Grady Gammage, this versatile center for the performing arts 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, with 58 ranks of pipes the building contains classrooms and workshops for the College of Fine Arts.

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

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

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

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

J. Russell and Bonita Nelson Fine Arts Center. Designed by Albuquerque architect Antoine Predock, the 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. This facility is dedicated to museum quality exhibitions of historical and contemporary photography. Located in Matthews Hall, it is open during the academic year.

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

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

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

Television Station KAET. KAET, Channel 8, Phoenix, is licensed and owned by the Arizona Board of Regents and operated by Arizona State University. Studios of the award winning station are located in the Stauffer Communication Arts Building. The station is affiliated with the Public Broadcasting Service (PBS) and broadcasts 24 hours daily. Program information is available from the KAET program manager (602/965 3506).

University Art Museum. The University Art Museum collections are housed in a large complex of galleries and art study rooms in two locations: the Nelson Fine Arts Center and the second floor of the Matthews Center. The Oliver B. James Collection of American Art ranges from the early 18th century to the contemporary and includes major works by Stuart, Ryder, Homer, and the Ash Can School painters. Master works by great printmakers such as

Durer, Rembrandt, Whistler, and Hogarth are often featured in special exhibitions selected from the university's extensive print collection.

The gallery devoted to Latin American art features folk art as well as paintings by celebrated 20th century artists Rivera, Siquieros, 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.

University Dance Laboratory. An integral part of the Nelson Fine Arts Center, this flexible performance space is designed specifically for modern and experimental dance. Along with the Dance Studio Theatre in the Physical Education Building East, the Dance Laboratory is used by the Department of Dance for its season performances.

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

COMPUTING FACILITIES AND SERVICES

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

Programming, statistical, graphics, and other applications software are provided on microcomputers and mainframe computing systems. These services, including university-wide electronic mail and the library's online catalog, can be accessed through a communications network from many sites and offices on campus, as well as from off campus offices and homes via a phone connection. Communication with other research facilities is possible through national networks such as BITNET and Internet.

A wide range of information on campus activities and related topics is available online. The ASU Gopher Server is available on a round the clock basis to anyone on or off campus who has a computer with an ethernet, broadband, or modem connection. Via the Internet Gopher, students, faculty, and staff of

ASU also have access to the thousands of Gopher and other information systems around the world. The wealth of information available via Gopher is growing geometrically. The ASU Gopher Server contains such information as a phone and electronic mail directory, the *Schedule of Classes*, the athletic calendar of events, weather forecasts from around the United States, and information from various colleges, departments, and organizations. For more information on accessing the ASU Gopher Server, send electronic mail to COMM-Q@ASU.EDU (COMM-Q) or call 602/965-CNCS (602/965 2627). Educational services to assist faculty, students, and staff include online documentation, online consulting facilities, online tutorials, videotaped and written materials, and noncredit seminars.

The following service centers are provided for the academic community

Computing Commons. In August 1993, ASU opened a significant new addition to the main campus, the Computing Commons. The Computing Commons was established to provide the university with an ideal setting to learn and experience the vast new frontier of high performance computing. The purpose of the Computing Commons is to draw together students, faculty, and staff from all disciplines and create an environment designed to foster maximum interaction. The building and its facilities are drawing national recognition and acclaim as a model facility for the support of instruction and research in a technology based environment. The commons houses a 200 workstation student computing site open 24 hours a day, nine electronic classrooms, a Visualization Center, COMPASS, a computer store, and a technology-based art gallery.

Assistance Center. The Computing Assistance Center (COMPASS) has news publications, manuals, handbooks, and other information concerning computing systems and software. Faculty, staff, and students can obtain information about discounts for purchases of microcomputer hardware and software from this center

Student Consulting. This service is available to ASU students using the academic computing systems either on campus or through dial in. Student

Consulting focuses on the needs of undergraduate and graduate students in classes

Instructional Services. The Consortium for Instructional Innovation (CII) assists faculty with computing support for instructional and learning technologies, including graphics and courseware development. In addition, the CII assists in the development and implementation of new technological and pedagogical approaches to teaching. It is composed of support personnel from Information Technology, University Libraries, University Media Systems, Writing across the Curriculum, and the University Program for Faculty Development.

Research Computing Support. Assistance is available to researchers, including help with scientific programming and use of statistical software, and support for interactive visualization and "hard copy" presentation of data and analysis results.

Visualization Center. The Visualization Center provides support services for faculty, staff, and graduate students in visualizing the results of computational science and by acting as a test bed of software, hardware, and communications for interactive viewing of scientific data.

Computer Accounts. Computer accounts are needed to access many of the computing systems and can be obtained from the Computer Accounts Office.

Computation Facilities. A variety of computation facilities are provided to support the ASU community. Everything from workstations to mainframes are available as is access to the national NSF Centers. Contact COMPASS for current information about specific facilities.

ALUMNI ASSOCIATION

Founded in 1894, the Alumni Association involves graduates and former students throughout Arizona and around the world. It communicates with all alumni and provides services to dues paying members. The Alumni Center (601 E. Apache Blvd.) maintains more than 160,000 files of graduates. The Alumni Association strives

to promote effective interest in and loyalty to ASU on the part of alumni and the general public.

PROGRAM ASSESSMENT AND THE OFFICE OF UNIVERSITY EVALUATION

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

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

UNDERGRADUATE ACADEMIC SERVICES

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

The goals of the division are to improve the five year graduation rate of ASU undergraduates, increase the retention of first-year students, improve the foundational skills (numeracy and literacy) of undergraduates, and increase employer and graduate satisfaction with an ASU education.

The division includes the Writing across the Curriculum program (for course listings, see page 45), the University 100 program (for course listings, see page 45), and the University Academic Advising Center (see page 41).

CONSORTIUM FOR INSTRUCTIONAL INNOVATION

The Consortium for Instructional Innovation (CII) is a multidisciplinary organization committed to developing and supporting new pedagogical and technological approaches to teaching. CII uses a vast system of university resources to provide professors and members of the university teaching community with an opportunity to combine their talents and expertise to produce beneficial and productive new teaching initiatives for both faculty and students.

CII is particularly interested in developing and supporting innovations that lead to more active learning roles for students. In some instances, CII seeks to combine existing teaching methods with technological options such as the incorporation of computers, videotape, computer animation, and laser disks in order to create the best possible instructional methods.

As an incentive to innovating existing teaching programs, CII offers resource and personnel assistance to those members of the teaching community who seek to develop projects that contribute to improving the quality of education at ASU. In evaluating proposals for curricular innovation, CII considers the applicability of projects to other areas and settings; the impact of projects on both students and faculty; and the commitment from the college or department in support of proposed programs.

In addition to reviewing specific proposals, CII periodically sponsors workshops and serves as a clearing house for information and referrals.

The departments that make up CII are Computer and Network Consulting Services, University Libraries, University Media Systems, the University Program for Faculty Development, Writing across the Curriculum, and Distance Learning Technology.

CENTER/CONSORTIUM FOR ATLANTIC STUDIES

The Center/Consortium for Atlantic Studies (CAS) promotes research and programs of study relating to modern and contemporary Europe and European-American relations. The CAS sponsors international symposia, conferences, and lecture series. Regular projects on the European Community are among annual campus and off campus programs. The *Yearbook of Ger-*

man American Relations is a CAS publication. The CAS also houses the executive offices of the German Studies Association and the editorial offices of the *German Studies Review*. Workshops and special seminars on Europe and international trade are provided for business executives. International media studies and research on European integration are part of the CAS program. The CAS is an interdisciplinary unit and works with faculty and students in many departments. Regional and European fellows participate in research activities.

For more information, contact the director, Center/Consortium for Atlantic Studies, MOEUR 137, 602/965-4839; fax 602/965 8989.

INTERDISCIPLINARY STUDIES

Adult Development and Aging. The Adult Development and Aging Program (ADAP) brings together faculty from several disciplines to teach courses related to adult development and aging, to collaborate on gerontological research, and to participate in projects of service to older adults.

ADAP offers an undergraduate minor in Gerontology. The minor consists of 18 semester hours—six hours of required and 12 hours of elective course work. Courses related to aging are taught throughout the university by faculty who are active contributors to research, theory, and public policy and practice. In addition, ADAP provides students with opportunities to gain practical experience in working with elderly people. A Practicum in Gerontology, held at the Veterans Administration Hospital, is available to students who have completed some gerontology course work. ADAP also helps students find rewarding volunteer positions in community programs for older adults. For more information, refer to the current Student Handbook in Gerontology or call 602 965 3225.

Asian Studies. Students may elect an interdisciplinary program leading to a bachelor's degree with a major in a chosen field and an Asian studies emphasis, for example: History Asian studies. Certificate programs in Asian studies and Southeast Asian studies (see the separate listing on page 22) are available to undergraduates, as well as an Asian emphasis in the University Honors College. A certificate program in East Asian studies is pending. To

undertake such a program, the student must fulfill the requirements of a departmental major and the degree requirements of the college.

The Center for Asian Studies sponsors Asian film series, colloquia, and seminars as well as Asian related conferences. The center also conducts student exchange programs with China and Japan and coordinates summer language study opportunities in Asia. For more information, contact the Center for Asian Studies, WHALL 109, 602 965 7184.

Energy Studies. An expanding instructional and research involvement in energy matters exists through the following three curricular paths:

1. general studies, which emphasize energy as an elective beyond the scope of a chosen major (for more information, contact the chair of the Energy Studies Committee, listed in the current *Schedule of Classes*);
2. specific studies in the College of Architecture and Environmental Design, for those pursuing the Master of Architecture degree, the Master of Science degree in Building Design, and the Master of Environmental Planning degree; and
3. specific studies in the College of Engineering and Applied Sciences, usually for those seeking a degree in a branch of engineering.

Environmental Studies. The Center for Environmental Studies was established to initiate, coordinate, and encourage research, community service, and academic programs. The center does not formally offer courses or a degree program. It sponsors special courses, conferences, and workshops on environmental topics. Drawing from faculty and students throughout the university, the center participates in research and community programs relating to environmental problem areas.

Film Studies. The Film Studies Program exists not only to provide information and experience, but also to serve as a means of creative expression for the student and as a useful subject and tool in teaching. The program is not designed to produce professional filmmakers. However, it may provide practical preparation for students desiring further film study in other institutions.

Inquiries about this program should be directed to the chair of the Interdisciplinary Film Committee or the film studies advisor in participating colleges.

Islamic Studies. The art, history, geography, and religion of the Islamic world are the subjects of several courses offered by departments in the College of Fine Arts and the College of Liberal Arts and Sciences. For information, call Dr. Richard Martin, Department of Religious Studies, at 602/965 7145.

Linguistics. Linguistics concentrations are offered in master's degree programs in the Departments of Anthropology, English, and Foreign Languages through the Graduate College. Numerous linguistics courses are offered in these and other departments. For information, call Dr. Daniel T. Brink, of the University Committee on Linguistics, at 602/965 3168.

Medieval and Renaissance Studies. Significant opportunities for the study of medieval and Renaissance culture exist at ASU. Hayden Library has an extensive microfilm collection and many rare books in medieval and Renaissance studies.

The Arizona Center for Medieval and Renaissance Studies (ACMRS) is housed in the College of Liberal Arts and Sciences. The center is a research unit composed of scholars from Arizona State University, Northern Arizona University, and the University of Arizona. ACMRS enriches departmental offerings in medieval and Renaissance studies by sponsoring one visiting professor for one semester each year. ACMRS also sponsors a lecture series each semester that covers a variety of topics.

ACMRS works in close conjunction with the following committees in establishing program scheduling: Committee on Medieval Studies, Robert Bjork, Chair; Committee on Renaissance Studies, Deborah Losse, chair, Committee on Textual Studies, Jean Brink, chair; Committee on the Survival of the Classical Tradition, Benjamin Victor, chair. In 1993 ACMRS established a local faculty advisory board composed of six ASU faculty members and faculty members from the University of Arizona, Northern Arizona University, and the Institute for Advanced Study at Princeton University.

For more information, call 602/965-5900 or write

DIRECTOR, ACMRS
ARIZONA STATE UNIVERSITY
BOX 872301
TEMPE AZ 85287 2301

Scholars in ACMRS represent a variety of disciplines, including art, history, languages, literature, music, philosophy, religion, and science.

Southeast Asian Studies. The study of Southeast Asian languages, linguistics, societies, religions, political systems, and historical traditions is offered through a variety of courses in the social sciences, humanities, and other disciplines. In addition, Thai and Indonesian are taught through the Department of Foreign Languages. Hayden Library houses a collection of monographs and periodicals on Southeast Asia in Western languages, Thai, and Indonesian. Students may enroll in a course of study leading to a Certificate in Southeast Asian Studies.

The Program for Southeast Asian Studies organizes conferences, colloquia, and similar events that bring together scholars and students with diverse disciplinary perspectives on Southeast Asia. The program publishes a semiannual newsletter, *Suvarnabhumi*, invites to campus visiting scholars of Southeast Asia, and offers a limited number of graduate assistantships.

For information on a course of study for undergraduate and graduate students and on other program activities, please call 602/965-4232 or write to

PROGRAM FOR SOUTHEAST ASIAN
STUDIES
ARIZONA STATE UNIVERSITY
BOX 873101
TEMPE AZ 85287-3101

Women's Studies. An interdisciplinary perspective on women serves as a vehicle for critical explorations of the following: the roles and status of women past and present, assumptions about women accepted in American and other cultures; the validity of research on women; effects on women of political, economic, and social systems; the ethnic minority experience; and the contributions of women to world culture and development. The student has the opportunity to consider alternative ways of looking at the assumptions that affect the images, roles, and status of women and to make a research contri-

bution to the field. For more information, see pages 156-157, refer to the current women's studies brochure, or contact the director or associate director of the Women's Studies Program (602/965 2358).

CAMPUS COMMUNITIES

Campus Communities is an interdisciplinary program developed at ASU and designed to help connect students and faculty who share common interests in one of several broad themes. This program has both curricular and cocurricular elements. Students from a variety of backgrounds, academic interests, and intended careers participate in each community. Involvement in Campus Communities enables students to apply classroom learning to real-world issues and gain experience with larger, nonuniversity communities. There are no prerequisites for participation in any campus community; each community is open to any undergraduate with an interest in exploring its theme.

Campus Communities currently exist to investigate natural resources and the environment, American Indian issues and cultures, the individual in public life, the African and African American experience, and Pacific Rim Asia; other community themes are under development.

Each community offers a residential option for its members; each "special interest" hall is also the base for academic, social, and cocurricular programs for all its community's participants, whether or not they choose to live there.

Once a year, each community offers a coordinated block of three or four courses drawn from across the disciplines and employing a range of methods addressing the community's theme (Campus Learning Community). These classes are scheduled to allow students to enroll in all of them concurrently. Participants in the community come together again in another integrative seminar either team taught by the faculty conducting the learning community or led by a "master learner," a veteran teacher who also participates in the same classes as the students. This seminar helps students appraise and extend their experiences in those courses. Establishing a shared intellectual context and offering students the experience of a small, participatory seminar,

learning communities enhance students' skills in critical thinking, writing, and oral argumentation and help students develop a cooperative, collaborative approach to learning.

In addition, every semester students can choose from a menu of other courses identified as being particularly relevant to the community's theme. Students can also explore each chosen topic further through a variety of extra-curricular programs organized by and for each Campus Community.

Academic recognition is based on fulfilling 18 semester hours of approved course work, including at least one campus learning community.

Students interested in participating in a Campus Community may do so by filing an "Intent to Participate" form, available from each community fellow, who is the faculty mentor and coordinator for each community, or from the University Honors College, MCL 112. Further information about the program and the names and telephone numbers of the community fellows are available through the University Honors College, 602/965-2359.

Natural Resources and the Environment. This program introduces students to the various pathways available for studying issues related to the environment at ASU and in the community. No special experience or training is necessary to participate, only an eagerness to learn and a willingness to develop a sense of environmental awareness.

Pacific Rim Asia. This program focuses on the cultures and values of the peoples of East and Southeast Asia. Students are challenged to learn about the history, language, politics, anthropology, religion, economics, and arts of a region mysterious to and often misunderstood by the rest of the world.

Umoja, the African American Experience. Students have the opportunity to explore the different dimensions of issues particularly relevant to African American culture. Umoja, the Swahili word for unity, is an invitation to study contemporary issues facing the African American community while enriching

understanding of old and new cultural traditions.

Public and Community Service. Participants are given the opportunity to study and experience the volunteer phenomenon. The course work might focus on conflicts between private values and public priority or on differing cultural attitudes toward charity, ethical issues, and the economics of volunteerism. In addition, by working with campus resources and community agencies, students can participate in volunteer opportunities.

American Indian Culture and Issues. Students have the chance to experience concentrated course work built upon a central theme particular to the American Indian experience. Social and cocurricular programs increase the students' understanding of such American Indian institutions as the powwow, the drum, or the sweat lodge. Field trips extend participants' acquaintance with the diversity of American Indian cultures.



Undergraduate Enrollment

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

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

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

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

A substance abuse counselor is available at Student Health for those students who are experiencing problems as a result of the use of alcohol or other substances and who wish to discuss the problems in a confidential setting.

Substance abuse educational programs are also available to students through Student Health. Students are encouraged to use the health education resource center at Student Health to obtain relevant information.

The university has a strong interest in its students' conduct. Students are expected, as part of their obligations of enrollment, to become familiar with the *Student Code of Conduct*, available at Student Life (SSV B228). Violations of the *Student Code of Conduct*,

whether committed by individuals or groups, are subject to university discipline, as are violations of university regulations with regard to academic dishonesty. The university reserves the right to take necessary and appropriate action to protect the safety and welfare of the campus community. Such action may include taking disciplinary measures under the *Student Code of Conduct* against students whose behavior off campus involves the sale or distribution of illegal drugs, physical assault, or violence that may present a danger to the university or to members of the university community.

STUDENT SERVICES AT ASU

Arizona State University is a richly diverse academic setting with more than 42,000 students. The ASU student may be a traditional 18 to 24 year old, a recent high school graduate, a community college transfer, someone returning to college to pursue a degree, or a professional studying for an advanced degree or career change. The ASU student may live in residence halls, with sororities or fraternities on campus, or in one of the many communities in the metropolitan Phoenix area. Each of the 50 states and more than 100 foreign countries have students enrolled at ASU.

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

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

Enrollment services to students begin with recruitment, admissions, student financial assistance, on-campus housing, and registration programs. Once

students are on campus, they are encouraged to explore the facilities, services, and human resources available. Campus agencies guiding students in this learning process include Career Services, Counseling and Consultation, Educational Development, the Memorial Union, Recreational Sports and Student Activities, Student Development and Residential Life, Student Health, Student Life, and Student Publications. Each of these areas provides specialized learning opportunities that contribute to an environment that fosters both personal and academic growth.

The university's commitment to students does not diminish as a student nears graduation. By promoting career exploration and placement services, students are accompanied through their transition from the university experience to the professional lifestyles they have chosen to pursue.

Fees, Deposits, and Other Charges

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

DEFINITIONS

Registration fee refers to the charge assessed to all students who register for classes at ASU. *Tuition* refers to additional charges assessed to nonresidents, as established in Arizona Board of Regents' Policy 4-102.

ACADEMIC YEAR REGISTRATION FEE AND NONRESIDENT TUITION

The registration fee and nonresident tuition for fall 1993 and spring 1994 semesters are shown in the "1993-94 Registration Fee and Nonresident Tuition" table. The amounts listed are per academic semester. For information on in state versus out of state residency classification see "Residency Classification Procedures and Policies," pages 28-29.

1993-94 Registration Fee and Nonresident Tuition¹

Semester Hours	Registration Fee ²	Nonresident Students	
		Nonresident Tuition	Total Registration Fee and Tuition ²
1	\$ 93	\$ 211	\$ 304
2	186	422	608
3	279	633	912
4	372	844	1,216
5	465	1,055	1,520
6	558	1,266	1,824
7	889	1,239	2,128
8	889	1,543	2,432
9	889	1,847	2,736
10	889	2,151	3,040
11	889	2,455	3,344
12 or more	889	2,753	3,642

¹ Fees and tuition are subject to change for 1994-95 and 1995-96.

² In addition to the registration fee, students are charged for other fees (e.g., the Student Recreation Complex fee and financial aid trust fee). Students admitted to the College of Law are charged the appropriate resident or nonresident amount plus an additional fee. In 1993-94 the additional fee was \$500 per semester.

Students registered for seven or more hours are considered full-time for fee payment purposes. See "Enrollment Verification Guidelines," page 43. *Note:* The rate for one hour is charged if the student is registered only for a zero hour class.

College of Law Fees. Beginning with the fall 1993 semester, students admitted to the College of Law pay registration fees and tuition at different rates from other students. For 1993-94, rates for newly admitted full time law students were \$500.00 more per semester than the standard resident or nonresident rates. Students already admitted to the College of Law before the fall 1993 semester pay the standard registration and tuition fees. See the "1993-94 Registration Fee and Nonresident Tuition" table or the current *Schedule of Classes* for up to date fee amounts.

Summer Sessions Fees. The 1994 registration fee per semester hour is \$93.00 except for law students. The registration fee per semester hour for law students is \$145.00. For more information on the summer sessions, see page 378 and the *Summer Sessions Bulletin*.

Off-Campus and Correspondence Courses

For information on fees for off campus and correspondence courses, see "Division of Instructional Programs" and "Independent Study by Correspondence," pages 363 and 364.

OTHER FEES, DEPOSITS, AND CHARGES

Special Class Fees and Deposits.

Certain university classes require payment of fees or deposits for materials, breakage, and/or rentals. These fees and deposits are listed in the *Schedule of Classes* for each semester.

Student Recreation Complex Fee.

All students (except university employees) who take at least one class at ASU Main must pay a mandatory Student Recreation Complex fee. Full-time (seven or more hours) students are charged \$25.00 per semester. Part time students pay \$12.00 per semester, and summer students pay \$2.00 per semester hour. See the current semester *Schedule of Classes* for further information.

Financial Aid Trust Fee. All students must pay a financial aid trust fee. Full time (seven or more hours) students are charged \$8.00 per semester. Part time students pay \$4.00 per semester. Summer students pay \$4.00 per session. Fees collected from students are

matched by the State of Arizona and used to create a Financial Aid Trust Fund, from which student grants are awarded under the usual financial aid eligibility criteria

Private Music Instruction

One half hour of instruction weekly	\$40.00
One hour of instruction weekly	\$60.00
More than one hour of instruction weekly	
music majors only	\$60.00

Musical Instrument Rental Charge

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

Late Registration

Fee assessed on registrations beginning with the first day of each session	\$10.00
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A \$10 late fee is also assessed on registration payments received after the fee payment deadline but processed before the class enrollment purge.

Transcripts

Official transcripts for currently enrolled students	\$1.00 each
Official transcripts for nonenrolled students	\$5.00 copy

Additional copies ordered at the same time are \$1.00 each. Requests for official transcripts should be made at least two weeks in advance of the time desired.

Copies of Educational Records Other Than ASU Transcripts

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

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

Graduation Application or Reapplication

Undergraduate	\$12.00
Graduate	\$1.00

A late fee of \$5.00 is added to the charge noted above if not paid on or before the deadlines shown in the "University Calendar," pages 9-13.

ID Card

Replacement fee	\$5.00
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Comprehensive Examination. This fee is paid by all students seeking to establish credit by examination and is \$7.50 per semester hour

Parking Decals. A parking decal must be purchased for motor vehicles parked on campus except in areas where metered parking (quarters only) or visitor lots are available. Annual decals range from \$45.00 to \$105.00 for controlled access parking. Photo identification is required.

Each vehicle registered at ASU Parking and Transit Services must be and remain in compliance with State of Arizona emission standards (ARS § 15-1627G) during the entire registration period. The fee for this emission inspection is \$5.35 per vehicle. For more decal sales information, call 602/965-6124.

Everyone is encouraged to support travel reduction measures by using mass transit, university shuttle bus, carpooling, bicycling, or walking whenever possible. See page 75 for more information.

Parking Violations. Due to high demand, parking regulations are strictly enforced. Fines range from \$10 to \$50. Appeals to parking citations may be filed within 14 calendar days from the issuance date with the hearing appeals officer and, after payment, may be further appealed to the Parking Citation Appeals Board. Unpaid parking citations are delinquent financial obligations subject to provisions of the section on Delinquent Financial Obligations. Any person owing three or more unpaid parking citations or \$100.00 in unpaid parking citations is subject to impoundment. A \$50.00 minimum fee is assessed if immobilization is required. If the vehicle is towed, an additional charge is applied. For more information, call 602/965-4527.

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

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

Students paying registration fees and tuition with a check that is subsequently not honored by a financial institution are subject to involuntary withdrawal from the university if repayment is not made. All students involuntarily withdrawn are charged tuition and/or registration fees according to the standard refund schedule as of the involuntary withdrawal date, as determined by the university.

On-Campus Housing. The cost of on-campus housing varies. In 1993-94 the most typical cost is \$2,509 per academic year. Meal plans are purchased separately. For more information, see "Residential Life," pages 74-75.

PAYMENT METHODS AND DEADLINES

InTouch. The InTouch system, at 602/350-1500, allows students to register for classes, drop add and make fee payment from any Touch Tone phone. Fees can be paid from any Touch Tone phone with available financial aid, debit cards bearing the cactus logo, VISA, and MasterCard. Refer to the *Schedule of Classes* for available dates and times and further information about the InTouch system.

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

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

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

Veterans Deferred Payment. The Veterans Readjustment Assistance Act allows veterans to apply for deferred payment of registration fees. A Certificate of Eligibility must be presented. Contact the Veterans Services Section for information on meeting the neces-

sary requirements. The university may deny this privilege to students with previous delinquent obligations.

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

REFUNDS

Academic Year Registration Fee and Nonresident Tuition. Students withdrawing from school or individual classes receive a refund as follows

Withdrawal Date	Refund
Before first day of the semester	100% less \$10.00
One through 14 calendar days	80%
15 through 21 calendar days	60%
22 through 28 calendar days	40%
29 through 35 calendar days	20%
After the 35th calendar day	No refund

The university provides a prorated refund for first time students receiving financial aid; therefore, the refund schedule is the minimum amount refundable to these students.

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

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

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

* A \$10 processing fee is subtracted per session.

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

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

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

Late Registration. This fee is not refundable

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

Financial Aid Trust Fee. This fee is not refundable.

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

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

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

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

Checkout. A student's checkout is based on the date Residential Life is notified on a prescribed checkout form, not the last day of occupancy.

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

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

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

DELINQUENT FINANCIAL OBLIGATIONS

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

1. Each university shall establish procedures to collect outstanding obligations owed by students and former students
2. Each university shall maintain a system to record all delinquent financial obligations owed to that university by students and former students.
3. Students with delinquent obligations shall not be allowed to register for classes, purchase parking decals, receive cash refunds, or obtain transcripts, diplomas, or certificates of degree. The university may allow students to register for classes, obtain transcripts, diplomas or certificate of degree if the delinquent obligation is \$25.00 or less.
4. Unpaid obligations shall remain a matter of record until students and former students satisfy their financial obligations or until satisfactory arrangements for repayment are made with the university.
5. The university may write off delinquent financial obligations of students according to accepted accounting principles and after appropriate collection efforts. No such write off shall operate to relieve the student of liability for the obligation nor shall such write off entitle the student to release of any transcript, diploma or certificate of degree or to register for further university classes until such obligation is actually paid.
6. Each university shall include this policy in its bulletin or catalog.

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

Business Services Office, located in ADM 109.

RESIDENCY CLASSIFICATION PROCEDURES AND POLICIES

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

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

Mere physical presence in Arizona for one year does not automatically establish residency for in state classification. 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. 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, which are available in the Residency Classification Section, SSV B115.

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

Aliens. Students who are aliens are subject to the same requirements for in state residency 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 in state 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 in state 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 reside 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 in state status for tuition purposes.

Transferred Employees. If students live 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 in state 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 in state status for tuition purposes. If military service is concluded while they are enrolled, students do not lose in state 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 in state status because of their absence while on active duty with the military as long as they maintain Arizona affiliations and state tax filing status consistent with a claim to Arizona residence during their absence.

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 in-state status for tuition purposes.

1993-94 Typical Student Budgets

Cost/Allowance Category	Standard Budget	Living with Parents
Room and board	\$ 4,850	\$ 2,390
Personal (including travel)	2,210	2,210
Living total ¹	\$ 7,060	\$ 4,600
Fees ²	\$ 1,844	\$ 1,844
Books and supplies (30 hour course load)	700	700
Resident total ³	\$ 9,604	\$ 7,144
Nonresident tuition ²	\$ 5,506	\$ 5,506
Nonresident total	\$15,110	\$12,650

¹ Living expenses (room, board, personal expenses) are stated for a nine month period.

² These are 1993-94 fees and nonresident tuition and are subject to change. Fees include registration, financial aid trust, and Student Recreation Complex fees.

The above allowances are the average amount spent by students for their educational costs. These allowances are used to calculate eligibility for university "need based" financial aid awards. Actual costs may vary according to lifestyle. Financial aid awards are intended to assist a student in satisfying this budget.

Procedures for Establishing Residency Status

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

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

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

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

Financial Aid

The primary responsibility for financing a college education belongs to students and their families. Student Financial Assistance helps students meet this responsibility by evaluating all aid applications through the use of a standard financial need analysis system. Student Financial Assistance determines the cost of a student's attendance as well as how much students and their families can afford to contribute toward that cost. It is the student's responsibility to complete all applications in an accurate and timely manner and to notify Student Financial Assistance of any changes in circumstances that might affect eligibility (e.g., loss of parent's income or change in residency classification). Financial assistance is available in the form of scholarships, grants, loans, and employment. This aid has been made available collectively by the university, alumni, private foundations, civic groups, individuals, and state and federal governments.

To be considered for financial aid, all students must complete an application separate from the admission application. The Free Application for Federal Student Aid (FAFSA) is the only required application. It is not necessary to complete any other application that may require an application fee. The form should be completed in January or February preceding the academic year the student anticipates attending ASU. Students are notified by mail regarding any additional items or documents needed to complete their applications. These items may include copies of federal tax returns, proof of valid visa, and proof of registration with the Selective Service. The priority date for applying is March 1. Applications completed by this date are considered for all grant funds. Applications completed after this date are processed; however, they are considered late applications. Late applications may receive limited grant dollars and a higher proportion of loan or work dollars.

A statement of need letter is sent to all applicants. This letter estimates expenses and contribution for the school year and specifies the amount of the applicant's financial need. If students have financial need in excess of \$500.00, they receive a separate Financial Aid Notification. This letter in

forms them of the types and amounts of aid they are eligible to receive through ASU. Applicants should read carefully all correspondence received from Student Financial Assistance.

Students receiving aid from Student Financial Assistance are required to meet minimum standards of satisfactory academic progress. In addition to maintaining the minimum GPA defined for good academic standing, undergraduate students awarded on a full-time basis must complete a minimum of 24 semester hours within the academic year. Failure to meet these standards results in the suspension of aid funds for subsequent semesters until the deficiency is satisfied.

TYPES OF FINANCIAL AID AND MAJOR PROGRAMS

More than 24,000 students receive financial aid resources that total more than \$120 million. There are four categories of financial aid: scholarships, grants, loans, and employment.

Scholarships

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

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

Private Donor Scholarships. More than 6,000 students at ASU receive private donor scholarships. Most of these scholarship funds are provided by employers, private individuals, organizations, and corporations. In most cases, the private donor specifies the criteria used by the Scholarship Office to identify candidates for a particular scholarship.

University Scholarships. More than 5,200 ASU students receive a scholarship that is generally in the value of tuition and/or fees from university sources. The largest source for university scholarships is the waiver program authorized by the Arizona Board of Regents. In addition, many scholarships are funded from a general endowment fund. Some of the typical areas targeted for these scholarships are top academic seniors in Arizona high schools, underrepresented minority students, students who demonstrate leadership, students who demonstrate scholastic or scientific abilities, students with disabilities, and nontraditional students.

Grants

Like scholarships, grants are provided to students without repayment or service obligation. However, the criterion to receive a grant is generally a calculation of financial need. More than 8,500 ASU students receive some form of grant.

Federal Pell Grant. The Federal Pell Grant program is funded by the federal government and is a basic financial resource to low- and moderate income students. Eligibility is determined through the Financial Aid Application process by the federal government. Under this program, the university converts entitlements to cash grant payments. A student may be eligible for a maximum grant of \$2,300.00 per year.

Federal Supplemental Grant. Funds are received from the federal government by the university, which is required to match the funds. Student Financial Assistance then determines the eligibility of a student based on a specific calculation of exceptional financial need. Generally, recipients of the Federal Pell Grant are eligible to receive a Federal Supplemental Grant. Maximum grants are \$2,000.00.

Arizona State Grant. This program is a three partner program of federal, state, and university funding. Students with a high financial need may receive this particular form of funding. It is restricted to residents of Arizona. Maximum grants are \$1,000.00.

Arizona Trust Fund. This grant source is provided in partnership between ASU students and the state legislature. These funds are provided primarily to resident, undergraduate, or

underrepresented students with a high financial need. Maximum grants are \$1,000.00.

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

Loans

About 13,000 students borrow approximately \$45 million annually. A variety of loan programs are provided to assist students and, in some cases, parents in the financing of a university education.

Federal Stafford Student Loan.

Through the Federal Stafford Student Loan program, the federal government guarantees loans from private lenders to students. The university must, through a need analysis process, determine the eligibility for each loan applicant. Repayment is made after graduation. For new borrowers, there is a variable interest rate that is adjusted annually and cannot exceed 9%. No repayment during the enrollment period is required, and the federal government pays the interest on the loan during the enrollment period. Deferment provisions for community service are available. Freshmen may borrow up to \$2,625.00 per year, sophomores may borrow up to \$3,500.00, and juniors and seniors may borrow up to \$5,500.00 per year.

Federal Perkins Loan. The Federal Perkins Loan program is similar to the Federal Stafford Student Loan program. However, the funding source is the federal government, and matching funds are provided by the university. In this particular program, the university is the lender, and repayments after graduation are made to the university at a 5% interest rate. No interest is charged or accumulated during the period of enrollment. Annual loan maximums are \$3,000.00. Deferment and cancellation provisions are available for community service and qualifying law enforcement and teaching occupations.

Federal Supplemental Loan. Federal Supplemental Loans are available to independent students who may need to borrow from more than one program. This program is generally the second one used for those students. Additionally, students who do not have a dem-

onstrated financial need may borrow under this program. There is no subsidy, and interest must be paid during the enrollment period or it accrues until graduation. The interest rate is about 7%. Maximum loans are \$4,000.00 or \$5,000.00 per year depending upon grade level.

Federal Parent Loans. The Federal Parental Loan for Undergraduate Students (PLUS) is made to parents, not students. The intent is to help parents make a contribution to their children's education. There is no subsidy to this program, and parents begin to repay this loan within 60 days after the loan is taken. The interest rate is about 7%. The maximum loan amount is determined by subtracting all other financial aid awarded from the average cost of attendance.

Employment

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

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

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

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

Undergraduate Admission

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

Prospective students may call 602/965 7788 (toll free numbers 1 800-252 ASU1 for out of state applicants and 1 800-325 9371 for in state) or may write to Undergraduate Admissions for information including application materials:

UNDERGRADUATE ADMISSIONS
ARIZONA STATE UNIVERSITY
BOX 870112
TEMPE AZ 85287-0112

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

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

Admission Procedures for New Freshman and Transfer Applicants

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

1. application for admission (including Domicile Affidavit);
2. official transcript(s);
3. American College Test (ACT), Scholastic Aptitude Test (SAT), or Test of English as a Foreign Language (TOEFL) scores (as needed); and
4. a \$35.00 nonrefundable application fee (required of all applicants applying as nonresidents or residing outside Arizona).

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

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

Priority Application Date. Applicants whose files are not complete by April 15 for fall semester or November 15 for spring semester may not be admitted in time to register for the desired semester.

Admitted students who do not register must submit a new application if they wish to apply for a subsequent semester. All documents are destroyed one year after the semester for which the student has applied if the student is not registered in a degree program.

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

Application. Prospective students must complete and sign the Application for Undergraduate Admission. A \$35.00 nonrefundable application fee is required of all applicants applying as nonresidents or residing outside Arizona.

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

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

with fewer than 36 semester hours of transferable college or university credit must also have official high school records submitted. An English translation of all non English transcripts is required.

Entrance Examinations. All new freshman applicants *must* take either the American College Test (ACT) or Scholastic Aptitude Test (SAT) on a national test date in their junior or senior years of high school. Transfer applicants who have completed fewer than 36 semester hours of acceptable college or university work must submit ACT or SAT scores, which are used to complete competency requirements and for course placement.

A report of the test scores should be sent to Undergraduate Admissions directly from the American College Testing Program, P.O. Box 168, Iowa City, Iowa 52240, or the College Board Admissions Testing Program, Box 592 R, Princeton, New Jersey 08540.

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

Applicants whose native language is not English usually are required to take the Test of English as a Foreign Language (TOEFL). See "International Student Admissions," on page 35

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

Upon receipt, a student should check the Certificate of Admission for accuracy and report any errors and changes to Undergraduate Admissions at 602/965 1358 for more information.

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

General Aptitude Requirements for Freshmen

Residency Classification	Class Rank	Composite Score		
		ACT ¹	SAT	GPA (4.00 A)
Arizona residents ²	top quarter	or	22 or 930	or 3.00 high school GPA
Nonresidents ³	top quarter	or	24 or 1010	or 3.00 high school GPA

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

² All resident freshmen who carry a GPA from 2.50 to 2.99 or who rank in the top 26–50% of the graduating high school class are admitted with conditions.

³ All nonresident freshmen who believe they have had a strong high school background and who rank in the top 26–50% of their graduating classes or who carry a GPA from 2.50 to 2.99 are encouraged to apply and are considered on a case by case basis. Based on the review, the applicants may be admitted with conditions, deferred until additional course work is completed, or denied.

General Aptitude Requirements for College Transfers

Residency Classification	Transferable Semester Hours	GPA (4.00 A)	Materials Required
Arizona residents	1–35	2.00 college GPA plus freshman requirements	Application, college and high school transcripts, and ACT or SAT scores
	36 or more	2.00 college GPA	Application and college transcripts
Nonresidents*	See above	2.50 college GPA	See above

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

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

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

Orientation

University orientation programs for new students and their parents are provided at numerous times during the year, including the beginning of each semester. Each orientation program includes academic advisement, campus tours, special events, and an introduction to university resources and procedures. Parent programs are also included. Newly admitted students are sent information preceding each orientation program. Students are strongly encouraged to attend orientation activities.

Undergraduate Admission Standards

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

Admission Requirements

Graduation from Secondary School.

To be eligible for admission to ASU, an applicant must have graduated from a recognized high school with satisfactory scholarship defined as meeting both the general aptitude and basic competency requirements shown in the "General Aptitude Requirements for Freshmen" and "General Aptitude Requirements for College Transfers" tables and the "Basic Competency Requirements" table, page 33.

Applicants with a maximum of one deficiency in no more than two competency areas may be admitted with con-

ditions subject to removing the deficiencies within one calendar year of university enrollment. (See page 48 for an explanation of procedures to meet these competencies.)

Competencies may be met by combinations of high school and college courses or test scores. A minimum 2.00 average (4.00 A) must be earned in the courses taken in each of the four competency areas. Transfer students with 36 or more transferable semester hours and students 22 years of age or older at the time of enrollment need only meet the general aptitude requirements. An applicant whose most recent education is outside the United States is exempt from fulfilling the competency requirements. See the "Basic Competency Requirements" table, page 33.

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

Basic Competency Requirements

High School Courses		Test Scores		College Courses
English				
Four years high school: English composition/ literature-based	<i>or</i>	Minimum test score: ACT English 21* or SAT Verbal 450	<i>or</i>	One transferable three-semester-hour college level course in English composition
Mathematics				
Three years high school: One year Algebra I One year Geometry I One year Algebra II	<i>or</i>	Minimum test score: ACT Math 20* or SAT Math 500	<i>or</i>	Two pre college level three- semester hour courses in algebra or one transferable three semester hour course in college algebra
Laboratory Science				
Two years high school, one each from two of the following: biology chemistry earth science physics	<i>or</i>	One year high school lab science (biology, chemistry, earth science, physics) plus minimum test score on one of the following: ATP Chemistry Achievement 575 ATP Biology Achievement 550 ATP Physics Achievement -- 590 ACT Science Reasoning 20 The test score may not be from the same subject from which high school credit was earned.	<i>or</i>	Two transferable four semester hour college-level lab science courses in different subject areas
Social Science				
Complete both A and B.				
A One year high school American history	<i>or</i>	Minimum test score on ATP American History/Social Studies Achievement 510	<i>or</i>	One transferable three semester hour college level American history course
B One year high school social science (e.g., European history, world history, sociology, geography, government, anthropology)	<i>or</i>	Minimum score on ATP European History/World Cultures Achievement 545	<i>or</i>	One transferable three-semester-hour college level social science course

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

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

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

1. an upward grade trend during the
high school career or an upward
grade trend during the senior year;
2. positive recommendations from
secondary school administrators,
faculty, or counselors based on
considerations such as academic
potential, work experience, and
leadership ability;

3. an average score of 50 or greater
on the General Education Develop-
ment (GED); or
4. completion of at least nine semes-
ter hours of college freshman-level
academic studies (at a community
college or at a university, or both)
with a GPA of 2.50 or higher on a
4.00 – A scale in courses in En-
glish, social science, mathematics,
physical or natural science, foreign
languages, fine arts, or the humani-
ties.

The School of Engineering recom-
mends three and a half high school
years of mathematics, including ad-
vanced algebra, geometry, and trigo-
nometry. Calculus is recommended.
The laboratory sciences chosen should
include at least one unit in physics and

one year of chemistry. One year of bi-
ology is strongly recommended.
The College of Liberal Arts and Sci-
ences strongly recommends a minimum
of two years of a single foreign lan-
guage.

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

**Admission before Graduation from
High School.** Admission may be
granted to high school seniors who sub-
mit a six semester or seven-semester
transcript that shows academic quality
and rank in class in keeping with ad-
mission standards and who complete
the steps in the undergraduate admis-
sion procedures. Admission is *con-
firmed* when a verification of the high

school graduation showing the final GPA, the rank in class, and the date of graduation has been received in the mail by Undergraduate Admissions directly from the high school. In addition, students who are admitted with more than two deficiencies must submit, at least 45 days in advance of the semester, official records to verify the completion of competencies such that *no more than two deficiencies remain*. Students with more than two deficiencies who have not been admitted 45 days in advance of the semester may not be eligible for admission. An admission may be cancelled if the final verification shows that the applicant has not met the university requirements for admission or that more than two deficiencies remain.

Admission with Distinction. Admission with Distinction certificates recognizing outstanding scholarship are awarded to entering freshmen who rank in the top 10% of their high school graduating classes. This designation is honorary in nature and does not include a financial award.

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

Anyone interested in admission as a nondegree undergraduate student at ASU must submit to Undergraduate Admissions: (1) a Nondegree Undergraduate Application for Admission (including Domicile Affidavit) and (2) a \$35.00 nonrefundable application fee (for applicants applying as nonresidents or residing outside Arizona). Applicants who are not high school graduates or who are younger than age 18 must also submit ACT or SAT scores.

No more than 15 hours of completed nondegree work may be applied to a degree program if the completed courses meet specific requirements within a degree program. A nondegree student who decides to work toward a

bachelor's degree must *apply for admission to a degree program* with Undergraduate Admissions and meet the admission requirements.

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

Transfer Applicants

Arizona Applicants. An Arizona applicant for transfer admission must have a cumulative GPA of 2.00 or higher on a 4.00 – A scale in all work undertaken at previous institutions of higher learning. A minimum of 12 college or university transferable semester hours must have been earned in order to be considered a transfer applicant.

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

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

All applicants having completed fewer than 36 semester hours of transferable college or university work must submit official high school records, including an ACT or SAT score, and meet basic competency requirements. Students who will be 22 years old by the time the semester begins are exempt from the competency requirements.

Transfer Credit

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

which the student is enrolled. There are several qualifications:

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

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

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

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

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

1. are honorably discharged;
2. have served in the armed forces of the United States for a minimum of two years, and

3. have previously enrolled at a university or community college in Arizona.

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

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

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

Students Attending Arizona Community Colleges. To determine the equivalency of courses offered by Arizona community colleges and courses offered at ASU, a student should refer to the *Arizona Higher Education Course Equivalency Guide* in consultation with an academic advisor. Provided college attendance has been continuous, a student is permitted to follow the degree requirements specified in the ASU catalog in effect at the time he or she began community college work. See page 72, "Guidelines for Determination of Catalog Year."

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

Appeal Procedure. Transfer students who feel they have been unjustly denied credit for courses they have taken may appeal to the standards committee of the colleges in which they have enrolled. This procedure does not apply to community college transfer of credit greater than the 64 hour maximum; see "Community Colleges" on page 35. The decision of this committee is final.

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

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

The decision of this board is final.

International Student Admissions

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

1. have a minimum GPA of 3.00 (4.00 = A) from secondary school course work if a freshman applicant, or have a minimum GPA of 2.50 (4.00 = A) from college or university course work, if a transfer applicant;
2. submit a financial statement not more than six months old from a financial institution assuring adequate resources to support themselves while in residence at the university;
3. have all required admissions materials and credentials reach Undergraduate Admissions by May 15 if applying for the fall semester or October 15 if applying for the spring semester (an English translation of all non English documents is required);
4. pay a nonrefundable application fee of \$35.00 in U.S. funds; and
5. meet all appropriate immigration standards and requirements.

TOEFL

Applicants whose native language is not English (identified by the U.S. Department of State Bureau of Public Affairs) must provide evidence of English language proficiency as indicated by acceptable scores on the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 500 is required for general admission to the university, and a minimum score of 550 is required for the professional programs

in the School of Engineering, the Del E. Webb School of Construction, and the College of Architecture and Environmental Design. The following three exceptions apply:

1. Applicants who have completed their junior and senior years in a U.S. high school may provide an SAT Verbal score of 500 or an ACT English subscore of 23 in place of a TOEFL score for the professional programs in the School of Engineering, the Del E. Webb School of Construction, and the College of Architecture and Environmental Design. Scores of 450 on the SAT Verbal or 21 on the English subscore place these applicants in the preprofessional programs.
2. Applicants who have completed a minimum of 48 semester hours of transfer credits at a U.S. college or university (including completion of two semesters of first year composition, earning a minimum 2.50 cumulative GPA), may submit a TOEFL score of 550, an SAT Verbal score of 500, or an ACT English subscore of 23 for the professional programs in the School of Engineering, Del E. Webb School of Construction, and the College of Architecture and Environmental Design. Applicants providing scores below the standards are admitted into the preprofessional programs.
3. Applicants who have received a bachelor's degree from a college or university in the United States are exempt from the TOEFL. If these applicants meet the admission standards for the professional programs, exclusive of language tests, they are admitted to the professional program

All required application materials must be received by Undergraduate Admissions no later than May 15 for fall applicants and October 15 for spring applicants.

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

All F 1 or J 1 visa students must have insurance coverage against illness and accident before being permitted to register. Insurance must be maintained

throughout the student's enrollment in the university and may be obtained at the time of registration.

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

American Language and Culture Program

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

AMERICAN LANGUAGE AND
CULTURE PROGRAM
ARIZONA STATE UNIVERSITY
BOX 873106
TEMPE AZ 85287 3106

Acceptance into the American Language and Culture Program is separate from admission to the university. For more information, see page 362.

Admission of Applicants with Disabilities

Persons with disabilities who meet academic qualifications are encouraged to apply for admission to ASU.

A preadmission inquiry may be made by Disabled Student Resources in order to assist the incoming student better with the appropriate support services. The inquiry is made on a confidential basis. Refusal to respond to the inquiry or to provide requested information has no bearing on either the applicant's admission or treatment at ASU.

Disabled Student Resources is staffed with specially trained professionals working with hearing impaired/deaf, visually impaired/blind, physically disabled, learning disabled, and individuals with hidden disabilities. Disabled Student Resources is committed to facilitating appropriate resources that allow each qualified student with a disability access to educational, social, and cultural/recreational opportunities available within the university community. Each student is encouraged to function independently and to develop personal techniques for attaining the highest possible goals in life.

Disabled Student Resources coordinates a comprehensive academic support program for students with disabilities. (For more information about

available services, see page 75.) Eligibility for services is based on enrollment, appropriate documentation of permanent or temporary disability, and documented need for academic support services.

Students with disabilities who require attendant care or other personal assistance must make appropriate arrangements *before the beginning of each academic term*. The student has the sole responsibility for his or her own personal care assistance.

To ensure a smooth transition into the university community, prospective students with disabilities are encouraged to call 602/965 1234 (TTY) or write to

DISABLED STUDENT RESOURCES
ARIZONA STATE UNIVERSITY
BOX 873202
TEMPE AZ 85287 3202

Special Programs for Advanced Placement and Credit

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

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

When the scores are received by the university directly from CEEB, credit is awarded as shown in the "Advanced Placement Credit" table, pages 37-38.

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

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

No more than six semester hours taken under CLEP may be applied toward university general studies requirements. General studies requirements in natural sciences (S1 and S2) and literacy and critical inquiry (L1 and L2) are not satisfied by CLEP.

General Examinations. To obtain credit or placement, students must receive a standard score of 500 or higher for the General Examinations, except for English Composition with Essay, on which students must receive a standard score of 610/1978 scale or 500/1986 scale. *Students who have completed 60 semester hours of credit are not eligible to receive any credit for the CLEP*

General Examinations.

Subject Examinations. A standard score of 50 or higher must be received to obtain credit for any subject examination. The completion of 60 semester hours of credit does not preclude eligibility for additional credit for subject examinations.

All equivalency is subject to future review and possible catalog change.

For further information regarding CLEP, contact the University Testing Services, at EDB 302 or 602/965 7146.

International Baccalaureate

Diploma/Certificate. Students who present an International Baccalaureate Diploma/Certificate may qualify for university credit, depending on the level of the examination and the grade received. Arizona State University grants credit for higher level courses only. A grade of 5 qualifies the student to receive credit for up to two introductory courses while a grade of 4 qualifies a student to receive credit for one introductory course. No credit is awarded for the English as a Second Language (English B) or foreign language examinations (Foreign Language A or B). Credit is awarded according to the table of "International Baccalaureate Diploma/Certificate Credit," page 40.

Comprehensive Examinations. A comprehensive examination is intended to permit a student to establish academic credit in a field in which the student has gained experience or competence equivalent to an established university course. Applications are given

Advanced Placement Credit

Exam	Score	Semester Hours	Equivalency	
Art History	5 or 4	6	ARS 101, 102	
	3	3	ARS 101 or 102	
Art Studio—Drawing	4	3	ART 111	
	5	6	ART 111, 112	
Art Studio—General	4	3	ART 112	
	5	6	ART 112, DEC*	
Biology	5 or 4	8	BIO 181, 182	
	3	4	BIO 181	
Chemistry	5 or 4	9	CHM 113, 115	
	3	4	CHM 113	
Computer Science AB	5 or 4	6	CSE 100, 101	
Computer Science A	5 or 4	3	CSE 100	
Economics Introductory Macroeconomics	5 or 4	3	ECN 111	
Economics Introductory Microeconomics	5 or 4	3	ECN 112	
English Language and Composition	5 or 4	6	ENG 101, 114 eligible for ENG 102H	
English Literature and Composition	5 or 4	6	ENG 101, 110 eligible for ENG 102H	
French, German, or Spanish Language	5	14	FRE 201, 205, 311, 312 GER 201, 202, 311, 312 SPA 201, 202, 311, 312	
	4	11	FRE 201, 205, 311 GER 201, 202, 311 SPA 201, 202, 311	
	3	8	FRE 201, 205 GER 201, 202 SPA 201, 202	
French, German, or Spanish Literature	5	18	FRE 111, 201, 205, 321, 322	
		15	GER 111, 201, 202, 314	
		15	SPA 111, 201, 202, 325	
	4	12	FRE 111, 201, 205 GER 111, 201, 202 SPA 111, 201, 202	
French, German, or Spanish Literature	3	8	FRE 201, 205 GER 201, 202 SPA 201, 202	
	History American or European	5 or 4	6	HIS 103 and 104 <i>or</i> HIS 101 and 102
		3		Department evaluates examination and recommends credit.
Mathematics—Calculus AB	5, 4, or 3	4	MAT 270	

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

Exam	Score	Semester Hours	Equivalency
Mathematics—Calculus BC	5 or 4	4	MAT 270; additional credit may be granted upon departmental approval. MAT 270
	3	4	
Physics B	5 or 4	6	PHY 111, 112 PHY 111
	3	3	
Physics C Electricity and Magnetism	5 or 4	4	PHY 112, 114; or, upon departmental approval, credit may instead be granted for PHY 131, 132
Physics C Mechanics	5 or 4	4	PHY 111, 113; or, upon departmental approval, credit may instead be granted for PHY 121, 122.
Political Science American Government and Politics	5 or 4	3	POS 110
Comparative Government and Politics	5 or 4	3	POS 150
Psychology	5 or 4	3	PGS 100 Department evaluates examination and recommends credit.
	3		

CLEP Credit

General Examinations	Semester Hours	Equivalency
English Composition	None	With essay qualifies for ENG 105
Humanities	6	Elective credit
Mathematics	3	MAT 106
Natural Sciences	8	Elective credit
Social Sciences and History	6	Elective credit
Subject Examinations	Semester Hours	Equivalency
American Government	3	POS 110
American History (6) Early Colonization to 1877 1865 to the Present	3	HIS 103
	3	HIS 104
American Literature	6	ENG 341, 342
Analysis and Interpretation of Literature	3	Elective credit
Calculus with Elementary Functions	4	MAT 270
College Algebra	3	MAT 117

Subject Examinations	Semester Hours	Equivalency
College Algebra and Trigonometry	3	MAT 118
College Composition	None	With satisfactory essay qualifies for ENG 105
College French	8	FRE 101, 102
College German	8	GER 101, 102
College Spanish	8	SPA 101, 102
Information Systems and Computer Applications	3	Elective credit
English Literature	3	Elective credit
Freshman Eng 1sh	None	Recommend college composition subject exam
General Biology	8	BIO 181, 182
General Chemistry	9	CHM 113, 115
Introductory Psychology	3	PGS 100
Human Growth and Development	None	No credit
Introductory Macroeconomics	3	ECN 111 (Students must score a 75 or higher to receive credit.)
Introduction to Management	None	No credit
Introductory Microeconomics	3	ECN 112 Students must score a 75 or higher to receive credit)
Introductory Accounting	6	Elective credit
Introductory Business Law	3	Elective credit
Principles of Marketing	None	No credit
Introductory Sociology	3	SOC 101
Trigonometry	None	No credit
Western Civilization (9)		
Ancient Near East to 1648	6	HIS 100 and 101
1648 to the Present	3	HIS 102

only for courses listed in the current catalog and only for courses in which a comprehensive examination can serve as a satisfactory measure of accomplishment.

A number of restrictions apply. The student must be enrolled at ASU with *no more than 100 semester hours of credit* earned. The examinations must be taken during the first two semesters in residence in a degree program at the university. *No more than 60 semester*

hours of credit may be established by comprehensive examinations (including AP and CLEP credit) and correspondence courses.

Comprehensive examinations may not be taken in any course in which the student has been given admission credit or transfer credit from any educational institution. Credit may not be received for an examination in an elementary level of a field in which the student has earned more advanced credit nor for a

prerequisite for a course already completed.

The decision on the suitability of course material for a comprehensive examination, the development of a comprehensive examination, and the administration of an examination are strictly departmental functions. An application is for one course only. The student completes an application form with the number, title, and number of semester hours for the course. When

International Baccalaureate Diploma/Certificate Credit

Exam	Score	Semester Hours	Equivalency
Biology	7, 6, or 5 4	8 4	BIO 181 and 182 BIO 181
Chemistry	7, 6, or 5 4	9 4	CHM 113 and 115 CHM 113
English A	7, 6, or 5 4	6 3	ENG 101 and 110 ENG 110
English B	<i>no credit awarded</i>		
Foreign Language A or B	<i>no credit awarded</i>		
History American	7, 6, or 5 4	6 3	HIS 103 and 104 HIS 103
History European	7, 6, or 5 4	6 3	HIS 101 and 102 HIS 101
Mathematics	7, 6, 5, or 4	4	MAT 270
Physics	7, 6, or 5 4	8 4	PHY 111, 112, 113, and 114 PHY 111 and 113

completed, the application must be approved by the student's advisor and the chair of the department responsible for offering the course.

The student must then pay the stated fee for such examinations at the Cashier's Office. The receipt must be taken to the departmental office.

The examination is prepared by the instructor who normally conducts the course, and it is comprehensive in nature and scope. The instructor and other experts designated by the chair grade the examination, using letter grades "A," "B," "C," "D," or "E." If the grade is "C" or better, a mark of "Y" is entered on the student's permanent record, otherwise, no entry is made. Credit by examination is indicated as such on the record. The student is notified by mail of the result of the examination. In cases of failure ("D" or "E"), the student is *not* given an opportunity to repeat the examination.

A student pursuing a second baccalaureate degree may not receive credit by comprehensive examination, but, with prior approval of the college, the student may use the examination to waive a course requirement if a grade of "C" or better is earned.

Proficiency Examinations. Proficiency examinations and auditions are given

1. to waive a course requirement,
2. to validate certain transfer credits in professional programs; and
3. to determine a student's ability in a field where competence is an important consideration.

Detailed information may be obtained from the dean's office of the college in which the student is registered.

PLACEMENT EXAMINATIONS FOR PROFICIENCY

English. New students and continuing, re-entry, transfer, and nondegree students who have not taken any composition courses are placed in First Year Composition courses according to their scores on the ACT English or SAT Verbal tests. Students who score 18 (16)* or below on the ACT English test or 380 or below on the SAT Verbal test must enroll in WAC 101, a basic writing course (see page 45). Students who score between 19 (17)* and 28 (24)* on

the ACT English test or between 390 and 580 on the SAT Verbal test are eligible to enroll in ENG 101. Students who score 29 (25)* or higher on the ACT English test or 590 or higher on the SAT Verbal test may take ENG 105 in place of ENG 101 and 102. Students who are accepted in the University Honors College are eligible to enroll in ENG 105 after being advised. Students may also qualify for ENG 105 by achieving appropriate scores on the CLEP General Examination in English Composition with Essay or the CLEP Subject Examination in College Composition with Essay.

Foreign Language. For information regarding foreign language placement, see page 124, "Foreign Language Requirement and Placement," and pages 36-40, "Special Programs for Advanced Placement and Credit."

Mathematics. Placement examinations before registering in mathematics courses are not required at ASU. Students planning to register in mathematics courses should consult the Self Advisement flowchart, mailed to all fresh-

* The ACT scoring system has been modified. As a result, these scores are effective for tests taken in and after October 1989. Equivalent scores for tests taken before October 1989 are in parentheses.

man applicants and available at university advising offices and the Department of Mathematics offices in PSA 208 and 216. The flowchart places emphasis on a student's prior preparation and performance in mathematics. In most lower division mathematics courses, an intensive review by the students is followed by a test during the first week of classes. Students not doing well on these tests are encouraged to enroll immediately in a less demanding mathematics course. Those students needing additional evaluation are encouraged to take the Algebra Placement Exam or the Calculus Placement Exam, administered by appointment at University Testing Services (UTS), EDB 302. Call UTS at 602/965 7146 for an appointment.

ACADEMIC ADVISEMENT

Effective academic advisement of students is an essential aspect of the educational experience at ASU. The university is committed to provide quality advisement to students and, at the same time, recognizes that it is the responsibility of the student to make advising contacts. To assure timely and accurate advisement to their majors, each college has advisors to assist students in developing programs of study, assessing educational goals, and understanding rules, procedures, and curriculum requirements. In some colleges, these advisors are faculty members. In others, they are full time, professional advisors. In most instances, students have academic and career advisement available from both faculty members and full time advisors. Students are encouraged to take advantage of the skill and knowledge of the advising professionals available to them. Most new students and many continuing students have mandatory advisement as a condition of registration.

An additional unit, the University Academic Advising Center, is a central advising, referral, and information facility whose staff are available to assist students in their academic careers at ASU. The center provides special advising services to prospective, transfer, undecided, undeclared, unclassified, and visiting students. In addition to guidance in the exploration and/or selection of a major, the center provides general academic information and referrals to any area of student academic support.

Students are strongly encouraged to seek academic advisement at the earliest possible time and regularly throughout their academic careers, whether or not advising is mandatory in their particular programs. Academic offices may be contacted at the locations and times below. See page 446 for a list of building abbreviations and names.

College of Architecture and Environmental Design

ARCH 141, 602/965 3584
 Mon. Fri. 8:00 12:00
 1:00 5:00

College of Business

BA 123, 602/965-4227
 Mon. Tues. and Thurs. Fri. 9:00 12:00
 1:00 4:30
 Wed. 9:00 12:00
 1:00 6:30

College of Education

EDB 7, 602/965 3877
 Mon. Tues. and Thurs. Fri. 7:00 5:00
 Wed. 7:00 7:00
 Call 965 3877 for additional hours

College of Engineering and Applied Sciences

ECG 100, 602/965 3421
 Mon. Fri. 8:00 5:00

College of Fine Arts

GHALL 123, 602/965-6647
 Mon. Fri. 8:00 5:00

College of Law

LAW 101, 602/965-7896
 Mon. Fri. 8:00 5:00

College of Liberal Arts and Sciences

SS 111, 602/965-6506
 Mon. Fri. 8:00 5:00

College of Nursing

NUR 108, 602/965 2987
 Mon. Fri. 8:00 5:00

College of Public Programs

WILSN 203, 602/965-1034
 Mon. Fri. 8:00 5:00

Graduate College

WILSN Lobby, 602/965 3521
 Open year round; walk ins welcome,
 appointments recommended

School of Social Work

WHALL 137, 602/965-6081
 Mon. Fri. 8:00 12:00
 1:00 5:00

University Academic Advising Center

MCENT, 602/965-4464
 Mon. Thurs. 8:00 6:30
 Fri. 7:00 4:00

University Honors College

MCL 112, 602/965 2359
 Mon. Fri. 8:00 5:00
 Appointments are recommended

READMISSION TO THE UNIVERSITY

Undergraduate students who have previously attended ASU but have not been enrolled at ASU for one semester or more are required to apply for readmission for the semester in which re-enrollment is intended. If, meanwhile, the student has attended another accredited college or university, it is necessary for the student to have on file an official transcript of all academic work taken. Failure to report such attendance is considered misrepresentation and falsification of university records. In addition, it is considered cause for Records Hold action and withholding of further registration privileges.

An applicant for readmission to a degree program must meet the requirements for good standing (page 48) and the requirements of the college to which the application is being made. An applicant who has been denied readmission may appeal to the University Undergraduate Admissions Board. Nondegree applicants for readmission must have a minimum GPA of 2.00. If not, the applicant must apply to ASU through Undergraduate Admissions.

Conditional Readmission. A student completing academic work in progress at another institution may be granted conditional readmission. This conditional status remains effective until an official transcript is received. The student is subject to Records Hold action and additional registration privileges are withheld if this condition for readmission is not cleared by mid semester.

ACADEMIC RENEWAL

Academic renewal is a university policy administered for the purpose of recalculating the ASU cumulative GPA of undergraduate students who have been readmitted to a degree program after an absence of at least five continuous calendar years and who have completed in good standing a minimum of 12 college approved additional hours in residence within three semesters after re-entry. Students may have the former academic record before the five year absence (including transfer credits) accepted in the same manner as if the credits were community college transfer credits. That is, earned hours are carried forward for up to 64 hours of credit in which a grade of "C" or better was earned. The cumulative GPA is

based only on credits earned subsequent to the student's re-entry. All graduation residency, academic recognition residency, and GPA requirements must be fulfilled after academic renewal.

A request for academic renewal follows this procedure:

1. Students interested in academic renewal must request the Application for Academic Renewal from the Readmission Section of the Office of the Registrar or the dean of the college offering the major.
2. The Application for Academic Renewal may be submitted immediately upon readmission but not later than the start of the third semester after readmission. Credits must be completed by the third semester after re-entry.
3. The Application for Academic Renewal is submitted by the student to the dean of the college offering the major.
4. The dean specifies in advance a minimum of 12 semester hours.
5. When the approved credits are completed with a cumulative GPA of 2.50 or higher, the dean forwards the Application for Academic Renewal to the Office of the Registrar for processing.

Only students working toward their first undergraduate degree are eligible to apply for academic renewal, which may be effected only once during a student's academic career. Academic renewal is transferable among colleges. Eligibility for graduation is based on the ASU cumulative GPA after academic renewal. However, a student's complete record before and after academic renewal remains on the transcript and may be taken into consideration when a student applies for undergraduate professional or graduate programs.

Registration

All persons attending a class at ASU must be registered for that class. A student is considered to be registered when all registration fees have been paid in full.

Eligibility. Only eligible students may register for courses at ASU. An eligible student is either continuing from the previous semester or has been admitted or readmitted to the university.

See "Undergraduate Admission," page 31, and "Readmission to the University," page 41.

Proof of Identification. In order to receive university services, photo identification must be presented. Each admitted or readmitted student who completes the registration process for a regular semester needs to obtain a student identification card. This photo identification card is valid for the duration of the student's enrollment at ASU.

Photo IDs are issued throughout the semester at the Payne registrar site, EDB 42, and at selected times in the Memorial Union. See the *Schedule of Classes*. Refer to page 26, "ID Card."

Registration Fees. Registration fees are due and must be paid in full at the time specified each semester in the *Schedule of Classes*. If any payment tendered is unauthorized, incomplete, or received after the due date, registration fees are considered not paid.

Schedule of Classes. The *Schedule of Classes*, published for the fall and spring semesters, and the *Summer Sessions Bulletin* are distributed without charge. They list course offerings, dates, times, places, and procedures for registration, along with other important information relating to the term.

Course Loads. A minimum full-time course load for an undergraduate student is 12 semester hours. The maximum course load for which a student may register is 18 semester hours (with the exception of a 19-hour maximum for students enrolled in the Colleges of Engineering and Applied Sciences or Architecture and Environmental Design). A student wishing to register for more than the maximum must petition the standards committee of the college in which he or she is enrolled and must present an approved override at the time of registration. See "Summer Course Loads," page 42, for summer course load information.

Reserving of Course Credit by Undergraduates. Seniors at ASU within 12 semester hours of graduation may enroll in a 400-level or graduate course and reserve the credit for possible use in a future graduate program. The course cannot be used to meet a baccalaureate graduation requirement. Before registration in the course, the student

must submit a Graduate College Petition form requesting credit reservation. The form must be signed by the student's advisor, the head of the academic unit offering the class, and the dean of the Graduate College.

Permission to reserve a course does not guarantee admission to a graduate degree program or that the course may be used toward graduate degree requirements. A maximum of nine hours of credit may be reserved, and only courses with an "A" or "B" grade are applicable. Reserved credit earned before admission to a graduate degree program is classified as nondegree credit. The maximum course load for a student enrolled in a reserved course is 15 semester hours during a regular session and six hours during a summer session.

Summer Course Loads. Maximum load for each five-week session is six semester hours and nine semester hours for an eight-week session. The student registering in a five-week session and an eight-week session simultaneously may not exceed the following combinations of semester hours:

Session			
First Five Week	Eight Week	Second Five Week	Total Semester Hours
0	9	3	12
1	8	3	12
2	7	3	12
3	6	3	12
4	4	4	12
5	2	5	12
6	0	6	12

Concurrent Enrollment. Provided that the other university regulations concerning enrollment, graduation requirements, and transfer of credits are not violated, a student may enroll in classes at other institutions or in correspondence courses while enrolled at ASU. However, the student is urged to seek advisement before concurrent enrollment to assure orderly progress toward a degree. If total credits exceed the maximum course load, prior permission must be granted by the college standards committee. (See "Course Loads," page 42.)

Attendance. The instructor has full authority to decide whether class attendance is required.

Enrollment Verification Guidelines. The registrar is responsible for verifying enrollment according to the general guidelines in the table of enrollment verification guidelines.

COOPERATIVE EDUCATION

Cooperative Education at ASU is any educational program that requires *alternating classroom and work experience* in government or industry. The work experience exists for its educational value.

Full-time Status of Co op Students. A co op student, during a work semester, is identified as both co op and full time by the university if he or she was full time during a “cooperative education” course.

Rights and Privileges of Co op Students. During their work semesters, co op students have the rights, privileges, and protections with regard to university matters accorded to full time students, except financial aid assistance. They maintain catalog continuity and have student access to university facilities and events.

Financial Aid for Co op Students. Co-op students are not identified to lenders (including ASU) as being in loan repayment status. They have an “in school” full time enrollment status. Co op students do not receive any financial aid disbursement during their co-op semesters *nor are such awards transferred to another semester.* The student is responsible for notifying Student Financial Assistance as soon as plans for a co-op term are made but no later than 10 days before the co op term begins. The department or school is re-

sponsible for notifying Student Financial Assistance of students approved for co op terms.

Traveling Scholar Program. The Traveling Scholar Program is a cooperative program between the three state universities designed to enable students to take advantage of programs or special resources that are not available at their own institutions. Any undergraduate student with a GPA of at least 2.50 or graduate student with a GPA of at least 3.00 enrolled *full time* at Arizona State University, Northern Arizona University, or University of Arizona may be designated a Traveling Scholar by prior mutual agreement of the appropriate academic authorities at both the sponsoring and hosting institutions. Contact the Records Information Section for additional information and the application form.

Classification of Courses

COURSE INFORMATION

Information about all courses that may be offered by ASU appears in the *General Catalog*, published biennially every other spring. Classes scheduled for the current or upcoming fall or spring semester are listed in the *Schedule of Classes*, published before the beginning of every semester. Classes scheduled for the summer sessions are listed in the *Summer Sessions Bulletin*, published every spring. Information about courses that apply toward graduate programs also appears in the *Graduate Catalog*, published biennially.

COURSE NUMBERING SYSTEM

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

300–499 (Upper-Division) Courses. These courses are designed primarily for juniors, seniors, and other advanced students. Prerequisites and other restrictions should be noted before registration. Courses at the 400 level apply to graduate degree requirements for individual programs of graduate study when approved by the Graduate College. See “Reserving of Course Credit by Undergraduates” on page 42.

500–799 (Graduate-Level) Courses. These courses are designed for graduate students. However, an upper division undergraduate student may enroll in these courses with the approval of his or her advisor, the course instructor, the department chair, and the dean of the college in which the course is offered. If the course does not meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by a nondegree graduate student. See “Reserving of Course Credit by Undergraduates” on page 42. See page 366 and the *Graduate Catalog*.

Enrollment Verification Guidelines

	Full-Time	Half-Time	Less Than Half Time
Regular Semester			
Undergraduate	12 or more hours	6–11 hours	5 or fewer hours
Graduate	9 or more hours	5–8 hours	4 or fewer hours
Graduate Assistant*	6 or more hours		
Five Week Summer Session			
Undergraduate	4 or more hours	2 hours	1 hour
Graduate	3 or more hours	2 hours	1 hour
Graduate Assistant*	2 or more hours	1 hour	
Eight Week Summer Session			
Undergraduate	6 or more hours	3–5 hours	2 or fewer hours
Graduate	5 or more hours	3–4 hours	2 or fewer hours

* For enrollment verification purposes, graduate assistant is a generic term that includes graduate assistant, teaching assistant, research assistant, graduate associate, teaching associate, and research associate.

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

Omnibus Undergraduate Courses

191 First-Year Seminar. This omnibus course, ranging from one to three semester hours, is designed to bring faculty and small groups of students together to discuss topics of common interest. Students must have freshman class standing to enroll. Contact your academic advisor for more information.

194, 294, 394, and 494 Special Topics. These courses cover topics of immediate or special interest to a faculty member and students. They range in credit from one to four semester hours.

484 Internship. These courses offer structured practical experience following a contract or plan, supervised by faculty and practitioners. Internships range in credit from one to 12 semester hours.

498 Pro-Seminar. These courses involve small group study and research for advanced students within their majors. Major status in the department or approval of the instructor is required. These courses range in credit from one to seven semester hours.

499 Independent Study. The course number 499 has been reserved for Independent Study courses in each of the instructional departments or divisions of the colleges at the undergraduate level. Independent Study courses are honors courses and may be taken only by outstanding senior students who have completed at least one semester in residence. To be eligible for an Independent Study course, a student must have a cumulative GPA of 3.00 or better in the major or field of specialization.

An Independent Study course is designed to provide an opportunity for the superior senior student or graduate student to do an original study or investi-

gation in the major or field of specialization on an individual basis with a minimum of supervision or direction.

An Independent Study course is not a substitute for a catalog course nor a means of taking a catalog course on an individual basis. Courses listed in the catalog may not be taken as Independent Study.

Application for Independent Study must be made well in advance of the regular registration period with the student's advisor. The application must be signed by the advisor and approved by the instructor under whom the student will work and by the chair of the department offering the course. A special class fee may be required. These courses range in credit from one to three semester hours.

International Program Courses.

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

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

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

Omnibus Graduate Courses

	<i>Semester Hours</i>
500 Research Methods	1 12
580 Practicum	1 12
583 Field Work	1 12
584 Internship	1 12
590 Reading and Conference	1 12
591 Seminar	1 12
592 Research	1 12
593 Applied Project	1 12
594 Conference and Workshop	1 12
595 Continuing Registration*	1
598 Special Topics	1-4
599 Thesis	1 12
600 Research Methods	1 12
680 Practicum	1 12
683 Field Work	1 12
684 Internship	1 12

690 Reading and Conference	1 12
691 Seminar	1 12
692 Research	1 12
693 Applied Project	1 12
695 Continuing Registration*	1
700 Research Methods	1 12
780 Practicum	1 12
783 Field Work	1 12
784 Internship	1 12
790 Reading and Conference	1 12
791 Seminar	1 12
792 Research	1 15
793 Applied Project	1 12
795 Continuing Registration*	1
799 Dissertation	1 15

* The student receives neither credit nor grade for 595, 695, and 795.

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

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

Prerequisites and Corequisites.

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

Key to Course Listing Codes

Code	Definition
M	Course campus code
GLG	Departmental prefix designation
410	Course number
(3)	Three semester hours
F	Course offered fall only
S	Course offered spring only
SS	Course offered summer session only
F, S	Course offered both semesters
A	Course offered once a year
F '94	Course offered every other year on semester indicated
N	Course not regularly offered

Undergraduate Academic Services. UNI and WAC courses are offered by Undergraduate Academic Services. See page 20 for more information.

UNIVERSITY

UNI 100 Academic Success at the University. (3) F, S, SS
Mastery in time management, notetaking, test taking, college text reading, university library use, goal setting, and use of university resources. Lecture, discussion, co-op learning.
Prerequisite: freshman or sophomore or transfer student standing.
Omnibus Courses: See page 44 for omnibus courses that may be offered.

WRITING ACROSS THE CURRICULUM

WAC 101 Introduction to Academic Writing. (3) F, S
Combines classroom and supplemental instruction to teach academic genres of writing including definition, summary, and analysis.

Grading System

Definition of a Unit of Credit. The Arizona Board of Regents has defined (May 26, 1979) a unit of credit for the institutions under its jurisdiction. A minimum of 45 hours of work by each student is required for each unit of credit. An hour of work 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 the classroom for each unit of credit. Even though the values of 15 and 30 may vary for different modes of instruction, the minimum total of 45 hours of work for each unit of credit is a constant. Since the unit of credit as defined by the Arizona Board of Regents is the cornerstone of academic degree programs at ASU, degrees granted by other institutions that are recognized by ASU should be based on a similar unit of credit.

Scholarship Grades and Marks. All grades and marks appear on the grade report, permanent record, and/or unofficial transcript.

They are indicated by the following letters:

A	Excellent (4.00)
B	Good (3.00)
C	Average (2.00)
D	Passing (1.00)
E	Failure (0.00)
I	Incomplete
NR	No Report
P	Pass
RC	Remedial Credit*
RN	Remedial No Credit*
W	Withdrawal
X	Audit
Y	Satisfactory

* Appears only on unofficial copy of ASU transcript

Grading Options. Ordinarily a grade of “A,” “B,” “C,” “D,” or “E” is given upon completion of a course, unless a grading option of “audit” or “pass/fail” is indicated at the time of registration. *Grading options cannot be changed after the close of the drop/add period.*

Incomplete. A mark of “I” (incomplete) is given by the instructor only when a student who is otherwise doing acceptable work is unable to complete a course because of illness or other conditions beyond the student’s control. The mark of “I” should be granted only when the student can complete the unfinished work with the same instructor. However, an incomplete (“I”) may be completed with an instructor designated by the department chair if the original instructor later becomes incapacitated or is otherwise not on campus. The student is required to arrange with the instructor for the completion of the course requirements. The arrangement is recorded on the Request for Grade of Incomplete form. The student has one calendar year from the date the mark of “I” is recorded to complete the course. If the student completes the course within the calendar year, the instructor must submit a Request for Grade of Incomplete/Authorization for Change of Grade form to the Office of the Registrar, whether the student passed or failed the course. Marks of “I” are changed to a grade of “E” for purposes of evaluating graduation requirements for undergraduate students. Marks of “I” received in the fall 1983 semester or thereafter for undergraduate courses that have been on a student’s record for more than one calendar year are automatically changed to a grade of “E.”

An undergraduate student does not register or pay fees for a course for which an incomplete “I” has been received in order to complete the course.

Students who receive a mark of “I” in courses at the 500 level or above have one calendar year to complete the course for a grade. After one calendar year, the mark of “I” becomes a permanent part of the transcript. To repeat the course for credit, a student must re-register and pay fees. The grade for the repeated course appears on the transcript but does not replace the permanent “I.”

Satisfactory. A mark of “Y” (satisfactory) may be used at the option of individual colleges and schools within the university and is appropriate for internships, projects, readings and conferences, research, seminars, theses, and workshops. The “Y” is included in earned hours but is not computed in the GPA.

Credit Enrollment. The semester hour is the unit on which credit is computed. It represents one 50 minute class exercise per week per semester. To obtain credit, a student must be properly registered and must pay fees for the course.

Audit Enrollment. A student may choose to audit a course, in which case the student attends regularly scheduled class sessions, but no credit is earned. The student should obtain the instructor’s approval before registering and paying the fees for the course. Selected courses may not be audited.

The mark of “X” is recorded for completion of an audited course, unless the instructor determines that the student’s participation or attendance has been inadequate, in which case, the mark of “W” (unrestricted withdrawal) may be recorded. This grading option may not be changed after the close of drop/add. The “X” is not included in earned hours and is not computed in the GPA.

Pass/Fail Enrollment. A mark of “P” (pass) or “E” (fail) may be assigned for this grading option. This grading method may be used at the option of individual colleges and schools within the university. Consult the college dean’s office for detailed information and restrictions before registration. “P” is included in earned hours but is not computed in the GPA.

Remedial Enrollment. A mark of "RC" (remedial credit) or "RN" (remedial no credit) may be assigned for this grading option. The course appears on an unofficial ASU transcript but does not appear on the grade report or official ASU transcript and is not included in earned hours. Remedial hours are included in verification of enrollment for purposes of loan deferment and eligibility.

Drop/Add. Students registering for courses for a semester or summer session may drop or add courses through the first week of classes in a semester or the first two days of a summer session. See the *Schedule of Classes* or *Summer Sessions Bulletin* for dates of drop/add periods. During this period, a student may drop one or more (but not all) scheduled courses without penalty. Courses that are dropped do not appear on the student's transcript and fees paid are fully refunded, depending on the student's remaining hours. A student who wishes to withdraw from all courses during the drop/add period must process an unrestricted withdrawal.

Unrestricted Course Withdrawal. During the first four weeks of a semester or the first six days of a summer session, a student may withdraw from any course with a mark of "W." See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the unrestricted withdrawal period.

Restricted Withdrawal. From the fifth week to the end of the 10th week of a semester and from the seventh day to the end of the third week of a summer session, students may withdraw with a mark of "W" from courses only in which the instructor certifies that they are passing at the time of the withdrawal. See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the restricted withdrawal period.

The number of restricted withdrawals with the mark of "W" is limited. One restricted withdrawal is assessed for each course withdrawn from, unless the student is withdrawing from all courses. A complete withdrawal results in the assessment of one restricted withdrawal against a student's limit. The number of withdrawals is as follows: during freshman standing, a total of three; during sophomore standing, a total of two; during junior and senior standing, a total of two; and, during

second undergraduate degree standing, a total of two. Students who have reached their restricted withdrawal limit will not be allowed to process any additional restricted course withdrawals. However, students are allowed to process a restricted complete withdrawal even when they have reached the restricted withdrawal limit. The preceding limits do not prevent students from processing a complete withdrawal from the university with marks of "W" and/or "E." Complete withdrawal counts as one withdrawal for purposes of applying the above limits. The preceding does not apply to audit enrollment or zero-hour labs and recitations.

Procedure for Restricted Withdrawal

1. Obtain a withdrawal form from any registrar site.
2. Obtain a signature and verification of grade from instructor(s).
3. Have the form processed at any registrar site.

Instructor-Initiated Withdrawal. An instructor may withdraw a student from a course with a mark of "W" or a grade of "E" only in cases of disruptive classroom behavior. A student may appeal an instructor-initiated withdrawal to the standards committee of the college in which the course is offered. The decision of the committee is final. Restricted withdrawal limits do not apply to withdrawals initiated by an instructor.

Withdrawal from the University. In order to withdraw from *all* classes after having paid registration fees, a student must initiate complete withdrawal from the university by appearing in person or by addressing a signed request to the Office of the Registrar. During the unrestricted complete withdrawal period, a student may withdraw from all courses with marks of "W." During the restricted complete withdrawal period, a student may withdraw with marks of "W" only from courses that the instructors certify the student was passing at the time of withdrawal. See the *Schedule of Classes* or the *Summer Sessions Bulletin* for dates of the complete withdrawal periods. No one is permitted to withdraw from the university or to conduct any registration transaction in the last two weeks of the semester. The date of the complete withdrawal is al

ways the date the withdrawal form or letter is received in the Office of the Registrar.

Medical Withdrawal. Normally, a medical withdrawal request is made in cases where serious illness or injury prevents a student from continuing courses and incompletes or when other arrangements with the instructor are not possible. Consideration is usually for complete withdrawal. An application for less than a complete withdrawal must be well documented to justify the selective nature of the medical withdrawal request. This policy applies both to cases involving physical health problems and those involving mental or emotional difficulties.

To receive permission for a medical withdrawal from courses, a student must present a Request for Documented Medical Withdrawal form and proper documentation (usually a letter from a physician) of the medical condition to the medical withdrawal designee of the college of the student's major. For complete procedural information, contact the appropriate medical withdrawal designee.

Grade Points. For the purpose of computing the grade point average (GPA), grade points are assigned to each of the grades for each semester hour as follows: "A," four points; "B," three points; "C," two points; "D," one point; "E," zero points. GPAs are rounded to the nearest 100th of a grade point.

Grade Point Average. Grade points earned for a course are multiplied by the number of semester hours to produce honor points. For example, receiving an "A," which is assigned four grade points, in a three semester hour course would produce 12 honor points. The grade point average (GPA) is obtained by dividing the total number of honor points earned by the total number of semester hours graded "A," "B," "C," "D," or "E." Other grades do not carry grade points. *Semester GPA* is based on *semester* net hours. *Cumulative GPA* is based on *total* net hours.

Change of Grade. Ordinarily the instructor of a course has the sole and final responsibility for any grade reported. Once the grade has been reported to the registrar, it may be changed upon the signed authorization of the faculty member who issued the

original grade. Approval for the change is also required by the department chair and the dean of the college concerned. This policy also applies to the grade of "I" (incomplete).

University Policy for Student Appeal Procedures on Grades

Informal

The steps outlined below, beginning with step A, must be followed by any student seeking to appeal a grade. Student grade appeals must be processed in the regular semester immediately following the issuance of the grade in dispute (by commencement for fall or spring), regardless of whether the student is enrolled at the university. It is university policy that students filing grievances and those who are witnesses will be protected from retaliation. Students who believe they are victims of retaliation should immediately contact the dean of the college in which the course is offered.

- A. The aggrieved student must first undergo the informal procedure of conferring with the instructor, stating the evidence (if any) and reasons for questioning that the grade received was not given in good faith. The instructor is obliged to review the matter, explain the grading procedure utilized, and show how the grade in question was determined. If the instructor is a graduate assistant and this interview does not resolve the difficulty, the student may then go to the faculty member in charge of the course (regular faculty member or director of the course sequence) with the problem.
- B. If the grading dispute is not resolved in step A, the student may appeal to the department chair or other appropriate chair of the area within the department (if any). The department chair may confer with the instructor to handle the problem. Step B applies only in departmentalized colleges.
- C. If these discussions are not adequate to settle the matter to the complainant's satisfaction, the student may then confer with the dean of the college concerned (or the dean designate), who will review the case. If unresolved, the dean or designate may refer the case to the college academic grievance hearing committee to review the case for

mally. In most instances, however, the grievance procedure will not go beyond this level.

Formal

The following procedure takes place after steps A, B, and C (or A and C) have been completed.

- D. Each college has on file in the office of the dean (and in each department of the college) the procedures and composition of the undergraduate or graduate academic grievance hearing committee for student grievances. Each college committee shall operate under grievance procedures as stated which satisfy due process requirements. The committee shall always meet with the student and the instructor in an attempt to resolve the differences. At the conclusion of the hearing, the committee shall send its recommendations to the dean.
- E. Final action in each case will be taken by the dean after full consideration of the committee's recommendation. Grade changes, if any are recommended, may be made by the dean. The dean shall inform the student, instructor, department chair (if any), the registrar, and the grievance committee of any action taken.

Repeating Courses. An undergraduate course taken at ASU may be repeated for credit if the grade of "D," "E," or "W" or a mark of "X" is received. Undergraduate courses in which grades of "D" or "E" are received may be repeated only once. After an undergraduate student repeats 100 and 200 level courses, the student's transcript shows both grades, but the student's cumulative GPA reflects only the higher grade. After an undergraduate student repeats 300 or 400 level courses, the student's cumulative GPA and the transcript reflect both grades.

After completing the course, the student must file a Deletion Form with the Office of the Registrar. To be eligible for the deletion of "D" or "E" grades, the course must be repeated at ASU. Students who have graduated are not eligible to delete the grade for a course taken before the award of the ASU bachelor's degree.

This policy does not apply to seminar and independent study courses with different content each semester. This

policy affects only undergraduate students and undergraduate courses.

Demonstration of Mastery. An undergraduate student who receives a "D" in a course in which a "C" or better is required may use the grade from an equivalent course taken elsewhere to demonstrate mastery at the "C" or higher level. However, the course may neither be transferred to ASU (since credit has already been given for the course) nor computed in the student's GPA.

Midterm Report. Instructors are required to evaluate students at midterm for academic progress. A student who has been evaluated for a "D" or "E" at mid semester receives a midterm report. The midterm "D" and "E" grades are not recorded on the student's permanent record. Midterm reports are mailed to the student's local address of record.

Final Grade Report. A grade report is sent to each student at the end of each semester to the permanent address of record. *It is the responsibility of the student to keep the Office of the Registrar informed of address changes.*

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

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

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

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

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

1. the student's name and former name(s);
2. the student ID number;
3. the date of birth; and
4. the dates of attendance.

No transcript is issued in cases of a financial records hold. If the transcript is to be mailed, the student must also supply a specific address. The fee for an official transcript for nonenrolled students is \$5.00 for the first copy. The fee is \$1.00 per copy for students enrolled for a current or future semester. Additional copies ordered at the same time are \$1.00 each.

Unofficial transcripts may be requested in person at the Office of the Registrar, any registrar site, or by mail if a signed release is enclosed. There is no charge for an unofficial transcript.

All in-person transcript requests require presentation of photo identification. Requests are not accepted from third parties without a written release from the student. For information on parental access to records, see "Access to Records," pages 49-50.

Retention and Academic Standards

Class Standing of Students

- 1 Freshman, 24 or fewer hours earned
- 2 Sophomore, 25-55 hours earned
- 3 Junior, 56-86 hours earned
- 4 Senior, 87 or more hours earned
- 5 Graduate, bachelor's degree from accredited institution

Academic Good Standing. Academic good standing for degree seeking students for the purpose of retention is defined as follows:

Total Earned Hours	Minimum Cumulative GPA
24 or fewer	1.60
25-55	1.75
56 or more	2.00

A student who does not maintain the minimum GPA standard is placed on academic probation or is disqualified. A student on academic probation is in conditional good standing and is permitted to enroll. A student who has been disqualified is not in academic good standing and is not permitted to enroll for fall or spring semesters.

In order to transfer from one college to another within the university or to be eligible for readmission, a student must have a GPA of 2.00 or better. The GPA determining good standing is computed on courses taken only at ASU.

For purposes of retention or transfer, an individual college may set higher GPA standards; otherwise, the university standards prevail. See the college sections of this catalog or contact the college deans' offices for statements regarding college retention standards.

Meeting Basic Competencies. New students are required to have completed a specific number of courses in the areas of American history, English, laboratory science, mathematics, and social science. Students who are exempt from these requirements include transfer students with 36 or more transferable semester hours, students admitted by GED, and students who are 22 years of age or older by the first day of the semester. An admitted student who needs to meet competencies in one or more of these areas must satisfy the requirement within one year of the beginning of his or her first semester at ASU. Subject competencies in each area may be met by earning a grade of "D" or better at ASU in an appropriate course(s) as listed in the following table:

Area	ASU Courses That May Be Used to Meet Basic Competencies
American history	HIS 103 or 104
English	ENG 071 or 101 or 105 or 107
Laboratory science*	<i>Life Sciences:</i> BIO 100 or 181 or 182 or BOT 108 or ZOL 113 or 120 or 201 <i>Chemistry:</i> CHM 101 or 113 or 117 <i>Physics:</i> AST 111 and 125 or AST 112 and 126 or PHS 110 or PHY 101 or 105 or 111 and 113 or 112 and 114 or 121 and 122 or 131 and 132 <i>Earth Science:</i> GLG 101 and 103; GPH 111
Mathematics	MAT 106 or 117 or 118 or 119 or 210 or 260 or 270 or 290
Social science	ASB 102; ECN 111 or 112; GCU 102 or 121 or 141, HIS 100 or 101 or 102, PGS 100; POS 101 or 110 or 120 or 150 or 160; SOC 101

* The laboratory science requirement is designed to demonstrate competency in two separate laboratory science areas. Therefore, for example, if one lab science com-

petency has already been met in life science either through high school course work, the ATP biology achievement test, or college course work, the second lab science course must be selected from chemistry, earth sciences, or physics.

Appealing Basic Competencies. A student who has not met all basic competencies at the end of one calendar year after his or her initial date of enrollment is not permitted to continue at ASU. Each student is notified that he or she may not register or, if already registered, that his or her registration has been cancelled.

A student wishing to appeal the dismissal should submit a petition through his or her college. The colleges have three options in reviewing these appeals:

1. extending the student's end semester to allow one additional semester to complete the required course work;
2. allowing the student to substitute a course not currently approved to fulfill a competency area when an error has been made in advising or for other just causes; or
3. denying the petition.

College actions are forwarded to the Office of the Registrar for processing.

Dean's List. Undergraduate students who earn 12 or more graded semester hours ("A," "B," "C," "D," or "E") during a semester in residence at ASU with a GPA of 3.50 or better are eligible for the Dean's List. A notation regarding Dean's List achievement appears *only* on the final grade report for the semester.

Satisfactory Academic Progress. The university is required to publish and enforce standards of satisfactory academic progress for certain students (e.g., student athletes, students receiving financial aid, and students receiving veterans benefits).

Certification of satisfactory progress for student athletes is verified by the academic advisor and the dean's designee for certifying satisfactory progress. Certification of satisfactory progress for students receiving financial aid or veterans benefits is verified by Student Financial Assistance or the Veterans Services Section respectively. Students should contact their advisors or the appropriate office for additional information on satisfactory progress requirements.

Student Academic Complaints. If a student is dissatisfied with the instruction received in a class or with the interaction with the instructor of the class, the student may pursue the following avenues in the order listed:

1. The student may discuss the complaint with the instructor of the class.
2. If the issue is not resolved at this level, the student may contact the chair of the department in which the course is offered.
3. If further discussion and/or appeal is needed, the student may contact the dean of the college in which the course is offered.

Probation. A student's college assumes responsibility for enforcing academic standards and may place any student on probation who has failed to maintain good standing as previously defined. For purposes of probation and retention, an individual college may set higher GPA standards. A student on academic probation is required to observe any rules or limitations the college may impose as a condition for retention.

Disqualification. A student who is placed on probation at the end of a semester is subject to disqualification by the college at the end of the following semester if the conditions imposed for retention are not met.

Disqualification is exercised at the discretion of the college and becomes effective on the first day of the semester following college action. A *disqualified student is notified by the dean of the college and/or the Office of the Registrar and is not allowed to register in a fall or spring semester at the university until reinstated.* A student who has been disqualified may appeal to the college standards committee. A student who is disqualified may not attend as a nondegree student.

Reinstatement. If a student with a GPA of 2.00 or greater has been disqualified by one college and seeks to transfer to another college at ASU, the student may apply at the Readmissions Section (SSV B114) or directly to the college to which the student wishes and is qualified to transfer.

To be reinstated into an ASU college other than the disqualifying college, the student must submit an application for reinstatement to the University Undergraduate Admissions Board through the

Readmissions Section of the Office of the Registrar

To be reinstated into the same college from which the student was disqualified, the student must submit an application for reinstatement to the disqualifying college. When reinstatement includes readmission, application must be made to the Readmissions Section of the Office of the Registrar.

Reinstatement Appeals. A student wishing to appeal the decision of the standards committee of a college may submit an appeal to the University Undergraduate Admissions Board. The decision of the board is final.

Academic Integrity. The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university 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 and college academic integrity policies are available from the Office of the Senior Vice President and Provost and from the deans of the individual colleges.

Suspension or Expulsion for Academic Dishonesty. All decisions relating to expulsion or suspension that are concerned with academic dishonesty are the sole prerogative of the dean of the school or college in which the student has been admitted. These decisions of suspension or expulsion can be appealed in accordance with established university procedures. Application for reinstatement may be made to any of the academic units within the university after the specified period of suspension. Merely having remained in a suspended status for a period of time does not, in itself, constitute a basis for reinstatement.

Student Records

Family Educational Rights and Privacy Act of 1974

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. The term *record* includes any information or data recorded in any medium, including, but not limited to, handwriting, print, tapes, film, microfilm, microfiche, and electronic means.

Types of Information

Educational Record. The term *educational record* refers to those records directly related to a student and maintained by an educational institution. Two types of educational records are subject to the provisions of this act: (1) directory information and (2) personally identifiable information. The term does not include those records specifically excluded by Section 99.3 of the privacy act.

Directory Information. The term *directory information* includes the following student information: name, local and permanent addresses, local telephone number, date and place of birth, citizenship, residency status, academic level, major field of study, college of enrollment, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student.

Personally Identifiable Information. The term *personally identifiable information* includes the name of a student's parent or other family member(s), a personal identifier such as the student's Social Security number, a list of personal characteristics, or other information that would make the student's identity easily traceable and any information, including directory information, that the student has indicated will not be released.

Access to Records

An eligible student or a parent of a dependent eligible student may inspect and review the student's educational records. Some form of photo identification must be displayed before access to educational records is allowed.

Directory information may be released to anyone without consent of the student unless the student has indicated otherwise. Students may request that this information not be released by completing a form in the Office of the Registrar. A request to withhold this information excludes the student from being listed in the annual directory only if the request is submitted to the Office of the Registrar before the end of the third week of the fall semester.

All other educational records that contain personally identifiable information may not be released without the written consent of the student. A parent of a dependent student may challenge denial of such access by producing the most current copy of Internal Revenue Form 1040. If that form lists the student in question as a dependent, the parent is required to sign an affidavit that affirms that the student is his or her dependent. The affidavit is retained by the Office of the Registrar. Upon receipt of the affidavit, the university makes student records available to the parent for the rest of that calendar year as specified under the Buckley Amendment.

Students may grant access to parents or agencies by completing a form in the Office of the Registrar.

Location of Policy and Records

The custodian of Educational Records at ASU is the Office of the Registrar. Copies of this policy are available in the following offices: Reserve sections of Hayden Library and the Noble Science and Engineering Library, the Office of the Registrar, Undergraduate and Graduate Admissions, and Student Life. The Office of the Registrar also maintains a directory that lists all education records maintained on students by ASU.

University General Studies Program Requirements

The General Studies Program is based on four principles. The first is the distinction between skill and knowledge—the instrumental skills by means of which knowledge is acquired and communicated and the knowledge itself in the sense of fact, information, or conclusions. Second is the distinction between skill in the use of language and skill in the use of figures—literacy and numeracy. Third is the

conventional division of knowledge into the humanities, the social sciences, and the natural sciences. And fourth is the concept of the university graduate as a person who is not only prepared for advanced study or a particular profession, but also is amply prepared to lead a constructive and satisfying personal, social, and civic or political life. This principle implies a commonality of knowledge (that is, knowledge shared with others), skill in learning and in communicating with others, and a diversity of learning that frees the person to enjoy the diversity of human potentiality. In addition to the four principles, the program recognizes the value of sustained experience in the acquisition of a skill or the mastery of a body of knowledge, the increasing importance of literacy and numeracy skills because of the rapid growth of modern knowledge, the utility of historical perspective, and the internationalization of modern life.

The General Studies Program consists of *five core areas* and *three awareness areas*. The core areas are as follows:

1. literacy and critical inquiry;
2. numeracy;
3. humanities and fine arts;
4. social and behavioral sciences; and
5. natural sciences.

These areas provide training in basic academic skills and assure that students are introduced to the traditional branches of knowledge.

The *three awareness areas* are as follows:

1. cultural diversity in the United States;
2. global awareness; and
3. historical awareness.

These contribute to the development of an international perspective, foster an understanding of current human events by study of the past, and promote appreciation of cultural diversity within the contemporary United States.

The courses approved by the University General Studies Council for meeting general studies requirements are noted in the *General Catalog* following this section, in the course descriptions, and in the *Schedule of Classes* each academic term. All students enrolled in a baccalaureate degree program must successfully complete a minimum of 35 semester hours of approved general

studies courses. The required distribution of general studies courses among the core areas and awareness areas is described below. It is important to note that *35 semester hours must be taken in the five core areas*. *Fulfillment of the requirements in global awareness, historical awareness, and cultural diversity does not oblige the student to exceed the 35 semester hour total since a large number of approved courses within the five core areas concurrently satisfy the three awareness requirements*.

Although a course may satisfy a core area requirement and an awareness area requirement concurrently, *a course may not be used to satisfy requirements in two core areas simultaneously or in two awareness areas*, even if it is approved for those areas. With departmental consent, an approved general studies course may be counted toward both the general studies requirements and the major program of study. Students transferring from approved institutions of higher education ordinarily are given general studies credit, hour for hour, for work done in those institutions insofar as it is equivalent in content to general studies courses at this university.

Specific patterns of general studies requirements are established by the colleges within the overall program. First Year Composition is a university requirement of all students that is separate from and in addition to the General Studies Program.

CORE AREAS

Literacy and Critical Inquiry

Literacy is here defined broadly as communicative competence in written and oral discourse; critical inquiry is defined as the gathering, interpretation, and evaluation of evidence. Building on the proficiency attained in traditional freshman composition courses, the literacy and critical inquiry requirements help students sustain and extend their ability to reason critically and communicate clearly through language. Thus, the literacy and critical inquiry requirement stipulates a sequence of two courses beyond First Year Composition.

Requirement. Six semester hours are required. One LI course is required, typically at the sophomore level, in which students learn how to gather, interpret, and evaluate evidence and to

express their findings in writing or speech. This course includes a series of formal, graded, and written or spoken assignments.

One L2 upper division course is required with advanced subject-matter and rigorous critical-writing assignments. The course should be taken in the student's major discipline and may also count toward the major.

Numeracy

The numeracy requirement is intended to ensure that students have skill in basic mathematics, can use mathematical analysis in their chosen fields, and can understand how computers can make mathematical analysis more powerful and efficient. Numeracy thus has three components. First, the acquisition of essential skill in basic mathematics requires the student to complete a course in college algebra or to demonstrate a higher level of skill by completing a course for which college algebra is a prerequisite. The second component, the real world application of mathematical reasoning, requires the student to take a course in the use of quantitative analysis to solve problems of substance. Many students may use courses in statistics to satisfy this requirement. The third component of numeracy requires use of the computer to assist in serious analytical work. Computers are widely used to study the implications of social decisions or to model physical systems, and computer modeling courses are available in many major programs.

Requirement. Six semester hours are required. *One course must be selected from the mathematics category; a second course must be selected from either of the remaining two categories listed below.* However, if competence is demonstrated in college algebra by passing an exemption examination, six semester hours are still required, and one course in the mathematics category that has College Algebra as a prerequisite may be selected, or all six semester hours may be taken in one or both of the two remaining categories.

1. *Mathematics.* A course in college algebra (i.e., MAT 117) or any other mathematics course for which college algebra is a prerequisite fits this category.
2. *Statistics and Quantitative Reasoning.* Courses that emphasize the use of statistics or other mathemat-

cal methods in the interpretation of data and in describing and understanding quantitative relationships fit this category. The course selected can be taken in the student's major discipline and can count toward the major's semester-hour requirements.

3. *Computer Applications.* Courses that involve the use of computer programming languages or software in the development of skills in analytical thinking fit this category. The course selected can be taken in the student's major discipline and can count toward the major's semester-hour requirements.

Humanities and Fine Arts

The humanities are concerned with questions of human existence and the universality of human life, questions of meaning and the nature of thinking and knowing, and questions of moral, aesthetic, and other human values. The humanities investigate these questions in both the present and the past and make use of philosophy, foreign languages, linguistics and communication studies, religious studies, literature, and fine arts. The fine arts constitute the artist's creative deliberation about reality, meaning, knowledge, and values. The humanities and fine arts core area enables students to broaden and deepen their consideration of basic human values and their interpretation of the experiences of human beings.

Requirement. See combined requirement below.

Social and Behavioral Sciences

The social and behavioral sciences provide scientific methods of inquiry and empirical knowledge about human behavior, both within society and individually. The forms of study may be cultural, economic, geographic, historical, linguistic, political, psychological, or social. The courses in this area address the challenge of understanding the diverse natures of individuals and cultural groups who live together in a world of diminishing economic, linguistic, military, political, and social distance.

Combined Requirement. *A total of 15 semester hours must be completed in the following two core areas: social and behavioral sciences and humanities and fine arts. A minimum of six semester hours must be taken in one core*

area and nine hours in the other core area. In addition, three conditions must be satisfied:

1. In one of these two core areas, two courses must be in the same department.
2. In one of these two core areas, courses from at least two departments must be taken. These two conditions may, but need not, be satisfied in the same core area.
3. At least one course within the 15 semester hours must be at the upper division level.

Natural Sciences

Courses in the natural sciences core area help the student to develop an appreciation of the scope and limitations of scientific capability to contribute to the quality of society. Knowledge of methods of scientific inquiry and mastery of basic scientific principles and concepts, in particular those that relate to matter and energy in living and non-living systems, are stressed. Firsthand exposure to scientific phenomena in the laboratory is important in developing and understanding the concepts, principles, and vocabulary of science. At least one of the two laboratory courses required in the natural sciences core area must include an introduction to the fundamental behavior of matter and energy in physical or biological systems.

Requirement. Eight semester hours are required. *One laboratory course in the natural sciences that includes a substantial introduction to the fundamental behavior of matter and energy in physical or biological systems is required.*

A second laboratory course in the natural sciences selected, for example, from anthropology, astronomy, botany, chemistry, experimental psychology, geology, microbiology, physical anthropology, physical geography, physics, or zoology is required.

AWARENESS AREAS

Six semester hours taken in two of the three awareness areas are required. Courses that are listed for a core and an awareness area may satisfy both requirements concurrently.

Cultural Diversity in the United States

The contemporary "culture" of the United States involves the complex interplay of many different cultures that exist side by side in various states of

harmony and conflict. The U.S. history involves the experiences not only of different groups of European immigrants and their descendants, but also of diverse groups of American Indians, Hispanic Americans, African Americans, and Asian Americans—all of whom played significant roles in the development of contemporary culture and together shape the future of the United States. At the same time, the recognition that gender, class, and religious differences cut across all distinctions of race and ethnicity offers an even richer variety of perspectives from which to view oneself. Awareness of cultural diversity and its multiple sources can illuminate the collective past, present, and future and can help to achieve greater mutual understanding and respect.

The objective of the cultural diversity requirement is to promote awareness and appreciation of cultural diversity within the contemporary United States through the study of the cultural, social, or scientific contributions of women and minority groups, examination of their experiences in the United States, or exploration of successful or unsuccessful interactions between and among cultural groups.

Global Awareness

Human organizations and relationships have evolved from being family and village centered to the modern global interdependence that is apparent in many disciplines—for example, contemporary art, business, engineering, music, and the natural and social sciences. Many serious local and national problems are world issues and require solutions that exhibit mutuality and reciprocity. These problems occur in a wide variety of activities, such as food supply, ecology, health care delivery, language planning, information exchange, economic and social developments, law, technology transfer, and even philosophy and the arts. The global awareness area recognizes the need for an understanding of the values, elements, and social processes of cultures other than the culture of the United States. The global awareness area includes courses that recognize the nature of other contemporary cultures and the relationship of the American cultural system to generic human goals and welfare.

Courses that meet the requirement in global awareness are of one or more of the following types:

1. area studies that are concerned with an examination of culture specific elements of a region of the world;
2. the study of foreign language;
3. studies of international relations, particularly those in which cultural change is facilitated by such factors as social and economic development, education, and the transfer of technology; and
4. studies of cultural interrelationships of global scope such as the global interdependence produced by problems of world ecology.

Historical Awareness

The historical awareness area aims to develop a knowledge of the past that can be useful in shaping the present and future. Because historical forces and traditions have created modern life and lie just beneath its surface, historical awareness is an aid in the analysis of present day problems. Also, because the historical past is a source of social and national identity, historical study can produce intercultural understanding by tracing cultural differences to their origins in the past. Even the remote past may have instructive analogies for the present.

The historical awareness area consists of courses that are historical in method and content. In this area, the term "history" designates a sequence of past events or a narrative whose intent or effect is to represent such a sequence. The requirement presumes that these are human events and that history includes all that has been felt, thought, imagined, said, and done by human beings. History is present in the languages, art, music, literature, philosophy, religion, and the natural sciences, as well as in the social science traditionally called history.

GENERAL STUDIES COURSES

The following general studies courses satisfy the requirements of the five core areas and three awareness areas. Students should note that this list includes courses approved for general studies credit as of spring semester 1994. Since courses are occasionally added to and deleted from the list, students should always consult the *Schedule of Classes* each semester to see

which courses currently meet general studies requirements.

A student receives the general studies credit a course carries in the semester in which the course is taken, with one exception: a course listed on an approved program of study but subsequently deleted from the general studies list retains the general studies credit it carried when the program of study was approved.

Under each core and awareness area, courses are presented alphabetically by college name and by course prefix. The course prefix is followed by course number and course title. The number in parentheses following the course title indicates the semester hours of credit. The letter following the semester hours of credit indicates when the course will be offered. See "Key to Course Listing Codes" on page 45.

General studies courses are regularly reviewed. The following table, "Key to General Studies Credit Abbreviations," identifies which requirement(s) the course meets. This key is also used in the *Schedule of Classes*. General studies courses are also identified following course descriptions.

Key to General Studies Credit Abbreviations

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

General Studies Courses

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
---	493	Honors Thesis. (3-6) F, S, SS (See description on page 80. Only three semester hours may fulfill L2 requirement.)											
			L2										
AES	301	U.S. Air Force Communication Management and Leadership. (3) F											
			L2										
	303	U.S. Air Force Management and Leadership. (3) S											
			L2										
	401	National Security Institutional Policy and Strategy. (3) F											
			L2										
AET	308	Air Transportation. (3) F										G	
AGB	101	Food Chain. (2) F										G	
	444	Agribusiness Analysis. (3) S											
			L2										
	453	World Agricultural Resources. (3) S										G	
APH	100	Introduction to Environmental Design. (3) F, S, SS (Cross-listed as DSC/PUP 100.)					HU					G	H
	200	Introduction to Architecture. (3) F					HU					G	
	300	World Architecture I/Western Cultures. (3) F					HU					G	H
	301	World Architecture II/Eastern Cultures. (3) S										G	
	304	American Architecture. (3) N					HU						
	305	Contemporary Architecture. (3) N					HU						
	313	History of Western Architecture I. (3) F					HU						
	348	Theory of Built Environments. (3) N					HU						
	411	History of Landscape Architecture. (3) F (Cross-listed as PLA 310.)											H
	441	Ancient Architecture. (3) N					HU						
	443	Renaissance Architecture. (3) N					HU						
	444	Baroque Architecture. (3) N					HU						
	445	19th-Century Architecture. (3) N					HU						H
	446	20th-Century Architecture I. (3) F					HU						
	447	20th-Century Architecture II. (3) S					HU						
ARA	303	Art Appreciation and Human Development. (3) F					HU						
	345	Design Rhetoric. (3) F, S											
			L2										
	488	Understanding Art. (3) F, S					HU						
			L2										
ARS	100	Introduction to Art. (3) F, S, SS					HU						
	101	Art of the Western World I. (3) F, S					HU						H
	102	Art of the Western World II. (3) F, S					HU						
	201	Art of Asia. (3) A					HU					G	H
	202	Art of Africa, Oceania, and the Americas. (3) A					HU					G	
	300	Introduction to Art. (3) F, S					HU						
	340	Art in America. (3) A					HU						
	350	19th-Century Photography. (3) F					HU						
	351	20th-Century Photography. (3) S					HU						
	400	History of Printmaking. (3) A					HU						H
	402	Art of Ancient Egypt. (3) N					HU						H
	404	Greek Art. (3) A					HU						H
	406	Roman Art. (3) A					HU						H
	410	Early Christian and Byzantine Art. (3) A					HU						
	412	Early Medieval Art. (3) N					HU						H
	414	Romanesque Art. (3) A					HU						H
	416	Gothic Art. (3) A					HU						
	418	Renaissance Art in Northern Europe. (3) A					HU						
	420	Early Renaissance Art in Italy. (3) N					HU						H
	422	Italian High Renaissance Art and Mannerism. (3) A					HU						
	424	Italian Baroque Art. (3) A					HU						H
	426	Art of the 17th Century in Northern Europe. (3) A					HU						H
	428	Art of the 18th Century. (3) A					HU						H

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	430	Art of Spain and Its Colonies. (3) A					HU						H
	432	Art and Revolution: European Art, 1770-1850. (3) A					HU						H
	434	Realism and Impressionism: European Art 1840-1880. (3) N					HU						
	436	Art at the Turn-of-the-Century. 1885-1914 (3) A					HU						
	438	Art of the 20th Century I. (3) A					HU						H
	439	Art of the 20th Century II. (3) A					HU						H
	442	American Art I. (3) A					HU						
	443	American Art II. (3) A					HU						
	444	Modern American Art, 1900-1945. (3) A					HU						
	457	History of Art Criticism. (3) N					HU						H
	458	Critical Theories in the Visual Arts. (3) N					HU						
	462	Precolumbian Art I. (3) A					HU						H
	463	Precolumbian Art II. (3) A					HU						H
	465	Native North American Art. (3) A					HU						H
	466	Native American Art of the Southwest. (3) A					HU				C		H
	468	Art of the Arctic and Northwest Coast. (3) N					HU						
	469	Mexican Art. (3) A					HU						H
	472	Art of China. (3) A					HU					G	
	473	Art of Japan. (3) A					HU						
	475	Chinese Painting. (3) A					HU						
	480	Research Methods. (3) F, S				L2							
	485	Women in the Visual Arts. (3) S				L2							
ART	444	Computer Art I. (3) F, S				N3							
	446	Computer Art II (3) A				N3							
ASB	102	Introduction to Cultural and Social Anthropology. (3) F, S						SB				G	
	202	Ethnic Relations in the United States. (3) F, S									C		H
	211	Women in Other Cultures. (3) N										G	
	222	Buried Cities and Lost Tribes: Our Human Heritage. (3) S					HU						
	231	Archaeological Field Methods. (4) S								S2			
	240	Introduction to Southeast Asia. (3) F (Cross listed as GCU/HIS/POS/REL 240.)										G	
	242	Asian American Experiences: An Anthropological Perspective. (3) F				L1					C		
	250	Anthropology Topics. (3) S				L1							
	311	Principles of Social Anthropology (3) S						SB					
	321	Indians of the Southwest. (3) S				L2		SB					H
	322	Indians of Mesoamerica (3) S										G	
	324	Peoples of the Pacific. (3) N										G	
	325	Peoples of Southeast Asia. (3) F										G	
	330	Principles of Archaeology. (3) F						SB					
	333	New World Prehistory. (3) F				L2		SB					
	334	Arctic Anthropology. (3) S										G	
	335	Southwestern Anthropology. (3) N						SB			C		H
	337	Pre Hispanic Civilization of Middle America. (3) S											H
	351	Psychological Anthropology (3) S						SB					
	353	Death and Dying in Cross Cultural Perspective (3) S					HU	SB				G	
	355	Shamanism, Healing, and Consciousness. (3) S					HU	SB					
	361	Old World Prehistory I. (3) F											H
	362	Old World Prehistory II (3) S											H
	383	Linguistic Theory: Phonetics and Phonology. (4) F						SB					
	412	History of Anthropology. (3) F				L2		SB					
	416	Economic Anthropology. (3) F				L2		SB					
	462	Medical Anthropology: Culture and Health. (3) F '94									C		
	480	Introduction to Linguistics. (3) F						SB					
	481	Language and Culture. (3) S						SB					

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		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H	
	410	Interpersonal Communication Theory and Research. (3) F, S, SS							SB					
	421	Rhetoric of Social Issues. (3) A						HU						
	430	Leadership in Group Communication. (3) N							SB					
	450	Theory and Research in Organizational Communication. (3) F, S, SS							SB					
	456	Political Communication. (3) F, S (Cross-listed as MCO 456.)							SB					
	457	Communication and Information Diffusion. (3) F							SB					
	463	Intercultural Communication Theory and Research. (3) F, S, SS							SB				G	
	472	Development of Language as Communicative Behavior. (3) N							SB					
CON	101	Construction and Culture: A Built Environment (3) F, S						HU					G	
	389	Construction Cost Accounting and Control. (3) F, S												N3
	453	Construction Labor Management. (3) F, S												H
	472	Development Feasibility Reports. (3) S									L2			
	495	Construction Planning and Scheduling. (3) F, S												N3
CSE	101	Introduction to Computer Science II (3) F, S, SS												N3
	180	Computer Literacy (3) F, S, SS												N3
	181	Applied Problem Solving with BASIC. (3) F, S, SS												N3
	183	Applied Problem Solving with FORTRAN. (3) F												N3
	200	Concepts of Computer Science (4) A												N3
	225	Assembly Language Programming (Motorola) (3) F, S, SS (Cross-listed as EEE 225.)												N3
	226	Assembly Language Programming (Intel). (3) F, S (Cross listed as EEE 226)												N3
DAH	100	Introduction to Dance (3) F, S						HU						
	300	Introduction to Dance. (3) F, S						HU						
	301	Philosophy and Criticism of Dance (3) F, S									L2			
	401	Dance History I. (3) F						HU						
	402	Dance History II. (3) S						HU						
DSC	100	Introduction to Environmental Design. (3) F, S, SS (Cross listed as APH/PUP 100.)						HU					G	H
	101	Contemporary International Design/Theory. (3) F, S						HU					G	
	223	Interior Design Issues and Theories. (3) F, S						HU						
	310	History of Interior Design I. (3) F						HU						H
	311	History of Interior Design II. (3) S						HU						H
	316	20th Century Design I. (3) F						HU						H
	317	20th Century Design II (3) S						HU						H
	318	History of Graphic Design. (3) F						HU						
	412	History of Decorative Arts in Interiors (3) F						HU						
	442	Specifications and Documents for Interiors. (3) F									L2			
ECE	106	Introduction to Computer Aided Engineering. (3) F, S												N3
	383	Probability and Statistics for Engineers. (2) F, S, SS												N2
	400	Engineering Communications. (3) F, S, SS												L2
ECN	111	Macroeconomic Principles. (3) F, S, SS							SB					
	112	Microeconomic Principles. (3) F, S							SB					
	313	Intermediate Macroeconomic Theory. (3) F, S							SB					
	314	Intermediate Microeconomic Theory (3) F, S							SB					
	331	Comparative Economic Systems. (3) N							SB				G	
	360	Economic Development (3) N							SB				G	
	365	Economics of Russia and Eastern Europe. (3) N							SB				G	
	404	History of Economic Thought (3) N							SB					
	421	Labor Economics. (3) A							SB					
	436	International Trade Theory. (3) A							SB				G	
	438	International Monetary Economics. (3) A							SB				G	
	441	Public Finance. (3) A							SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	480					N2							
	485					N2							
EDP	303		L2										
	310							SB					
	454					N2							
EEE	225					N3							
	226					N3							
	490		L2										
EMC	321					N3							
	323					N3							
ENG	200		L1				HU						
	201						HU						H
	202						HU						H
	204						HU						
	212		L1										
	215		L1										
	216		L1										
	217		L1										
	218		L1										
	221						HU						
	222						HU						
	260						HU						
	301		L1										
	303						HU						
	307						HU						
	312						HU						
	321						HU						
	331		L2										
	332		L2										
	333		L2								C		
	341						HU						
	342						HU						
	357						HU						
	353		L2				HU				C		
	354		L2				HU				C		
	355						HU						
	356						HU						
	357						HU						
	359						HU				C		
	360						HU						
	361						HU						
	362						HU						
	363										C		
	400						HU						
	413						HU						
	415						HU						
	416						HU						
	417						HU						
	418						HU						
	419		L2				HU						
	421						HU						
	422						HU						

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	415	French Civilization I. (3) F					HU						
	416	French Civilization II. (3) S					HU					G	
	441	French Literature of the 17th Century (3) N					HU						
	442	French Literature of the 17th Century. (3) N					HU						H
	445	French Literature of the 18th Century. (3) N	L2				HU						
	452	French Novel of the 19th Century. (3) N					HU						
	461	Pre Atomic Literature (3) F					HU						
	462	Post Atomic Literature. (3) S					HU						
	471	The Literature of Francophone Africa and the Caribbean (3) N	L2				HU						
GCU	102	Introduction to Human Geography. (3) F, S						SB					
	121	World Geography. 4) F, S						SB				G	
	141	Introduction to Economic Geography (3) F, S						SB					
	240	Introduction to Southeast Asia (3) F (Cross listed as ASB/HIS/POS/REL 240.)											G
	253	Introduction to Cultural and Historical Geography. (3) A						SB				G	
	322	Geography of U.S. and Canada. (3) F						SB					
	323	Geography of Latin America (3) F						SB				G	
	375	Geography of Europe. (3) S						SB				G	
	326	Geography of Asia (3) S						SB				G	
	327	Geography of Africa (3) F						SB				G	
	328	Geography of Middle East and North Africa. (3) A						SB				G	
	332	Geography of Australia and Oceania. (3) A										G	
	350	The Geography of World Crises (3) F						SB				G	
	351	Population Geography (3) F						SB					
	352	Political Geography. (3) S						SB				G	
	357	Social Geography (3) A						SB					
	359	Cities of the World I. (3) F										G	
	360	Cities of the World II (3) S										G	
	361	Urban Geography. (3) F, S						SB					
	423	Geography of South America. (3) F						SB				G	
	424	Geography of Mexico and Middle America (3) S						SB				G	
	426	Geography of the Soviet Union. (3) S						SB				G	
	442	Geography of Transportation (3) N						SB					
	495	Quantitative Methods in Geography. (3) S				N ²							
	496	Geographic Research Methods (3) F, S	L2										
GER	201	Intermediate German (4) F, S, SS											G
	202	Intermediate German. (4) F, S, SS											G
	311	German Conversation (3) F											G
	312	German Conversation (3) S											G
	313	German Composition. (3) S											G
	319	Business Correspondence and Communication. (3) N											G
	321	German Literature. (3) F					HU						
	322	German Literature. (3) S	L2				HU						
	411	Advanced Grammar and Conversation (3) F											G
	412	Advanced Grammar and Composition. (3) S											G
	415	German Civilization (3) S					HU						H
	416	German Civilization. (3) F					HU						H
GLG	101	Introduction to Geology I (Physical). (3) F, S, SS (Both GLG 101 and 103 must be taken to secure S1 and S2 credit.)							S1	S2			
	102	Introduction to Geology II (Historical). (3) S (Both GLG 102 and 104 must be taken to secure S2 credit)								S2			
	103	Introduction to Geology I Laboratory (1) F, S, SS (Both GLG 101 and 103 must be taken to secure S1 and S2 credit.)							S1	S2			

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		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	104	Introduction to Geology II Laboratory (1) S (Both GLG 102 and 104 must be taken to secure S2 credit.)											
GPH	111	Introduction to Physical Geography. (4) F, S											
	211	Landform Processes (3) S											
	212	Introduction to Meteorology I. (3) F (Both GPH 212 and 214 must be taken to secure S2 credit.)											
	214	Introduction to Meteorology Laboratory (1) F (Both GPH 212 and 214 must be taken to secure S2 credit.)											
	381	Geography of Natural Resources (3) A											
	418	Landforms of the Western United States (3) F, S											
GRK	301	Greek Literature. (3) F											
	302	Greek Literature. (3) S											
HIS	100	Western Civilization. (3) F, S											
	101	Western Civilization. (3) F, S											
	102	Western Civilization (3) F, S											
	103	The United States. (3) F, S											
	104	The United States. (3) F, S											
	107	Introduction to Japan (3) A											
	230	American Social History (3) F, S											
	240	Introduction to Southeast Asia (3) F Cross listed as ASB GCU/POS/REL 240											
	270	Judaism in American History. (3) N											
	273	American Military History. (3) F											
	303	American Cultural History (3) F, S Cross listed as AMS 320 at ASU West.)											
	304	American Cultural History (3) F, S Cross listed as AMS 321 at ASU West)											
	305	Asian Civilizations (3) F, S											
	306	Asian Civilizations. (3) F, S											
	311	Asian American Experiences: A Historical Perspective (3) N											
	320	Ancient Greece (3) A											
	321	Rome (3) A											
	322	The Middle Ages (3) A											
	323	The Middle Ages (3) A											
	324	Renaissance. (3) F											
	325	Reformation (3) S											
	326	Early Modern Europe (3) A											
	327	Early Modern Europe (3) A											
	329	19th-Century Europe. (3) A											
	330	19th Century Europe. (3) A											
	331	20th Century Europe. (3) N											
	332	20th Century Europe. (3) N											
	333	Women and Society in Europe (3) N											
	335	Family, Class, and Society in Modern Europe (3) N											
	351	England. (3) F, S											
	352	England (3) F, S											
	357	19th Century West (3) F											
	358	The West in the 20th Century (3) S											
	362	American Indian History (3) F											
	363	African American History I. (3) A											
	364	African American History I (3) A											
	365	Islamic Civilization (3) A											
	366	The Modern Middle East (3) S											
	370	Women in U.S. History, 1600-1880 (3) F											
	371	Women in U.S. History 1880-1980. (3) S											

	L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
380	History of the Mexican American. (3) A						SB					H
382	Historical Statistics (3) S			N2								
383	Latin America (3) A						SB					H
384	Latin America (3) A						SB					H
401	American Colonial History (3) A						SB					H
404	The Early Republic, 1789-1850. (3) A	L2					SB					H
406	Civil War and Reconstruction. (3) A	L2					SB					H
407	The Emergence of Modern America (3) A						SB					H
409	Recent American History. (3) A						SB					H
410	Recent American History (3) A						SB					H
411	Contemporary America. (3) A						SB					H
414	The Modern American Economy. (3) A						SB					H
415	American Diplomatic History. (3) A						SB					H
416	American Diplomatic History. (3) A						SB				G	H
417	Constitutional History of the United States (3) N						SB					H
418	Constitutional History of the United States. (3) N						SB					H
419	American Urban History. (3) A						SB					H
420	American Urban History (3) A						SB					H
421	History of American Labor. (3) A						SB					H
422	Rebellious Women (3) A	L2					SB			C		H
423	Recent American Intellectual History. (3) A						SB					H
424	The Hispanic Southwest (3) N						SB					H
425	The American Southwest (3) N	L2					SB					H
426	Indian History of the Southwest (3) S						SB			C		H
428	Arizona (3) A						SB					H
430	20th Century Chicano History (3) A						SB					H
431	The French Revolution and the Napoleonic Era (3) N						SB					H
433	Modern France (3) A						SB				G	H
434	Hitler: Man and Legend (3) N						SB					H
435	Modern Germany. (3) A						SB				G	H
437	Eastern Europe and the Balkans (3) A						SB					H
438	Eastern Europe and the Balkans. (3) A						SB				G	H
441	Imperial Russia (3) A						SB					H
442	The Soviet Union (3) A						SB				G	H
443	Russia and the United States. (3) A						SB				G	H
445	Tudor England (3) A						SB					H
446	Stuart England (3) A						SB					H
449	Modern Britain (3) A						SB				G	H
450	British Constitutional History (3) A						SB					H
451	The British Empire (3) A						SB					H
452	Economic History of Europe. (3) N						SB					H
453	Economic History of Europe. (3) N						SB				G	H
454	Intellectual History of Modern Europe (3) A						SB					H
455	Intellectual History of Modern Europe. (3) A						SB					H
456	History of Spain. (3) N						SB					
457	History of Spain. (3) N						SB					
460	Spanish South America (3) N						SB					H
461	Spanish South America (3) N						SB					H
463	Intellectual and Cultural History of Latin America. (3) N						SB					H
464	The United States and Latin America (3) N						SB				G	H
466	Mexico (3) A						SB					H
467	Mexico. (3) A						SB					H
468	Brazil (3) N						SB					H
469	Chinese Thought and Way (3) N						SB					H
470	Chinese Thought and Way (3) N						SB				G	H
471	The United States and Japan. (3) A						SB				G	H
472	The United States and China. (3) N						SB				G	H

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	321	Japanese Literature. (3) N						HU					G
	414	Introduction to Classical Japanese (3) S					HU						
JRN	201	Journalism Newswriting. (3) F, S, SS	L1										
	301	Reporting (3) F, S	L2										
JUS	100	The Justice System (3) F, S, SS						SB					
	200	Concepts and Issues of Justice (3) F, S, SS						SB					
	302	Basic Statistical Analysis in Justice Studies. (3) F, S, SS			N2								
	360	Law and Social Control. (3) F, S, SS						SB					
	463	Discretionary Justice (3) F, S, SS	L2					SB					
	469	Political Deviance and the Law. (3) F, S, SS						SB					
	474	Legislation of Morality (3) F, S, SS	L2										
LAT	201	Intermediate Latin (4) F					HU						
	202	Intermediate Latin. (4) S					HU						
LIA	390	The Use of Research Libraries. (3) F, S	L1										
MAT	114	College Mathematics. (3) F, S, SS			N1								
	117	College Algebra (3) F, S, SS			N1								
	119	Finite Mathematics (3) F, S, SS			N1								
	170	Precalculus. (3) F, S, SS			N1								
	210	Brief Calculus. (3) F, S, SS			N1								
	242	Elementary Linear Algebra (2) F, S, SS			N1								
	260	Technical Calculus I. (3) F, S, SS			N1								
	270	Calculus with Analytic Geometry I. (4) F, S, SS			N1								
	290	Calculus I. (5) F, S			N1								
	300	Mathematical Structures. (3) F, S	L2										
	419	Linear Programming (3) S			N2								
	451	Mathematical Modeling. (3) S			N2								
	464	Numerical Analysis I. (3) F			N3								
	465	Numerical Analysis II (3) S			N3								
	466	Applied Computational Methods. (3) F, S			N3								
	467	Computer Arithmetic. (3) S			N3								
MCE	446	Understanding the Culturally Diverse Child. (3) A									C		
MCO	120	Media and Society. (3) F, S						SB					
	402	Communications Law. (3) F, S, SS	L2										
	418	History of Communications (3) F, S						SB					H
	430	International Communication. (3) F, S										G	
	450	Visual Communication. (3) F, S, SS					HU						
	456	Political Communication (3) F, S (Cross listed as COM 456)						SB					
	460	Race, Social Change, and Media. (3) S									C		
MET	416	Applied Computer Integrated Manufacturing (3) F			N3								
MGT	463	Strategic Management (3) F, S, SS	L2										
MHL	201	MacLiteracy for Musicians. (3) F, S, SS			N3								
	344	Music in World Cultures. (3) F, S										G	
	352	The Evolution of Jazz. (3) F '94											H
	438	Music in the Classic Era (3) F '94											H
	439	Music in the 19th Century. (3) F '95	L2										H
	441	Music of the Baroque Era (3) F '95	L2										H
	447	Music Since 1900. (3) F, SS	L2										H
	466	North American Indian Music (3) S '95	L2				HU				C		
MIC	205	Microbiology. (3) F, S, SS (Both MIC 205 and 206 must be taken to secure S2 credit)								S2			
	206	Microbiology Laboratory (1) F, S, SS (Both MIC 205 and 206 must be taken to secure S2 credit.)								S2			

UNIVERSITY GENERAL STUDIES COURSES 65

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
302	Advanced Bacteriology Laboratory. (2 S (Both MIC 302 and 401 must be taken to secure L2 credit.)		L2										
401	Research Paper. (1) F, S, SS (Both MIC 302 and 401 must be taken to secure L2 credit.)		L2										
MUE 381	Music Therapy Research. (3) S		L2										
MUS 107	Introduction to Music (2) F, S, SS						HU						
340	Survey of Music History (3) F, S, SS						HU						H
347	Jazz in America. (3) F, S, SS						HU						
353	Survey of Afro American Music. (3) A						HU						
354	Popular Music. (3) A						HU						
355	Survey of American Music (3) F, S, SS						HU						H
356	Survey of the Musical Theatre (3) N						HU						
357	Aesthetic Perception in Music Performance (3) F, S, SS						HU						
NUR 254	Health for All Issues of World Health (3) N											G	
403	Research in Nursing Practice. (3) F, S		L2										
457	Third World Women (3) F. (Cross listed as SPF 457/WST 457.)							SB				G	
PGS 101	Introduction to Psychology. (3) F, S, SS							SB					
222	Human Sexual Behavior (3) F, S							SB					
270	Psychology of Adjustment (3) F, S, SS							SB					
304	Effective Thinking (3) A		L1										
306	Environmental Psychology (3) F, S, SS							SB					
315	Personality Theory and Research. (3) F, S, SS							SB					
341	Developmental Psychology (3) F, S							SB					
344	Directed Child Study (3-4) F, S, SS		L2										
350	Social Psychology. (3) F, S, SS							SB					
351	Honors Social Psychology. (3) N		L2					SB					
365	Community Psychology (3) F, S							SB					
414	History of Psychology. (3) F, S		L2					SB					
427	Psychology of Aging (3) N		L2					SB					
431	Gender Role Development. (3) N		L2					SB					
441	Cognitive Development. (3) F, S		L2					SB					
442	Life Span Development (3) N							SB					
443	Abnormal Child Psychology (3) F, S		L2					SB					
444	Adolescent Psychology and Psychopathology. (3) N		L2										
445	Child Language and Drawing. (3) F							SB					
446	Social Development (3) N		L2										
450	Social Perception and Cognition. (3) N		L2										
451	Stereotyping, Prejudice, and Discrimination (3) N		L2										
452	Applied Social Psychology (3) F		L2										
461	Interpersonal Influence. (3) N							SB					
463	Advanced Psychology of Adjustment (3) F		L2										
465	Psychology of Stress and Coping (3) F		L2										
466	Abnormal Psychology (3) F, S, SS							SB					
467	Psychology of Magical Beliefs (3) N		L2										
PHI 101	Introduction to Philosophy (3) F, S, SS						HU						
103	Principles of Sound Reasoning. (3) F, S, SS		L1				HU						
301	History of Ancient Philosophy (3) F						HU						H
302	History of Modern Philosophy (3) S						HU						H
304	Existentialism and Phenomenology (3) N						HU						
305	Contemporary Ethics. (3) A						HU						
306	Applied Ethics (3) F, S, SS						HU						
307	Philosophy of Law (3) A						HU						
308	Philosophy of Art. (3) A						HU						
309	Social and Political Philosophy (3) A						HU						

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	311	Philosophy in Literature	3	A			HU						
	312	Theory of Knowledge	3	A			HU						
	314	Philosophy of Science	3	A			HU						
	315	Philosophy of Language	3	A			HU						
	316	Metaphysics	3	A			HU						
	317	Philosophy of Mind	3	A			HU						
	318	Philosophy of Religion	3	A			HU						
	325	Philosophy of Social Science	3	N			HU	SB					
	332	19th Century Philosophy	3	N			HU						
	350	Philosophical Argument and Exposition	3	S		L2							
	402	Empiricism	3	N			HU						
	403	Contemporary Analytic Philosophy	3	A			HU						
PHS	110	Fundamentals of Physical Science	4	F, S					S1	S2			
PHY	101	Introduction to Physics	4	F, S					S1	S2			
	111	General Physics	3	F, S, SS					S1	S2			
		Both PHY 111 and 113 must be taken to secure S1 and S2 credit.											
	112	General Physics	3	F, S, SS					S1	S2			
		Both PHY 112 and 114 must be taken to secure S1 and S2 credit.											
	113	General Physics Laboratory	1	F, S, SS					S1	S2			
		(Both PHY 111 and 113 must be taken to secure S1 and S2 credit.)											
	114	General Physics Laboratory	1	F, S, SS					S1	S2			
		Both PHY 112 and 114 must be taken to secure S1 and S2 credit.)											
	121	University Physics I: Mechanics	3	F, S, SS					S1	S2			
		Both PHY 121 and 122 must be taken to secure S1 and S2 credit											
	122	University Physics Laboratory I	1	F, S, SS					S1	S2			
		Both PHY 121 and 122 must be taken to secure S1 and S2 credit											
	131	University Physics II: Electricity and Magnetism	3	F, S, SS					S1	S2			
		(Both PHY 131 and 132 must be taken to secure S1 and S2 credit.)											
	132	University Physics Laboratory II	1	S, SS					S1	S2			
		Both PHY 131 and 132 must be taken to secure S1 and S2 credit.)											
	241	University Physics III: Thermodynamics, Optics, and Wave Phenomena	3	F, S					S1	S2			
		Both PHY 241 and 242 must be taken to secure S1 and S2 credit.)											
	242	University Physics Laboratory III	1	F, S					S1	S2			
		Both PHY 241 and 242 must be taken to secure S1 and S2 credit.)											
	334	Intermediate Physics Laboratory II	3	F, S		L2							
PLA	310	History of Landscape Architecture	3	F									H
		(Cross listed as APH 411.)											
	420	Theory of Urban Design	3	F			HU						
		Cross listed as PUP 420											
POR	201	Intermediate Portuguese	5	S									G
	313	Portuguese Composition and Conversation	3	F									G
	314	Portuguese Composition and Conversation	3	S									G
	321	Luso-Brazilian Literature	3	N			HU						
	472	Luso-Brazilian Civilization	3	N			HU						G
POS	101	Political Ideologies	3	F, S				SB					
	110	Government and Politics	3	F, S				SB					
	120	Political Issues and Public Policy	3	A				SB					
	150	Comparative Government	3	F, S				SB					G

UNIVERSITY GENERAL STUDIES COURSES 67

	L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
160 Global Politics. 3) F, S...							SB				G	
170 American Legal System 3) F, S...							SB					
240 Introduction to Southeast Asia (3 F (Cross listed as ASB GCU HIS/REL 240											G	
301 Empirical Political Inquiry 3) F, S...							SB					
310 American National Government. 3) F, S							SB					
311 Arizona Constitution and Government. 2) F, S							SB					
313 The Congress (3) A							SB					
314 The American Presidency (3) A							SB					
315 The Supreme Court 3) A							SB					
316 State and Local Government (3) A							SB					
320 Public Administration (3) A							SB					
325 Public Policy Development 3) A							SB					
330 Current Issues in National Politics 3) F, S							SB					
331 Public Opinion. 3) A							SB					
332 American Political Parties 3) A							SB					
333 Interest Groups. (3) A							SB					
336 Electoral Behavior 3) A							SB					
350 Comparative Politics. (3) A							SB				G	
351 The British Nations (3) A							SB				G	
352 Revolution and the Social System. (3) A							SB					
356 Western Europe (3) A							SB				G	
360 Current Issues in International Politics. 3) F, S							SB				G	
361 American Foreign Policy 3) A							SB				G	
401 Political Statistics. (3) F, S					N2							
410 Urban Government and Politics (3) A							SB					
422 Politics of Bureaucracy. (3) N							SB					
423 Politics of Budgeting (3) N							SB					
424 Regulatory Politics. 3) N							SB					
426 Elements of Public Policy. 3) A							SB					
435 Women, Power, and Politics 3) N							SB					
439 Minority Group Politics in America. 3) N							SB			C		
440 History of Political Philosophy I (3) A						HU						H
441 History of Political Philosophy II (3) A						HU						H
442 American Political Thought (3) A						HU						
443 Topics in Contemporary Political Theory. (3) A						HU						
445 Asian Political Thought. (3) A							SB				G	
446 Problems of Democracy (3) A						HU						
450 Soviet Union and Eastern Europe. 3) A							SB				G	
451 China, Japan, and the Koreans (3) A							SB				G	
452 China (3) A							SB				G	
453 South America (3) A							SB				G	
454 Mexico. 3) A							SB				G	
455 Central America and the Caribbean. (3) A							SB				G	
458 Southeast Asia (3) A							SB				G	
459 Sub Saharan Africa. (3) N							SB				G	
460 World Politics (3) A							SB				G	
462 Soviet Foreign and Defense Policies (3) A							SB				G	
463 Inter American Relations. (3) A							SB				G	
464 American Defense Policy (3) A							SB				G	
465 International Organization and Law. (3) A							SB				G	
467 Comparative Defense Policy (3) A							SB				G	
468 Comparative Asian Foreign Policies (3) A							SB				G	
470 Law and Society 3) A							SB					
471 Constitutional Law I (3) A							SB					
472 Constitutional Law II 3) A							SB					
485 Political Economy. (3) A							SB					

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	486 International Political Economy (3) A							SB				G	
	498 Pro Seminar. (3) A		L2										
PSY	230 Introduction to Statistics (3) F, S, SS				N2								
	290 Research Methods. (4) F, S		L1							S2			
	330 Statistical Methods (3) S				N2								
	390 Experimental Psychology (3) S		L2										
	420 Analysis of Behavior (3) N		L2										
	425 Biological Bases of Behavior (3) N		L2										
	426 Neuroanatomy (4) N		L2										
	434 Cognitive Psychology (3) S		L2										
	437 Human Factors. (3) F		L2										
PUP	100 Introduction to Environmental Design (3) F, S, SS Cross listed as APH/DSC 100.)						HU					G	H
	200 The Planned Environment (3) F						HU						H
	301 Introduction to Urban Planning. (3) F, S, SS		L1										
	412 History of the City (3) F												H
	420 Theory of Urban Design. (3) S Cross listed as PLA 420.)						HU						
	445 Women and Environments. (3) F										C		
	452 Ethics and Professional Practice. (3) S		L2										
QBA	221 Statistical Analysis. (3) F, S				N2								
	391 Management Science. (3) A				N2								
REC	120 Leisure and the Quality of Life. (3) F, S, SS							SB					
	160 Leisure and Society. (3) F, S, SS							SB					
	330 Programming of Recreation Services. (3) F, S		L2										
	458 International Tourism. (3) F											G	
REL	100 Religions of the World. (3) F, S						HU					G	
	200 The Study of Religious Traditions (3) A		L1				HU					G	
	201 Religions and the Modern World. (3) A		L1				HU						
	210 Introduction to Judaism (3) A		L1				HU						H
	240 Introduction to Southeast Asia. (3) F Cross listed as ASB/GCU/HIS/POS 240.)											G	
	270 Introduction to Christianity (3) A						HU						
	305 Ritual, Symbol, and Myth (3) A		L2				HU					G	
	310 Western Religious Traditions. (3) F												H
	315 Hebrew Bible (Old Testament) (3) A		L2				HU						H
	316 Types of Early Judaism. (3) A						HU						H
	317 Introduction to Rabbinic Judaism (3) A						HU						H
	320 Religion in America (3) F, S						HU						
	321 Religion in America (3) F, S						HU						
	330 Native American Religious Traditions. (3) A						HU						
	331 History of Native American Religious Traditions. (3) N		L2				HU						H
	340 Confucianism and Taoism (3) A		L2				HU						
	345 Asian Religious Traditions (3) F						HU					G	
	350 Hinduism. (3) A		L2				HU					G	H
	351 Buddhism (3) A		L2				HU					G	
	365 Islamic Civilization, 700-1300. (3) F						HU					G	H
	371 New Testament (3) A						HU						
	372 Formation of the Christian Tradition. (3) A						HU						
	381 Religion and Moral Issues (3) A		L2				HU						
	385 Contemporary Western Religious Thought. (3) A		L2				HU						
	390 Women and Religion. (3) A						HU					G	
	410 Judaism in Modern Times (3) N						HU						H
	415 The Jewish Mystical Tradition. (3) A						HU						
	420 Religion in American Life and Thought (3) A		L2				HU						
	426 American Preachers and Preaching The Sermon in America. (3) N		L2				HU						

UNIVERSITY GENERAL STUDIES COURSES 69

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	427	American Religious Thought. (3) N					HU						H
	437	Problems in Native American Religions. (3) A					HU						
	444	Religion in Japan (3) A					HU					G	H
	460	Studies in Islamic Religion (3) A					HU					G	
	464	The Islamic Mystical Tradition (3) N					HU					G	
	470	Religion in the Middle Ages (3) A					HU						H
	471	Reformation and Modern Christianity (3) A					HU						H
	486	Modern Critics of Religion. (3) A					HU						
RUS	201	Intermediate Russian. (4) F, SS										G	
	202	Intermediate Russian (4) S, SS										G	
	211	Basic Russian Conversation. (3) F										G	
	212	Basic Russian Conversation (3) S										G	
	311	Russian Composition and Conversation (3) F										G	
	312	Russian Composition and Conversation. (3) S										G	
	321	Survey of Russian Literature. (3) A	L2				HU						H
	322	Survey of Russian Literature. (3) A	L2				HU						
	323	Survey of Soviet Literature. (3) A	L2				HU					G	
	411	Advanced Composition and Conversation I (3) F										G	
	412	Advanced Composition and Conversation II. (3) S										G	
	420	Russian Poetry (3) N	L2				HU						
	421	Pushkin (3) N	L2				HU						
	423	Dostoyevsky (3) N	L2				HU						
	424	Tolstoy (3) N	L2				HU						
	425	Chekhov (3) N	L2				HU						
	426	Soviet Dissident Literature (1917 Present) (3) N	L2				HU					G	
	430	Russian Short Story. (3) N	L2				HU						
	441	Survey of Russian Culture. (3) N					HU					G	H
SOC	101	Introductory Sociology. (3) F, S, SS						SB					
	301	Principles of Sociology (3) F, S, SS						SB					
	312	Sociology of Adolescence (3) F, S						SB					
	315	Courtship and Marriage (3) F, S, SS						SB					
	318	Overview of Aging (3) F						SB					
	321	Sociology of Work (3) S						SB					
	332	The Modern City. (3) F, S						SB					
	333	Population (3) F, S, SS						SB				G	
	340	Sociology of Deviant Behavior. (3) F, S, SS						SB					
	341	Modern Social Problems. (3) F, S, SS						SB					
	352	Social Change. (3) F, S						SB				G	H
	360	Sociological Psychology (3) F, S						SB					
	361	Variant Sexuality (3) F						SB					
	365	The Sociology of Mass Communication (3) F, S						SB					
	391	Sociological Research. (3) F, S, SS						SB					
	395	Social Statistics I (3) F, S, SS				N2							
	415	The Family (3) F, S, SS						SB					
	416	Marriage Problems in Contemporary Society. (3) S	L2					SB					
	417	Family Violence (3) F, S						SB					
	418	Aging and the Life Course (3) F, S						SB					
	420	Sociology of Religion. (3) S	L2					SB					
	422	Sociology of Complex Organizations. (3) F	L2					SB					
	423	Social Class and Stratification. (3) S	L2					SB					
	427	Sociology of Health and Illness (3) F	L2					SB					
	428	AIDS and Society (3) F	L2										
	429	Sociology of Law (3) S						SB					
	432	Human Ecology (3) F, S						SB					
	433	Demographic Methods (3) S						SB					
	446	Sociology of Crime (3) F						SB					
	451	Comparative Sociology (3) F						SB				G	

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
	455							SB					
	456							SB				G	
	462							SB					
	464					L2		SB			C		
	470							SB					
	474					L2		SB			C		
	483					L2		SB					
	485					L2		SB					
	486							SB					
SPA	201											G	
	202											G	
	203											G	
	204											G	
	207											G	
	313											G	
	314											G	
	319											G	
	325						HU						
	412											G	
	413											G	
	420							SB					
	421							SB					
	425						HU						
	426						HU						
	464						HU						
	471						HU						
	472						HU					G	H
	473						HU	SB				G	
SPE	311							SB					
SPF	457							SB				G	
STE	202					L1							
STP	226												
						N2							
	326												
						N2							
	420												
						N2							
	429												
						N3							
SWU	301					L2		SB					
	331												H
	402							SB					
	474										C		
TCM	201					L1							
	315					L2							
THE	100						HU						
	104					L1							
	300						HU						
	320						HU						H
	321						HU						H
	401						HU				C		
	420						HU						H
	421					L2	HU						
	425						HU						
TXC	122							SB					
	424							SB					H
	425					L2							

		L1	L2	N1	N2	N3	HU	SB	S1	S2	C	G	H
UNI 390	The Use of Research Libraries. (3 F, S	L1											
WST 100	Women and Society. (3) F, S							SB			C		
300	Women in Contemporary Society (3) F, S, SS							SB			C		
373	La Chicana. (3) F, S							SB			C		
376	Introduction to Feminist Theory. (3) F, S	L1									C		
457	Third World Women (3 F, S (Cross listed as NUR 457/SPF 457.)							SB					G
498	Pro Seminar. Theoretical Issues in Women's Studies (3) A	L2											
ZOL 113	Contemporary Zoology (4) F, S									S2			
120	Human Physiology. (4) F, S									S2			
201	Human Anatomy and Physiology I. (4) F, S, SS									S2			
316	History of Biology: Conflicts and Controversies (3) N (Cross listed as HPS 330)												H
318	History of Medicine. (3) N (Cross listed as HPS 331)												H
410	Techniques in Wildlife Conservation Biology. (3) F	L2											
470	Systematic Zoology. (3) S '95	L2											
473	Ichthyology. (3) S '95	L2											
481	Research Techniques in Animal Behavior (3) S '96	L2											

University Degree Requirements

Credit Requirements

A minimum of 126 semester hours is required for graduation with a baccalaureate degree. A minimum of 50 semester hours in upper division courses is required for graduation. The College of Business requires 51 hours in the upper division.

Not more than 60 hours of credit in correspondence courses and/or by comprehensive examination (including AP, CLEP, and IB exams) are accepted for credit toward the baccalaureate degree.

Grade Point Requirements

For a baccalaureate degree, the minimum cumulative GPA is 2.00 for all courses taken at ASU.

First-Year Composition Requirement

Completion of both ENG 101 and 102 or ENG 105 with a grade of "C" or better is required for graduation from ASU in any baccalaureate program (see page 40). International students from non English speaking countries may

meet the First-Year Composition requirement by completing ENG 107 and 108 with a grade of "C" or better.

Before new students or transfer students can register for the first time at ASU, they must determine what courses to take to complete the university first year composition requirement; the students must then enroll immediately in composition courses and continue to do so every term until composition requirements are met. *College offices may grant waivers to the immediate and continual enrollment requirement when there are scheduling conflicts detrimental to the student's academic progress* Transfer students from other Arizona colleges or universities can determine the acceptability of their composition courses by referring to the most recent Arizona Commission for Postsecondary Education *Course Equivalency Guide* in consultation with an academic advisor. Composition courses transferred from out-of-state institutions must be evaluated and approved by advisors specifically designated for this purpose by the dean of each college

The transfer student must file an application in his or her college for Equivalency of First Year Composition Requirements, along with a transcript and catalog descriptions of the composition courses to be transferred. The application, available in each college, should be filed immediately upon transfer of course work to ASU so that the student will be able to enroll in an additional composition course, if required to do so

For more information, the student should go to the appropriate college or school listed below:

- College of Architecture and Environmental Design
ARCH 141
- College of Business BA 123
- College of Education EDB 7
- College of Engineering and Applied Sciences ECG 100
- College of Fine Arts
GHALL 123
- College of Liberal Arts and Sciences SS 111
- College of Nursing NUR 108
- College of Public Programs
WILSN 203
- School of Social Work
WHALL 137

Refer to "Building Abbreviations," page 446, and "Directory," pages 447-449, for more information.

Resident Credit Requirement

Resident credit refers to a course that is offered in a regular semester or summer session.

Campus Resident Credit Requirement. A minimum of 30 semester hours earned in resident credit courses at the ASU campus from which the student will graduate is required of every candidate for the baccalaureate degree.

University Resident Credit Requirement. The final 12 semester hours immediately preceding graduation with the baccalaureate degree must be earned in ASU resident credit but may be completed at either campus.

Guidelines for Determination of Catalog Year

The *General Catalog* is published biennially. Department, division, school, college, and university requirements may change and are upgraded often. In determining graduation requirements, an undergraduate student may use only one edition of the *General Catalog* but may elect to follow any subsequent catalog. In general, students who have been in continuous attendance or who have not had a break or breaks in attendance that total more than two semesters usually follow the degree requirements specified in the *General Catalog* in effect for their first fall or spring semester.

For students following the 1990-91 or a later *General Catalog*, continuous attendance is defined by enrollment in and completion of at least one course in the fall and spring semesters. Completion of a course is defined by receiving a grade of "A," "B," "C," "D," "E," "I" (Incomplete), "Y," "P," or "RC" (Remedial Credit). Receiving a grade of "NC," "W," or "X" (Audit), for all course work in a semester does not constitute continuous attendance.

The following are representative samples but do not address every student's situation.

1. A student who has been in continuous attendance at ASU or who has not had a break or breaks in attendance that total more than two semesters usually follows the degree requirements specified in the *General Catalog* in effect for his or her

first fall or spring semester at ASU; however, he or she may elect to follow the catalog in effect at the time of readmission.

2. A student who attends an Arizona community college and transfers to ASU without breaks in attendance that total more than two semesters may elect to use the *General Catalog* in effect at the time of his or her first enrollment at the community college.
3. A student who has been readmitted after a period or periods of nonattendance exceeding two semesters or after attending an institution other than ASU or an Arizona community college for a period or periods exceeding two semesters, graduates under the requirements for graduation as stated in the *General Catalog* at the time of reenrollment.
4. A student who completes one undergraduate degree program at ASU, is readmitted into a second undergraduate degree program for the next semester, and attends that semester does not maintain the catalog year under which he or she graduated with the first degree. This student must meet the catalog requirements in effect at the time he or she begins work toward the second degree.
5. Completion of course work in one or more summer sessions does not apply in determining catalog requirements.
6. A nondegree student who is admitted to a degree program may follow the catalog requirements in effect during his or her first fall or spring semester at ASU, provided he or she has met the requirements of continuous attendance.
7. Correspondence course work is not resident credit; therefore, it does not meet the definition of continuous attendance and does not apply toward catalog determination.
8. All guidelines for catalog determination apply to disqualified and/or dismissed students.

Inquiries about these guidelines may be directed to the student's academic advisor.

Program of Study Requirements

A student must file an Undergraduate Program of Study for graduation within the semester he or she earns his or her 87th hour. The Program of Study guides the student in accomplishing successful completion of degree requirements in a timely manner. Students who have not met the above requirement are prevented from further registration.

Program of Study forms and procedural information are available from the Graduation Section, SSV B113A, or any registrar site.

Application for Graduation Requirements

The following steps are required to complete the graduation process:

1. Register for the final semester.
2. Pay the graduation fee at the University Cashier's Office. Note the deadline date listed in the "University Calendar," pages 9-13.
3. Submit the fee receipt to the Graduation Section, SSV B113A, and apply for graduation. The Program of Study is reviewed at this time and the graduation date and eligibility to graduate are verified.
4. Complete all course work listed on the Program of Study by graduation date.

For more information about application for graduation requirements at ASU West, contact ASU West Admissions and Records, UCB 120.

Students failing to comply with the above requirements do not graduate.

The Application for Graduation along with the Program of Study is reviewed to verify graduation eligibility.

Petition for Waiver of Degree Requirements

Any student wishing to have a college or university degree requirement waived must petition the standards committee of the college in which he or she is enrolled. In addition, waivers of university degree requirements must be approved by the University Standards Committee.

All petitions must originate with the student's advisor. See pages 71-73, "University Degree Requirements." See the college sections of this catalog for college and department requirements.

University Standards Committee.

This committee advises the Office of the Senior Vice President and Provost regarding undergraduate student petitions that concern university wide academic requirements. These requirements include but are not limited to requirements on the amount of transfer credit, graduation requirements, limits on credit by examination, and requirements for a second baccalaureate degree. In order to petition for a waiver of such university requirements, the normal department, division, school, and college forms and procedures are used, before being forwarded to the Office of the Senior Vice President and Provost.

Minors

A "minor" is an approved, coherent concentration of academic study in a single discipline, involving substantially fewer hours of credit than the corresponding major. Several ASU colleges offer undergraduate minors in addition to majors. For more information about specific minors offered at ASU, refer to the individual college and department descriptions in this catalog.

Students in most majors may pursue one or more minors and, upon successful completion of the prescribed course work, have that accomplishment officially recognized on the ASU transcript at graduation if (1) the college/department of the minor officially certifies, through established verification procedures, that all requirements for the minor have been met, and (2) the college (and, in certain colleges, the department) of the student's major allows the official recognition of the minor.

A student wishing to pursue a specific minor should consult an academic advisor in the unit offering that minor to ensure that an appropriate set of courses is taken.

Note: Certain major/minor combinations may be deemed inappropriate either by the college/department of the major or by the college/department of the minor. Inappropriate combinations include (but would not be limited to) ones in which an excessive number of courses in the minor are simultaneously being used to fulfill requirements of the student's major.

General Graduation Information

Graduation with Academic Recognition. *An undergraduate student must have completed at least 60 semester hours of resident credit at ASU to qualify for graduation with academic recognition for a baccalaureate degree.* A student with a cumulative GPA of 3.40–3.59 graduates *cum laude*, 3.60–3.79 graduates *magna cum laude*, or 3.80–4.00 graduates *summa cum laude*. The cumulative GPA for these designations is based on only ASU resident course work. For example, ASU correspondence course grades are not calculated in the honors GPA. All designations of graduation with academic recognition are indicated on the diploma and the ASU transcript. Graduation with academic recognition applies only to undergraduate degrees.

A student who has a baccalaureate degree from ASU and is pursuing a second baccalaureate degree at ASU (with a minimum of 30 hours of resident credit) is granted academic recognition on the second degree based on the semester hours earned subsequent to the posting of the first degree. If fewer than 60 semester hours are completed at ASU subsequent to completion of the first ASU degree, the level of academic recognition can be no higher than that obtained on the first degree. If 60 or more semester hours are completed at ASU after completion of the first ASU degree, the level of academic recognition is based on the GPA earned for the second ASU degree. Inquiries about graduation with academic recognition may be directed to the Graduation Section, 602/965 3256.

Second Baccalaureate Degree. The student seeking a second baccalaureate degree must meet admission criteria for that degree. After conferral of the first degree, a minimum of 30 semester hours in resident credit must be suc-

cessfully completed at the ASU campus from which the second baccalaureate degree will be awarded. The student must meet all degree and university requirements of the second degree.

Concurrent Degrees. More than one baccalaureate degree may be pursued concurrently if prior approval is given by the standards committee(s) of the college(s) offering the degrees. A minimum of 30 additional hours is required.

Graduate Degrees. See the "Graduate College" and "College of Law" sections for graduate degrees offered and statements of requirements for graduate degrees. A separate *Graduate Catalog* may be obtained from the Graduate College.

WESTERN INTERSTATE COMMISSION FOR HIGHER EDUCATION (WICHE)

For Arizona residents who wish to attend professional schools of dentistry, veterinary medicine, occupational therapy, optometry, and osteopathy in one of the other western states, Arizona has joined with the other western states to create the Western Interstate Commission for Higher Education through whose effort and agency qualified Arizona residents may attend schools in these other states at essentially the same expense to the students as to residents of the state in which the school is located. Students must have maintained at least average grades in their preprofessional work and must have been legal residents of Arizona for at least the last five years. Recipients are required to return to Arizona to practice or to repay a portion of the funds expended in their behalf.

For further information and applications, interested students should contact Dr. Brice W. Corder, College of Liberal Arts and Sciences, 602/965 2365.

Student Services: The Campus Ecology

The university is committed to the belief that an education involves more than attending class. While the assimilation of information is a central part of the university experience, learning about others, about independence and leadership, and about living in a complex society are equally important. This view is reflected in the services and developmental programs provided by each of the agencies in Student Affairs.

UNDERGRADUATE ADMISSIONS

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

STUDENT FINANCIAL ASSISTANCE

Approximately two thirds of the full time students at ASU rely on some form of financial assistance to meet their educational expenses. The purpose of Student Financial Assistance is to review and award financial resources from a variety of private, federal, state, and institutional sources. Information about and applications for scholarships, grants, loans, and student employment are coordinated by this department. From these types of assistance, 24,000 students received approximately \$120 million in 1992-93.

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

REGISTRAR

Management of the registration system and maintenance of academic records are the primary responsibilities of the Office of the Registrar. InTouch, the ASU Touch Tone telephone system for registration and fee payment, and the online registration system, accessed at any registrar site, including one at ASU West, ease the enrollment process and make ASU a national leader in the use of computerized registration. The Student Information System stores academic records and improves the quality of data used in academic advising. The Office of the Registrar coordinates applications for graduation and undergraduate readmission, course changes and scheduling, transcript services, disbursement of student identification cards, applications for residency, and verification of enrollment. For more information, call 602/965 3175.

STUDENT DEVELOPMENT AND RESIDENTIAL LIFE

Residential Life

Residing on campus at ASU provides a unique opportunity for students to live and grow in a community of individuals from diverse backgrounds sharing a common experience. The residence hall environment offers a variety of out of classroom activities designed to complement the educational process. Skilled professional and paraprofessional staff members live in each hall and coordinate personal and academic support services, leadership development opportunities, and educational and recreational programs for students.

Special interest housing is available, creating communities of students sharing similar interests or experiences. Current special interest communities include a Scholars' Residence administered by the University Honors College; a sorority residence hall; communities for students interested in public service or the environment; graduate, older than 23, and transfer wings; an African American culture community; an American Indian and Southwest culture community; a study intensive environment, and a wellness floor. Residential space is also provided for The Freshman Year Experience, a program that provides academic and personal support for all first year ASU students.

Residence hall application information, including information about vol

untary meal plans, may be obtained by calling 602/965 3515 or writing to

RESIDENTIAL LIFE
ARIZONA STATE UNIVERSITY
BOX 870212
TEMPE AZ 85287-0212

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

Student Development

Student Organization Center. The Student Organization Center maintains a listing of more than 300 student organizations, coordinates mall activities, and offers numerous student leadership development programs. The staff works with students interested in enriching their campus experience at all levels. For more information, call 602/965-2249.

Child Care Resources. Child Care Resources (CCR) provides resources and referral services to students, faculty, and staff. Information about the Campus Children's Center (602/921 2737), Child Development Laboratory (602/965 7267), Child Study Laboratory (602/965 5320), and the College of Education's Preschool (602/965 2510) may be obtained at CCR or by calling the programs directly. CCR maintains the Child Care Referrals database, housed in the university libraries, and coordinates child and family workshops. Educational materials and listings of additional on and off campus activities, programs, and services for children and their families are available at the CCR office, MU 14C. For more information, call 602/965 9515.

Fraternities and Sororities. Fifteen sororities and 26 fraternities offer a range of opportunities for interested students. Programs are coordinated by the Interfraternity Council and the Panhellenic Council to foster communication between chapters, to reward scholastic achievement, and to promote university and community service projects. For more information, call 602/965 3806.

Transportation

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

Alternative transportation modes are used by many thousands of ASU students. ASU is served by a Phoenix area regional bus service; monthly and reduced fare semester passes are available on campus. In addition, an inexpensive express shuttle runs between ASU Main in Tempe and ASU West in northwest Phoenix, and a free transit service is available around the periphery of ASU Main.

Bicycle ridership at ASU is estimated to be more than 12,000 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. A Bicycle Coop at ASU Main provides assistance with bicycle maintenance.

Also, careful class scheduling, when possible, can reduce a student's transportation needs. For more information, call 602/965 1072.

EDUCATIONAL DEVELOPMENT

Educational Development consists of four programs dedicated to providing academic support to students with special educational needs. The offerings are directed toward students meeting their educational and personal development goals.

The Educational Opportunity Center. This community outreach service focuses on low income individuals. The center has a main office in Phoenix (1700 N. Seventh Ave., Suite 100) and satellite offices around Maricopa County. It offers vocational testing and guidance as well as assistance in application for admission, scholarships, and financial assistance at a postsecondary institution suited to particular individuals' needs. Services are free. For more information, call 602/256-2124.

Disabled Student Resources. This office provides a broad range of support services, including the following: academic, career, and personal counseling; orientation and mobility for the blind; campus orientation; and assistance with

registration, financial aid, and housing. In addition, the following academic support services are provided as appropriate: readers, interpreter/notetakers, library research aides, test accommodations (proctors, scribes, readers), assistance with adapting course work materials, and Braille production.

Disabled Student Resources houses the Access Learning Laboratory, which helps students develop individualized strategies for mathematics, writing, study skills, and time management. The lab coordinates closely with other campus resources, such as the Writing Center, the Math Center, and the Educational Support Program Tutoring Center. An Adapted Computer Laboratory, with many of the latest high technology devices for individuals who are disabled, is also available. An intra campus cart transportation system and an off-campus van are available for academic and medical needs. Adapted recreational facilities and physical education classes are provided through the Adaptive Recreation Program in the Student Recreation Complex for students who are disabled. Students are fully integrated into campus life and all activities. For more information, call 602/965 1234 (TTY)

The Upward Bound Program. This program is designed to increase the academic skills and motivational levels of participants (low income, potential first generation college students) to the extent that they will complete high school and successfully enter postsecondary institutions. The year round program includes summer residential components. For more information, call 602/965-6483.

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

STUDENT LIFE

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

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

Student volunteerism and community involvement are encouraged through the Campus Voluntary Action Program. Concern for the social environment is reflected in the activities of the Cultural Diversity Committee, Student Judicial Affairs, the Women's Student Center, and the International Student Office.

Academic assistance and self assessment are provided by the Educational Support Program (ESP). Understanding the University Experience (Hispanic Mother/Daughter Program) involves precollege women in early preparation for college.

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

COUNSELING AND CONSULTATION

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

Counseling and Consultation offers counseling groups for career exploration,

relationship difficulties, stress management, depression, assertiveness, eating disorders, family problems, and other common student issues. Individual therapy and couples counseling are offered on a short-term basis. Counseling and Consultation also provides emergency counseling to help students in emotional crises.

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

The Minority Assistance Program (MAP). This program is a separate component within Counseling and Consultation and is built upon a student development model providing cultural, emotional, and academic support services to the university's underrepresented minority populations. MAP counselors provide this support through programs and workshops, summer institutes, academic classes, personal and educational counseling, and sponsorship of student organizations. Students may schedule an appointment with a MAP counselor by phone (602/965-6060) or in person. The MAP office is located in SSV B312.

STUDENT HEALTH

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

Additional services include comprehensive women's health care, immunizations, a wart clinic, an allergy clinic for students needing periodic injections,

and physical therapy service. Radiology and laboratory services are also available. The pharmacy at Student Health provides many prescription and over the counter medications.

Health Education. Student Health provides educational programs on nutrition, stress management, alcohol and substance use and abuse, sexuality and sexually transmitted diseases, including the Human Immunodeficiency Virus (HIV). Peer education programs provide students an opportunity to gain experience in health education counseling and to enhance presentation skills. Services and educational brochures are available at Student Health and at various locations throughout the campus.

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

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

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

registrar site. For more information, call the Student Health insurance office at 602/965 2411.

STUDENT PUBLICATIONS

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

The *State Press* provides students with on-the-job training in news writing, photography, editing, advertising, and production work. The *State Press* also addresses the many informational needs of the university community, not only through stories about the campus and about local and national events, but through paid advertisements by area merchants, campus groups, and university faculty, students, and staff.

In addition to the *State Press*, Student Publications publishes *The Sun Devil Spark Yearbook* each May. The yearbook is published by a team of more than 55 student editors, writers, photographers, and marketing people. The *Spark* is a comprehensive history book encompassing every aspect of campus life and is available to students, staff, and the general public for \$35.00 per copy (subject to change) at the fall discount.

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

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

MEMORIAL UNION

The Memorial Union (MU) is a major center of campus activity. It serves thousands of students, faculty, staff, and many daily campus visitors.

The MU has diversified dining for individual and group needs and provides catering and conference services. It houses a branch of the Arizona State Savings and Credit Union, a card and gift shop, a hair salon, a photo shop, a travel agency, a U.S. Post Office, a flower shop, a copy center, and automatic teller machines. MU facilities include student lounges (both TV and

study), a Fine Arts Lounge, reserved meeting rooms, and ballrooms. Recreational activities include billiards, bowling, and amusement games. The MU operates the university information desk, the Lost and Found Department, and the MU Activities Board (MUAB).

The eight MUAB student committees serve advisory and program development functions for the MU, which, in turn, provides opportunities for students to contribute to their community and to develop leadership skills. The facility meets the needs of many diverse student populations. For more information, call 602/965 5728.

ASSOCIATED STUDENTS OF ARIZONA STATE UNIVERSITY (ASASU)

ASASU is the student government of the university. It is the official representative of the student body in matters of university governance and budgeting. Programs and services include the Bike Repair Co-op, Campus Clubs and Organizations, College Councils, Concerts, the Counseling and Health Advisory Committee, the Course Information Program, the Executive Committee, the Graduate Student Association, Homecoming, Insuring Tomorrow, Leadership Institute, Lecture Series, the Multicultural Awareness Board, Off-Campus Student Services, the Political Union, Public Relations, the Safety Escort Service, Special Events, State Relations, Student Legal Assistance, the Student Senate, and the Volunteerism Service.

CAREER SERVICES

Career Services provides advisement for individual career planning concerns and offers information about numerous career fields and permanent positions. Students are encouraged to utilize the Career Development Center throughout their academic careers. Computerized career planning systems and published resources and position listings are available to assist them in evaluating and making career choices. Workshops and classroom presentations on career planning, interviewing skills, resumé writing, and a myriad of additional career-related topics are offered. Advisors are available to assist students on an individual basis in career planning and placement.

Hundreds of employers from business, industry, government, social service agencies, health organizations and

school districts come to ASU to interview students seeking permanent and career-related summer, intern, and co-op employment. Career Services schedules these interviews for both employers and students to meet each group's needs and interests.

Current job listings are maintained and disseminated throughout the year. Career Services recommends that students register at least two semesters before graduating to participate fully in career placement activities. The offices are located in SSV C359 and C363. For more information, call 602/965 2350.

VETERANS SERVICES

This office offers complete educational services for U.S. veterans and their eligible dependents. Counseling is available about admissions, registration, and veterans benefits. Veterans programs provide service by advising all interested veterans and dependents about educational benefits and their optimum use. The program also assists veteran students in obtaining suitable paid tutors, when needed, using their federal benefits. Veterans must achieve adequate GPAs and semester-hour progress toward their academic programs for continued educational benefits. The university must report this progress each semester. The Veterans Services Section is located in SSV B117. For more information, call 602/965 7723.

MILITARY OFFICER TRAINING

U.S. Air Force and U.S. Army ROTC units are active on the ASU campus. See "Aerospace Studies" and "Military Science," pages 92-93 and 137-139, for more information.

Defense Activity for Non-Traditional Education Support (DANTES). Arizona State University is a participating institution with DANTES and is listed in the DANTES Directory of Independent Study. DANTES is an executive agency of the Department of Defense that provides educational support for the voluntary education programs of all services. The primary missions of DANTES are (1) to provide nationally recognized examination and certification programs as part of the voluntary education programs of military services and (2) to facilitate the availability of high-quality independent institutions for service men and women.

U.S. Armed Forces Institute Correspondence Courses. Arizona State University does not grant military science credit for active service or courses that were taken through the military.

STUDENT RECREATION COMPLEX AND RECREATIONAL SPORTS AND STUDENT ACTIVITIES PROGRAM

The Student Affairs Recreational Sports and Student Activities Program is one of the largest programs in the country, serving more than 20,000 students annually through more than 60 sport, dance, and exercise activities. Programs offered include intramural sports, informal recreation, fitness, aquatic and sports skills classes, outdoor recreation, children and family programs, sport clubs, adaptive recreation for individuals with permanent or temporary disabilities, a wellness center, and special events.

Located on the south end of Palm Walk, the Student Recreation Complex is one of the finest student recreation facilities in the United States. Features include expansive resistance and cardiorespiratory training facilities and equipment, three large gymnasiums, 14 indoor racquetball courts, one squash court, martial arts, aerobics, and sport club rooms, and an adaptive weight room. Outdoor facilities include a lighted, multiuse complex with four fields, a .43-mile perimeter walking and jogging path and four sand volleyball courts, 14 tennis courts, and an Olympic-size swimming pool with two movable bulkheads that allow the pool to be divided into three parts for simultaneous multiuse programming.

For more information, call 602/965-8900.

INTERCOLLEGIATE ATHLETICS

The university is a member of the National Collegiate Athletic Association, Division One, and the Pacific-10 Conference. The university has 20 varsity intercollegiate sports and more than 500 participants. Intercollegiate athletics at ASU are governed by a board of faculty, students, and staff under the regulations of the Arizona Board of Regents, the NCAA, the Pacific-10 conference, and the university. Policies are administered by Intercollegiate Athletics. All athletic grants-in-aid and scholarships are administered in coordination with Intercollegiate Athletics.

RELIGIOUS ACTIVITIES

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

OTHER OPPORTUNITIES FOR STUDENT INVOLVEMENT

The Department of Dance and Dance Arizona Repertory Theatre, a student touring repertory company, presents 12 to 14 faculty- and/or student-directed concerts each year. Interested students should attend open auditions, which are held at the beginning of each semester. For more information, call 602/965-5029.

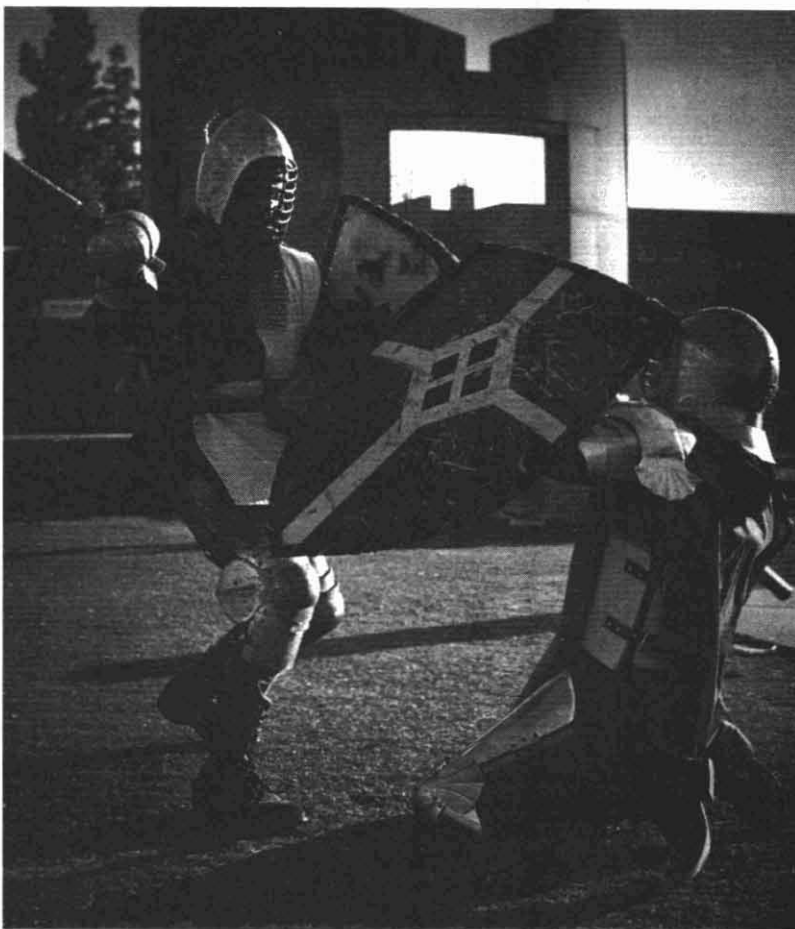
Forensics. A Sun Devil Forensic squad, associated with Pi Kappa Delta, national forensic honorary, travels to trophy tournaments across the country.

Permission of the director of Forensics is required. For more information, call Dr. Clark D. Olson, director of Forensics, at 602/965-3825.

Interpreters Theatre. Participants write, compile, and perform scripts for presentation in diverse on- and off-campus settings through the Department of Communication. For more information, call 602/965-4111 or -5061.

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

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



University Honors College

Ted Humphrey, Ph.D.
Dean

NATURE AND GOALS

The University Honors College offers talented, motivated students educational opportunities designed to enrich and further their personal academic and career goals. The college is unique in Arizona and the southwest. It provides students the educational benefits typical of small colleges while allowing them to enjoy the resources found only at a comprehensive research university. Students enroll for courses taught by teaching and research faculty who nurture intellectual creativity and curiosity. These faculty bring to undergraduate education the expertise of their own academic backgrounds and the excitement of nationally distinguished research.

The University Honors College has administrative, faculty, classroom, and residential facilities in a single, centrally located building, McClintock Hall, the Scholars' Residence. It houses classrooms, a computer laboratory, lounges, meeting rooms, and study areas. These facilities are available to all members of the University Honors College. With its interior courtyard, McClintock Hall is an inviting environment where students, faculty, and visiting scholars interact informally.

McClintock Hall is a coeducational residence that accommodates 160 students and is open to honors students on a first come, first-served basis. The college regularly schedules intellectual and social events in McClintock Hall.

Students from all disciplinary colleges and academic majors enroll in the University Honors College. The College of Architecture and Environmental Design and the School of Social Work developed the nation's first honors curricula in their disciplines. The Colleges of Business, Liberal Arts and Sciences, and Public Programs offer particularly strong programs. The College of Engineering and Applied Sciences has the most complete engineering honors curriculum in the United States. Students with majors in the Colleges of Education, Fine Arts, and Nursing can also choose from a wide range of exciting courses, especially at the lower division.

Students seeking to graduate from the University Honors College must also graduate from a disciplinary college. The ASU honors curriculum normally allows students to finish all re-

quirements within the 126 semester hours of credit usually required for graduation.

The first two years of the honors curriculum typically focus on general studies. The second two years concentrate on the student's academic major and lead to graduation from both a disciplinary college and the University Honors College. Participating in this part of the curriculum allows students to write an honors thesis or complete some other extended creative project appropriate to their academic interests. In conceiving and completing this project, each student works closely with a faculty mentor to identify and develop an original concept that extends and integrates the student's work in a discipline.

Participants in the University Honors College have diverse interests and strong records of success. Many go on to the nation's finest graduate and professional programs, including Cornell, Harvard, Michigan, Stanford, Virginia, Wisconsin, MIT, Northwestern, UC Berkeley, UCLA, and USC. Many have published portions of their honors theses and have presented their work at the national and regional meetings of scientific and honors societies.

The Office of National Scholarship Advisement (ONSA) assists honors and other high achieving students by identifying nationally competitive programs appropriate to each person's intellectual and career goals, nurturing these prospective applicants, and advancing their candidacy. This office, administered by the University Honors College, serves the entire ASU community. ASU students regularly earn distinction in the most rigorous and prestigious scholarship competitions. Many pursue enhanced degree programs and research projects under the auspices of Goldwater Scholarships or National Endowment for the Humanities Younger Scholars awards. Still others undertake postgraduate study in the United States and abroad as Truman, Mellon, Fulbright, and Marshall Scholars. Many others have been recognized by a range of postgraduate awards, fellowships, and assistantships.

BENEFITS

Honors students have special advisors to help them plan individualized programs of study, and they receive priority at preregistration. Honors

courses are normally limited to 22 students.

Honors students are eligible to live in McClintock Hall, the Scholars' Residence and home of the University Honors College. They have access to all the college's facilities, lounges, computer rooms, and study areas and enjoy extended loan periods at the library.

Students can receive transcript recognition for lower division honors studies. Students who meet all upper division requirements of both their disciplinary college and the University Honors College receive transcript recognition of that accomplishment as well as special acknowledgment in the graduation ceremonies and collegiate honors convocations.

ADMISSION

All candidates for admission to the University Honors College must file an application.

Only *one* of the following criteria must be met. An entering *freshman* is admitted if he or she

1. graduated in the top 5% of his or her high school class;
2. has a composite ACT score of 29;
3. has a combined SAT score of 1250, or
4. submits similar indications of academic achievement and aptitude.

Continuing and transfer students who have completed at least 12 semester hours of study with a cumulative GPA of at least 3.25 (on a 4.00 = A scale) may apply for admission to the college.

Community college transfer students who have graduated from their institutions' honors programs are eligible to apply for Regents' Transfer Scholarships. Information about this award is available through the Student Financial Assistance Office (602/965 3355).

Students not meeting the requirements listed above but who believe they can better succeed at the university and meet the college's academic standards may apply for provisional admission. The dean of the college reserves the right to interview each such applicant.

Application forms and additional information about the college and its activities are available by writing or calling the college's offices at 602/965 2359.

RETENTION

Honors students must maintain high standards of academic performance and show progress toward completion of graduation requirements in their disciplinary majors and the Honors College. Students normally register for at least one honors course each semester. A student with a cumulative GPA below 3.25 (on a 4.00 = A scale) is placed on probation and is withdrawn from the college if he or she does not make reasonable progress in raising the cumulative GPA during the following semester.

COURSES

Freshmen and students entering the college with fewer than 45 semester hours of course work must take HON 171 and 172 The Human Event. This cross disciplinary seminar acquaints them with ideas that form the foundation of a university education and emphasizes critical thinking, discussion, and writing. Entering freshmen typically also enroll for ENG 105 Advanced First Year Composition.

Students entering the college after completing 45 semester hours must take HON 394, a junior level seminar that introduces them to critical thinking, discussion, and writing in an area chosen by the instructor.

Departmental courses carrying footnote number 18 in the *Schedule of Classes* allow honors students to contract with the instructor for honors credit by pursuing enrichment activities. When several students in the same section arrange such contracts, the instructor may require them to meet for supplemental sessions. Footnote 18 contracts must be filed during the first three weeks of class during the semester in which the course is offered.

Departmental courses carrying footnote number 19 in the *Schedule of Classes* are limited to honors students and others who receive special permission to enroll from the instructor. Enrollment in these courses is limited to 22 students.

Departmental courses with the number 497 (Honors Colloquium) always carry footnote number 19. Students may receive credit for more than one Honors Colloquium in a given department.

Courses listed in the *Schedule of Classes* as 298, 492 Honors Directed Study, 493 Honors Thesis, 497 Honors Colloquium, and all classes with the HON prefix are reserved for University Honors College students.

Departmental courses with the number 493 are reserved for honors students completing their honors theses or projects. A student may enroll for these courses only with the approval of the sponsoring academic department and of the faculty member who serves as the student's thesis director. *Note:* Students may receive a maximum of six semester hours credit for an honors thesis or project, three semester hours of which may fulfill the student's L2 general studies requirement.

The college regularly offers blocks of three or four courses focused on a central theme. The blocks permit students to concentrate on the issues at hand to understand them more fully. In these course blocks, or *honors learning communities*, students work together closely with a master learner and two or three other faculty. Past honors learning communities have focused on symbolism, language, and culture; the social, economic, scientific, and personal impact of AIDS; and the development of modern Sino Japanese cultures.

All courses a student takes for honors credit count toward graduation, even if the student does not graduate from the University Honors College.

HONORS TRANSCRIPT RECOGNITION

Lower Division. To receive transcript recognition for lower-division honors work, students must complete 18 semester hours of honors course work by the end of the semester in which the 60th credit hour is earned. The 18 semester hours must include HON 171 and 172 The Human Event and may include ENG 105 Advanced First Year Composition and any combination of lower and upper division honors courses. Students must also have attained a cumulative ASU GPA of at least 3.40 (on a 4.00 = A scale).

Graduation from the University Honors College. To graduate from the University Honors College, students must complete HON 171 and 172; those entering the college after com

pleting 45 semester hours of course work must complete HON 394 instead. All students must also complete an additional 18 semester hours of upper-division honors courses (courses at or above the 300 level). These 18 semester hours must include three to six hours of honors thesis work (including any research preparation courses) and at least six hours of honors courses *outside the academic major*. Students must also meet all requirements of the disciplinary college and academic major. Students seeking disciplinary college or departmental honors may have to meet more specific versions of these general requirements. Finally, students must have a cumulative ASU GPA of at least 3.40 (on a 4.00 = A scale). Except for HON 171 and 172, students may not use the same course to satisfy requirements for both lower-division transcript recognition and graduation from the college.

University Honors College

Ted Humphrey
Dean

(MCL 112) 602/965-2359

PROFESSOR
HUMPHREY

SENIOR LECTURER
WEIDEMAIER

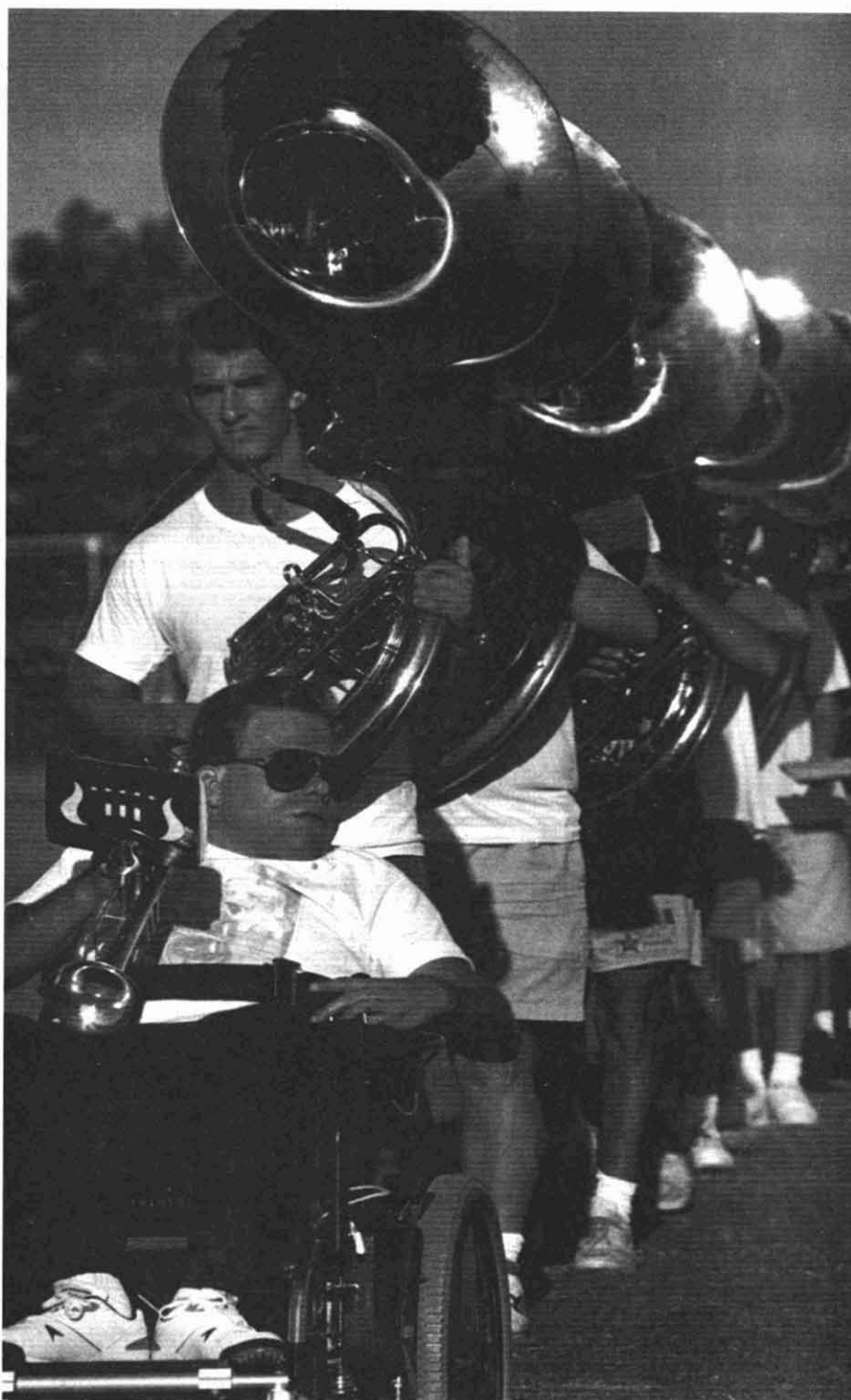
LECTURERS
COUDERT, FACINELLI, STANFORD

HONORS

HON 171 The Human Event. (3) F, S
Landmarks in the social and intellectual development of the human race, with emphasis on Western civilization. Enrollment restricted to members of the University Honors College. Consult the Honors office for applicability to general studies requirements. *General studies:* L1, HU, H.

172 The Human Event. (3) F, S
Continuation of HON 171, with emphasis on the Renaissance through the modern period. *General studies:* L1, HU, H.

Omnibus Courses: See page 44 for omnibus courses that may be offered.



College of Liberal Arts and Sciences

Gary S. Krahenbuhl, Ed.D.
Dean

PURPOSE

Like all major research universities, Arizona State University provides the means for its undergraduates to acquire a liberal education, an education that broadens students' understanding in the major areas of human knowledge while providing students with in depth knowledge in their chosen areas of focus. While the professional schools and colleges can and do provide for important dimensions of a liberal education, the central academic setting for accomplishing this basic university purpose is the College of Liberal Arts and Sciences. The college provides a particularly rich and varied set of opportunities for students to gain the kind of liberal education that helps to prepare them for a lifetime of continued learning and application of knowledge in a diverse and ever changing world.

Much of the ASU faculty's discovery and dissemination of knowledge occurs in the college. Because of the wide range of subjects it offers in the humanities, the natural sciences and mathematics, and the social and behavioral sciences, the college provides instruction in a number of core areas for undergraduate students from all of the other colleges. Students with majors in business, education, engineering, nursing, and other professional colleges rely on the College of Liberal Arts and Sciences for basic foundation courses. The college also offers the majority of courses meeting the university general studies requirements.

The college initiated and continues to participate actively with the University Honors College. It also offers advisement to undergraduates who are working out their undergraduate programs, planning for graduate studies, or preparing to enter professional careers such as law and medicine.

ORGANIZATION

The College of Liberal Arts and Sciences consists of 22 academic departments, several interdisciplinary programs, six centers, and several research institutes and laboratories. The college offers 33 programs leading to a bachelor's degree, 27 programs leading to a master's degree, 18 programs leading to a doctoral degree, and interdisciplinary graduate programs in cooperation with other colleges.

ADMISSION

Any entering ASU student who has met the minimum university entrance requirements can be admitted to the College of Liberal Arts and Sciences. Students with fewer than 50 earned hours of credit can, if they wish, be admitted as "no preference" students. Students with 50 or more hours must declare a major to be accepted into the college.

Any student with a cumulative GPA of at least 2.00 who is currently registered (in good standing) in another college at ASU and who wishes to major in a subject offered by the College of Liberal Arts and Sciences and to follow a program of study in the major may transfer into the college by making application and being initially advised in the Office for Academic Programs, SS 111. Students admitted from other ASU colleges are under mandatory advisement during the first semester and must take courses leading directly to a degree in the College of Liberal Arts and Sciences. Failure to follow mandated advice on course selection can result in enrollment and registration problems, including cancellation and holds.

Transfer Students. The university standards for evaluation of transfer credit are listed on page 34. Transfer students are urged to contact the relevant academic department or the Office for Academic Programs, SS 111, to ensure a smooth transition to the College of Liberal Arts and Sciences. Students who have transferred courses from institutions other than Arizona community colleges must have their transcripts evaluated by an advisor in SS 111; students who have attended only Arizona community colleges have evaluations done in the department of the major.

Courses transferred from two year (community) colleges are accepted as lower division credit only. Students are urged to choose their community college courses carefully, in view of the fact that a minimum of 50 semester hours of work taken at the university must be upper division credit (see page 35).

"Undecided" or "Undeclared" Majors. Students in the College of Liberal Arts and Sciences are not required to select a major upon entering the college as freshmen or at any time thereafter until the semester in which 60 semester

hours are earned. Until such students have chosen a major, they are advised through the University Academic Advising Center. It is important to consult an academic advisor before any enrollment activity. Before or during the semester in which they earn 60 semester hours, students must select their major and transfer into the appropriate department. *Note:* Students who wish to enter a program of study that has a rigidly structured curriculum should be aware that delay in choosing a major initially could result in added time and cost in the completion of requirements.

ADVISEMENT

All students are urged to seek advising in the appropriate college unit before registration. Students must follow the calendar published in the *Schedule of Classes* for each semester for information regarding enrollment, adding/dropping classes, and withdrawals.

Regular Advisement. All students are strongly urged to seek advisement in the appropriate college unit before registration. Students must follow the calendar published in the *Schedule of Classes* for each semester when conducting registration transactions such as enrollment, adding/dropping classes, and withdrawals.

Advising Locations. College of Liberal Arts and Sciences students should seek routine advisement in the following locations:

Student	Advisement Location
Declared majors	Department of major
No preference	University Academic Advising Center (call 602/965-4464.)
No preference, pre medical	Call 602/965 2365
No preference, pre-law	SS 111

The Office for Academic Programs, located in SS 111, is the central resource center for academic information in the college. Requests from students, departmental advisors, and faculty for clarification of rules, procedures, and advising needs of the college and university should be directed to that office.

Mandatory Advisement. The following categories of Liberal Arts and Sciences students *must* receive advisement and *must* be cleared on the Mandatory Advisement Computer System (MACS) before their classes may be scheduled:

1. students in their first semester at ASU;
2. students on probation;
3. students with less than a 2.00 cumulative GPA;
4. students who have admissions deficiencies;
5. other students with "special admissions" status; and
6. students who have been disqualified (these students are allowed to attend ASU summer sessions only and must be advised in the Office for Academic Programs, SS 111).

Students in the above mandatory advisement categories should consult an advisor in the appropriate location listed in the previous section. Additionally, the University Academic Advising Center, Matthews Center, has been assigned the task of monitoring all students in the College of Liberal Arts and Sciences who have admissions de-

ficiencies. All students with admissions deficiencies must check with the University Academic Advising Center, regardless of where they receive regular advisement, to verify that the courses they are taking will eliminate their deficiencies.

Advisement for Preprofessional Programs. Special advisement is available for students planning to enter the fields listed in the "Advisement for Preprofessional Programs" table. The professional programs shown in the table are not majors in themselves; that is, there are no majors called "pre medical," "pre law," etc. In each program, the student must eventually select an established major in the College of Liberal Arts and Sciences or in one of the other colleges.

DEGREES

Majors. Programs leading to the B.A. and B.S. degrees are offered by the College of Liberal Arts and Sciences, with majors in the subjects listed in the "College of Liberal Arts and Sciences Degrees, Majors, and Concentrations" table, pages 84-86. Each major is administered by the academic department indicated.

Advisement for Preprofessional Programs

Professional Field	Office Where Advisor Is Located
Dentistry*	Pre Health Professions
Foreign service	Department of chosen major
Health physics	Pre Health Professions
Law	Office for Academic Programs, SS 111
Medicine*	Pre Health Professions
Ministry	Department of Religious Studies
Occupational therapy*	Pre Health Professions
Optometry*	Pre-Health Professions
Osteopathy*	Pre Health Professions
Pharmacy*	Pre Health Professions
Physical therapy*	Pre Health Professions
Podiatry*	Pre Health Professions

* Students preparing for a career in these areas should register with the secretary in the Pre Health Professions Office. Phone 602 965 2365 for the new location of the office. No school in the State of Arizona offers a program in dentistry, occupational therapy, optometry, osteopathy, or podiatry. Students interested in pursuing these professions should confer with the pre health professions advisor concerning out of state schools where they may complete their training.

College of Liberal Arts and Sciences Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Anthropology	B.A.	Department of Anthropology
Emphasis: Latin American studies		
Asian Languages (Chinese/Japanese)	B.A.	Department of Languages and Literatures
Biology	B.S.	Departments of Botany and Zoology
Botany	B.S.	Department of Botany
Concentrations: plant biochemistry and molecular biology, systematics and ecology, urban horticulture		
Chemistry	B.A.	Department of Chemistry and Biochemistry
Chemistry	B.S.	Department of Chemistry and Biochemistry
Emphasis: biochemistry		
Clinical Laboratory Sciences	B.S.	Department of Microbiology
Computer Science	B.S. ¹	Department of Computer Science and Engineering
Economics	B.A., B.S. ²	Department of Economics
Emphasis: Latin American studies		
English	B.A.	Department of English
Exercise Science/Physical Education	B.S.	Department of Exercise Science and Physical Education
Concentrations: exercise and sport studies, exercise and wellness		
Family Resources and Human Development	B.A., B.S.	Department of Family Resources and Human Development
Concentrations: family resources and human development in business, family studies/child development, human nutrition-dietetics		
French	B.A.	Department of Languages and Literatures
Geography	B.A., B.S.	Department of Geography
Emphases: Asian studies, Latin American studies, meteorology climatology, urban studies		
Geology	B.S.	Department of Geology
German	B.A.	Department of Languages and Literatures
History	B.A., B.S.	Department of History
Emphases: Asian studies, Latin American studies		
Humanities	B.A.	Interdisciplinary Humanities Program
Interdisciplinary Studies	B.A., B.S.	College of Liberal Arts and Sciences
Italian	B.A.	Department of Languages and Literatures
Mathematics	B.A.	Department of Mathematics
Mathematics	B.S.	Department of Mathematics
Options: applied mathematics, computational mathematics, general mathematics, pure mathematics, statistics and probability		
Microbiology	B.S.	Department of Microbiology
Philosophy	B.A.	Department of Philosophy
Physics	B.S.	Department of Physics and Astronomy
Emphasis: astronomy		
Options: I, II		
Political Science	B.A., B.S.	Department of Political Science
Emphases: Asian studies, Latin American studies		
Psychology	B.A., B.S.	Department of Psychology
Religious Studies	B.A.	Department of Religious Studies

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Requirements differ according to college (see page 103 and pages 258-261).

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the College of Liberal Arts and Sciences and the College of Business. Requirements differ according to college (see page 103 and pages 194-195).

³ This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

⁴ The major has only one formalized concentration; other areas of study are available.

Major	Degree	Administered by
Russian	B.A.	Department of Languages and Literatures
Sociology	B.A.	Department of Sociology
Emphasis: public safety		
Spanish	B.A.	Department of Languages and Literatures
Emphases: Latin American studies, Mexican American studies		
Speech and Hearing Science	B.S.	Department of Speech and Hearing Science
Wildlife Conservation Biology	B.S.	Department of Zoology
Options: aquatic, terrestrial		
Women's Studies	B.A., B.S.	Women's Studies Program
Zoology	B.S.	Department of Zoology
Graduate Degrees		
Anthropology	M.A.	Department of Anthropology
Concentrations: archaeology, bioarchaeology, linguistics, museum studies, physical anthropology, social cultural anthropology		
Anthropology	Ph.D.	Department of Anthropology
Concentrations: archaeology, physical anthropology, social cultural anthropology		
Biological Sciences	M.S.	Departments of Botany, Microbiology, and Zoology
Botany ⁴	M.S., Ph.D.	Department of Botany
Concentration: ecology		
Chemistry	M.S., Ph.D.	Department of Chemistry and Biochemistry
Concentrations: analytical chemistry, biochemistry, geochemistry, inorganic chemistry, organic chemistry, physical chemistry, solid state chemistry		
Communication Disorders	M.S.	Department of Speech and Hearing Science
Creative Writing	M.F.A. ³	Creative Writing Committee
English	M.A.	Department of English
Concentrations: comparative literature, English linguistics, literature and language, rhetoric and composition		
English	Ph.D.	Department of English
Exercise Science	Ph.D. ³	Committee on Exercise Science
Concentrations: biomechanics, motor behavior/sport psychology, physiology of exercise		
Exercise Science/Physical Education	M.S.	Department of Exercise Science and Physical Education
Family Resources and Human Development	M.S.	Family Resources and Human Development
Concentrations: family studies, general family resources and human development		
French	M.A.	Department of Languages and Literatures
Concentrations: comparative literature, language and culture, literature		
Geography	M.A., Ph.D.	Department of Geography
Geology	M.S., Ph.D.	Department of Geology
German	M.A.	Department of Languages and Literatures
Concentrations: comparative literature, language and culture, literature		

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Requirements differ according to college (see page 103 and pages 258-261)

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the College of Liberal Arts and Sciences and the College of Business. Requirements differ according to college (see page 103 and pages 194-195)

This program is administered by the Graduate College. See the "Graduate College" section of this catalog

The major has only one formalized concentration; other areas of study are available.

Major	Degree	Administered by
History Concentrations: Asian history, British history, European history, Latin American history, public history, U.S. history, U.S./Western history	M.A.	Department of History
History Concentrations: Asian history, British history, European history, Latin American history, U.S. history	Ph.D.	Department of History
Humanities	M.A. ³	Graduate Committee on Humanities
Mathematics	M.A., Ph.D.	Department of Mathematics
Microbiology	M.S., Ph.D.	Department of Microbiology
Molecular and Cellular Biology	M.S., Ph.D.	Interdisciplinary Committee on Molecular and Cellular Biology
Natural Science Concentrations: botany chemistry communication disorders geology mathematics microbiology physics zoology	M.N.S.	Department of Botany Department of Chemistry and Biochemistry Department of Speech and Hearing Science Department of Geology Department of Mathematics Department of Microbiology Department of Physics and Astronomy Department of Zoology
Philosophy	M.A.	Department of Philosophy
Physics	M.S., Ph.D.	Department of Physics and Astronomy
Political Science Concentrations: American politics, comparative politics, international relations, political theory	M.A., Ph.D.	Department of Political Science
Psychology Concentrations: clinical psychology, developmental psychology, environmental psychology, experimental psychology, physiological psychology, social psychology	Ph.D.	Department of Psychology
Religious Studies	M.A.	Department of Religious Studies
Science and Engineering of Materials	Ph.D. ³	Committee on the Science and Engineering of Materials
Sociology	M.A., Ph.D.	Department of Sociology
Spanish Concentrations: comparative literature, language and culture, linguistics, literature	M.A.	Department of Languages and Literatures
Spanish	Ph.D.	Department of Languages and Literatures
Speech and Hearing Science Concentrations: developmental neurolinguistic disorders, neuroauditory processes, neurogerontologic communication disorders	Ph.D. ³	Committee on Speech and Hearing Science
Statistics	M.S. ³	Committee on Statistics
Teaching English as a Second Language	M.TESL	Department of English
Zoology ⁴ Concentration: ecology	M.S., Ph.D.	Department of Zoology

¹ The Department of Computer Science and Engineering is located administratively in the College of Engineering and Applied Sciences. The B.S. degree in Computer Science is offered by both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Requirements differ according to college (see page 103 and pages 258-26).

² The Department of Economics is located administratively in the College of Business. The baccalaureate degree in Economics is offered by both the College of Liberal Arts and Sciences and the College of Business. Requirements differ according to college (see page 103 and pages 194-195).

³ This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

⁴ The major has only one formalized concentration, other areas of study are available.

Minors. Although not required for graduation, special college approved minors are available in most departments. Check department program descriptions for details. Minors offered by departments must have at least 18 hours of designated courses, including 12 hours of upper division work. The college requires a grade of at least "C" in all upper division courses in the minor. Some departments have stricter requirements. A minimum of six upper-division hours in the minor must be taken in residence (ASU Main).

University policies prohibit the "double counting" of courses from the major in the minor. Specific questions concerning double counting, as well as general questions about the approval processes for minors, should be taken up with an academic advisor in the department offering the minor or the CLAS Office for Academic Programs.

DEGREE REQUIREMENTS

Credit Requirement. All candidates for graduation in the B.A. and B.S. degree curricula are required to present at least 126 semester hours, of which at least 50 hours must consist of upper division courses. A minimum ASU cumulative GPA of 2.00 is required for graduation.

Course Load. The normal course load is 15-16 semester hours. First semester freshmen and entering transfer students are not permitted to register for more than 18 semester hours in the initial semester. Other students who wish to register for more than 18 hours must have a GPA of at least 3.00 and must file a petition in the Office for Academic Programs, SS 111, before registration. Any petition for an overload in excess of 21 hours must be presented to the Standards Committee of the college.

Foreign Language Requirement. The College of Liberal Arts and Sciences requires knowledge of one foreign language equivalent to the completion of two years' study at the college level. For more information, see page 124.

UNIVERSITY GENERAL STUDIES REQUIREMENTS

A well planned program of study enables students to complete university general studies requirements while fulfilling College of Liberal Arts and Sciences graduation requirements.

General studies courses are regularly reviewed. For specific requirements and to determine whether a course meets one or more general studies course credit requirements, see pages 50-71. General studies courses are also identified in the course descriptions according to the "Key to General Studies Credit Abbreviations," page 52. College graduation requirements are more extensive than the university general studies requirements. Additional course work in the humanities, natural sciences and mathematics, and social and behavioral sciences is required. It is also important to note that the college classification of the humanities, natural sciences and mathematics, and social and behavioral sciences is, in some courses, different from that used in the university general studies.

COLLEGE GRADUATION REQUIREMENTS

To graduate from the College of Liberal Arts and Sciences, a student must satisfy separate requirements of three kinds in addition to the university general studies requirements: *proficiency requirements* indicate a minimal level of competence in written communication, quantitative reasoning, and foreign language; *major requirements* involve concentrated course work in one field; and *distribution requirements* ensure that the student is exposed to disciplines outside the major field.

I. Proficiency Requirements. Each student is required to demonstrate proficiency in First Year Composition, a foreign language, and mathematics.

Each student must demonstrate proficiency by completing the courses specified below with a grade of "C" or better in each course. Courses used to meet a proficiency requirement may not ordinarily be used to satisfy the distribution requirement; the two exceptions are specified under III.A and III.B.

- A. First Year Composition
 1. ENG 101 and 102 or
 2. ENG 105 or
 3. ENG 107 and 108 for foreign students.
- B. Foreign Language
 1. completion of foreign language course work at the intermediate level (202 or equivalent; see Department of Languages and Literatures listings for these equivalencies) or
 2. a foreign language course at the 300 level or above taught in the foreign language and having 202 or equivalent as a prerequisite or
 3. completion of secondary education at a school in which the language of instruction is not English.
- C. Mathematics
 1. MAT 114 or 117 or
 2. any higher level MAT course

II. Major Requirements. Each student is required to select a major from among the fields of study offered by the College of Liberal Arts and Sciences. The requirements for completion of the major are described under departmental listings.

- A. The major department may require up to 45 semester hours of course work. The minimum is 30 hours. A maximum of 18 additional hours may be required in related courses and prerequisites. No more than 63 semester hours of course work may be required to complete the major, related courses, and prerequisites. Some departments require calculus level mathematics; up to five of these semester hours may be excluded from the 63 hour maximum because they satisfy the mathematics proficiency requirement. A minimum of 12 upper-division hours in the major must be taken in residence (at ASU Main).

B No credit is granted toward fulfilling major or minor requirements in any upper division course in that subject field unless the grade in that course is at least a "C." Normally a "Y" (satisfactory) grade needs confirmation that it is equivalent to a "C" or better.

C Major fields of study are classified into the following three divisions:

1. Humanities
 - Asian Languages
 - Chinese Japanese)
 - English
 - French
 - German
 - Humanities
 - Italian
 - Philosophy
 - Religious Studies
 - Russian
 - Spanish
2. Natural Sciences and Mathematics
 - Biology
 - Botany
 - Chemistry
 - Clinical Laboratory Sciences
 - Computer Science
 - Geology
 - Mathematics
 - Microbiology
 - Physics
 - Wildlife Conservation
 - Biology
 - Zoology
3. Social and Behavioral Sciences
 - Anthropology
 - Economics
 - Exercise Science/Physical Education*
 - Family Resources and Human Development
 - Geography
 - History
 - Political Science
 - Psychology
 - Sociology
 - Speech and Hearing Science[†]
 - Women's Studies*

* Students majoring in these fields must satisfy the distribution requirements in all three divisions

III. Distribution Requirements. The purpose of the distribution requirement is to ensure that the student is introduced to disciplines outside the division of the major. A list of major fields and their respective divisions is given under I.I.C.

Unless the major field carries an asterisk in I.I.C, students are considered to have fulfilled the distribution requirements in the division of the major.

Students majoring in Family Resources and Human Development, Exercise Science/Physical Education, Speech and Hearing Science, and Women's Studies must satisfy distribution requirements in social and behavioral sciences as well as in the other two divisions

Students majoring in Anthropology, Geography, and Psychology may not use ASM courses in the case of Anthropology majors, GPH courses in the case of Geography majors, or PSY courses in the case of Psychology majors to satisfy the natural sciences and mathematics requirements.

A. Humanities (15 semester hours). Each student is required to complete five courses of at least three semester hours each. Course prefixes are identified below.

At least three of the five courses must be taken in the (CLAS) Departments of English, Languages and Literatures, Philosophy, and Religious Studies and the Interdisciplinary Humanities Program. Two of these three courses must be at the 300 level or above.

Note: Literature or "civilization" courses (300 level or above) taught in a foreign language may be used to satisfy the humanities distribution requirement, even if they are also used to demonstrate foreign language proficiency (see I.B.).

Course prefixes for the humanities distribution requirement.

1. ENG (Department of English: any course except ENG 101, 102, 105, 107, 108, or their equivalents)

2. CHI, FLA, FRE, GER, GRK, HEB, IDN, ITA, JPN, LAT, POR, RUS, SPA, THA (Department of Languages and Literatures: FLA 150 or any literature or "civilization" course at the 300 level or above)
3. HUM (Interdisciplinary Humanities Program)
4. PHI, HPS (Department of Philosophy)
5. REL (Department of Religious Studies)
6. APH (School of Architecture, College of Architecture and Environmental Design)
7. ARS, DAH, MHL, MUS, THE (College of Fine Arts)

B. Natural sciences and mathematics (14 semester hours)

1. Part A (eight semester hours) Two courses (either lecture courses with included laboratories or lecture courses with appropriate accompanying laboratories) to be taken in the Departments of Botany, Chemistry and Biochemistry, Geography (GPH 111, and 212 with 214 only), Geology, Microbiology, Physics and Astronomy, or Zoology. Laboratories need to meet for at least 30 hours per semester. See departmental listings.
2. Part B (six semester hours). Two courses to be taken from the Departments of Anthropology (ASM only), Botany, Chemistry and Biochemistry, Computer Science and Engineering, Geography (GPH only), Geology, Mathematics, Microbiology, Physics and Astronomy, Psychology (PSY only), or Zoology. See departmental listings. Students who completed Part A using courses from only one department may not use courses from that department in Part B. Biology courses are considered to be from the departments of both Botany and Zoology for the purposes of this restriction.

Note: Only mathematics courses for which MAT 117 or a higher level mathematics course is a prerequisite may be used to satisfy natural sciences and mathematics distribution requirements. Mathematics courses for which MAT 117 is a prerequisite may be used to satisfy distribution requirements in natural sciences and mathematics, even if they were also used to demonstrate mathematics proficiency.

- C. Social and behavioral sciences (15 semester hours). Each student is required to complete five courses of at least three semester hours each.

Courses used to fulfill the social and behavioral sciences distribution requirement must be taken from no fewer than two but no more than three departments.

At least two courses must be at the 300 level or above.

Course prefixes for the social and behavioral sciences distribution requirement:

1. ASB (Department of Anthropology)
2. ECN (Department of Economics, College of Business)
3. GCU (Department of Geography)
4. HIS (Department of History)
5. POS (Department of Political Science)
6. PGS (Department of Psychology)
7. SOC (Department of Sociology)
8. WST (Women's Studies Program, only WST 100 or 300 but not both)

- IV. **General Electives.** CLAS majors can meet all of the above requirements with fewer than the 126 hours of credit required for graduation. The remainder of their hours are general electives that may be selected from any of the departments of the College of Liberal Arts and Sciences and from the offerings of the other colleges.

Program of Study. The program of study, which is required by university regulations during the semester in which a student earns the 87th hour, must be filed and approved at least two weeks before the preregistration period for the subsequent semester. Students are expected to follow the approved program of study or to receive early college approval for proposed changes to the program of study. Students should contact the college graduation office, SS 111, regarding college graduation rules and deadlines. Deadlines for filing a program of study after enrolling in the 87th hour are March 1 and October 1 of each year. Students with 87 hours must have a college approved program of study before registering for the next semester.

SPECIAL CREDIT OPTIONS

Pass/Fail Grade Option. The pass/fail grade option is intended to broaden the education of Liberal Arts and Sciences undergraduates by encouraging them to take advanced courses outside their specialization. A mark of "P" contributes to the student's earned hours but does not affect the GPA. A failing grade is computed into the GPA.

Only College of Liberal Arts and Sciences students with at least 60 semester hours may take courses under the pass/fail option. The option may be used under the following conditions:

1. enrollment for pass/fail needs the approval of the instructor and the college;
2. enrollment under this option must be indicated during registration and may not be changed after the late registration period; and
3. a maximum of 12 hours taken for pass/fail may be counted toward graduation.

Students may not enroll under the pass/fail option in the following courses.

1. those taken to satisfy the foreign language or English proficiency requirements;
2. those in the student's major or minor or certificate program;
3. those counted toward or required to supplement the major;
4. those counted as 499 Independent Study;
5. those taken for honors credits; or

6. those counted toward satisfying the proficiency and distribution requirements of the college or the university general studies requirements.

The above option is not available to College of Liberal Arts and Sciences students for courses offered by other colleges except for courses in economics offered by the College of Business.

Audit Grade Option. A student may choose to audit a course, in which case the student attends regularly scheduled class sessions but no credit is earned. The student should obtain the instructor's approval before registering for the course. For additional information see "Grading System," pages 45–48. *Note:* This grade option may not be changed after the late registration period.

Correspondence Study. Study by correspondence is not a normal part of a degree program; special circumstances must exist for a resident student to take correspondence courses. Any enrollment in correspondence courses must have prior approval of the college.

ACADEMIC STANDARDS

The standards for GPA and the terms of probation, disqualification, reinstatement, and appeal are identical to those of the university as set forth on page 49 of this catalog, except that the disqualified student in the College of Liberal Arts and Sciences is suspended for at least two regular semesters at the university. Students on probation normally have one semester in which to remove their probation. Students with cumulative GPAs of less than 2.00 who leave the university for a semester or more are not automatically readmitted. Such students, as well as all disqualified students, should contact the Office for Academic Programs, SS 111, regarding procedures and guidance for reinstatement and returning to good standing. By following recommendations and meeting established standards for summer school work or course work at other institutions, the possibility of successful reinstatement is enhanced.

Academic discipline is one of the functions of the Office for Academic Programs, SS 111. All students having academic difficulties of any kind should contact this office. Also available in this office is information on

policies and procedures of the college on academic honesty, student grievances with respect to grades, and various petitions regarding college standards and graduation requirements.

Academic honesty is expected of all students in all examinations, papers, academic transactions, and records. The possible sanctions include but are not limited to appropriate grade penalties, loss of registration privileges, disqualification, and dismissal.

STUDENT RESPONSIBILITIES

Any student enrolling in courses offered by the College of Liberal Arts and Sciences is expected to follow the rules and deadlines specified in the *General Catalog* and the current *Schedule of Classes*. Students are urged to meet with their departmental academic advisors before registration. Students with additional questions or problems are also urged to meet with advisors in the college office, SS 111, regarding the academic rules of the college and the university.

SPECIAL PROGRAMS

University Honors College. The College of Liberal Arts and Sciences works closely with the University Honors College, which affords qualified undergraduates opportunities for enhanced educational experiences. For a complete description of the University Honors College requirements and opportunities, see the description on pages 79-81.

Interdisciplinary Studies. An Interdisciplinary Studies major leading to the B.A. or B.S. degree provides students of outstanding ability in the humanities, natural sciences and mathematics, and social and behavioral sciences opportunities to pursue courses of studies that cut across departmental boundaries and focus on specific topics or problem areas. Completion of 32 semester hours with a GPA of at least 3.25 and three letters of recommendation from ASU faculty members are required for admission. For more information about degree requirements, contact the Office for Academic Programs in the College of Liberal Arts and Sciences, SS 111.

Washington Semester Program. Students have a variety of opportunities for practicum and internship experiences that enable them to meld classroom

learning with practical application. Among the several individual departmental programs that provide internships for majors, the Department of Political Science is the ASU sponsor of the Washington Semester Program. The program provides students a one-semester opportunity to study in Washington, D.C., through any one of several programs sponsored by the American University. The program is available to outstanding juniors or seniors and requires careful planning with an academic advisor early in the student's career. Call the Department of Political Science, 602/965-6551, for more information.

Military Officer Training. The Departments of Aerospace Studies and Military Science offer programs leading to commissions in the armed forces, but they do not offer majors or minors. For further information, see the appropriate department descriptions in this catalog.

Certificate Programs and Areas of Emphasis

Asian Studies. An Asian Studies certificate is offered through the Center for Asian Studies and enables students to apply Asian emphasis courses toward an undergraduate degree from any college at ASU.

Students must complete two years (20 semester hours) of an Asian language plus 30 additional hours of Asian area studies courses selected from core Asian studies courses or courses with a significant focus on Asia chosen in consultation with the Center for Asian Studies advisor. Students whose native language is an Asian language or who have otherwise mastered an Asian language may elect to take four additional Asian studies courses in place of the elementary and intermediate language classes. Language requirements may be selected from Chinese, Japanese, Vietnamese, Indonesian, and Thai.

An East Asian Studies certificate is also available. Students must complete two years (20 semester hours) of Chinese or Japanese plus 30 additional semester hours of East Asian area studies courses selected from the core East Asian curriculum or course with a significant focus on East Asia chosen in consultation with the Center for Asian Studies director. Note that students whose native language is Chinese or

Japanese or who have otherwise mastered these languages may elect to take four additional East Asian studies courses in place of the elementary and intermediate language courses.

The center houses a comprehensive library and is involved in student and faculty exchange programs with several Asian universities as well as serving as a liaison with various Asian organizations.

A Southeast Asian Studies certificate program is also available (see Southeast Asian Studies). For more information, contact the Center for Asian Studies, WHALL 109, 602/965-7184.

Health Physics. The curriculum of health physics involves work in the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. The purpose of the concentration is to serve undergraduate students who wish to prepare themselves for careers in health physics. To qualify for professional status, a health physicist needs a B.S. degree in one of the physical or life sciences and a group of specialized courses in physics, mathematics, chemistry, engineering, and biology or zoology.

A Certificate of Concentration in Health Physics is awarded for the successful completion of a B.S. degree in a physical or life science that follows a prescribed program. Inquiries about the program should be addressed to the Pre Health Professions Office, 602/965-2365, where academic advisement is available.

Jewish Studies. The Jewish studies program is designed with the following goals in mind:

1. to examine the history and culture of the Jews,
2. to provide a model for interdisciplinary teaching and research;
3. to generate and facilitate research on Judaica;
4. to provide the community with programs, courses, and research furthering the understanding of Judaica; and
5. to stand as an example of the university's commitment to a program of meaningful ethnic studies on a firm academic base.

The Certificate of Concentration in Jewish Studies may be combined with a major in any college. For information about the program, refer to the Depart

ment of History or the Department of Religious Studies or the chair of the Jewish Studies Committee listed in the current *Schedule of Classes*.

Latin American Studies. The Latin American area studies program is designed to give students an understanding of public affairs, culture, and national trends in Latin American nations and is offered as a combined degree program in cooperation with the Departments of Anthropology, Economics, Languages and Literatures, Geography, History, and Political Science and the College of Business. In this program, the students major in one of the cooperating departments, completing the degree requirements of that particular discipline. At least 30 upper division semester hours of the total program must be in Latin American content courses, 15 hours in the major, and 15 hours in other disciplines. A reading knowledge of Spanish or Portuguese is required. Fulfillment of requirements is recognized on the transcript by a bachelor's degree in "(major)—Latin American Studies."

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

Museum Studies. The Department of Anthropology's program in museum studies is designed to prepare students for curatorial and associated positions in museums of anthropology, art, history, natural history, science, and related fields. Course offerings include the history and philosophy of museums, administration, collection management and conservation, exhibition design and preparation, public programming and interpretation, and computers in museums. The certificate is awarded to undergraduate, graduate, and unclassified students who successfully complete 12 hours of required course work plus 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.

For more information, call the director of museum studies at 602/965 5266.

Russian and East European Studies. Any undergraduate major can earn a Certificate in Russian and East European Studies by successfully completing one of the following options.

Option one requires three years of Russian or two years of Russian and one year of another East European language and 30 upper division semester hours in Russian and/or East European course work. *Option two* requires two years of Russian and 36 upper division hours in Russian and/or East European course work. Fulfillment of these requirements is recognized on the transcript by a bachelor's degree in "(Discipline)—Russian/East European Studies."

For more information, call the coordinator of the Russian and East European Consortium, in the Department of History at 602/965 5778.

Southeast Asian Studies. A Certificate in Southeast Asian Studies is awarded to any undergraduate student who elects an interdisciplinary focus in Southeast Asian studies while completing degree requirements in any discipline or professional program. The certificate program offers two options: (1) an area studies specialization emphasizing courses in the social sciences and humanities and requiring one year of Indonesian, Thai, or Vietnamese and (2) a language specialization requiring a two year sequence in a Southeast Asian language and a proportional number of area studies courses. Students wishing to study a Southeast Asian language other than those offered on campus may transfer credits earned at the Southeast Asian Studies Summer Institute, a consortium for intensive language and area studies, or at other accredited programs. Qualified students may request placement testing on other national languages of the region, administered in accordance with the national ACTFL guidelines.

The ASU curriculum includes language instruction in Indonesian, Thai, or Vietnamese, ASB 240/GCU 240/HIS 240/POS 240/REL 240 Introduction to Southeast Asia, HIS 394 Modern Southeast Asian History, electives in the social sciences and humanities on the history, geography, culture, politics, and religion of the region, and a culminating capstone seminar in which the students share multidisciplinary approaches to the region and integrate knowledge of Southeast Asia with their respective disciplinary orientations.

Courses counting toward the Certificate in Southeast Asian Studies fulfill requirements for undergraduate majors and general studies in the social and be

havioral sciences, humanities, literacy, and global and historical awareness areas. A two year sequence in Southeast Asian language study meets the foreign language requirement for undergraduates in the College of Liberal Arts and Sciences.

The Program for Southeast Asian Studies is a federally funded National Resource Center for Southeast Asia. For more information, contact the Program for Southeast Asian Studies, LL C32, 602/965-4232.

Translation. See page 124 for information about the Certificate in Translation.

Women's Studies. The curriculum of women's studies involves courses from colleges throughout the university. The program is designed with the following goals in mind:

1. to examine the central issues of the quality and shape of women's lives;
2. to provide a model for interdisciplinary teaching and research;
3. to generate and facilitate research on women's experience;
4. to provide the university and the community with programs, courses, and research that acknowledge and expand the potential of women; and
5. to stand as a visible example of the university's commitment to change in the status of women.

A Certificate of Concentration in Women's Studies is awarded for the successful completion of either WST 100 or 300, 498, and an additional 15 semester hours from the list of approved women's studies courses, only six hours of which may also be applied toward the student's major.

Inquiries about the program should be addressed to the Women's Studies Program, SS 104, 602/965 2358, where the current list of approved courses is available.

GENERAL INFORMATION

Research Centers. To expand educational horizons and to enrich the curriculum, the College of Liberal Arts and Sciences maintains the following research centers:

Arizona Center for Medieval and Renaissance Studies
Cancer Research Institute
Center for Asian Studies

Center for Latin American Studies
Center for Meteorite Studies
Center for Solid State Science
Hispanic Research Center

See the *Graduate Catalog* for a description of these research centers.

LIBERAL ARTS AND SCIENCES

LIA 390 The Use of Research Libraries. (3) F, S

Interdisciplinary resources and services of libraries particularly this university with emphasis on research information literacy and applied critical thinking skills. Lecture/discussion, site visits. *General studies L1*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Aerospace Studies

Air Force ROTC

Col. Merrill R. Karp

Chair

(MAIN 340) 602/965-3181

PROFESSOR

KARP

ASSISTANT PROFESSORS

BENNETT, HALL, McKOWN

Purpose. The Department of Aerospace Studies curriculum consists of the general military course and history for freshmen and sophomores (AES 101, 102, 201, 202) and the professional officer course for juniors and seniors (AES 301, 302, 401, 402).

General Qualifications. A man or woman entering the Air Force Reserve Officers' Training Corps (AFROTC) must be the following:

1. a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. of sound physical condition; and
3. at least 17 years of age for scholarship appointment or admittance to the Professional Officer Course (POC).

Additionally, scholarship recipients must be able to fulfill commissioning requirements by age 25. If designated for flying training, the student must be able to complete all commissioning requirements before age 26 and a half, persons in other categories must be able to complete all commissioning requirements before age 30.

Four-Year Program (GMC and POC). A formal application is not required for students entering the four year program. A student may enter the program by simply registering for one of the general military course (GMC) classes at the same time and in the same manner as other courses. GMC students receive two semester hours for each AES 100 and 200 class completed for a total of eight semester hours. GMC students not on AFROTC scholarship incur no military obligation. Each candidate for commissioning must pass an Air Force aptitude test and a physical examination and be selected by a board of Air Force officers. If selected, the student then enrolls in the POC the last two years of the AFROTC curriculum. Students attend a four week field training course at an Air Force base normally between the sophomore and junior years. Upon successful completion of the POC and the college requirements for a degree, the student is commissioned in the U.S. Air Force as a second lieutenant. The new officer then enters active duty or may be granted an educational delay to pursue graduate work.

Two-Year Program (POC). The basic requirement for entry into the two year program is that the student have two academic years of college work remaining, either at the undergraduate or graduate level. Applicants seeking enrollment in the two year program must pass an Air Force aptitude and medical examination and be selected by a board of Air Force officers. After successfully completing a six week field training course at an Air Force base, the applicant may enroll in the professional officer course in the AFROTC program. Upon completion of the POC and the college requirements for a degree, the student is commissioned.

Qualifications. The following requirements must be met for admittance to the POC:

1. The four year student must successfully complete the general military course and the four week field training course.
2. The two year applicant must complete a six week field training course.
3. All students must pass the Air Force Officer Qualifying Test (AFOQT).

4. All students must pass the Air Force physical examination.
5. All students must maintain the minimum GPA required by the college.

Pay and Allowances. POC members in their junior and senior years receive \$100.00 per month for a maximum of 20 months of POC attendance. Students are also paid to attend field training. In addition, uniforms, housing, and meals are provided during field training at no cost to the student. Students are reimbursed for travel to and from field training.

Scholarships. AFROTC offers scholarships annually to outstanding young men and women on a nationwide competitive basis. Scholarships cover college tuition for resident and nonresident students and provide an allowance for books, fees, supplies and equipment, and a monthly tax free allowance of \$100.00. Scholarships are available on a four and two year basis. To qualify for the four year scholarship, a student must be a U.S. citizen and submit an application before December 1 of the senior year in high school. Interested students should consult their high school counselors or call AFROTC at ASU for application forms to be submitted to: HQ AFROTC, Maxwell AFB, Alabama 36112-6663. Students enrolled in AFROTC at ASU are eligible for two year scholarships. Those students interested must apply through the Department of Aerospace Studies. Consideration is given to academic grades, the score achieved on the AFOQT, and physical fitness. A board of officers considers an applicant's personality, character, and leadership potential.

Flight Screening Program (FSP). A cadet designated to enter U.S. Air Force Undergraduate Pilot Training after graduation participates in FSP after the junior year in college. This program trains and motivates pilot candidates.

AEROSPACE STUDIES

AES 101 U.S. Air Force Organization. (2) F Introduction to U.S. Air Force organization, mission, doctrine, offensive and defensive

102 Leadership Lab. (0) F Emphasis on common Air Force customs and courtesies and ceremonies health and physical fitness through group participation. Corequisite: AES 101

103 Nature of U.S. Air Power. (2) S

Background on strategic missile defense forces, general purpose, and aerospace support forces in national defense

104 Leadership Lab. (0) S

Continuation of AES 102 with more in depth emphasis on learning the environment of an Air Force officer. Corequisite: AES 103.

201 Aerospace History to WWII. (2) F

Historical survey of events, trends and policies leading to the emergence of a superpower through WWII

202 Leadership Lab. (0) F

Application of advanced direction and ceremonies, issuing commands, knowing flag etiquette, and developing directing and evaluating skills to lead others. Corequisite: AES 201

203 Aerospace History: WW II to Present. (2) S

Aerospace power from WWII to the present emphasizing the impact of limited war and technology on roles and missions.

204 Leadership Lab. (0) S

Continuation of AES 202 with an emphasis on preparation for field training. Corequisite: AES 203

301 U.S. Air Force Communication Management and Leadership. (3) F

The individual as a manager in the Air Force. Covers motivation and behavior processes, leadership, communication and group dynamics. *General studies: L2.*

302 Leadership Lab. (0) F

Advanced leadership experiences apply leadership and management principles to motivate and enhance the performance of other cadets. Corequisite: AES 301.

303 U.S. Air Force Management and Leadership. (3) S

Organizational and personal values, management of forces in change, organizational power, politics, managerial strategy, and tactics. *General studies: L2*

304 Leadership Lab. (0) S

Continuation of AES 302 with emphasis on planning the military activities of the cadet corps and applying advanced leadership methods. Corequisite: AES 303

401 National Security Institutional Policy and Strategy. (3) F

Emphasis on the broad range of American civil-military relations, the political, economic, and social constraints on the national defense. *General studies: L2*

402 Leadership Lab. (0) F

Advanced leadership experience demonstrating earned skills in planning and controlling the military activities of the corps. Corequisite: AES 401.

403 Topical and Regional Security Issues. (3) S

Formation and implementation of U.S. defense policies: impact of technological and international developments in the overall defense policy-making processes

404 Leadership Lab. (0) S

Continuation of AES 402 with an emphasis on preparation for transition from civilian to military life. Corequisite: AES 403

Omnibus Courses: See page 44 for omnibus courses that may be offered

Anthropology

Charles L. Redman
Chair

(ANTH A124) 602/965-6213

REGENTS' PROFESSOR
TURNER

PROFESSORS

BAHR, CHANCE CLARK, COWGILL, EDER, FOSTER, KOSS, MARTIN, MERBS, MORRIS, NASH, REDMAN, SCHOENWETTER, STARK, WILLIAMS

ASSOCIATE PROFESSORS

AGUILAR ALVAREZ, BRANDT, CARR, FIRESTONE, HEDLUND, HUDAK KINTIGH, MARZKE, RICE, SPIELMANN

ASSISTANT PROFESSORS

FALCONER, STEADMAN, WELSH

LECTURER

WINKELMAN

ACADEMIC PROFESSIONAL

BARTON

PROFESSORS EMERITI

DITBERT, GAINES, STEWART

ANTHROPOLOGY—B.A.

The program consists of 45 semester hours, of which 36 must be in anthropology and nine in related fields to be approved by the advisor in consultation with the student. Course requirements are distributed as follows:

1. ASB 102 and ASM 101;
2. six hours, including at least one course at the 300 level or above, in each of the following subfields: social-cultural anthropology, physical anthropology, and archaeology, and
3. three hours each in linguistics, an ethnographic area course, and an archaeology or physical anthropology area course.

Three of the nine hours in related fields must be in statistics. Each student's program of study must be approved by the advisor in consultation with the student. At least 18 semester hours must be in upper-division courses. For details see the departmental brochure. See "Foreign Language Requirement and Placement," page 124.

Latin American Studies Emphasis.

Students majoring in Anthropology may elect to pursue a Latin American Studies emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

Minor in Anthropology

The Anthropology minor requires 18 semester hours. Two courses, ASB 102 and ASM 101, are required. The other 12 hours must be upper-division and represent at least two of the three subfields of anthropology. For more information, consult the department office.

SECONDARY EDUCATION—B.A.E.

Social Studies. The major teaching field consists of 63 semester hours, of which 30 hours must be in the anthropology courses required for the B.A. degree. Of the remaining hours, two groups of 15 hours are to be taken in related social sciences. Psychology or a single natural science may be used as one of the 15-hour fields. SED 480 is taken to provide the remaining three hours.

Semester Hours

SED 480 Special Methods of Teaching Social Studies	3
Anthropology	30
Social sciences	15
Social sciences, natural sciences, or psychology	15
Total	63

The minor teaching field consists of 24 semester hours in anthropology. Courses ASB 102 and ASM 101 and two upper-division courses in each subdisciplinary field (archaeology, physical anthropology, and social-cultural anthropology) are required

GRADUATE PROGRAM

The Department of Anthropology offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

ANTHROPOLOGY (ASM)

ASM 101 Human Origins and the Development of Culture. (3) F, S

Physical anthropology and archaeology. Evidence and processes of human evolution and of culture change. Primate fossils, hominids and their tools. Race, variation, and heredity. Environment and human biology. Prehistoric culture and society. *General studies: SB*

241 Biology of Race. (3) F, S

Human variation and its interpretation in an evolutionary context.

301 Peopling of the World. (3) S

Course reviews a) evidence for human dispersals during the last 100,000 years, origins of language, cultures, races, and beginnings of modern humans. Prerequisite: ASM 101. *General studies: SB, G*

338 Anthropological Field Session. (2–8) S

Anthropological field techniques, analysis of data and preparation of field reports. May be repeated for credit. Prerequisite: instructor approval.

341 Human Osteology. (4) F

Osteology: human paleontology, and osteometry. Description and analysis of archaeological and contemporary human populations. 3 hours lecture, 3 hours lab. Prerequisite: ASM 101 or instructor approval.

342 Human Biological Variation. (4) S

Evolutionary interpretations of biological variation in human populations, with emphasis on anthropological genetics and adaptation. Nutrition and disease and their relation to genetics and behavior. 3 hours lecture, 3 hours lab. Prerequisites: ASM 101 and MAT 106 (or equivalent) or instructor approval. *General studies: S2.*

343 Primatology. (3) F

Evolution and adaptations of nonhuman primates, emphasis on social behavior. Includes material from fossil evidence and field and laboratory studies on behavior and biology. Prerequisite: ASM 101 or instructor approval.

344 Fossil Hominids. (3) N

Ancient African, Asian, and European human and primate skeletal and cultural remains. Human biology, behavior, and cultural evolution. Prerequisite: ASM 101 or instructor approval. *General studies: SB*

345 Disease and Human Evolution. (3) F

Interaction of people and pathogens from prehistoric times to the present, with emphasis on disease as an agent of genetic selection. Prerequisite: ASM 101 or instructor approval. *General studies: H*

346 Human Origins. (3) S

Humanity's place in nature: fossil, historic, and recent concepts of human races; influence of culture on human evolution.

348 Social Issues in Human Genetics. (3) S

Morality and social implications of developments in genetic science, particularly as they affect reproduction, medicine, and evolution. *General studies: SB.*

365 Laboratory Methods in Archaeology. (4) N

Techniques of artifact analysis. Basic archaeological research techniques, methods of report writing. May be repeated for credit for total of 8 hours. Prerequisite: ASM 101 or instructor approval.

435 Archaeological Pollen Analysis. (3) F

Theory, methodology, and practice of pollen analytical techniques. Compares uses in botany, geology, and archaeology. 2 hours lecture, 3 hours lab, possible field trips. Prerequisite: instructor approval.

450 Bioarchaeology. (3) S

Surveys archaeological and physical anthropological methods and theories for evaluating skeletal and burial remains to reconstruct biological adaptation and lifeways. Prerequisite: ASM 101 or instructor approval.

452 Dental Anthropology. (4) F

Human and primate dental morphology, growth, evolution, and genetics. Within and between-group variation. Dental pathology and behavioral-cultural dietary factors. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval. *General studies: S2*

454 Comparative Primate Anatomy. (4) S

Functional anatomy of the cranial, dental, and locomotor apparatus of primates, including humans, emphasizing the relation of morphology to behavior and environment. Lectures, lab, dissections, demonstrations. 3 hours lecture, 3 hours lab. Prerequisite: instructor approval.

455 Primate Behavior Laboratory. (3) N

Instruction and practice in methods of observation and analysis of primate behavior. Discussion of the relationship between class work on captive animals and field techniques for studying free-ranging groups. Directed readings, 6 hours lab. Prerequisites: ASM 343, instructor approval. *General studies: L2.*

465 Quantification and Analysis for Anthropologists. (3) S

Statistical, quantitative, and geometric strategies for environmental and exploring archaeological, physical anthropological, bioarchaeological, and socioeconomic data. Univariate and multivariate methods. Prerequisite: introductory statistics course. Instructor approval.

472 Archaeological Ceramics. (3) N

Analysis and identification of pottery wares, types, and varieties. Systems for ceramic classification and cultural interpretation. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.

548 Geoarchaeology. (3) F

Geological context relevant to archaeological research. Topics include sediments, deposition environments, soils, anthropogenic and biogenic deposits, and Quaternary chronology. Prerequisite: instructor approval.

555 Advanced Human Osteology. (3) N

Laboratory and field techniques in dealing with the human skeleton. Emphasis on preparation, identification, radiography, sectioning, microscopy, and data processing. 1 hour lecture, 6 hours lab. Prerequisite: ASM 341 or instructor approval.

565 Quantitative Archaeology. (3) S

Formal methods of structuring, codifying, and analyzing data for archaeological problems. Designing research to yield data amenable to productive analysis.

566 Advanced Topics in Quantitative Archaeology. (3) F

Archaeological issues associated with quantitative analysis, e.g., Bayesian and Monte Carlo approaches to mutation diversity. May be repeated for credit. Prerequisite: ASM 565 or instructor approval.

573 Lithic Analysis. (3) N

Analysis and interpretation of chipped stone artifacts. Focus on both techniques and underlying concepts and their application to real collections. Prerequisite: instructor approval.

591 Seminar. (3) N

Selected topics in archaeology and physical anthropology.

(a) Physical Anthropology

(b) Primates and Behavior

(c) Bioarchaeology

(d) Evolution and Culture

Cross-listed as ASB 591

(e) Interdepartmental Seminar

Cross-listed as ASB 591

Omnibus Courses: See page 44 for omnibus courses that may be offered.

ANTHROPOLOGY (ASB)**ASB 102 Introduction to Cultural and Social Anthropology.** (3) F, S

Principles of cultural and social anthropology with illustrative materials from a variety of cultures. The nature of culture, social, political, and economic systems; religion, aesthetics and language. *General studies: SB, G*

202 Ethnic Relations in the United States. (3) F, S

Processes of intercultural relations; systems approach to history of U.S. interethnic relations, psychocultural analysis of contemporary U.S. ethnic relations. *General studies: C, H*

210 Sex, Marriage, and Evolution. (3) F

Examination of the sexual nature and behavior of humans from both a biological and an anthropological point of view.

211 Women in Other Cultures. (3) N

Cross-cultural analysis of the economic, social, political, and religious factors that affect women's status in traditional and modern societies. *General studies: G.*

222 Buried Cities and Lost Tribes: Our Human Heritage. (3) S

Archaeology through its most important discoveries: human origins, Pompeii, King Tut, the Holy Land, Southwest Indians, and methods of field archaeology. *General studies: HU*

231 Archaeological Field Methods. (4) S

Excavation of archaeological sites and recording and interpretation of data. Includes local field experience. 2 hours lecture, 8 hours lab. Prerequisite: ASM 101 or instructor approval. *General studies: S2*

240 Introduction to Southeast Asia. (3) F

An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as GCU 240/HIS 240/POS 240/REL 240. *General studies: G*

242 Asian American Experiences: An Anthropological Perspective. (3) F

The historical and contemporary experiences of Asian Americans in terms of the anthropological concepts of culture, ethnicity, and adaptation. *General studies: L1, C*

250 Anthropology Topics. (3) S

Covers five areas of anthropological inquiry. Emphasizes library research, critical analysis, and communication skills relevant to upper-levels on anthropology course work. Prerequisites: ASB 102, ASM 101 or equivalent; completion of the First-Year Composite requirement. *General studies: L1.*

302 Ethnographic Field Study in Mexico. (3) SS

Fieldwork study of cultural adaptation, Mexican culture, United States-Mexican cultural conflict, ethnographic research methods, and local culture. Lecture, discussion, field research. Pre- or corequisite: Span 101 or equivalent.

311 Principles of Social Anthropology. (3) S

Comparative analysis of domestic groups and economic and political organizations in primitive and peasant societies. *General studies: SB.*

314 Comparative Religion. (3) F, S

Origins, elements, forms, and symbolism of religion: a comparative survey of religious beliefs and ceremonies, the place of religion in the total culture. Prerequisite: ASB 102 or instructor approval.

319 The North American Indian. (3) A Archaeology ethnology and linguistic relationship of the Indians of North America. Does not include Middle America. Prerequisite: ASB 102 or instructor approval.

320 Indians of Arizona. (3) F The traditional cultures and the development and nature of contemporary political, economic and educational conditions among Arizona Indians.

321 Indians of the Southwest. (3) S Cultures of the contemporary Indians of the Southwestern United States and the historic antecedents. Prerequisite: ASB 102 or instructor approval. *General studies: L2, SB, H*

322 Indians of Mesoamerica. (3) S Historic tribes and folk cultures. Prerequisite: ASB 102 or instructor approval. *General studies: G*

324 Peoples of the Pacific. (3) N Peoples and cultures of Oceania focusing particularly on societies of Melanesia, Micronesia and Polynesia. Prerequisite: ASB 102 or instructor approval. *General studies: G*

325 Peoples of Southeast Asia. (3) F A cultural-ecological perspective on the peoples of mainland and insular Southeast Asia. Subsistence modes, social organization, and the impact of modernization. Prerequisite: ASB 102 or instructor approval. *General studies: G*

330 Principles of Archaeology. (3) F Prehistoric societies. Survey of dating methods, field techniques, and artifact inventories. Geographic context, and geogocare relationship. *General studies: SB*

333 New World Prehistory. (3) F The variety of archaeological patterns encountered in the Western Hemisphere. Covers the period from the appearance of humans in the New World to European contact. Covers the area from Alaska to Tierra de Fuego. Prerequisite: completion of the First-Year Composition requirement. Prerequisite: 1 upper-division ASU course. *General studies: L2, SB*

334 Arctic Anthropology. (3) S Past and present Aleut Eskimo prehistory, origins, physical features, adaptations, variation, and culture, with comparisons of Asian Arctic populations. Prerequisite: instructor approval. *General studies: G*

335 Southwestern Anthropology. (3) N Past cultures in the Southwest and the relation to present peoples using archaeological, ethnological, and linguistic evidences. Environmental and resource utilization from earliest times to the present. *General studies: SB, C, H*

337 Pre-Hispanic Civilization of Middle America. (3) S Pre-conquest cultures and civilizations of Mexico. The Aztecs, Mayas and their predecessors. Prerequisite: ASM 101 or instructor approval. *General studies: H*

338 Archaeology of North America. (3) N Origin, spread, and development of the prehistoric Indians of North America up to the historic tribes. Does not include the Southwest. Prerequisite: ASM 101 or instructor approval.

350 Anthropology and Art. (3) A Art forms of people in relationship to their social and cultural setting. Prerequisite: ASB 102 or instructor approval.

351 Psychological Anthropology. (3) S Approaches to the interrelationship between the personality system and the socio-cultural environment. Prerequisite: ASB 102 or instructor approval. *General studies: SB*

353 Death and Dying in Cross-Cultural Perspective. (3) S Humanistic and scientific study of aging, sickness, dying, death, funerals and grief and the philosophy and ecology in non-Western and Western cultures. *General studies: HU, SB, G*

355 Shamanism, Healing and Consciousness. (3) S Worldviews, practices and roles of shamans and traditional and contemporary healers, explanatory biopsychological models of consciousness. *General studies: HU, SB*

361 Old World Prehistory I. (3) F Biosocial evolution in the Pleistocene, emphasizing technological achievements and the relationship between technology and environment in western Europe, sub-Saharan Africa. Prerequisite: ASM 101 or instructor approval. *General studies: H*

362 Old World Prehistory II. (3) S Transition from hunting and collecting societies to domestication, economies, establishment of settled village life emphasizing the Near East, Egypt, Southwest Europe. Prerequisite: ASM 101 or instructor approval. *General studies: H*

383 Linguistic Theory: Phonetics and Phonology. (4) F Basic articulatory phonetics and contemporary theories of the sound system of language. 3 hours lecture, 1 hour lab. *General studies: SB*

400 Cultural Factors in International Business. (3) S Anthropological perspectives on international business relations, applied principles of cross-cultural communication and management. Regional approaches to culture and business. Cross-listed as BS 400.

411 Kinship and Social Organization. (3) S Meanings and uses of concepts referring to kinship, consanguinity, affinity, descent, alliance, and residence in the context of a survey of the varieties of social groups, marriage, rules, and kinship terminology systems. Prerequisite: 6 hours of anthropology or instructor approval.

412 History of Anthropology. (3) F Historical treatment of the development of the culture concept and its expression in the chief theoretical trends in anthropology between 1860 and 1950. Prerequisite: ASB 102 or instructor approval. *General studies: L2, SB*

416 Economic Anthropology. (3) F Economic behavior and the economy in pre-industrial societies: description and classification of exchange systems, relations between production, exchange systems, and other societal subsystems. Prerequisite: ASB 102 or instructor approval. *General studies: L2, SB*

417 Political Anthropology. (3) A Comparative examination of the forms and processes of political organization and activity in primitive peasant and complex societies. Prerequisite: ASB 102 or instructor approval.

426 Historical Archaeology. (3) N Principles, techniques and important sites. Use of ethnohistory, laboratory techniques and artifact analysis. Discussion of value to historical understanding. Prerequisite: 1 course in archaeology or instructor approval.

462 Medical Anthropology: Culture and Health. (3) F 94 Role of culture in health, illness, and curing health status, provider relationships, and indigenous healing practices in United States ethnic groups. Lecture, discussion. *General studies: C*

471 Introduction to Museums. (3) F History, philosophy and current status of museums. Exposition, education, and research activities in different types of museums. Prerequisites: ASB 102 and ASM 101 or instructor approval.

480 Introduction to Linguistics. (3) F Descriptive and historical linguistics. Survey of theories of human language, emphasizing synchronic linguistics. *General studies: SB*

481 Language and Culture. (3) S Application of linguistic theories and findings to nonlinguistic aspects of culture, language change, psycholinguistics. Prerequisite: ASB 102 or instructor approval. *General studies: SB*

483 Sociolinguistics and the Ethnography of Communication. (3) N Relationships between linguistic and social categories, functional analysis of language use, maintenance, and diversity. Interact on between verbal and nonverbal communication. Prerequisites: ASB 480 and ENG 213 (or FLA 400) or instructor approval. *General studies: SB*

530 Ecological Anthropology. (3) A Relations among the population dynamics, social organization, culture, and environment of human populations, with special emphasis on hunter-gatherers and extensive agriculturalists.

532 Graduate Field Anthropology. (2-8) S Independent research on a specific anthropological problem to be selected by the student in consultation with the staff. May be repeated for credit. Prerequisites: ASM 338 or equivalent; instructor approval.

535 Public Archaeology. (4) N Theoretical and practical applications of cultural resources legislation and policy. Legal and administrative requirements; conservation, development, and management of cultural resources. CRM research design formulation. Seminar, field work. Prerequisites: regular graduate student standing; 12 completed graduate hours in archaeology. Instructor approval.

537 Topics in Mesoamerican Archaeology. (3) N Changing organization of pre-Columbian civilizations in Mesoamerica is explored through interpretive issues such as regional analysis, chiefdoms, urbanism, and exchange. Prerequisite: instructor approval.

540 Method and Theory of Sociocultural Anthropology and Archaeology I. (3) F Basic issues concerning concepts of social and ethnic groups, cultural and sociological theory, and the nature of anthropological research. Prerequisite: instructor approval.

541 Method and Theory of Social and Cultural Anthropology. 3 S

Continuation of ASB 540 Prerequisite ASB 540 or instructor approval

542 Method and Theory of Archaeology II. 3 S

Modes of human evolution, culture change and interpretation of hunter-gatherer and tribal societies, ceramic, lithic and faunal materials Prerequisite: instructor approval

543 Method and Theory of Archaeology III. 3 F

Covers concepts of social complexity along with economy, demography and social dynamics, followed by archaeological research designs Prerequisite: instructor approval

544 Settlement Patterns. 3 N

Spatial arrangement of residences, activities, and communities over and above emphasis on natural and cultural factors influencing settlement patterns Prerequisite: instructor approval

546 Pleistocene Prehistory. 3 F

Development of society and culture in the Old World during the Pleistocene epoch emphasis on technological change through time and the relationship of people to the environment Prerequisite ASB 361 or equivalent

547 Issues in Old World Domestication Economies. (3) S

Archaeological evidence for transitions in Old World subsistence economies from hunting and gathering to dependence on domesticated plants and/or animals. Prerequisite ASB 362 or equivalent

550 Economic Archaeology. 3 N

Prehistoric economies in hunter-gatherer tribal, and complex societies. Subsistence strategies, craft production and specialization and exchange covered Prerequisite: instructor approval

551 Prehistoric Diet. (3) N

Includes (1) a critical review of techniques for recovering dietary information and (2) the relevant models concerned with experimental diet and nutrition. Prerequisite: instructor approval

555 Complex Societies. (3) S

Structural variations in hierarchical organization and social evolution with ongoing dynamics and collapse are examined Seminar.

559 Archaeology and the Ideational Realm. 3 N

"Post-processual" and other views concerning relevance of mental phenomena for understanding socio-cultural change. Various approaches to inferring prehistoric meanings.

563 Hunter-Gatherer Adaptations. 3 N

Evolution of prehistoric hunter-gatherer societies in the Old and New Worlds from the most ancient times through protohistoric eras. Prerequisite: instructor approval

567 Southwestern Archaeology. (3) S

Broad coverage of Southwestern cultural developments focusing on current debates and rigorous use of archaeological data in making cultural inferences

568 Intrasite Research Strategies. 3 F

Research issues within a single site context. Topics include quantitative spatial analysis, site definition, sampling distribution analysis, and substantive interpretation

571 Museum Principles. 3 F

History, philosophy and current status of museums. Exploration of collecting, preservation, exhibition, education and research activities in different types of museums Prerequisites: ASB 102 and ASM 101 or instructor approval

572 Museum Collection Management. (3) S

Principles and practices of acquisition, documentation, care and use of museum collections registration, cataloging and preservation methods, legal and ethical issues Prerequisite ASB 571 or instructor approval

573 Museum Administration. 3 S

Formal organization and management of museums: governance, personnel matters, fundraising and grantsmanship, legal and ethical issues Prerequisite ASB 571 or instructor approval

574 Exhibition Planning and Design. (3) S

Exhibition philosophy and development, processes of planning, design, staging, installation, evaluation and disassembly temporary and long-term exhibits Prerequisites ASB 571 and 572 or instructor approval

575 Computers and Museums. (3) F

Basics of museum computer application; hardware and software fundamentals of database management issues of research collections management and administration

576 Museum Interpretation. (3) F

Processes of planning, implementing, documenting and evaluating educational programs in museums for varied audiences—children, adults, and special interest groups. Lecture, discussion Prerequisite ASB 571

577 Principles of Conservation. (3) S

Preservation of museum objects: nature of materials, environmental controls and causes of degradation; recognizing problems, damage and solutions; proper care of objects. Prerequisites ASB 571 and 572 or instructor approval

582 Linguistic Theory: Syntax. (3) N

Contemporary theories of the grammatical structure of languages Prerequisite: ASB 480 or FLA 400 or instructor approval

585 Linguistic Theory: Phonological Systems. 3 F

Origins and development of contemporary phonological systems with particular attention to non-Western languages Prerequisite ASB 480 or FLA 400 or instructor approval

591 Seminar. 3 N

Selected topics in archaeology, linguistics, and socio-cultural anthropology.

- (a) Cultural Anthropology
- (b) Social Anthropology
- (c) Problems in Southwestern Ethnology
- (d) Culture and Personality
- (e) Linguistics
- (f) Museum Studies
- (g) Problems in Southwestern Archaeology
- (h) Archaeology of North America
- (i) Historical Archaeology
- (j) Archaeology and Ceramics
- (k) Evolution and Culture
 - Cross-listed as ASM 591
 - Interdepartmental Seminar
 - Cross-listed as ASM 591

Omnibus Courses: See page 44 for omnibus courses that may be offered

Biological Sciences

The following curricula are offered jointly by the Departments of Botany and Zoology. Students who elect one of these programs are advised by a member of one of the two departments.

BIOLOGY—B.S.

The major in Biology is offered jointly by the Departments of Botany and Zoology. Students are advised by a member of either department. This major serves students desiring a broader program in the biological sciences than that provided by the more specialized majors in the degree programs of the individual departments.

The major consists of 43 hours and 20 hours in supplementary areas, plus a mathematics proficiency. The required major courses, totaling 31 hours, are as follows: BIO 181, 182, 320, 340; BOT 300, 360 (or ZOL 360); MIC 206, 220; ZOL 350. The remaining 12 hours (up per division) are to be selected so that the total major hours reflect a balance between the two departments. Required supplementary courses are as follows: CHM 113, 115; CHM 231 and 235 or the sequence CHM 331 and 332 and 335 and 336; CSE 181 or 183; MAT 210 or any calculus, PHY 101 or the sequence 111 and 112 and 113 and 114.

SECONDARY EDUCATION—B.A.E.

Biological Sciences Offered jointly by the Departments of Botany and Zoology, the major teaching field consists of a minimum of 40 semester hours and at least 22 hours in supporting courses. Required major courses are as follows: BIO 181, 182, 320, 340, 445; BOT 300 (or 370 or ZOL 350 or 370), 360; MIC 206, 220; ZOL 360. The remaining courses in the major (six hours minimum) should be selected to reflect a balance between ZOL and BOT courses. Required supporting courses are as follows: CHM 113, 115; GLG 102 or 300, HPS 330 (or ZOL 316). MAT 118; PHY 101 or the sequence 111 and 112 and 113 and 114. BIO 480 is required in the professional education program.

The minor teaching field consists of 24 semester hours as follows: BIO 181, 182; 16 additional hours in BIO, BOT, MIC, and ZOL courses selected to reflect a balance across the disciplines and subdisciplines in biology. BIO 480 is required in addition to the 24 semester hours in biological sciences.

BIOLOGY

- BIO 100 The Living World.** (4) F, S
Principles of biology. Cannot be used for major credit in the biological sciences. 3 hours lecture 3 hours lab *General studies S1, S2*
- 181 General Biology.** (4) F, S
Biological concepts emphasizing fundamental principles and the interplay of structure and function at the molecular, cellular, organismal and population levels of organization. 3 hours lecture 3 hours lab. For majors in biological sciences and preprofessional students in health-related sciences. Secondary school chemistry strongly recommended. *General studies S1 or S2.*
- 182 General Biology.** (4) F, S
Continuation of BIO 181. Secondary school chemistry strongly recommended. Prerequisite: BIO 181. *General studies S2*
- 217 Conservation Biology.** (3) F
The scientific and technical means for management, protection, maintenance and restoration of biological resources on the planet. Prerequisite: 8 hours of biology
- 218 Medical History.** (1) F
Brief survey of human and important inventions and discoveries in the art and science of medicine, illustrating interrelationships of medical ideas.
- 300 Natural History of Arizona.** (3) F, S
Plant and animal communities of Arizona. Cannot be used for major credit in the biological sciences. Prerequisite: junior or standing
- 301 Field Natural History.** (1) F, S
Organisms and the natural environment. 2 weekend field trips, field project. Cannot be used for major credit in the biological sciences. Pre- or corequisite: BIO 300
- 310 Special Problems and Techniques.** (1-3) F, S
Qualified undergraduates may investigate a specific biological problem under the direction of a faculty member. May be repeated for a total of 6 semester hours. Prerequisites: formal conference with the instructor approval of the problem by the instructor and department chair
- 320 Fundamentals of Ecology.** (3) F, S
Organization, functioning and development of ecological systems: energy flow, biogeochemistry, environmental relations, population dynamics. Prerequisite: BIO 182 or instructor approval
- 321 Introductory Ecology Laboratory.** (3) S
Laboratory and field observations and experiments to test current concepts and theories in ecology. Lab. Pre- or corequisite: BIO 320

- 330 Ecology and Conservation.** (3) F
Ecological and biological concepts of conservation used to understand ecological problems caused by humans. Cannot be used for major credit in the biological sciences. *General studies G*
- 332 Cell Biology.** (3) F
Survey of major topics in cell biology including structural, biochemical and molecular aspects of cell function. Prerequisite: BIO 182
- 340 General Genetics.** (4) F, S, SS
Science of heredity and variation. 3 hours lecture, 1 hour recitation. Prerequisite: BIO 182
- 343 Genetic Engineering and Society.** (3) F
Introduction to genetic engineering, with emphasis on applications (gene therapy, DNA fingerprinting, bioremediation, transgenic animals and plants). Cannot be used for major credit in the biological sciences. Prerequisite: BIO 100 or equivalent
- 410 Professional Values in Science.** (2-3) A
Considers issues related to values in science such as collaboration, finances, legal issues, medication, ownership of ideas, scientific integrity. Discusses student projects. Cross-listed as HPS 410
- 415 Biometry.** (4) F
Statistical methods applied to biological problems: design of experiments, estimation, significance, analysis of variance, regression, correlation, chi-square and bioassay. The use of computers. Does not satisfy laboratory requirements for the liberal arts General Studies Program. 3 hours lecture 3 hours lab. Prerequisite: MAT 210 or equivalent. *General studies N2*
- 420 Computer Applications in Biology.** (3) F
Computer analysis techniques in biology, emphasizing data entry, management and analysis and graphic portrayal. Employs mainframe and microcomputers. Prerequisites: BIO 182 and MAT 117 and 118 or instructor approval. *General studies: N3*
- 426 Limnology.** (4) S
Structure and function of aquatic ecosystems with emphasis on freshwater lakes and streams. 3 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 320 or instructor approval. *General studies L2.*
- 428 Biogeography.** (3) F
Environmental and historical processes determining distributional patterns of animals and plants, emphasizing terrestrial life. Prerequisites: BIO 182 or equivalent; junior or standing. *General studies L2*
- 430 Advanced Developmental Biology.** (3) S
Current concepts and experimental methods involving differentiation and biosynthetic activities of cells and organisms, with examples from microorganisms, plants, and animals. Prerequisite: ZOL 330.
- 432 Biochemical Cytology.** (3) S
Eukaryotic cell functions as affected by intracellular compartmentation. Emphasis on the application of electron microscopic analyses, centrifugation, and selected biochemical procedures. Prerequisites: BIO 332 or BOT 360 or ZOL 360 or equivalent. CHM 231 or 331 or equivalent

- 441 Cytogenetics.** (3) F, 94
Chromosomal basis of inheritance. Prerequisite: BIO 340
- 442 Cytogenetics Laboratory.** (2) F, 94
Microscopic analysis of meiosis, mitosis, and aberrant cell divisions. 6 hours lab. Pre- or corequisite: BIO 441
- 443 Molecular Genetics.** (3) F
Nature and function of the gene: emphasis on the molecular basis of inheritance and gene expression in prokaryotes and eukaryotes. Prerequisites: BIO 340, a course in organic chemistry.
- 445 Organic Evolution.** (3) F
Processes of adaptive change and speciation in sexual populations. Prerequisite: BIO 340 or ZOL 241
- 464 Photobiology.** (3) F, 94
Principles underlying the effects of light on growth, development and behavior of plants, animals and microorganisms. Prerequisites: CHM 231 or 331; 12 hours of courses in life sciences
- 480 Methods of Teaching Biology.** (3) S
Methods of instruction, experimentation, organization and presentation of appropriate content in biology. Prerequisite: 20 hours in the biological sciences
- 512 Transmission Electron Microscopy.** (5) F
Theory, use and methods of preparing biological material for transmission electron microscopy. Material fee. Lecture, lab. Prerequisite: instructor approval
- 515 Scanning Electron Microscopy.** (3) N
Theory, use and methods of preparing biological material for scanning electron microscopy. Material fee. 2 hours lecture, 3 hours lab. Prerequisite: instructor approval.
- 520 Biology of the Desert.** (2) N
Factors affecting plant and animal life in the desert regions and adaptations of the organisms to these factors. Prerequisite: 10 hours of biological sciences or instructor approval
- 524 Ecosystems.** (3) F, 95
Structure and function of terrestrial and aquatic ecosystems with emphasis on productivity, energetics, biogeochemistry, cycling and systems integration. Prerequisite: BIO 320 or equivalent
- 526 Quantitative Ecology.** (3) N
Sampling strategies, spatial pattern analysis, species diversity, classification, and applications of multivariate techniques to ecology. 2 hours lecture 3 hours lab. Prerequisites: BIO 415 or equivalent. 1 course in ecology
- 529 Advanced Limnology.** (3) N
Recent literature, developments, methods and limnological theory, field and lab application to some particular topic in limnology. Prerequisite: BIO 426
- 535 Biomembranes.** (3) N
Structure and function of biological membranes emphasizing synthesis, fluidity, exocytosis, endocytosis, and cell responses to hormones and neurotransmitters. Prerequisites: BIO 332 or equivalent. CHM 231 or 331 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered

Botany

J. Kenneth Hooper
Chair
(LS E218) 602/965-3414

PROFESSORS

ARONSON, BACKHAUS, KLOPATEK,
NASH, PATTEN, PINKAVA,
SOMMERFELD, TRELEASE

ASSOCIATE PROFESSORS

CLARK, STUTZ, SZAREK,
TOWILL, VERMAAS

ASSISTANT PROFESSORS

FRASCH, MARTIN, PIGG,
ROBERSON, WEBBER

ACADEMIC PROFESSIONALS

BINGHAM, LANDRUM,
LOBRUTTO, SHARP

PROFESSORS EMERITI

CANRIGHT, SWAFFORD

BOTANY—B.S.

The Department of Botany provides a broad and flexible curriculum for students interested in the plant sciences. After a minimal number of core courses, a specific program can be designed with a concentration in plant biochemistry and molecular biology, systematics and ecology, or urban horticulture, depending on the student's specific interests and career goals. The program prepares students for positions in education, industry, and technical fields, as well as advanced degree programs in the plant sciences.

The program of study consists of 63 hours in the major. All students are required to take the same 19 hours of courses from the core area. Courses within the three different areas of concentration account for 34 to 39 additional hours. The balance of the 63 hours is electives within the life sciences and related areas selected by the student through consultation with a faculty advisor.

The required courses for the botany core are as follows: BIO 181, 182, 320; BOT 350, 360.

Systematics and Ecology. Additional required courses for this concentration are as follows: BIO 340; BOT 370, 420, 499 (three hours). Also required

is *at least* one of the following: BOT 410, 434, 450. Required supplemental courses include CHM 113, 115, and those selected from one of the following two options:

1. CHM 331 and 335, 332 and 336; or
2. CHM 231 and 235, 361.

Courses meeting the college numeracy requirement are as follows: BIO 415 or 420; MAT 210.

Plant Biochemistry and Molecular Biology. Additional required courses for this concentration are as follows: BIO 332, 340, 432; BOT 494, 499 (three hours). Required supplemental courses include CHM 113, 115, 331, 332, 335, 336, 361 and 367

Courses meeting the college numeracy requirement are as follows: BIO 415 or 420; MAT 210.

Urban Horticulture. Additional required courses for this concentration are as follows: BOT 231, 380, 381, 382, 485, 499 (three hours). Also required is *at least* one of the following: BOT 386, 388, 488. Required supplemental courses include those selected from one of the following three options:

1. CHM 101, 231 and 235; ERA 325, 326 (industry track);
2. CHM 113, 115, 231 and 235; ERA 325, 326 (graduate school track, applied or field research); or
3. CHM 113, 115, 331, 332, 335, 336; ERA 325, 326 (graduate school track, basic or laboratory research).

Courses meeting the college numeracy requirement are as follows: BIO 415 or 420 or ERA 350; MAT 117 and 118 or MAT 210

GRADUATE PROGRAMS

The Department of Botany offers programs leading to the degrees of Master of Natural Science, Master of Science, and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

The department participates in the new interdisciplinary program for the Master of Science and Doctor of Philosophy degrees in Molecular and Cellular Biology. See page 140 for courses. For more information, contact Dr. Douglas Chandler, LS C592, 602/965 5662

BOTANY

BOT 108 Plants and Society. (4) F, S, SS
The study of plants in relation to human affairs. Emphasis on edible, medicinal and commercially significant plants: how they live and grow and how mankind has applied knowledge to manipulate them. Not for majors in the biological sciences. 3 hours lecture, 3 hours lab. *General studies*: S1 S2.

231 Horticultural Science. (4) S
Principles and practices of horticulture, emphasizing growth, development and propagation of horticultural plants and environmental factors that affect these processes. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or BOT 108. *General studies*: S2.

300 Survey of the Plant Kingdom. (4) F
Systematic and evolutionary survey of the plant kingdom, emphasizing diversity of gross and cellular structure, reproduction, life cycles, and habitat. 3 hours lecture, 3 hours lab. Prerequisite: BIO 100 or 182 or BOT 108 or equivalent. *General studies*: L2, S2

301 Economic Botany. (3) F
Plants and plant products used by people throughout the world, including the cultivation process and uses in modern life. Farmers, medicinal beverages, perfumes, and foods. Prerequisite: BIO 100 or equivalent

350 Plant Anatomy. (4) F
Development and mature structure of tissues of vascular plants: patterns and modifications of the leaf, stem, root and the flower. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent

360 Plant Physiology. (4) S
Plant growth and development, nutrition, water relations, reproduction, metabolism, and photosynthesis. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182 or equivalent, CHM 101 or 115 or 231

370 The Flora of Arizona. (4) S
Principles of taxonomy and identification of Arizona plants. 2 hours lecture, 6 hours lab. Prerequisite: BIO 182 or equivalent or instructor approval

380 Landscape Plants. (3) S
Identification, culture and use of plants in urban landscapes. Prerequisite: BOT 231 or equivalent

381 Landscape Practices. (3) S '95
Propagation, installation and maintenance of landscape plants with an emphasis on integrated landscaping techniques. 2 hours lecture, 3 hours lab. Prerequisites: BIO 182 and BOT 231 or equivalents.

382 Urban Forestry. (3) F
The establishment, care, and maintenance of ornamental trees, shrubs, and vines. Prerequisite: BOT 231 or equivalent.

386 Indoor Plants. (3) SS
Identification, culture, and use of container grown plants for interior environments. Prerequisite: BOT 231 or instructor approval

388 Turf Management. (3) N
Selection, establishment and maintenance of turf grasses for lawn and sports areas. 2 hours lecture, 3 hours lab. Prerequisite: BOT 231 or equivalent

410 Lichenology. (3) S '95
Chemistry, ecology, physiology, and taxonomy of lichens. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or equivalent.

420 Plant Ecology. (4) S

Plants in relation to environments, emphasizing terrestrial population, community and ecosystem processes. 3 hours lecture, 3 hours lab or field trip, 1 weekend field trip. Prerequisite: BIO 320 or equivalent.

425 Plant Geography. (3) N

Plant communities of the world and their interpretation, emphasizing North American plant associations. Prerequisite: BIO 182 or equivalent or instructor approval.

434 General Mycology. (3) S

Fundamentals of fungal morphology and systematics with an introduction to fungal cell biology, growth and development, ecology, and economic significance. 2 hours lecture, 3 hours lab. Prerequisite: BIO 182 or MIC 206 or equivalent.

445 Morphology of the Vascular Plants. (4) S '96

Comparative form and evolutionary trends in the major groups of vascular plants. 3 hours lecture, 3 hours lab. Prerequisite: BOT 300 or equivalent.

448 Palynology. (3) S

Significance of fossil and extant pollen, spores, and other palynomorphs to systematics, evolution, ecology, and stratigraphy. 2 hours lecture, 1 hour lab. Prerequisite: instructor approval.

450 Phycology. (4) S

The algae (both fresh water and marine forms), emphasizing field collection and identification of local representatives. Morphological, ecological, and economic aspects of the algae. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.

461 Physiology of Lower Plants. (3) N

Cellular physiology and biochemistry of algae and fungi; responses of these organisms to chemical and physical stimuli and their process of morphogenesis. Prerequisites: BIO 182 or equivalent; CHM 231.

465 Plant Growth and Development. (3) F '95

Environmental factors affecting the adaptation, distribution, growth, and development of plants, with emphasis on cultivated species. Prerequisites: BIO 182; BOT 381; CHM 231.

470 Taxonomy of Southwestern Vascular Plants. (4) SS

Identification of the vascular plants of the Southwest and the principles underlying their classification. 3 hours lecture, 6 hours lab, 2 field trips. Not open to students who have had BOT 370.

475 Angiosperm Taxonomy. (3) S '96

Principles underlying angiosperm phylogeny. 2 hours lecture, 3 hours lab. Prerequisite: BOT 370 or instructor approval.

480 Plants: Pleasures and Poisons. (3) SS

Poisonous, medicinal, and other drug plants. Plant products and their effects on humans; historical and modern perspectives. Prerequisites: BIO 100, 182; BOT 108 or equivalent; CHM 231 or equivalent.

485 Plant Pathology. (3) F

Identification and control of biotic and abiotic factors which cause common disease problems to plants. Prerequisite: BOT 360. *General studies: L2.*

488 Greenhouse/Nursery Management. (3) F '95

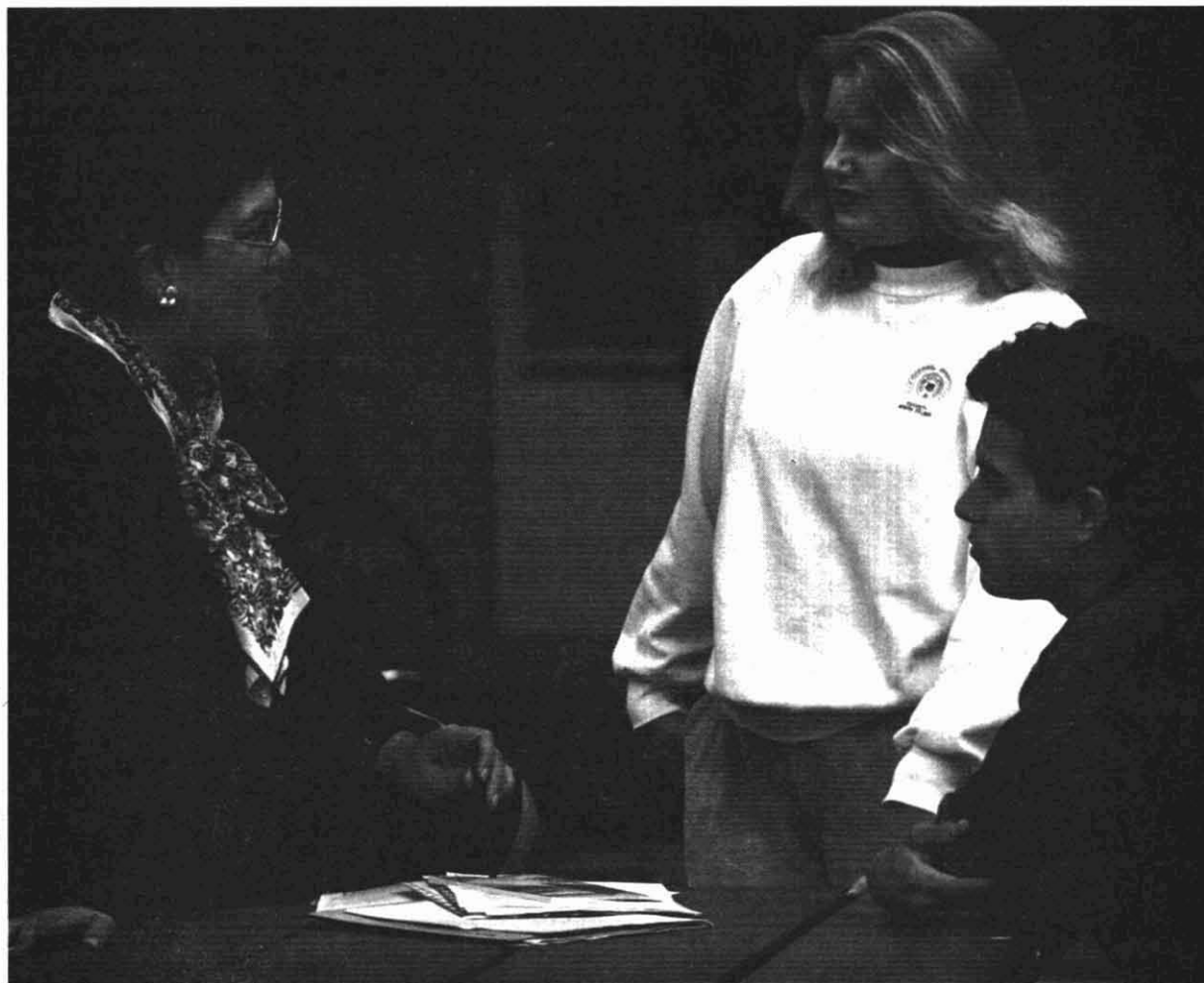
Greenhouse structures, environment, and nursery operation. Includes irrigation, nutrition, and other principles relative to container-grown species. Prerequisites: BOT 381; ERA 325.

489 Plant Pest Management. (3) S

Principles of management of plant pests, including insects, plant pathogens, and weeds, covering the use of chemical and nonchemical methods. Prerequisite: BIO 182 or equivalent.

490 Paleobotany. (4) S '95

A broad survey of plant life of the past, including the structure of plant fossils, their geologic ranges, geographic distribution, and paleo-environment. 3 hours lecture, 3 hours lab or field trip. Prerequisite: BIO 182 or equivalent.



510 Experimental Design. (3) S '96

ANOVAS one way classfication of factor a and partaly h erarch c designs ntroductory multivariate statistics 1 3-hour lecture at night Prerequisite BIO 415 or equivalent

520 Biophysical Ecology. (2) F '95

Physca processes n a p ant s m croenvironment radation heat, and water transfer, pollutant and on uptake Prerequisite BIO 320 or equivalent

525 Ecophysiology. (3) F '94

Physiolog ca adaptation to environmental stresses and ts ecolog cal s gn f cance for plant survival Env ronnemental and bo og ca contro of photosynthes s and transpirat on Prerequisite BOT 360 or instructor approval

560 Plant Molecular Biology. (2) S '96

B ochem stry and moecu lar b ology of p ant organe es, nc ud ng prote n target ng p ant v ruses, and moecu lar designs for plant m provements Prerequisite nstructor approval

562 Plant Genetic Engineering. (3) S '96

Plant transformation ut l zat on of transgenet c plants transient gene express on assays and app cations of p ant genet c eng neering Prerequisite nstructor approval.

563 Plant Genetic Engineering Laboratory.

(2) S '96
P ant transformat on uti zation of transgenet c plants transient gene express on assays, and app 'cat ons of p ant genetic engineering 6 hours laboratory Prerequisite nstructor approval.

564 Plant Metabolism. (3) N

Genera p ant metabo sm and typical p ant products emphasizing b osynthes s and functions of storage products ce l wal const tuents, plant ac ds p gments, hormones and numerous secondary products Prerequisite BOT 360 or CHM 231 or nstructor approval

566 Molecular Mechanisms of Photosynthesis. (3) F '95

Structure and function of photosynthet c com p exes mechanism of energy convers on n p ants bacteria and mode systems. Cross listed as CHM 568 Prerequisite nstructor approval

570 Plant Secondary Chemistry. (3) N

Biosynthesis and distribut on of plant natural products with n various plant taxa. 3 hours lecture Prerequisites CHM 331, 332 (or equivalent)

581 Plant Tissue and Cell Culture. (3) N

Asept c c onal propagat on of p ants and n vitro cu ture of cel s tssues and organs 2 hours lecture, 3 hours ab. Prerequisite BOT 360 or 381

585 Diagnosis of Plant Problems. (4) N

Prnc pes and techniques for diagnos s of biot c and ab ot c agents that cause problems n econom c p ants 2 hours lecture 2 three-hour abs Prerequisite: BOT 485

591 Seminar. (1) F, S

Top cs may be se lected from the fol ow ng:

- Biosystematics
- Ecology
- Horticulture
- Nonvascular Plants/Fungi
- Photosynthesis
- Plant Physiology

Omnibus Courses: See page 44 for omnibus courses that may be offered

Chemistry and Biochemistry

Morton E. Munk
Chair

(PS D102) 602/965-3461

REGENTS' PROFESSORS

BUSECK, LIN, C MOORE,
PETTIT WAGNER

PROFESSORS

ANGELL BALASUBRAMANIAN,
BIEBER, B RK, BLANKENSHIP
T BROWN, CRON N, FUCHS,
GLAUNSINGER, GLICK, GUST,
HOLLOWAY, JUVET LIU LOHR,
MCMILLAN, T MOORE, MUNK
O'KEEFFE, ROSE WILL AMS

ASSOCIATE PROFESSORS

A MOORE, PETUSKEY, SK BO,
STE MLE, WOLF, ZIURY S

ASSISTANT PROFESSORS

ALLEN, GRO TJAHN, KOUVETAKIS
PENA, WOODBURY YAGHI

REGENTS' PROFESSOR EMERITUS

EYRING

PROFESSORS EMERITI

D BROWN, BURGOYNE, BURKE,
HARRIS, LUCHSINGER, MOELLER,
STUTSMAN, THOMSON YUEN
WH TEHURST ZASLOW

CHEMISTRY—B.A.

The program consists of 46 semester hours, of which 30 must be in chemistry and 16 in closely related fields. Required courses are as follows: CHM 113 and 115 *or* CHM 117 and 118 (strongly recommended for qualified students); CHM 225, 226; CHM 331 and 332 and 335 and 336 *or* CHM 317 and 318 and 319 and 320 (strongly recommended for qualified students); CHM 341, 343, 453. Related courses must include the following. MAT 270 and 271 *or* equivalents; PHY 111 and 112 and 113 and 114 *or* more advanced PHY courses. The remaining courses to complete the major are determined by students in consultation with their advisors

CHEMISTRY—B.S.

The program consists of 42 semester hours in chemistry. Required courses are as follows: CHM 113 and 115 *or* CHM 117 and 118 (strongly recommended for qualified students); CHM 331 and 332 and 335 and 336 *or* CHM 317 and 318 and 319 and 320 (strongly recommended for qualified students); CHM 425 and 426 and 427 and 428 *or* CHM 225 and 226 and 421 and 422; CHM 441, 442, 444, 452, 453; MAT 290 and 291 *or* MAT 270 and 271 and 272, PHY 121, 122, 131, 132, 241. MAT 274 and an appropriate course in computer language (CSE 181 or 183) are strongly recommended. The remaining chemistry courses to complete the major are determined by the student in consultation with an advisor. With the consent of the department chair, selected advanced courses from other related scientific disciplines may be accepted in lieu of elective chemistry courses to complete the major.

Transfer students are interviewed and advised of possible preparatory work. They must contact the department to arrange for the interview in advance of registration. See "Degree Requirements," page 87.

American Chemical Society Certification. A student who satisfactorily completes the Bachelor of Science degree program is certified by the Department of Chemistry and Biochemistry to the American Chemical Society (ACS) as having met the specific requirements for undergraduate professional training in chemistry. Graduates meeting ACS guidelines can receive a certificate to indicate this fact.

Emphasis in Biochemistry. The major in Chemistry with an emphasis in biochemistry consists of 38 semester hours in chemistry plus work in related fields. Required courses are as follows: BIO 181, 182, 340; CHM 113 and 116 (or 115) *or* CHM 117 and 118 *or* equivalents; CHM 225 and 331 and 332 and 335 and 336 *or* CHM 317 and 318 and 319 and 320; CHM 441 and 442 and 444 *or* CHM 341 and 463 and 464, CHM 453, 461, 462, 467; MAT 290 and 291 *or* MAT 270 and 271 and 272, PHY 121, 122, 131, 132. The remaining courses to complete the major are determined by students in consultation with their advisors.

MINOR IN CHEMISTRY

A minor in Chemistry and Biochemistry is awarded to students who complete a minimum of 24 hours of chemistry courses. Required courses are CHM 113 and 116 (or equivalents); CHM 225 and 226, CHM 231 and 235 and 361 or CHM 331 and 332 and 335 and 336; CHM 341 and 343 (or equivalents).

**SECONDARY EDUCATION—
B.A.E.**

Chemistry. Students may pursue one of two options for the chemistry major teaching field.

Option One. The academic specialization consists of 48 semester hours in chemistry and related fields. Required courses are as follows: CHM 113, 115, 225, 226, 331, 332, 335, 336, 341 (or 441 or 442), 361, 480 (or PHY 480); MAT 270, 271; PHY 111, 112, 113, 114. The remaining courses to complete the specialization are determined by students in consultation with their advisors.

Option Two. The academic specialization consists of 31 semester hours of chemistry, which includes all of the required chemistry courses listed in option one and selection of the corresponding option in either mathematics or physics, that is, completion of an additional 30 semester hours in the chosen area as specified by the department selected.

The minor teaching field consists of 24 semester hours in chemistry. Required courses are as follows: CHM 113, 115; CHM 225 and 226 and 231 and 361 or CHM 331 and 332 and 335 and 336; CHM 341. The remaining courses to complete the specialization are determined by students in consultation with their advisors.

GRADUATE PROGRAMS

The Department of Chemistry and Biochemistry offers programs leading to the M.S. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

The department participates in the new interdisciplinary program for the Master of Science and Doctor of Philosophy degrees in Molecular and Cellular Biology. See page 140 for courses. For more information, contact Bonnie Engel, PS D121, 602/965 0743.

CHEMISTRY**CHM 101 Introductory Chemistry.** (4) F S SS

Elements of general chemistry. Adapted to the needs of students in nursing, home economics, agriculture, and physical education. Recommended for general studies credit. Normally followed by CHM 231. 3 hours lecture, 1 hour discussion, 2 hours lab. Credit is allowed for only CHM 101, 113, 114, or 117. *General studies: S1, S2*

113 General Chemistry. (4) F S SS

Principles of chemistry. Adapted to the needs of students in the physical, biological, and earth sciences. 3 hours lectures, 1 hour discussion, 2 hours lab. 1 year of high school chemistry recommended. Credit is allowed for only CHM 101, 113, 114, or 117. Prerequisite: MAT 106 or 3 semesters of high school algebra. *General studies: S1, S2*

114 General Chemistry for Engineers. (4) F, S

One semester college chemistry with emphasis toward engineering. 3 hours lecture, 1 hour discussion, 2 hours lab. Students without high school chemistry or chemical engineering majors must enroll in the CHM 113, 116 sequence instead of CHM 114. Credit is allowed for only CHM 101, 113, 114, or 117. Credit is allowed for only CHM 114, 115, 116, or 118. Prerequisites: MAT 106 or 3 semesters of high school algebra, 1 year of high school chemistry. *General studies: S1, S2*

115 General Chemistry with Qualitative Analysis. (5) F S, SS

Continuation of CHM 113. Equilibrium theory, chemistry of metals, nonmetals, and metalloids and the introduction to organic chemistry. Laboratory includes qualitative analysis. 3 hours lecture, 2 hours discussion, 4 hours lab. Credit is allowed for only CHM 114, 115, 116, or 118. Prerequisite: CHM 113 or 2 years of high school chemistry. *General studies: S1, S2*

116 General Chemistry. (4) F, S

Continuation of CHM 113. Equilibrium theory, chemistry of metals, nonmetals, and metalloids and the introduction to organic chemistry. 3 hours lecture, 1 hour discussion, 2 hours lab. Credit is allowed for only CHM 114, 115, 116, or 118. Prerequisite: CHM 113 or 2 years of high school chemistry. *General studies: S1, S2*

117 General Chemistry for Majors I. (4) F

Atomic and molecular structure, properties and physical states of matter, thermodynamics, kinetics, acids and bases, chemical analysis, and stoichiometry. 3 hours lecture, 1 conference, 2 hours lab. Credit is allowed for only CHM 101, 113, 114, or 117. Prerequisites: minimum of 1 year each of high school chemistry (with a grade of "B" or better) and physics; 3 years of high school mathematics. *General studies: S1, S2*

118 General Chemistry for Majors II. (5) S

Continuation of CHM 117. 3 hours lecture, 1 conference, 5 hours lab. Credit is allowed for only CHM 114, 115, 116, or 118. Prerequisite: CHM 117. Corequisite: MAT 270 or 290. *General studies: S1, S2*

225 Analytical Chemistry. (3) F, SS

Principles and methods of chemical analysis. Primary for students in agriculture, premedicine, predentistry, and medical technology. Credit is allowed for only CHM 225 or 425. Prerequisite: CHM 115 or 116.

226 Analytical Chemistry Laboratory. (2) F SS

Experiments in chemical analysis. 1 conference, 5 hours lab. Credit is allowed for only CHM 226 or 427. Corequisite: CHM 225

231 Elementary Organic Chemistry. (3) F, S

Survey of organic chemistry, with emphasis on the reactivity of basic functional groups. Credit is allowed for only CHM 231, 317, or 331. Prerequisite: CHM 101 (or 114 or 115 or 116 or 117) or 1 year of high school chemistry with grades of "A" or "B" or instructor approval. *General studies: S1, S2 (if taken with CHM 235)*

235 Elementary Organic Chemistry Laboratory. (1) F, S

Organic chemistry experiments in synthesis, purification, analysis, and identification. Lab. Pre- or corequisite: CHM 231. *General studies: S1, S2 (if taken with CHM 231)*

301 Chemistry and Society. (3) S

A qualitative survey of chemistry and its impact on modern technology and the environment. May not be counted toward the chemistry major.

302 Environmental Chemistry. (3) S

Explores major environmental issues, problems, and solutions from analytical and chemistry perspectives. Prerequisites: CHM 114 (or 115 or 116 or 118), 231 (or 331)

317 Organic Chemistry for Majors I. (3) F

Structures, reaction mechanisms and kinetics, and systematic syntheses of organic compounds. Credit is allowed for only CHM 231, 317, or 331. Prerequisite: CHM 115 or 118. Corequisite: CHM 319

318 Organic Chemistry for Majors II. (3) S

Continuation of CHM 317. Credit is allowed for only CHM 318 or 332. Prerequisite: CHM 317. Corequisite: CHM 320

319 Organic Chemistry Laboratory for Majors I. (1) F

Emphasis on mechanisms, kinetics, and products of organic reactions. 1 conference, 3 hours lab. Credit is allowed for only CHM 319 or 335. Pre- or corequisite: CHM 317

320 Organic Chemistry Laboratory for Majors II. (2) S

Continuation of CHM 319. 1 conference, 7 hours lab. Credit is allowed for only CHM 320 or 336. Prerequisite: CHM 319. Corequisite: CHM 318

331 General Organic Chemistry. (3) F S SS

Chemistry of organic compounds. Credit is allowed for only CHM 231, 317, or 331. Prerequisite: CHM 115 or 116 or 118

332 General Organic Chemistry. (3) F S SS

Continuation of CHM 331. Credit is allowed for only CHM 318 or 332. Prerequisite: CHM 331

335 General Organic Chemistry Laboratory. (1) F, S SS

Microscale organic chemical experiments in separation techniques, synthesis, analysis, and identification and relative reactivity. 4 hours lab. Credit is allowed for only CHM 319 or 335. Corequisite: CHM 331

336 General Organic Chemistry Laboratory. (1) F, S, SS

Continuation of CHM 335. 4 hours lab. Credit is allowed for only CHM 320 or 336. Prerequisite: CHM 335. Corequisite: CHM 332

- 341 Elementary Physical Chemistry.** (3) F Thermodynamics, equilibrium states of matter, solutions, and chemical kinetics. For students in premedical biological and educational curricula. Not open to students who have taken CHM 441. Prerequisites: CHM 114 (or 118 or 225) 231 (or 331); MAT 271.
- 343 Physical Chemistry Laboratory.** (1) F Physical chemistry experiments. 3 hours. Lab. Credit is allowed for *only* CHM 343 or 444. Corequisite: CHM 341 or 441.
- 361 Principles of Biochemistry.** (3) F, SS Structures, properties, and functions of proteins; enzymes, nucleic acids, carbohydrates and lipids; the utilization and synthesis of these materials by living systems and the relationship of these processes to energy production and utilization. Not open to students who have taken CHM 461. Credit is allowed for *only* CHM 361 or 461. Prerequisite: CHM 231 or 318 or 332.
- 367 Elementary Biochemistry Laboratory.** (1) F, SS Experiments include qualitative and quantitative analyses of constituents of biological systems, measurement of enzyme activities and metabolic studies. 3 hours. Lab. Prerequisite: CHM 361 or instructor approval.
- 392 Introduction to Research Techniques.** (1-3) F, S, SS Instrumental methods and philosophy of research by actual participation in chemistry research projects. May be repeated for a total of 6 credits. Prerequisites: approval of advisor and research supervisor.
- 421 Instrumental Analysis.** (3) S Principles of instrumental methods in chemical analysis: Electroanalytical and optical techniques. Credit is allowed for *only* CHM 421 or 426. Prerequisites: CHM 225, 226. Pre- or corequisite: CHM 442.
- 422 Instrumental Analysis Laboratory.** (1) S Experiments in chemical analysis by electroanalytical and optical techniques. 3 hours. Lab. Credit is allowed for *only* CHM 422 or 428. Corequisite: CHM 421.
- 424 Separation Methods and Quantitative Organic Analysis.** (3) N Theory and practice of gas liquid, ion exchange and gel permeation chromatography, countercurrent distribution, electrophoresis, and distillation, qualitative and quantitative interpretation of IR, mass, and NMR spectroscopy, quantitative methods of organic analysis via functional groups. 2 hours. Lecture, 4 hours. Lab. Prerequisites: CHM 318 or 332 or 442 or instructor approval.
- 425 Chemical Analysis.** (2) F Principles of chemical equilibria, separations, and analyses; chemical instrumentation. Pre- or corequisite: CHM 341 or 441.
- 426 Chemical and Instrumental Analysis.** (3) S Instrumental techniques for chemical analysis, methods for the interpretation of analytical data. Credit is allowed for *only* 421 or 426. Prerequisite: CHM 425.
- 427 Chemical and Instrumental Analysis Laboratory.** (2) F, S Class and instrumental techniques in chemical analysis with emphasis on accuracy and precision. 1 conference, 5 hours. Lab. Credit is allowed for *only* CHM 226 or 427. Pre- or corequisite: CHM 425.
- 428 Chemical and Instrumental Analysis Laboratory.** (2) F, S Continuation of CHM 427. Credit is allowed for *only* CHM 422 or 428. Pre- or corequisite: CHM 426.
- 431 Qualitative Organic Analysis.** (3) S Systematic identification of organic compounds. 1 hour. Lecture, 6 hours. Lab. Prerequisites: CHM 118 (or 226) and 320 (or 336) or instructor approval.
- 441 General Physical Chemistry.** (3) F Laws of thermodynamics and their applications; properties of gases, solids, liquids and solutions; reaction kinetics; wave mechanics; molecular spectroscopy and statistical thermodynamics. Credit is allowed for *only* CHM 341 or 441. Prerequisites: MAT 272 or 291, PHY 241.
- 442 General Physical Chemistry.** (3) S Continuation of CHM 441. Prerequisite: CHM 441.
- 444 General Physical Chemistry Laboratory.** (2) S Physical chemistry experiments. 1 conference, 5 hours. Lab. Credit is allowed for *only* CHM 343 or 444. Prerequisite: CHM 441. *General studies: L2 (if taken with CHM 452)*
- 452 Inorganic Chemistry Laboratory.** (1-2) S Preparation and characterization of typical inorganic substances emphasizing methods and techniques. 1 conference, 5 hours. Lab. Prerequisite: instructor approval. *General studies: L2 (if taken with CHM 444)*.
- 453 Inorganic Chemistry.** (3) S Principles and applications of inorganic chemistry. Prerequisite: CHM 341 or 441.
- 461 General Biochemistry.** (3) F Structure, chemistry, and metabolism of biomolecules and the role of the biochemical processes of living organisms. Prerequisites: CHM 318 (or 332) and 341 (or 441) or instructor approval.
- 462 General Biochemistry.** (3) S Continuation of CHM 461. Prerequisite: CHM 461 or instructor approval.
- 463 Biophysical Chemistry.** (3) S Principles of physical chemistry as applied to biological systems. Prerequisite: CHM 341 or 441.
- 464 Biophysical Chemistry Laboratory.** (2) S Introduction to physical methods in modern biochemistry. Corequisite: CHM 463. *General studies: L2 (if taken with CHM 467)*
- 467 General Biochemistry Laboratory.** (2) S The application of modern chemical and physical methods to biochemical problems; purification and characterization of biological macromolecules; quantitative measurement of enzyme activity and properties, evaluation of metabolic processes. 1 conference, 5 hours. Lab. Prerequisite: CHM 461. *General studies: L2 (if taken with CHM 464)*.
- 471 Solid State Chemistry.** (3) F Crystal chemistry, thermodynamics and electrochemistry of solids; nonstoichiometric compounds; diffusion and solid state reactions; crystal growth, and selected topics. Pre- or corequisite: CHM 441 or instructor approval.
- 480 Methods of Teaching Chemistry.** (3) S Organization and presentation of appropriate content of chemistry; preparation of reagents, experiments, and demonstrations; organization of stock rooms and laboratories, experience in problem solving. Prerequisite: instructor approval.
- 481 Geochemistry.** 3 F Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as GLG 481. Prerequisite: CHM 341 or 441 or GLG 321.
- 485 Meteorites and Cosmochemistry.** (3) N Chemistry of meteorites and their relationship to the origin of the earth-solar system, and universe. Cross-listed as GLG 485.
- 501 Current Topics in Chemistry.** (1) F, S May be repeated for credit. Prerequisite: instructor approval.
- 521 Computer Interfacing to Chemical Instrumentation.** (3) N Assembly and machine language programming of laboratory-size computers for data acquisition and on-line real-time control of chemical instrumentation on digital and timing considerations; hardware interfacing of computers. No prior knowledge of computers or electronics assumed. Sound knowledge of chemical instrumentation desirable. 2 hours. Lecture, 4 hours. Lab.
- 523 Advanced Analytical Chemistry.** (3) A Theoretical principles of analytical chemistry. Prerequisites: CHM 225 and 442 or equivalent.
- 525 Spectrochemical Methods of Analysis.** (4) N Theoretical and practical considerations involving the use of optical instruments for chemical analysis; emphasis on emission and absorption spectroscopy. 3 hours. Lecture, 3 hours. Lab. Prerequisite: CHM 442.
- 526 X-Ray Methods of Analysis.** (4) N Theoretical and practical considerations involving the use of X-ray diffraction and spectroscopy for chemical and structural analyses. 3 hours. Lecture, 3 hours. Lab. Prerequisite: CHM 442.
- 527 Electrical Methods of Chemical Analysis.** (4) N Theoretical and practical considerations of polarography, potentiometric, amperometric and conductometric titrations. 2 hours. Lecture, 6 hours. Lab. Prerequisite: CHM 442.
- 531 Advanced Organic Chemistry I.** (3) F Reaction mechanisms, reaction kinetics, free energy relationships, transition state theory, molecular orbital theory and Woodward-Hoffmann rules. Prerequisites: CHM 318 (or 332) 442.
- 532 Advanced Organic Chemistry II.** (2) S Continuation of CHM 531. Prerequisite: CHM 531.
- 537 Organic Reactions.** (3) S Important synthetic reactions of organic chemistry emphasizing recently discovered reactions of preparative value. Prerequisite: CHM 531.
- 541 Advanced Thermodynamics.** (3) F Equilibrium thermodynamics, chemical reactions and phase equilibria. Introduction to statistical thermodynamics, critical phenomena, and kinetics. Prerequisite: CHM 442.

545 Quantum Chemistry I. (3) F
Basic quantum theory, chemical bonding and molecular structure Prerequisite CHM 442

546 Quantum Chemistry II. (3) S
Quantum theory of rate processes Principles of spectroscopy and nonlinear optics Prerequisite CHM 545

548 Chemical Kinetics. (2) N
Kinetic theory and rate processes Prerequisite CHM 545

553 Advanced Inorganic Chemistry. (3) S
Principles of modern inorganic chemistry and their applications over the entire periodic system. Prerequisites: CHM 442 and 453 or equivalents

556 Topics in Inorganic Chemistry. (3) N
May be repeated for credit. Prerequisites: CHM 553, instructor approval

563 Biophysical Chemistry. (3) N
Physical chemistry of macromolecules especially proteins, nucleic acids and polysaccharides. Thermodynamics, hydrodynamics and spectroscopy of and the relation to structure Prerequisites: CHM 442, 462.

568 Molecular Mechanisms of Photosynthesis. (3) N
Structure and function of photosynthetic complexes, mechanism of energy conversion in plants, bacteria and model systems. Cross-listed as BOT 568. Prerequisite: instructor approval.

579 Topics in Solid State Chemistry. (3) N
May be repeated for credit. Prerequisite: instructor approval.

581 Isotope Geochemistry. (3) N
Geochemistry and cosmochemistry of stable and radioactive isotopes, geochronology, isotopic equilibria. Cross-listed as GLG 581. Prerequisite: instructor approval

582 Topics in Geochemistry and Cosmochemistry. (3) N
Topics of current interest for students in chemistry and other fields. Sampling of data and thought concerning phase equilibria, element distribution, meteorites, the Earth and other planets. May be repeated for credit. Prerequisite: instructor approval

583 Phase Equilibria and Geochemical Systems. (3) N
Natural reactions at high temperatures and pressures, sulfate sulfide and oxide equilibria. Cross-listed as GLG 583

Omnibus Courses: See page 44 for omnibus courses that may be offered

Computer Science

A major in Computer Science is available in both the College of Liberal Arts and Sciences and the College of Engineering and Applied Sciences. Faculty and course descriptions appear on pages 258–263.

COMPUTER SCIENCE—B.S.

The program in Computer Science consists of 30 hours of core course work and 15 semester hours of senior level breadth courses in the major. Also required are 18 semester hours of technical elective and mathematics courses approved by the department. The university requirement for literacy and critical inquiry is to be met in part by ECE 400 and ENG 301

A minimum cumulative GPA of 2.50 is required to begin upper division work in the major. A minimum grade of “C” is required in all CSE courses used for degree credit

For further information on college requirements, contact an advisor in the Office for Academic Programs, SS 111, or the Department of Computer Science and Engineering, GWC 206

Economics

A major in Economics is offered in both the College of Liberal Arts and Sciences and the College of Business Faculty, course descriptions, and the major requirements in the College of Business are listed on pages 194–195

ECONOMICS—B.A. OR B.S.

The program in Economics consists of 45 semester hours of course work, 24 of which, at a minimum, must be in economics, and the remainder in closely related fields to be selected from the “Approved List of Related Field Courses” in consultation with the faculty advisor.

The following lower division courses are required and must be counted as part of the 45-hour major:

	<i>Semester Hour</i>
ECN 111 Macroeconomic Principles	3
ECN 112 Microeconomic Principles ..	3
MAT 210 Brief Calculus	3
STP 226 Elements of Statistics	3
Total	12

While MAT 210 meets the minimum mathematics requirement to major in Economics, all Economics majors who anticipate going on to graduate school in economics or in business or to law school are encouraged to take MAT 270 Calculus with Analytic Geometry I

(4), offered in sections taught via the “reform calculus” method. The relevant section line numbers are available from the Department of Mathematics. Majors are encouraged to pursue further course work in mathematics. MAT 270 may be taken in lieu of MAT 210

To qualify for upper division course work in economics, the Economics major must earn a minimum grade of “C” in each of the above listed courses, have junior class standing (56 semester hours), and have a minimum cumulative GPA of 2.50. ECN 313 Intermediate Macroeconomic Theory and ECN 314 Intermediate Microeconomic Theory are required and should be taken after the completion of the above listed courses and before other upper division courses in economics.

Credit earned by an Economics major in ECN 484 Economics Internship, whether as a legislative intern or through the Department of Economics Internship Program and ECN 493 Honors Thesis), may not be used to satisfy the minimum 24 hours of economics course work requirement. However, up to six hours of ECN 484 and 493 may be used to meet the related fields requirement. See “Degree Requirements,” page 87.

Latin American Studies Emphasis.

Students majoring in Economics may elect to pursue a Latin American Studies emphasis, combining courses from the major with selected outside courses of wholly Latin American content. See “Latin American Studies,” page 91, for more information.

SECONDARY EDUCATION—B.A.E.

The minor teaching field consists of 21 semester hours. ECN 111 and 112 and MAT 210 are required. The remainder is to be approved by the advisor in consultation with the student

Social Studies. See page 153

GRADUATE PROGRAMS

The Department of Economics offers programs leading to the M.S. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements

Faculty and course descriptions are listed on pages 94–195 of this catalog.

English

Wendy K. Wilkins
Chair
(LL B504) 602/965-3168

REGENTS' PROFESSOR N DUBÉ

PROFESSORS

BATAILLE, BENDER BJORK,
BRACK, D. BRINK J. BRINK,
BUCKINGHAM, CANDELARIA,
D ANGELO B. DOEBLER,
J. DOEBLER DONELSON, EVANS,
HABERMAN, M HARRIS, HELMS,
KEHL LIGHTFOOT NEY A NILSEN,
D NILSEN, RIOS SANDS, SHANN

ASSOCIATE PROFESSORS

ADAMS, BOYER, CARLSON
J GREEN, GUTIERREZ, JANSSEN,
JOHNSON, MAJOR, MILLER,
MORGAN OJALA, RAMAGE,
SCHWALM, SENS BAR WILKINS

ASSISTANT PROFESSORS

BATES, BRAIDI CASTLE
COLBY CORSE, J. DUBIE
GOLDBERG, HORAN, MAHONEY,
G NELSON, VANDEN HEUVEL

INSTRUCTOR

K HARRIS

LECTURERS

COOK OBERMEIER

PROFESSORS EMERITI

BROSE ERNO, F SHER, M. GREEN
HAKAC HERMAN, MURRAY
NEBEKER, POWERS, RANDALL
SALERNO SHAFER TURNER

ENGLISH—B.A.

The program consists of 45 semester hours in English. Required courses are ENG 200, 221, 222, 312 (or 314 or 413), 341, 342, 421 or 422, a course in English literature before 1660, a course in English literature between 1660 and 1900, a course in 20th century British or American literature, and a course in women's literature or American ethnic literature. Twelve additional hours are free electives chosen from the department's offerings at the 200 level or above. A grade of "C" or better is required in all courses taken for the major. *No course may be used to satisfy more than one requirement.* At least 18 hours must be in upper division courses

MINOR IN ENGLISH

The English minor consists of 24 hours in English. Required courses are ENG 200, 221 (or 222), 312 (or 314 or 413), 341 or 342, 421 (or 422); one upper division course in English or American literature. Six additional hours are free electives chosen from the department's offerings at the 200 level or above. A grade of "C" or better is required in all courses taken for the minor.

SECONDARY EDUCATION— B.A.E.

English. The major teaching field consists of 42 semester hours in English. Required courses are ENG 200, 212 (or 215 or 216 or 217), 221, 222, 312 (or 314), 341, 342, 421 (or 422), 471, 480; one course in women's literature or American ethnic literature, and nine hours of electives (all chosen from English department courses), six of which must be upper division. ENG 471 and 480 must be taken before student teaching.

The minor teaching field consists of 24 semester hours. Required courses are ENG 200, 212 (or 215 or 216 or 217), 221 or 222, 312 (or 314), 341 (or 342), 471, 480, and an additional upper division elective in English.

These courses are also recommended for Elementary Education majors

GRADUATE PROGRAMS

The Department of English offers programs leading to the Master of Arts degree in English (with concentrations in comparative literature, English linguistics, literature and language, and rhetoric and composition), Master of Fine Arts degree in Creative Writing (fiction, poetry, nonfiction, and screen writing), Master of Teaching English as a Second Language degree, and Doctor of Philosophy degree in English (with numerous emphases). Consult the Graduate College for requirements.

ENGLISH

ENG 101 First-Year Composition. (3) F, S, SS
Discovering, organizing and developing ideas in relation to the writer's purpose, subject, and audience. Emphasis on modes of written discourse and effective use of rhetorical principles. Foreign students, see ENG 107. Prerequisite: see pages 40 and 71

102 First-Year Composition. (3) F, S, SS
Critical reading and writing, emphasis on strategies of academic discourse. Research paper required. Foreign students, see ENG 108. Prerequisite: ENG 101 with grade of "C" or better

105 Advanced First-Year Composition. (3) F, S

A concentrated composition course for students with superior writing skills; intensive reading, research papers; logical and rhetorical effectiveness. Not open to students with credit in First Year Composition. Prerequisite: see pages 40 and 71

107 English for Foreign Students. (3) F, S
For students from non-English speaking countries who have studied English in their native countries but who require practice in the demands of English. Intensive reading and discussion. Satisfies the graduation requirement of ENG 101

108 English for Foreign Students. (3) F, S
For foreign students, critical reading and writing strategies of academic discourse. Research paper required. Satisfies graduation requirement of ENG 102. Prerequisite: ENG 107 with grade of "C" or better

114 English Grammar and Usage. (3) F, S
The fundamentals of English grammar, word and phrase structure, and of English usage (punctuation, grammatical correctness)

Composition of the First Year Composition requirement is a prerequisite for all English courses above the 100 level

200 Critical Reading and Writing about Literature. (3) F, S

Introduction to the terminology, methods, and objectives of the study of literature with practical interpretation and evaluation. For English majors and minors only. *General studies: L1, HU*

201 World Literature. (3) F

The classical and medieval periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General studies: HU, H*

202 World Literature. (3) S

The Renaissance and modern periods. Selections from the great literature of the world in translation and lectures on the cultural background. *General studies: HU, H*

204 Introduction to Contemporary Literature. (3) F, S

Poetry, fiction, drama, and possibly other genres. Not for English majors or minors. *General studies: HU*

210 Introduction to Creative Writing. (3) F, S

Beginning writing of poetry, fiction, and drama (both stage and screen). Separate sections for each genre. Each genre may be taken once

212 English Prose Style. (3) N

Analysis and practice of writing in various classical and modern prose styles. Prerequisite: grade of "B" in ENG 102 and English major or approval of advisor and instructor. *General studies: L1*

213 Introduction to the Study of Language. (3) F, S

Language as code, phonetics, phonology, morphology, and syntax; the lexicon; language acquisition; sociolinguistics

215 Strategies of Academic Writing. (3) F, S

Advanced course in techniques of analyzing and writing academic expository prose. Writing is research based. *General studies L1.*

216 Persuasive Writing on Public Issues. (3) F, S

Advanced course in techniques of analyzing and writing persuasive arguments addressing topics of current public interest. Papers are research based. *General studies L1.*

217 Personal and Exploratory Writing. (3) F, S

Uses writing to explore one's self and the world. One writes in emphasis on expository writing as a means of learning. *General studies L1.*

218 Writing about Literature. (3) F, S

Advanced writing course requiring analytical and expository essays about fiction, poetry, and drama. For non-English majors. *General studies: L1.*

221 Survey of English Literature. (3) F, S
Medieval, Renaissance, and 18th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General studies: HU.*

222 Survey of English Literature. (3) F, S
Romantic, Victorian, and 20th-century literature. Emphasis on major writers and their works in their literary and historical contexts. *General studies: HU.*

260 Film Analysis. (3) N

Understanding and enjoyment of film and its correlation to literature, art, music, and other disciplines. *General studies: HU.*

A term paper or equivalent out-of-class written work is required in an upper-division (300–400 level) ENG course.

301 Writing for the Professions. (3) F, S
Advanced practice in writing and editing expository prose. Primarily for preprofessional majors. *General studies L1.*

303 Classical Backgrounds of English Literature. (3) N

Selected readings of Greek and Latin literature in translation emphasizing forms, ideas, and myths, as they relate to literature in English. *General studies: HU.*

307 Utopian Literature. (3) N

Selected works from the present to the classical period including *Walden Two*, *Walden Utopia*, and *The Republic*. *General studies: HU.*

310 Intermediate Creative Writing. (3) F, S

Separate sections for fiction and poetry. May be taken once for poetry once for fiction. Lectures, writing assignments discuss on criticism. Prerequisite: ENG 210 or instructor approval.

312 English in Its Social Setting. (3) F, S
Introduction to the sociolinguistic study of the English language. *General studies: HU.*

314 Modern Grammar. (3) F, S

Modern descriptive models of English grammar.

321 Introduction to Shakespeare. (3) F, S

Shakespeare's major comedies, histories, and tragedies. Not for English majors or minors. *General studies: HU.*

331 American Drama. (3) A

Major works in the development of American drama from its beginnings to the present. *General studies: L2.*

332 Major American Novels. (3) A

Novels from the 19th century to the present studied in their historical and cultural contexts. Not for English majors or minors. *General studies: L2.*

333 American Ethnic Literature. (3) A

Examination of America's multicultural identity through works of literature that depict American ethnic gender and class sensibilities. Lecture/discussion on *General studies: L2, C.*

341 American Literature. (3) F, S

From colonial times to the Civil War including the growth of nationalism and romanticism. *General studies: HU.*

342 American Literature. (3) F, S

From the Civil War to the present. Development of realism, naturalism and modernism and contemporary trends in prose and poetry. *General studies: HU.*

345 Selected Authors or Issues. (3–4) N

Different topics may be offered. Firm topics with ability may carry 4 credits. Repeat credit for different topics.

352 Short Story. (3) F, S

Development of the short story as a literary form, analysis of its technique from the work of representative authors. *General studies: HU.*

353 African-American Literature: Beginnings through the Harlem Renaissance. (3) F

Thematic and cultural study of African-American literature through the Harlem Renaissance. *General studies: L2, HU, C.*

354 African-American Literature: Post-Harlem Renaissance to the Present. (3) S

Thematic and cultural study of African-American literature since the Harlem Renaissance. *General studies: L2, HU, C.*

355 History of the Drama. (3) S

Development of European drama from the Greek to the Romantic Period. *General studies: HU.*

356 Biblical Backgrounds of Literature. (3) F, S

Readings in Old and New Testaments emphasizing ideas, literary types and sources as they appear in literature. *General studies: HU.*

357 Introduction to Folklore. (3) N

Survey of the history, genres, and dynamics of folklore with emphasis on oral traditions. *General studies: HU.*

359 American Indian Literatures. (3) S

Selected oral traditions of American Indians and their influences on contemporary Native American literary works. *General studies: HU, C.*

360 History of Film. (4) N

Emphasis on American film, with some study of European film. 3 hours lecture, 4 hours of screening. *General studies: HU.*

361 Silent Film. (4) F

Development of motion pictures from 1850 through 1930. 3 hours lecture, screening. *General studies: HU.*

362 Sound Film Genres. (4) S

Examination of the Western, the horror film, the comedy, and other genres. 3 hours lecture, screenings. *General studies: HU.*

363 Chicano Literature. (3) F

Development of Chicano literature: study of genres and themes. Attention to literary antecedents. *General studies: C.*

English majors and minors are expected to have completed ENG 200 before taking 400 level literature courses.

400 History of Literary Criticism. (3) S

Major critical and critical traditions in the western world. Prerequisite: 6 hours of literature or instructor approval. *General studies: HU.*

405 Style and Stylistics. (3) N

Linguistic rhetoric, and literary approaches to the analysis of style in poetry, fiction, and other forms of written discourse.

408 Advanced Screenwriting I. (3) F

A study of the principles of dramaturgy or dramatic structure with particular emphasis on character as the creator of events.

409 Advanced Screenwriting II. (3) S

Application of the principles taught in a complete feature length screenplay. Prerequisite: ENG 408.

411 Advanced Creative Writing. (3) F, S

Separate poetry and fiction workshops for experienced writers emphasizing individual style. May be taken once for poetry once for fiction. Prerequisite: ENG 310 or instructor approval.

412 Professional Writing. (3) N

Lectures and conferences concerning techniques of writing for publication. Prerequisite: ENG 310 or instructor approval.

413 History of the English Language. (3) F, S

Development of English from the earliest times to the modern period. Prerequisite: junior standing or instructor approval. *General studies: HU.*

415 Medieval Literature. (3) F

Medieval English literature in translation from *Beowulf* to *Malory* (excluding Chaucer), emphasizing cultural and intellectual backgrounds; includes contemporary works. Prerequisite: ENG 221 or instructor approval. *General studies: HU.*

416 Chaucer: Canterbury Tales. (3) F

Chaucer's language, his art work and its relationship to contemporary and insular traditions. Prerequisite: ENG 221 or instructor approval. *General studies: HU.*

417 Chaucer: Troilus and Criseyde and the Minor Works. (3) S

Chaucer's language, his major poem and his early works in their medieval context. Prerequisite: ENG 221 or instructor approval. *General studies: HU.*

418 Renaissance Literature. (3) F

Poetry and prose, 1485–1603, excluding the drama. Humanism and major genres; More, Spenser, and other representative writers. Prerequisite: ENG 221 or instructor approval. *General studies: HU.*

419 English Literature in the Early 17th Century. (3) S

Prose and poetry exclusive of Milton and the drama. Metaphysical, Cavalier, and neoclassical verse. Donne, Jonson, Bacon, and other representative writers. Prerequisite: ENG 221 or instructor approval. *General studies: L2, HU.*

421 Shakespeare I. (3) F, S

A selection of comedies, histories, and tragedies including *Midsummer Night's Dream*, *Henry IV*, *Hamlet*, and *Macbeth*. Prerequisite: ENG 221 or instructor approval. *General studies: HU.*

422 Shakespeare II. (3) F S

A selection of comedies, histories, and tragedies including *Twelfth Night*, *King Lear*, *The Tempest*, and *Othello*. Prerequisite: ENG 221 or instructor approval. *General studies* HU

423 English Drama to 1600. (3) S '95

Drama (exclusive of Shakespeare) including Kyd, Marlowe, Greene, and Decker. Prerequisite: ENG 221 or instructor approval. *General studies* L2 HU

424 Jacobean and Caroline Drama. (3) S '95

Drama from 1600 to 1642 (exclusive of Shakespeare) including Jonson, Chapman, Webster, and Beaumont. Prerequisite: ENG 221 or instructor approval. *General studies* L2 HU

425 Romantic Poetry. (3) F

Poetry of Wordsworth, Coleridge, Shelley, Keats, and Byron. *General studies* HU

426 Victorian Poetry. (3) F

Poetry of the second half of the 19th century. Special study of Tennyson, Browning, and Arnold. Prerequisite: ENG 222 or instructor approval. *General studies* L2 HU

427 Restoration and Early 18th Century. (3) F

Writers and movements in the nondramatic literature of the Restoration and early 18th century. Prerequisite: ENG 221 or instructor approval. *General studies* HU

428 The Later 18th Century. (3) S

Writers, movements, and books during the second half of the 18th century. Prerequisite: ENG 221 or instructor approval. *General studies* L2, HU.

429 Milton. (3) F S

Selected prose and poetry emphasizing *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*. Prerequisite: ENG 221 or instructor approval. *General studies*: HU

430 Victorian Cultural Backgrounds. (3) N

Social, religious, and other cultural issues in prose by such writers as Carlyle, Ruskin, Darwin, Arnold, Pater, and Morris. Prerequisite: ENG 222 or instructor approval. *General studies* L2 HU

435 19th-Century American Poetry. (3) S

Themes and developments in American poetry to 1900 including Poe, Whitman, and Dickinson. *General studies* HU

439 Restoration and 18th-Century Drama.

(3) S '95
English drama 1600–1800. Prerequisite: ENG 221 or instructor approval. *General studies* HU

440 American Literature to 1815. (3) N

Thought and expression from the time of the first English speaking colonies to 1815. *General studies* HU

441 20th-Century American Drama. (3) N
American drama since World War I, especially experimental techniques. *General studies* HU

442 20th Century British and Irish Poetry.

(3) F
Theory and practice of poetry since 1900. Prerequisite: ENG 222 or instructor approval

443 American Poetry, 1900–1945. (3) F
Developments in theory and practice of major poets. *General studies* HU

444 American Romanticism, 1830–1860, I.

(3) F
Cultural expression in works of representative writers. Emphasis on poetry, essay, and autobiography. *General studies* HU

445 American Romanticism, 1830–1860, II.

(3) S
Development of psychology, analytical, and tragic themes in works of representative writers. Emphasis on fiction and criticism

446 American Realism, 1860–1900. (3) S

Writers and influences that shaped the development of literary realism. *General studies* L2, HU

448 20th-Century British and Irish Novel.

(3) S
Theory and practice of the novel since 1900. Prerequisite: ENG 222 or instructor approval. *General studies*: HU.

451 The Novel to Jane Austen. (3) F

From origins of prose fiction through the 18th century. *General studies*: HU, H.

452 The 19th-Century Novel. (3) S

From Scott to Conrad. *General studies*: HU

453 The American Novel to 1900. (3) F

The rise and development of the novel to Dreiser. *General studies*: HU

454 The American Novel, 1900–1945. (3) F

Developments in theory and practice of major novels. *General studies* HU

455 The Form of Verse: Theory and Practice. (3) N

Types, history, criticism, and schools of theory of metrical form. Analysis of lyric narrative and dramatic poetry

457 American Poetry Since 1945. (3) S

Major American poets of the period. Developments in theory and practice. *General studies*: HU.

458 American Novel Since 1945. (3) S

Major novels of the period. Developments in theory and practice. *General studies* L2 HU.

460 Western American Literature. (3) S

Critical examination of ideas and traditions of the literature of the western United States, including the novel. *General studies*: HU.

461 Women and Literature. (3) N

Selected topics in literature by or about women. May be repeated for credit when topics vary. *General studies*: HU

462 20th Century Women Authors. (3) F

Critical examination of literature by 20th-century women writers. May be repeated for credit when topics vary. *General studies*: HU

463 European Drama from Ibsen to 1914.

(3) N
Chief continental and British dramatics of the period emphasizing the beginnings and development of realism. *General studies* HU

464 European Drama from 1914 to the Present. (3) N

Chief continental and British dramatists of the period, emphasizing experimental techniques. *General studies* HU

471 Literature for Adolescents. (3) F S

Prose and poetry that meet the interests and capabilities of junior high and high school students. Recent literature stressed. A passing grade of at least "C" required before students are permitted to student teach in English. *General studies*: HU

480 Methods of Teaching English. (3) F, S

Methods of instruction, organization, and presentation of appropriate content in English. A passing grade of at least "C" required before students are permitted to student teach in English. Prerequisite: ENG 312 or 314 or 413

500 Research Methods. (3) F

Methodology and resource materials for research. Analysis of criticism and scholarly procedure. Evaluation of sources

501 Introduction to Comparative Literature.

(3) N
Problems, methods, and principles illustrated by selected critical essays and literary texts

502 Contemporary Critical Theory. (3) F

An advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as HUM 549.

507 Old English. (3) F

Elements of Old English grammar with selected readings.

508 Old English Literature. (3) N

Intensive literary, linguistic, and cultural study of Old English literature. May be repeated for credit when topics vary. Prerequisite: ENG 507

509 Middle English. (3) S

A study of the principal dialects of the language with selected readings. Prerequisite: graduate standing

512 The Teaching of Composition. (3) N

The theory and practice of teaching writing at all levels. Emphasis on current research. Prerequisites: teaching experience; instructor approval.

515 Middle English Literature. (3) N

English literature from the 12th through the 15th centuries exclusive of Chaucer. Prerequisite: ENG 509 or instructor approval

517 Contemporary Rhetorical Theory. (3) F

Investigation of the work of such important rhetorical theorists as Burke, Toulmin, Perelman, Gates, and Cox. Seminar.

520 Renaissance Literature. (3) S

Poetry and prose of the English Renaissance, excluding drama.

521 Shakespeare. (3) F, S

A selection of comedies, histories, and tragedies presented in the context of literary history and critical theories, with an emphasis on classical and medieval backgrounds

525 American Literary Criticism. (3) N

Analysis and discussion of leading historical and critical interpretations of American literature from the beginnings to the present

530 Classical Rhetoric and Written Composition. (3) F '95

Relationship of major texts in classical rhetoric to developments in composition theory, literary theory, and practice through the 19th century

531 Rhetorical Theory and Literary Criticism. (3) S '95

Intensive study of major rhetorical theorists of the 20th century in such areas as literary criticism, discourse theory, and composition theory

532 Composition Theory. (3) N

Intensive study in the rhetorical categories of invention, arrangement, style, memory, and forms of written discourse.

545 Studies in English Literature. (3) N

This course offers selected authors or issues and may be repeated for credit

547 Studies in American Literature. (3) N

This course offers selected authors or issues and may be repeated for credit

549 Studies in Comparative Literature. (3) N

This course offers selected authors or issues and may be repeated for credit

550 Contemporary Comparative Literature. (3) F
Comparative studies in modern literature in English and other literatures in translation. May be repeated for credit when content varies.

571 Advanced Study in Literature for Adolescents. (3) N
History and criticalism of adolescent literature. Prerequisite: ENG 471 or instructor approval.

572 Theories Underlying the Acquisition of English as a Second Language. (3) F
Introduction to theories of language acquisition, including the linguistic, cognitive, affective, and sociocultural aspects of these theories.

573 Censorship and Literature. (3) N
The history of censorship primarily in the United States, and significant court decisions that affected writers and books.

574 The Teaching of English as a Second Language. (3) S
Introduction to the methods of teaching English as a second language, language teaching trends, practical applications and the teaching of different skills. Prerequisite: ENG 572 or instructor approval.

575 Advanced Studies in the Teaching of English as a Second Language. (3) F
Current research issues in the teaching and learning of English as a second language. Prerequisite: ENG 572 or instructor approval.

576 Sociolinguistic Aspects of Second Language Acquisition. (3) N
Nature of language and interlanguage variation; instructional implications of cultural patterns of verbal and nonverbal communication.

591 Seminar. (3) F, S
Selected topics regularly offered in the various areas of English studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

LINGUISTICS

LIN 500 Research Methods. (3) F
Methodology and resource materials for research. Analysis of criticalism and scholarship, including evaluation of sources.

505 American English. (3) F
Development of the English language in America, including a survey of geographical and social dialects.

510 English Linguistics. (3) F
Current approaches to the study of the English language.

511 Phonetics and Phonology. (3) S
Current trends in phonological theory and its basis in acoustic and articulatory phonetics. Prerequisite: ENG 510 or equivalent or instructor approval.

513 Semantics. (3) F, 94
Current approaches to linguistic meaning with particular attention to English. Prerequisite: ENG 510 or equivalent or instructor approval.

514 Syntax. (3) S
The analysis of syntactic structure by contemporary theoretical models with a focus on English. Prerequisite: ENG 510 or equivalent or instructor approval.

516 Pragmatics and Discourse Theory. (3) F, 95
The study of language use in context and of language structures in conversation and written text. Lecture, discussion. Prerequisite: ENG 510 or equivalent or instructor approval.

548 Studies in English Language. (3) N
This course offers selected authors or issues and may be repeated for credit.

591 Seminar. (3) F, S
Selected topics.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

HUMANITIES

For courses in humanities, see "Interdisciplinary Humanities Program," pages 121-122.

Exercise Science and Physical Education

Philip E. Martin
Interim Chair
(PEBW 201) 602/965-3591

REGENTS' PROFESSOR D.M. LANDERS

PROFESSORS

BURKETT, CORB N, CORDER,
DARST, KRAHENBUHL,
OSTERHOUDT, PANGRAZI, SKINNER,
STELMACH, STOCK, STONE,
J. THOMAS, WELLS

ASSOCIATE PROFESSORS DEZELSKY, HINRICH, MARTIN

ASSISTANT PROFESSORS MATT, K. THOMAS, WILLIS

LECTURER D. LANDERS

PROFESSORS EMERITI

BRYANT, DEACH, GRIER,
KAJIKAWA, KLANN, MAARSINGH,
McFARLAND, ODENKIRK, PACKER,
PITTMAN, RICHARDSON,
STEVERSON, STEWART, THOMSON,
WEGNER, WULK

EXERCISE SCIENCE/PHYSICAL EDUCATION—B.S.

The major consists of 45 semester hours, including 21 semester hours of required EPE core courses. The remaining 24 semester hours of EPE and other courses are prescribed by the specific concentration the student selects. The required EPE core courses are EPE 335, 340, 345, 352, 450, and six semester hours of EPE 110. Each EPE core course has specific prerequisite courses that must be taken before taking the respective core course. These prerequisite courses include CHM 101 (S1); MAT 117 (N1), PGS 101 (SB); ZOL 201 (S2), 202; and HIS 102 (SB, G, H)

or PHI 101 (HU). All prerequisite and EPE courses must be completed with a minimum grade of "C." The requirements for the specific concentrations are described below.

Majors must elect either the exercise and sport studies or the exercise and wellness concentration.

Exercise and Sport Studies Concentration. Candidates must complete 24 semester hours beyond the core courses in the major field, at least 12 of which must carry EPE prefixes, be upper division courses, and concern the theoretical subjects of the core. The remaining 12 semester hours may carry either EPE prefixes or prefixes from related disciplines selected with the advice and consent of a faculty advisor. Activity courses may not be used to fulfill part of the 24 semester hour requirement. No more than six semester hours may be in independent study courses.

Exercise and Wellness Concentration. Candidates must complete 24 semester hours beyond the required EPE core courses: EPE 320, 420, 425, six semester hours of EPE 484 Internship, and nine semester hours selected from an approved list of concentration electives that includes courses from EPE, nutrition, computer science/statistics, and business.

EXERCISE SCIENCE/PHYSICAL EDUCATION MINOR

The minor consists of the core sequence in exercise science and physical education as follows: EPE 110 (six semester hours), 335, 340, 345, 352, 450; plus all prerequisite courses.

SECONDARY EDUCATION— B.A.E.

Physical Education. Candidates for the B.A.E. are required to complete 19 semester hours in physical education beyond the required EPE core courses (EPE 110, 361, 376, 382, 480, and 483) and a four semester professional sequence in the College of Education (32 semester hours). Entry into this degree program requires filing an application, passing scores on a Pre Professional Skills Test (PPST), 56 semester hours of completed university study, and a minimum GPA of 2.50. See the "College of Education" section for additional requirements.

GRADUATE PROGRAMS

The Department of Exercise Science and Physical Education offers a program leading to the Master of Science degree in Exercise Science/Physical Education. The department also participates with the Graduate College in the program leading to the Doctor of Philosophy degree in Exercise Science and with the College of Education and the Graduate College in the program leading to the Doctor of Philosophy degree in Curriculum and Instruction with concentrations in exercise and wellness education and in physical education. Consult the *Graduate Catalog* for requirements.

HEALTH SCIENCE

HES 100 Introduction to Health and Wellness. (3) F, S, SS

Current concepts of health and wellness. Cross-listed as EPE 100

305 Substance Abuse. (3) F

General properties, principles of action and behavioral effects of psychoactive drugs. Focuses on how substances affect health of humans

382 Introduction to Public Health. (3) N

Public and community health examined including governmental, voluntary and community agency activities that promote health among populations.

505 Drug Dependency: Perspectives and Approaches. (3) S

Classification of mood-modifying substances in terms of effects. Motivational and social forces contributing to the dynamics of the problem, control and treatment

Students who satisfactorily complete selected HES 494 courses are eligible to qualify for a certificate of accomplishment from the Centers for Disease Control U.S. Department of Health and Human Services

Omnibus Courses: See page 44 for omnibus courses that may be offered.

EXERCISE SCIENCE/ PHYSICAL EDUCATION

A \$5.00 towel and locker fee is required each semester by students using towel and locker facilities for physical education classes and intramural activities

Physical education activity classes (EPE 105, 205, 305, 310) may not be taken for credit. Excessive absences and/or tardiness are considered disruptive behavior

EPE 100 Introduction to Health and Wellness. (3) F, S, SS

Current concepts of health and wellness. Cross-listed as HES 100

105 Physical Education Activity. (1) F, S, SS

Beginning instruction in a wide variety of sports such as aerobics, aquatics, racquet sports, physical conditioning, and golf. 3 hours a week. "Y" grade only. May be repeated.

110 Movement Analysis Laboratory. (1-2) F, S, SS

Practical application of biomechanics, physiological, psychological, and learning principles in the analysis of skill acquisition and performance. Prerequisites: ESPE major; EPE 105 proficiency.

205 Physical Education Activity. (1) F, S, SS

Intermediate level. Continuation of EPE 105. 3 hours a week. May be repeated for credit

283 Prevention and Care of Athletic Injuries. (3) F

Taping, injury recognition, emergency care, and observation on procedures in athletic training. Prerequisites: ZOL 201, 202.

290 Sports Officiating. (3) F

Rules and mechanics of officiating used in football, basketball, and volleyball

291 Theory of Coaching. (3) F, S

Theory of coaching competitive sports. Prerequisite: ESPE major

292 Sports Officiating. (3) S

Rules and mechanics of officiating used in softball (slow and fast pitch), baseball, and track and field.

305 Physical Education Activity. (1) F, S, SS

Advanced levels. Continuation of EPE 205, with instructor's approval. 3 hours a week. May be repeated.

310 Collegiate Sports. (1) F, S

Participation in men's or women's intercollegiate competition. May be repeated for 4 credits. 1 per year. "Y-E" grade.

320 Fitness and Wellness Management. (3) S

Principles of planning, organizing, promoting and managing fitness and wellness programs for majors only.

325 Fitness for Life. (3) F, S

Physical fitness and benefits of exercise with emphasis on self-evaluation and personalized program planning for a lifetime.

335 Biomechanics. (3) F, S, SS

Basic mechanical and anatomical principles applied to human movement. Emphasis is placed on kinematic and kinetic concepts. Prerequisites: MAT 117; ZOL 201

340 Physiology of Exercise. (3) F, S, SS

Physiological mechanisms of acute responses and chronic adaptations to exercise. Prerequisites: CHM 101; ZOL 202.

345 Motor and Developmental Learning. (3) F, S, SS

Principles of motor skill acquisition across the lifespan, focusing on the learner and the learning environment. Prerequisites: PGS 101; ZOL 201

348 Psychological Skills for Optimal Performance. (3) F, S, SS

Application of psychological techniques and their use to improve effectiveness and performance in sport and related areas.

352 Psychosocial Aspects of Physical Activity. (3) F, S, SS

Interrelationships between physical activity and psychosocial variables including socialization, team dynamics, cultural values, anxiety, aggression, and motivation. Prerequisites: PGS 101.

361 Physical Education in the Secondary School. (3) F, S

Current trends and theories such as elective programs, coed classes, equity issues, contract teaching, curriculum, and administration

370 Advanced First Aid. (3) N

Assessment, management, treatment of wounds, injuries, shock, poisoning, burns, sudden illness, emergency rescue and cardiopulmonary resuscitation. Lecture/lab

376 Physical Education for the Elementary School. (3) F, S

Scope and values of physical education in the elementary school. Methods, materials and practice in teaching activities for primary, intermediate, and upper grades.

382 Physical Education for the Atypical Student. (3) F, S, SS

Survey course of handicapping conditions and adapting activities to meet the needs of the handicapped. Prerequisite: EPE 335 or instructor approval

412 Biomechanics of the Skeletal System. (3) F

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

420 Exercise Testing. (3) F

Theoretical basis and practical application of screening, exercise testing, estimates of energy expenditure, and interpretation of results. Prerequisite: EPE 340.

425 Exercise Prescription. (3) S

Theoretical bases for and application of general principles of exercise prescription to various ages, fitness levels, and health states. Prerequisite: EPE 420.

441 Physiology of Women in Sport. (3) S

Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life will be emphasized. *General studies: L2.*

448 Applied Sport Psychology. (3) F, SS

Psychological theories and techniques applied to a sport to enhance the performance and personal growth of athletes and coaches. Lecture/discussion. Prerequisites: EPE 345 and 352 or equivalents. *General studies: L2.*

450 History and Philosophy of Sport. (3) F, S, SS

Nature, purpose, and development of modern sport and related activity. Prerequisite: H S 102 or PH 101

480 Methods of Teaching Physical Education. (3) F, S

Methods of instruction, organization and presentation of appropriate content in elementary and secondary physical education. Concurrent with student teaching or permission of instructor

483 Evaluation in Physical Education. (3) F, S, SS

Analysis and construction of tests. Statistics as applied to tests and measurement in school-based and non-school-based settings. Prerequisite: MAT 117

485 Advanced Techniques of Athletic Training. (3) S

An advanced course in athletic training designed for students seeking NATA certification. Emphasis on therapeutic modalities and rehabilitation procedures. Prerequisites: EPE 283, 370, CPR certification

500 Research Methods. (3) F

An introduction to the basic aspects of research including problem selection, literature review, instrumentation, data handling, methodology, and the writing of research reports and articles

501 Research Statistics. (3) S
Statistical procedures; sampling techniques, exercise testing, exercise prescription hypothesis testing, and experimental designs as they relate to research publications

505 Applied Exercise Physiology Techniques. (3) F '95
Investigative techniques used in the applied exercise physiology laboratory. Emphasis on pulmonary function, body composition, and cardiorespiratory assessment. Lecture, lab. Prerequisite: EPE 340.

510 Introduction to Biomechanics Research Methods. (3) F
Application of mechanics to human movement analysis. Includes consideration of 2-d mensural imaging techniques, force measurement, electromyography, and data processing methods. Lecture, discussion, some labs. Prerequisite: EPE 335 or instructor approval

520 Psychology of Exercise and Sport. (4) F
Current research in psychology of sport and exercise. Includes questionnaire, psychophysiology, and behavioral research techniques. Lecture, discussion. Prerequisites: EPE 345, 352, 500

521 Motor Development, Control, and Learning. (4) S '95
Theory and research on motor skill acquisition, neurodevelopment and development (i.e., growth, children and exercise, and development learning). Lecture, discussion, some abs. Prerequisites: EPE 345, 500, 501

530 Exercise Physiology. (3) F
Immediate and long term adaptations to exercise with special reference to training and the role of exercise in cardiovascular health. Prerequisite: EPE 340.

534 Sports Conditioning. (3) F
Bases of sports conditioning: neuroendocrine, aerobic and anaerobic power, strength, flexibility, and analysis of conditioning components for sports

536 Fitness Program Development. (3) S
Planning, organization, and administration of fitness programs. Exercise testing and prescription. Programs for special groups

540 Factors Influencing Exercise Performance. (3) S
Physiological factors that can affect the ability to exercise, and the body's response to exercise. Lecture, seminar. Prerequisite: EPE 530.

541 Physiology of Women in Sport. (3) S
Physiological aspects of women engaging in physical activity. Factors affecting performance and health throughout life will be emphasized

542 Environmental Aspects of Human Performance. (3) N
Physiological response mechanisms to desert, arctic, mountain and undersea environments with emphasis on exercise performance. Prerequisite: EPE 530

550 Historical Bases of Physical Education. (3) N
Golden Age of Greece, Renaissance, and modern Europe. Cultural, economic, and educational forces that influenced the development of physical education in the United States

555 Sport and the American Society. (3) F
Impact of sports upon the American culture with focus on competition, economics, myths, minorities, and the Olympic syndrome

560 Theory of Administration. (3) N
Administrative philosophies, development of concepts related to processes of administration types of administrative behavior, tasks and responsibilities of the administrator, and the evaluation of the effectiveness of administration

561 Administration of Athletics. (3) N
Managing an athletic program including financial budget policies, staging, and promotion of athletic contests, schedules, travel insurance, and current athletic trends.

562 Facility Development. (3) N
Principles, standards, personnel, designs, and equipment utilized in the planning, construction and maintenance of indoor/outdoor facilities

565 Improving Sport Skills. (3) SS
Factors in successful motor performance in skills used in individual and team sports

570 Adapted Physical Education. (3) F
Contemporary adapted, developmental remedial, and corrective physical education programs; understanding of principles, problems and recent developments in this area

572 Trends and Issues in Physical Education. (3) S
Literature, research, and practices in contemporary physical education including finances, Title IX, teaching and coaching philosophies, school organization and nonteaching physical education programs.

573 Curriculum Construction in Secondary Physical Education. (3) F
Application of principles, practices and functional philosophies of curriculum making in physical education. Prerequisite: major in ESPE or teaching experience

574 Analysis of Teaching Behavior in Sport and Physical Education. (3) N
Use of systematic direct observation techniques in analyzing and evaluating instruction in sport and physical education. Lecture, abs.

575 Teaching Lifetime Fitness. (3) S
Organizing and implementing physical fitness programs in the school with emphasis on individual problem solving.

576 Physical Education for Elementary School Children. (3) F
Current practices and research pertaining to elementary school physical education programs.

577 Movement Experiences for Preschool Children. (3) N
Movement activities for preschoolers based on the needs and characteristics of young children

610 Advanced Topics in Biomechanics. (3) S
Three-dimensional imaging techniques, data analysis theory and integration of biomechanics research tools. Includes original research project. Lecture, discussion, some abs. Prerequisite: EPE 510 or instructor approval

620 Developmental Motor Skill Acquisition. (3) S '95
Cognitive motor theories of learning/performance applied to children's motor skill acquisition. Study of knowledge development and research analysis/techniques. Lecture, discussion. Prerequisite: EPE 521

621 Motor Learning/Control. (3) F '95
Discussion of contemporary research issues in motor learning and control. Includes behavioral and neurophysiological issues. Lecture, discussion. Prerequisite: EPE 521

622 Sport Psychology. (3) S
Contemporary research and theory as related to human performance in sport and exercise settings. Lecture, discussion. Prerequisites: EPE 501, 520.

630 Current Topics in Exercise Physiology. (3) F
Discussion of contemporary research issues in exercise physiology. Lecture, seminar. Prerequisites: EPE 505, 530, 541 (or 542).

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Family Resources and Human Development

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PROFESSORS
HOOVER, MORGAN,
PETERSON, ROOSA

ASSOCIATE PROFESSORS
BOULIN-JOHNSON, CHR STOPHER,
FABES, GRIFFIN, HUGHSTON,
JOHNSTON, MANORE, C. MARTIN,
MONTE, VAUGHAN

ASSISTANT PROFESSORS
BALCAZAR, DUMKA,
PETERS, WILSON

LECTURERS
R. MARTIN, WEIGAND, ZYLLA

PROFESSORS EMERITI
BAKER, BARKLEY, BRESINA,
CREIGHTON, ELLSWORTH,
HUNTER, KAGY, O'CONNOR,
STANGE, WOOLDRIDGE

FAMILY RESOURCES AND HUMAN DEVELOPMENT— B.A. OR B.S.

For either the B.A. or B.S. degree (see "Degree Requirements," page 87), students must select one of the following three concentrations:

Family Resources and Human Development in Business with an option in food service management.

Family Studies/Child Development Human Nutrition Dietetics with an option in (1) general dietetics or (2) human nutrition.

Family Resources and Human Development in Business

Food Service Management Option. This option consists of 22 hours of the following required departmental courses: FON 100, 142, 341, 343, 344, 442, 445. In addition, credits are required from the following: CHM 101, 231, 235; MIC 205, 206; and a CSE, MAT, or ASM course to satisfy computer application. Additional business courses are selected in consultation with an advisor.

Family Studies/Child Development

This concentration consists of 33 hours of core family studies/child development classes. Required core courses include the following: CDE 232, 430; FAS 331, 332, 361, 431, 435, 436, 440; six hours of CDE 498 (or FAS 498); plus one of the following statistics courses: EDP 454 or PSY 230 or SOC 395.

In addition, 15 hours of electives must be taken, with at least six hours from the following: CDE 337, 338, 437; FAS 330, 390, 432; either CDE or FAS 498 or 499. The remaining courses are selected in consultation with an advisor.

Human Nutrition-Dietetics

The American Dietetic Association (ADA) has approved of the dietetics concentration as meeting their Plan V requirements. Graduates of a Plan V program may apply for dietetic internships or preprofessional practice programs to establish eligibility to write the Dietetic Registration examination. In addition to the required courses specified below, the following 18 hours are required by both the ADA and the Department of Family Resources and Human Development: EDP 310 or equivalent or HEE 480; MGT 301 or equivalent; MIC 205, 206; ZOL 201, 202. Additional courses required by the American Dietetic Association for completion of Plan V requirements are to be selected upon consultation with an advisor. Most of the Plan V requirements also satisfy College of Liberal Arts and Sciences graduation requirements.

There are the following 22 hours of required departmental courses: FON 142, 241, 440, 441, 442, 444; FRD 451 (maximum of three semester hours).

General Dietetics Option. Additional required departmental courses, totaling 18 hours, are FON 341, 343, 344, 445, 446, and 448.

Human Nutrition Option. An additional required departmental course, totaling three hours, is FON 446.

Family Resources and Human Development Minor

The minor in Family Resources and Human Development consists of 18 semester hours in which students must specialize in one of three emphases. These emphases consist of the following

- 1 family studies/child development;
2. foods and nutrition in business; and
- 3 nutrition

Each of these emphases requires that at least 12 of the 18 hours must be upper division courses.

Specific requirements for each emphasis are as follows:

- 1 The family studies/child development emphasis requires that students take CDE 232, 337; FAS 331, 440. This emphasis also requires that two courses (or six semester hours) be selected from the following: CDE 430, 437, 498; FAS, 431, 432
2. The foods and nutrition in business emphasis requires that students take FON 142, 343, 344, 442, 445, FRD 451.
3. The nutrition emphasis requires that students take FON 241, 440, 441, 444 (please note that FON 440, 441, and 444 have prerequisites). This emphasis also requires that two courses (or six semester hours) be selected from the following: FON 446, 448, 450, 451, 531, 532, 533 (please note that FON 446, 531, 532, and 533 have prerequisites).

SECONDARY EDUCATION—B.A.E.

Family Resources and Human Development. The major teaching field consists of 42 semester hours in family resources and human development and six hours in interior design. Major courses required are as follows: CDE 232, 337, FAS 330, 331, 354, 357, 431; FON 100, 142, FRD 451, HEE 461, 480, 481; two interior design courses, and two textile courses.

The College of Education has the following additional requirements for teacher certification: Arizona Teacher Proficiency Exam (professional knowledge only); POS 110 (or 310), 311 (or 417); 35 hours of Professional Teacher Preparation.

GRADUATE PROGRAMS

The Department of Family Resources and Human Development offers programs leading to the M.S. degree. Consult the *Graduate Catalog* for requirements.

CHILD DEVELOPMENT

CDE 232 Human Development. (3) F, S. Life span development from concept on through adulthood, with emphasis on family influences. Recognition of individuality within the universal pattern of development. Prerequisites: PGS 101, SOC 101. *General studies: SB*

337 Theory and Practice in Child Development. (3) F, S. Explores how child development theory affects practice with children and families, emphasizing development of preschool children and adult child interaction skills. Prerequisite: CDE 232 or equivalent.

338 Child Development Practicum. (2-4) F, S. Supervised practicum in the Child Development Lab preparing students for work in childcare centers and agencies serving young children and families. Laboratory. Prerequisite: CDE 337.

430 Infant/Toddler Development in the Family. (3) F. An examination of the development of infants/toddlers, the socialization processes of families, and the interactions of these processes. Prerequisite: CDE 232 or equivalent. *General studies: SB*

437 Observational and Naturalistic Methods of Studying Children. (3) S. In-depth examination of implementing observational and naturalistic studies of children in a variety of settings. 2 hours lecture, 3 hours lab. Prerequisites: CDE 430. 6 hours of psychology. *General studies: L2, SB*

531 Theoretical Issues in Child Development. (3) S. Major developmental theories, related research, and their application to family interaction. Prerequisites: CDE 430 and 437 (or equivalent) or instructor approval.

533 Research Issues in Child Development. (3) S. An in-depth exploration and critique of research focusing on child development in a family setting. Prerequisites: CDE 531, FRD 500

534 Applied Child Development. (3) S. Integration of child development research and theory to understand developmental problems and their relevance to intervention strategies. Prerequisites: CDE 531, FRD 500

Omnibus Courses: See page 44 for omnibus courses that may be offered

FAMILY STUDIES

FAS 301 Introduction to Parenting. (3) F, S Integrated approach to understanding parenting and parent-child interactions. Television on course Prerequisites: PGS 101, SOC 101 or equivalent

330 Personal Growth in Human Relationships. (3) F, S Personal development and behavior as related to competency in interpersonal relationships within the family. Processes of family interaction. Prerequisites: PGS 101, SOC 101 or equivalent *General studies SB*

331 Marriage and Family Relationships. (3) F, S

Issues, challenges and opportunities relating to present day marriage and family living. Factors influencing inter-relationships within the family. Prerequisite: course in psychology or sociology. *General studies SB*

332 Human Sexuality. (3) F, S

Relationship of sexuality to family life and to major social issues. Emphasis on developing healthy, positive, and responsive ways of integrating sexual and other aspects of human living. Prerequisite: PGS 101

354 Consumer Economics: Issues. (3) N Relationship of the consumer to the economy as a determinant of the family pattern of living. Current consumer problems and sources of protection.

357 Family Resource Management. (3) N Management as a means to realization of individual and family values and goals, creation, a location and use of resources. Focus on decisions making. Prerequisites: PGS 101, SOC 101 or equivalent

361 Introduction to Family/Child Research Methods. (3) S

Examines basic methods applied to family/child research, critiques current research literature and applies methods in current topics. Prerequisites: CDE 232, FAS 331 *General studies L1*

370 Family Ethnic and Cultural Diversity. (3) S

An integrative approach to understanding historical and current issues related to the structure and internal dynamics of diverse American families. Prerequisite: PGS 101 or SOC 101

390 Supervised Research Experience. (1-3) F, S, SS

Practical, first-hand experience within current faculty research projects in family studies or child development. "Y" grade on may be repeated for total of 6 hours. Prerequisites: FAS 361; 3.00 GPA in major, approval of supervising faculty member prior to registration

431 Parent-Adolescent Relationships. (3) F Dynamics of the relationships between parents and adolescents. Developmental characteristics of adolescence and the corresponding adult stage. Prerequisites: CDE 232, FAS 331.

432 Family Development. (3) N Normative changes in families over time from formation until dissolution. Emphasis on the marital subsystem in middle and later years. Prerequisites: CDE 232 and FAS 331 or instructor approval.

435 Advanced Marriage and Family Relationships. (3) F

Recent research, issues, and trends relating to marriage and family interaction. Influence of family composition, physical environment, family patterns, and values on family dynamics. Prerequisites: FAS 331-361. *General studies SB*

436 Conceptual Frameworks in Family Studies. (3) S

Approaches to study families focusing on systems, interactional exchange, conflict and developmental frameworks. Applications to diverse individual and family situations. Prerequisites: CDE 232; FAS 331-361.

440 Fundamentals of Marriage and Family Therapy. (3) S

Introduction to the fundamental orientations of marriage and family therapy

454 Consumer Economics: Family Finance. (3) N

Major family income and expenditure alternatives in attainment of family goals.

530 Introduction to Marriage and Family Therapy. (3) F

Introduction of major marriage and family therapy orientations. Review history, theory, application, and outcome research for each orientation. Prerequisite: admission to Family Studies M.S. program or instructor approval

531 Family Theory Development. (3) S

Historical and current approaches to theory development, evaluation and application in family studies. Prerequisite: FAS 435 or instructor approval.

535 Family Relationships in the Middle and Later Years. (3) N

Developmental processes and generational relationships of the family in the middle and later stages of the family life cycle. Prerequisites: CDE 232 and FAS 331 or instructor approval

536 Dysfunctional Marriage and Family Relationships. (3) N

Critical review of current theory and empirical evidence connecting marital and family interaction patterns with aberrant behavior. Prerequisite: PGS 466 or PSY 573 or equivalent or instructor approval

537 Interpersonal Relationships. (3) F

Critical examination of current theoretical and research developments in the area of interpersonal relationships. Applications for research and intervention emphasized. Prerequisite: FAS 435 or equivalent or instructor approval

538 Advanced Techniques in Marriage and Family Therapy. (3) N

An in-depth review of assumptions and advanced techniques associated with contemporary marriage and family therapy approaches. Prerequisite: a graduate-level course in marriage and family therapy or instructor approval

539 Research Issues in Family Interaction. (3) F

Critical review of current and past research in the area of family dynamics. Emphasizes interactional processes within the family. Prerequisite: FAS 435 or equivalent or instructor approval

540 Assessment in Marriage and Family Therapy. (3) S

Instruction in the assessment and outcome evaluation of couples and families involved in marital and family therapy. Lecture/lab. Prerequisites: FRD 500 or equivalent, PSY 530 or instructor approval

551 Family Decision-Making. (3) N

Theory and research focusing on centrality of decision to management in family settings. Ecological systems approach to family decisions on issues. Prerequisite: FAS 357 or instructor approval

554 Family Economics. (3) N

Analysis of public policy affecting family economic behavior with respect to divorce, taxation, credit, population, and other issues. Prerequisites: ECN 112; FAS 354.

580 Marriage and Family Therapy Practicum. (3) F, S

Supervised clinical experience in marriage and family therapy; includes development of assessment and outcome evaluation skills. Lecture/lab. Prerequisite: instructor approval (a) First semester (3) (b) Second semester (3) (c) Third semester (3)

Omnibus Courses: See page 44 for omnibus courses that may be offered.

FOOD AND NUTRITION

FON 100 Introductory Nutrition. (3) F, S, SS

Basic concepts of human nutrition. Alternative diets and how food choices affect personal health. Prerequisite: nonmajor.

142 Applied Food Principles. (3) F, S

Applied scientific principles of food preparation and production. 2 hours lecture, 3 hours lab

241 Human Nutrition. (3) F, S, SS

Principles of human nutrition relative to health. Emphasis on nutrients and the factors affecting their utilization in the human body. Prerequisite: CHM 101 or equivalent.

341 Introduction to Planning Therapeutic Diets. (3) S

Cultural, health, and economic aspects of diet planning. Computer and manual assessment of food composition. Review of common therapeutic diets. Prerequisites: FON 142, 241 (or equivalent).

343 Food Service Systems Procurement. (3) F

Food purchasing for institutions. Cost factors, food laws, quality standards and inventory control. Field trip may be required. Prerequisites: FON 142, MAT 106.

344 Nutrition Services Management. (3) S

Organization, administration, and management of food and nutrition services in hospitals and other institutions. Field trips may be included. Prerequisite: FON 343 *General studies L1*

440 Advanced Human Nutrition I. (3) F

Metabolic reactions and interrelationships of vitamins, minerals, and water. CHM 332 recommended. Prerequisites: CHM 361, FON 241 or equivalent; ZOL 202.

441 Advanced Human Nutrition II. (3) S

Metabolic reactions and interrelationships of carbohydrate, lipid and protein. CHM 331, 332 recommended. Prerequisites: CHM 361, FON 241 or equivalent; ZOL 202 *General studies L2*

442 Experimental Foods. (4) F

Food product development techniques. Food evaluation and testing, and investigation of current research into food composition. 2 hours lecture, 6 hours lab. Prerequisites: CHM 231, FON 142

444 Diet Therapy. (3) S

Principles of nutritional support for prevention and treatment of disease. Prerequisites: FON 241 or equivalent; ZOL 202.

445 Quantity Food Production. (3) S

Standard methods of food preparation in quantity; operation of institutional equipment and menu planning for institutions. Experience in quantity food service. 1 hour lecture, 6 hours lab. May require field trips. Prerequisites: FON 241 (or equivalent) and 343 and 344 or instructor approval.

446 Human Nutrition Assessment Lecture/Laboratory. (3) S

Clinical and biochemical evaluation of nutritional status. 2 hours lecture, 3 hours lab. Prerequisites: CHM 367; FON 440 or 441.

448 Community Nutrition. (3) F

Food-related behaviors; community organization and delivery of nutrition services; program design, implementation, and evaluation strategies; nutritional assessment of population groups. PGS 100 and SOC 101 are recommended. Prerequisite: FON 241 or equivalent.

450 Nutrition in the Life Cycle I. (3) F

Emphasis on nutritional needs and problems during pregnancy, lactation, infancy, and childhood. Prerequisite: FON 241 or equivalent.

451 Nutrition in the Life Cycle II. (3) S

The nutritional requirements and nutrition-related disorders of adolescence, middle adulthood, and later life. Prerequisite: FON 241 or equivalent.

531 Recent Developments in Nutrition. (3) N

Survey of research. Prerequisites: 1 course in advanced nutrition and 1 in biochemistry.

532 Current Research in Nutrition I. (3) S

Vitamins and minerals. Prerequisites: 1 course in advanced nutrition and 1 in biochemistry.

533 Current Research in Nutrition II. (3) F

Carbohydrates, lipids, and proteins. Prerequisites: 1 course in advanced nutrition and 1 in biochemistry.

**538 Recent Developments in Foods. (3) N**

Discussion and critique of current research. Prerequisite: FON 142.

540 Advanced Micronutrient Metabolism. (3) F

The metabolism of vitamins and minerals, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course in basic nutrition and 1 in biochemistry.

541 Advanced Macronutrient Metabolism. (3) S

The metabolism of protein, fat, and carbohydrate, primarily as applied to humans, with research literature emphasized. Prerequisites: 1 course in basic nutrition and 1 in biochemistry.

542 Advanced Food Product Development. (4) F

Principles of food product development and testing, including current government regulations. 2 hours lecture, 6 hours lab. Prerequisites: FON 142; inorganic chemistry.

544 Therapeutic Nutrition. (3) S

Current theories of the nutritional prevention or treatment of various diseases. Prerequisites: 1 course in basic nutrition and 1 in physiology.

545 Recent Developments in Institutional Feeding. (3) S

Current practices in institutional feeding, including supervised practicum with local quantity food operation. 1 hour lecture, 6 hours lab. Prerequisites: FON 142 and 343 and 344 or instructor approval.

546 Assessment Techniques in Nutrition Research. (2) S

Current techniques in human nutrition research. Research literature will be reviewed and critiqued. Lecture, lab. Prerequisites: CHM 361, 367; FON 440 or 441.

546L Laboratory Techniques in Nutrition Research. (1) S

Laboratory techniques required in nutrition research, including spectroscopy, chromatography, and RIA. Lab. Prerequisites: CHM 361, 367; FON 440 or 441.

548 Nutrition Program Development. (3) F

The planning, development, implementation, and evaluation of community nutrition programs, including the process of grant applications. Prerequisites: 1 course in basic nutrition and 1 in sociology.

550 Advanced Maternal and Child Nutrition. (3) F

Metabolic characteristics and nutritional needs of the pregnant woman, lactating woman, infant, and child will be reviewed in-depth. Prerequisites: 1 course in basic nutrition, physiology, and biochemistry.

551 Advanced Geriatric Nutrition. (3) S

Metabolic characteristics and nutritional requirements of the elderly will be reviewed in depth. Prerequisites: 1 course in basic nutrition, physiology, and biochemistry or instructor approval.

580 Dietetics Practicum. (3-9) F, S, SS

Structured practical experience in the Preprofessional Practice Program (AP4), supervised by practitioners with whom the student works closely. Practicum. Prerequisite: acceptance into the AP4 program.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

FAMILY RESOURCES AND HUMAN DEVELOPMENT**FRD 330 Research Issues in the Family. (3) N**

Study of current research issues in various areas that affect family life and individuals within families. Prerequisites: major; junior standing.

451 Field Experience. (1-12) N

Supervised field placement in the area of student's concentration with a community business or agency. Students must make arrangements with instructor one semester in advance of enrollment. Prerequisites: completion of 60 hours; instructor approval.

500 Research Methods. (4) F

Purposes of research. Experimental design, methods of data collection, and thesis proposal development. Includes practical application research laboratory. 3 hours lecture, 3 hours lab.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

HOME ECONOMICS EDUCATION**HEE 461 Presentations in Home Economics. (3) F**

Presentation and demonstration techniques in teaching home economics. Development of audiovisual materials for home economics content areas. Prerequisites: junior standing; instructor approval.

480 Methods of Teaching Home Economics. (3-4) F

Instruction, organization, presentation, and evaluation of subject matter in home economics. HEE students register for 4 semester hours. Dietetic students register for 3 semester hours.

481 Teaching Occupational Home Economics. (3) S

Career orientation related to home economics, cooperative work-related instruction, programs, and youth club advisement associated with secondary home economics programs. May include field trips. Prerequisite: home economics major or minor.

582 Program Planning in Home Economics. (3) S

Planning and development of home economics programs.

583 Program Evaluation in Home Economics. (3) F

Theories and processes of program evaluation. Prerequisite: HEE 582.

585 Administration and Supervision of Home Economics Education. (3) N

Development of individuals for state, city, school, and college leadership roles. Emphasis on supervision of student teachers.

586 Current Trends of Teaching Home Economics. (3) N

Focus on teaching home economics related to current issues and problems facing families and society. Prerequisite: home economics major or minor.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

TEXTILES AND CLOTHING

TXC 122 Clothing and Human Behavior. (3) F, S

Emphasizes cultural influences human behavior, and design. *General studies SB.*

123 Clothing Construction. (3) F, S

Construction processes related to fabrics, design, and fashions. Course may be waived on successful completion of a placement test given each semester during orientation week. 1 hour lecture, 4 hours studio.

221 Pattern Designing. (3) N

Flat patterns used to develop fundamental principles in design and visualized garments. 1 hour lecture, 4 hours studio. Prerequisites: TXC 122, 123.

223 Introduction to Textiles. (3) F, S

Basic properties, processing, end uses, and care of textile products.

318 The Clothing and Textile Industries. (3) F, S

Organization and marketing problems and practices specific to the textile and clothing industries. May include field trips. Prerequisites: ECN 112, TXC 122, 223.

323 Advanced Textiles. (3) F, S

Textile technology, fiber science, dyeing, finishing, and other topics. 2 hours lecture, 3 hours lab. May include field trips. CHM 231 recommended. Prerequisites: CHM 101, TXC 223.

325 Clothing and Textiles Industries Study Program. (2-3) N

The study and analysis of domestic and foreign textile and apparel industries. Lecture field trip. Prerequisites: TXC 318.

327 Analysis of Ready-to-Wear. (3) F, S

Analysis and evaluation of ready-to-wear apparel with emphasis on standards of quality for design, fabrication, production, and fit. Prerequisites: TXC 123, 223.

423 Apparel Analysis. (3) F, S

Specialized processes used with a wide variety of apparel fabrics. Interrelationships between fabric properties and apparel design. 2 hours lecture, 2 hours studio. May include field trips. Prerequisite: TXC 221.

424 History of Costume. (3) F, S

Evolution of costume from ancient Egypt to the 20th century. May include field trips. Prerequisites: an ARS course, TXC 122. *General studies SB, H.*

425 20th-Century Apparel. (3) F, S

Cultural, decorative, and functional influences on clothing. Prerequisites: ENG 102, TXC 424. *General studies L2.*

428 Clothing and Textile Economics. (3) N

A profile of textiles related industries, government and labor demands, consumer expectations, and new products and markets. Prerequisites: ECN 111, 2, TXC courses.

429 Textile Analysis. (3) S

Introduction to textile testing equipment and evaluation of data. 2 hours lecture, 3 hours lab. May include field trips. Prerequisite: TXC 323.

433 Sociopsychological Aspects of Clothing. (3) N

Sociopsychological theories applied to the selection and use of clothing. May include field trip. Prerequisites: ECN 111, SOC 101, TXC 122.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Geography

Anthony J. Brazel
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PROFESSORS

BRAZEL, BURNS, COMEAUX
GOBER, GRAF, MARCUS,
McTAGGART, PASQUALETTI

ASSOCIATE PROFESSORS

ALDRICH, ARREOLA, BALLING,
CERVENY, DORN, McHUGH,
MINGS, O'HUALLACHAIN

ASSISTANT PROFESSORS

FALL, HENKEL, KUBY

PROFESSORS EMERITI

ACKER, DURRENBERGER,
FROST, LOUNSBURY, PARKER,
SARGENT, WEIGEND

GEOGRAPHY—B.A. OR B.S.

Both programs consist of 45 semester hours. The required courses are as follows: GCU 102, 121, 495, 496; GPH 111 (or 411), 371, 491; an additional three- or four-hour course in GPH; an additional three-hour course in GCU. A further four to six hours of electives must be chosen, for a total of 36 hours in geography. The remaining nine hours are to be made up of electives from related fields of study, chosen in consultation with an advisor. At least 18 hours must be in upper division courses.

Asian Studies Emphasis. Students majoring in Geography may elect to pursue an Asian studies emphasis combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 90, for more information.

Latin American Studies Emphasis. Students majoring in Geography may elect to pursue a Latin American studies emphasis combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

SPECIAL EMPHASIS PROGRAMS

Two special emphasis programs, meteorology/climatology and urban studies, are optional. Students who wish to graduate with a B.A. or B.S. degree in Geography are not obligated to choose one of these emphases.

Meteorology-Climatology Emphasis.

The required courses are as follows: GCU 102, 121, 495, 496; GPH 111 (or 411), 213, 215, 371, 409, 410, 412 (or 413 or 414), 491. Students must also choose one other three-hour course in GCU. Also required are the following related courses: MAT 270 and 271 and 272 or 290 and 291; PHY 121, 122, 131, 132.

Urban Studies Emphasis. The required courses are as follows: GCU 102, 121, 357, 361, 444, 495, 496; GPH 111 (or 411), 371, 491. In addition, students must select two from the following list of options: GCU 351, 359 (or 360), 364, 441, 442, 453, 461; GPH 481. If GPH 481 is not selected, a further three-hour course in GPH is required. Nine hours in fields related to geography must be in urban-oriented course work.

OFFICE OF CLIMATOLOGY

Dr. R. C. Balling is director of the Office of Climatology. The office performs pure and applied climatic research and supports undergraduate and graduate students at ASU. The office maintains an extensive archive of climatic and meteorologic information on Arizona and the western United States.

SECONDARY EDUCATION—B.A.E.

Geography. The major teaching field consists of 45 semester hours, of which a minimum of 30 must be in geography and 15 in a related teaching field or fields. GCU 102, 121 and GPH 111 (or 411) are required. In conjunction with an advisor, students choose remaining credits from three groups of human, physical, and regional courses.

Social Studies. See page 153.

GRADUATE PROGRAMS

The Department of Geography offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

CULTURAL GEOGRAPHY

GCU 102 Introduction to Human Geography. (3) F S

Systematic study of human use of the earth. Spatial organization of economic, social, political, and perceptual environments. *General studies*. SB

121 World Geography. (4) F S

Description and analysis of area variations in social, economic and political phenomena in major world regions. *General studies*. SB, G.

141 Introduction to Economic Geography. (3) F, S

Production, distribution and consumption of various types of commodities of the world and relationships to the activities of man. *General studies*. SB

240 Introduction to Southeast Asia. (3) F

An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross listed as ASB 240 H S 240 POS 240 REL 240. *General studies*. G

253 Introduction to Cultural and Historical Geography. (3) A

Cultural patterns including such phenomena as language, religion and various aspects of material culture. Origins and diffusion and divisions of the world into cultural areas. *General studies*. SB G

294 Special Topics. (4) A

Topics include global awareness

322 Geography of U.S. and Canada. (3) F

Spatial distribution of relevant physical, economic, and cultural phenomena in the United States and Canada. *General studies*. SB

323 Geography of Latin America. (3) F

Spatial distribution of relevant physical, economic, and cultural phenomena in South Middle and Caribbean America. *General studies*. SB G

325 Geography of Europe. (3) S

Spatial distribution of relevant physical, economic, and cultural phenomena in Europe. Recommended for social studies teachers and students of European history. *General studies*. SB G

326 Geography of Asia. (3) S

Spatial distribution of relevant physical, economic and cultural phenomena in Asia, excluding the U.S.S.R. *General studies*. SB G

327 Geography of Africa. (3) F

Spatial distribution of relevant physical, economic, and cultural phenomena in Africa. *General studies*. SB, G.

328 Geography of Middle East and North Africa. (3) A

Spatial distribution of relevant physical, economic, and cultural phenomena in the Middle East and North Africa. Prerequisite: GCU 121 or instructor approval. *General studies*. SB, G

332 Geography of Australia and Oceania. (3) A

Spatial distribution of relevant physical, economic, and cultural phenomena in Australia, New Zealand and Pacific Islands. *General studies*. G

344 Geography of Hispanic Americans. (3) S

Examines the home lands, migrations, settlements, landscapes, roles, and selected cultural traditions of Hispanic Americans.

350 The Geography of World Crises. (3) F

Contemporary world crises viewed from a perspective of geographic concepts and techniques. *General studies*. SB, G

351 Population Geography. (3) F

Demographic patterns; spatial, temporal and structural investigation of the relationship of demographic variables to cultural, economic, and environmental factors. *General studies*. SB

352 Political Geography. (3) S

Relationship between the socio-physical environment and the state. *General studies*. SB G.

357 Social Geography. (3) A

Environmental perception of individuals and groups. The spatial aspect of social and physical environments is stressed. *General studies*. SB

359 Cities of the World I. (3) F

Historical evolution of urban patterns and structures in the Middle East, India, Southeast Asia, China, Japan and Europe. *General studies*. G

360 Cities of the World II. (3) S

Historical evolution of urban patterns and structures in Latin America, Anglo America, Sub-Saharan Africa, and Australasia. *General studies*. G

361 Urban Geography. (3) F, S

External spatial relationships of cities, internal city structure, and spatial aspects of urban problems in various parts of the world, particularly in the United States. *General studies*. SB

364 Geography of Energy. (3) F

Production, transportation, and consumption of energy emphasizing the electrical power industry and its environmental problems

421 Geography of Arizona and Southwestern United States. (3) F

Prerequisite: GCU 323 or instructor approval. *General studies*. SB G.

424 Geography of Mexico and Middle America. (3) S

Central America and Mexico. Prerequisite: GCU 323 or instructor approval. *General studies*. SB G.

426 Geography of the Soviet Union. (3) S

Prerequisite: GCU 121 or instructor approval. *General studies*. SB G

431 Geography of the Far East. (3) N

Japan, China and Korea excluding the U.S.S.R. Prerequisite: GCU 326 or instructor approval

433 Geography of Southeast Asia. (3) S

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

441 Economic Geography. (3) F S

Spatial distribution of primary, secondary, and tertiary economic and production activities. Prerequisite: GCU 141 or instructor approval

442 Geography of Transportation. (3) N

Geographic analysis of world trade routes and transportation systems. Prerequisite: GCU 141 or 441. *Graduate studies*. SB.

444 Applied Urban Geography. (3) N

Designed to prepare the student for employment in planning agencies. Includes application of urban geographic principles to present day planning problems. Prerequisite: GCU 361

453 Recreational Geography. (3) S

Examination of problems surrounding the organization and use of space for recreation. Introducing geographic field survey methods of data collection and analysis. Saturday field trips may be required.

455 Historical Geography of U.S. and Canada. (3) N

Changing geography of the United States and Canada from pre-Columbian times to about 1900. Emphasis on evolving economic patterns. Recommended for social studies teachers and students of American history

461 Geographic Applications of Urban and Regional Planning. (3) N

Philosophy of the planning concept, nature, and function of planning commissions and the development of comprehensive plans. Prerequisite: GCU 361 or 444 or instructor approval.

474 Federal Public Land Policy. (3) F

Geographic aspects of federal public lands, policy management, and issues. Emphasis on western wilderness and resource development problems

495 Quantitative Methods in Geography. (3) S

Statistical techniques applied to the analysis of spatial distributions and relationships. Introduction to models and theory in geography. Prerequisite: MAT 119. *General studies*. N2

496 Geographic Research Methods. (3) F, S

Scientific techniques used in geographic research. Prerequisites: GCU 495, GPH 371 491. *General studies*. L2

515 Human Migration. (3) F

Economic, political, social, and geographic factors underlying population movements. Migration sensitivity, streams and counter streams, labor migration, and migration decision making. Lecture seminar. Prerequisite: GCU 351 or instructor approval

526 Spatial Land-Use Analysis. (3) S

Determination, classification and analysis of spatial variations in land use patterns. Examination of the processes affecting land use change. Prerequisite: 15 hours of geography or instructor approval

529 Contemporary Geographic Thought. (3) N

Comparative evaluation of current philosophy concerning the nature and trends of geography. Prerequisite: 15 hours of geography; instructor approval.

585 Advanced Research Methods in Geography. (3) F

Specialized research techniques and methodologies in economic, political, or cultural geography

591 Seminar. (1-3) F, S, SS

Selected topics in economic, political, or cultural geography. Field trips may be required

596 History of Geographic Thought. (3) N

Development of geographic thought from Herodotus and Strabo to Humboldt and Ritter.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PHYSICAL GEOGRAPHY

GPH 111 Introduction to Physical Geography. (4) F S

Spatial and functional relationships among climates and forms, soils, water, and plants. 3 hours lecture, 3 hours lab. Field trips are required. *General studies*: S1, S2.

- 210 Physical Environment.** (3) F
Principles of physical geography relating to environmental problems pertinent to contemporary society. Pollution, maladjusted and use and resource exploitation.
- 211 Landform Processes.** (3) S
Geographic characteristics of landforms and earth-surface processes emphasizing erosion, transportation, deposition and implications for human management of the environment. Prerequisite: GPH 111. *General studies L1*
- 212 Introduction to Meteorology I.** (3) F
Fundamentals of weather and climate including basic atmospheric processes and elements. Students whose curriculum require a laboratory course must also register for GPH 214. Prerequisite: GPH 111 or instructor approval. *General studies S2 (if taken with GPH 214).*
- 213 Introduction to Meteorology II.** (3) S
Fundamentals of meteorology and climatology, including basic terminology and synology. Prerequisite: GPH 212 or instructor approval.
- 214 Introduction to Meteorology Laboratory I.** (1) F
Introduction to basic meteorological and climatology measurements. 3 hours lab. May be taken concurrently with GPH 212. *General studies S2 (if taken with GPH 212)*
- 215 Introduction to Meteorology Laboratory II.** (1) S
Basic meteorological map analysis and interpretation. 3 hours lab. May be taken concurrently with GPH 213.
- 271 Maps and Map Reading.** (3) F
Techniques of interpretation of different types of maps and map projections. History of mapping. 2 hours lecture, 3 hours lab.
- 371 Cartography.** (3) F, S
Basic map drafting, grid compilation, simple design, and use of cartographic instruments. 6 hours lab. Prerequisite: GPH 111
- 372 Air Photo Interpretation.** (3) S
Aerial photographs as a means of determining topography, vegetation, and culture; scale use of index, vertical and oblique photographs and stereoscopes. Prerequisites: GPH 111, 211
- 373 Cartographic Design.** (3) A
Optimizing the communication of spatial information and concepts. Includes cartographic decisions on making, symbolism, perceptions, color, topography, projections, and scale. Prerequisites: GPH 371, instructor approval.
- 381 Geography of Natural Resources.** (3) A
Nature and distribution of natural resources and the problems and principles associated with their use. *General studies SB*
- 401 Topics in Physical Geography.** (1-3) A
Open to students qualified to pursue independent studies. Field trips may be required. Prerequisite: instructor approval.
- 405 Energy and Environment.** (3) S
Sources, regulatory and technical controls, distribution and consequences of the supply and human use of energy. Prerequisite: courses in the physical or life sciences or instructor approval.
- 409 Synoptic Meteorology I.** (4) F, 95
Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisites: MAT 270, PHY 131, 132

- 410 Synoptic Meteorology II.** (4) S '96
Diagnostic techniques and synoptic forecasting. Includes techniques of weather analysis, map interpretation, and satellite and radar analysis. Prerequisite: GPH 409
- 411 Physical Geography.** (3) A
Introduction to physical geography and the physical elements of the environment. Open only to students who have not taken GPH 111. Field trips.
- 412 Physical Climatology.** (3) A
Physical processes in the earth-atmosphere system on regional and global scales; concepts and analysis of energy, momentum and mass balances. Prerequisites: GPH 212 and 213 or instructor approval.
- 413 Meteorological Instruments and Measurement.** (3) A
Design and operation of ground-based and aerological weather measurement systems. Collection, reduction, storage, retrieval and analysis of data. Field trips are required. Prerequisites: GPH 212 and 213 or instructor approval.
- 414 Climate Change.** (3) S
Processes that produce variations in climate over time and space. Includes changes in climate produced by human and natural forces and involves the analysis of climatic data to identify temporal and spatial variations. Prerequisite: GPH 212 or instructor approval.
- 418 Landforms of the Western United States.** (3) F, S
Study of landforms and geomorphic processes in the western United States, including lecture, topographic maps, aerial photographs, satellite imagery and field trips. Lecture, cartography laboratory, fieldwork. Prerequisites: GPH 211 or equivalent completion of L1 class. *General studies L2*
- 433 Alpine and Arctic Environments.** (3) F
Regional study of advantages and implications of the natural environment upon present and future problems involving resource distribution, human activities and regional and interregional adjustments. Field trips are required. Prerequisite: GPH 111 or instructor approval.
- 471 Geographic Information Systems.** (3) A
GIS as a basis for microcomputer spatial analysis and synthesis. Includes digitizing, database organization, spatial retrieval, and graphics. Prerequisite: instructor approval.
- 474 Dynamic Meteorology I.** (3) F '95
Large-scale atmospheric motion, kinematics, Newton's laws, wind equation, baroclinicity and the mid-latitude depression. Prerequisites: GPH 213, 215, MAT 271, PHY 131, 132
- 475 Dynamic Meteorology II.** (3) S '95
Topics in climate dynamics. General circulation, numerical modeling, teleconnection phenomena, and surface-atmosphere interaction. Prerequisite: GPH 474 or instructor approval.
- 481 Environmental Geography.** (3) S
Problems of environmental quality, including uses of spatial analysis, research design and fieldwork in urban and rural systems. Field trips are required. Prerequisite: instructor approval.
- 491 Geographic Field Methods.** (6) SS
Field techniques, including use of aerial photographs, scale maps and fractional code system of mapping, urban and rural field analysis to be done off campus. Travel fees required. Prerequisites: GCU 102, 121, GPH 111

- 511 Fluvial Processes.** (3) A
Geographic aspects of fluvial geomorphology, with emphasis on river channel change, fluvial erosion and sedimentation in the present environment. Prerequisites: GLG 101 (or GPH 111), 362 or GPH 211)
- 533 Snow and Ice.** (3) S
Processes, distribution, climatic interactions of snow. Emphasis on mass balance, snow stratigraphy, metamorphism and glacier/snowpack climatology. Lecture, fieldwork. Prerequisite: instructor approval.
- 571 Computer Mapping and Graphics.** (3) F
Utilization of the digital computer in analysis and mapping of geographic data. Includes plotting, surficial display, composition, and graphics. Field trips. Prerequisites: GPH 371, instructor approval.
- 575 Geographic Applications of Remote Sensing.** (3) S
Use of magnetic and nonmagnetic methods of remote acquisition of data, including satellite sensors, airborne radar, multiband scanning conventional photographic sensors, and ground-based equipment. Field trips are required. Prerequisites: GCU 585 (or GPH 491), GPH 372
- 591 Seminar.** (1-3) F, S
Selected topics in physical geography. Field trips may be required.
- Omnibus Courses:** See page 44 for omnibus courses that may be offered.

Geology

Edmund Stump
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REGENTS' PROFESSORS
BUSECK, MOORE

PROFESSORS
BURT, FINK, GREELEY, HOLLOWAY,
KNAUTH, LARIMER, LUNDIN,
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CHRISTENSEN, PEACOCK,
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ASSISTANT PROFESSORS
GRIMM, SANDERS

PROFESSORS EMERITI
DIETZ, KRINSLEY, PÉWÉ

GEOLOGY—B.S.

The program requires 37 semester hours including the following "core courses" or their equivalents: GLG 100 (or 101 and 103), 102, 104, 310, 321, 322, 400 (two semesters), 450. In addition, three of the following four "branch courses" must be taken: GLG 335, 418, 424, 435. It is strongly recommended that the fourth branch course is also taken. Supporting

courses required in related fields are the following. CHM 113, 116; MAT 290 and 291 or MAT 270 and 271 and 272 (or 274); PHY 121, 122, 131, 132 To complete the total required hours, other courses in geology or in related fields listed as approved by the department may be taken. French, German, or Russian is strongly recommended to fulfill the foreign language requirement. See "Degree Requirements," page 87.

MINOR IN GEOLOGY

A minor in Geology is awarded to students who complete a minimum of 23 hours of Geology courses. Required courses are GLG 101, 103, 102, 104, 310, 321, 322 and 400 totaling 17 semester hours. The remaining six semester hours may be chosen among other upper division Geology courses, except GLG 300 and 400, after consultation with a departmental advisor

GRADUATE PROGRAMS

The Department of Geology offers programs leading to the M.S. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

GEOLOGY

GLG 100 General Geology. (4) F, S SS Nonlaboratory introduction to physical and historical geology. The earth, its origin, processes that affect it, sequence of events in its evolution, and succession of life upon it. GLG 100 and 101 may not both be taken for credit. Possible field trips.

101 Introduction to Geology I (Physical). (3) F, S SS Basic principles of geology, geochemistry and geophysics. Rocks, minerals, weathering, earthquakes, mountain building, volcanoes, water, and glaciers. Possible weekend field trips. *General studies S1 S2 (if taken with GLG 103)*

102 Introduction to Geology II (Historical). (3) S Basic principles of applied geology and the use of these principles in the interpretation of geological history. Possible weekend field trips. Prerequisite: GLG 101. *General studies S2 (if taken with GLG 104)*

103 Introduction to Geology I-Laboratory. (1) F, S SS Three hours lab, some field trips. Corequisite: GLG 101. *General studies S1, S2 (if taken with GLG 101)*

104 Introduction to Geology II Laboratory. (1) S Laboratory techniques involving map interpretation, cross sections, and fossils. 3 hours lab, possible field trips. Prerequisite: GLG 103 or equivalent. Corequisite: GLG 102. *General studies S2 (if taken with GLG 102)*.

105 Introduction to Planetary Science. (3) F Planets, asteroids, comets, and meteorites and the geological evolution, surfaces, interior atmospheres, and exobiology. Terraforming and space colonies.

110 Environmental Geology. (3) F Geological studies as they apply to interactions between humans and earth. Includes geological processes and hazards, resources, and global change.

111 Environmental Geology Lab. (1) F Basic geological processes and concepts. Emphasis on geology-related environmental problems concerning Arizona. Case histories and field studies. Lab. Corequisite: GLG 110

300 Geology of Arizona. (3) F, S Basic and historical geology, fossil mining, energy resources, environmental problems, landscape development, and meteorite casting examples from Arizona. Majors who have taken GLG 101 for credit may not enroll.

302 Man and Geologic Environment. (3) N Geological hazards, problems of waste disposal, and land use planning, and environmental problems related to the earth.

304 Geology of the Grand Canyon. (2) N Review of the discovery, history, origin, and geology of the Grand Canyon of the Colorado River in Arizona. Six-day field trip down the river (first 6 days after commencement in May) required at student's expense. Field research and term paper on trip also required.

305 Geology of the Earth, Moon, and Planets. (3) S Geological studies of the planets and satellites through the analysis of spacecraft data and field studies. Weekend field trips. Prerequisites: GLG 100 and 101 and 105 and 300 or equivalents.

310 Structural Geology. (3) S Geological structures and the mechanical processes involved in their formation. 2 hours lecture, 3 hours lab. Possible field trips. Prerequisites: GLG 101, MAT 270 or 290.

321 Mineralogy. (3) F Crystallography, crystal chemistry, and crystal physics as applied to mineral determination methods, origin and occurrence. Possible field trips. Prerequisite: MAT 270 or 290. Pre- or corequisite: CHM 116. Corequisite: GLG 322

322 Mineralogy Laboratory. (2) F Hand specimen identification, polarizing microscopy, and optical techniques. 6 hours lab. Corequisite: GLG 321

335 Principles of Paleontology. (2) F Emphasis on preservation, growth, species concept, and evolution as demonstrated by the fossil record. Prerequisites: GLG 102 and MAT 270 or 290 or instructor approval

336 Invertebrate Paleontology. (3) F Biology, skeletal morphology, and systematics of fossil invertebrates. One or two projects emphasizing population analysis and techniques in paleontology. Lecture: 6 hours lab, possible field trips. Prerequisite: GLG 102 or instructor approval. Pre- or corequisite for Geology majors: GLG 335

362 Geomorphology. (3) N Landforms and processes which create and modify them. Laboratory and field study of physiographic features. 2 hours lecture, 3 hours lab, some field trips during lab, possible weekend field trips. Pre- or corequisites: GLG 101, 310, 424

400 Geology Colloquium. (1) F, S Presentation of recent research by faculty and guests. Written assignments required. 1 semester hour required for Geology majors; may be repeated for a total of 2 semester hours. Prerequisite: 2 courses in the department or instructor approval.

405 Geology of the Moon. (3) N Current theories of the origin and evolution of the moon through photogeological analyses and consideration of geochemical and geophysical constraints. Possible weekend field trip. Prerequisite: GLG 105 or 305 or instructor approval

406 Geology of Mars. (3) N Geological evolution of Mars through analyses of spacecraft data, theoretical modeling, and study of terrestrial analogs, emphasis on current work. Possible weekend field trip. Prerequisite: GLG 105 or 305 or instructor approval

412 Geotectonics. (3) F Origin of continents and ocean basins. Evolution of the crust in time. Drifting sea floor spreading, and other large-scale movements of the earth's crust. Upper mantle processes. Emphasis on current work. Prerequisite: GLG 310

418 Geophysics. (3) F Solid earth geophysics: geomagnetism, gravity, seismology, heat flow, emphasis on crust and upper mantle. 2 hours lecture, 3 hours lab, field trips during lab, possible weekend field trips. Prerequisites: GLG 101 and MAT 272 (or 291) and PHY 121 and 131 or instructor approval

419 Thermal-Mechanical Processes in the Earth. (3) S Emphasis on applied mathematical techniques: heat conduction problems in geology, thermal convection, stresses in the lithosphere, and viscoelastic processes in the Earth. Prerequisites: PHY 121, 131

420 Volcanology. (3) A Description of past and present volcanism, types of volcanic activity, mechanism of eruption, form and structure of volcanoes, and geochemistry of volcanic activity. Possible weekend field trips. Prerequisite: GLG 424

424 Petrology-Petrography. (4) S Theoretical and laboratory study of the origin and classification of igneous and metamorphic rocks. Hand specimen and thin section study of rocks. 3 hours lecture, 3 hours lab. Possible weekend field trips. Prerequisites: GLG 321, 322

435 Sedimentology. (3) S Origin, transport, deposition, and diagenesis of sediments and sedimentary rocks. Physical analysis, hand specimen examination, and interpretation of rocks and sediments. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisites: GLG 102, 321, 322

436 Principles of Stratigraphy. (3) S Principles of interpreting lithostratigraphic, magnetostratigraphic, biostratigraphic, chronostratigraphic, and chronostratigraphic units, correlation and facies relationships in stratified rocks. Applied stratigraphy project(s). Lecture, possible field trips. Prerequisites: GLG 102, instructor approval

441 Ore Deposits. (3) N

Origin, occurrence, structure, and mineralogy of ore deposits. Possible weekend field trips. Prerequisite: GLG 424 or instructor approval.

450 Geology Field Camp. (6) SS

Geological mapping techniques on aerial photos and topographic maps. Field-based with excursions. Prerequisite: GLG 310/321.

455 Advanced Field Geology. (4) F S

Geological mapping in igneous sedimentary and metamorphic terranes of the Basin and Range province of Arizona. Weekend field trips. May be repeated for credit. Prerequisite: GLG 450 or instructor approval.

456 Cordilleran Regional Geology. (3) F

Systematic coverage through space and time of the geological development of Western North America, emphasizing the Western United States. Prerequisite: senior or graduate student in Geology or instructor approval.

462 Environmental Geology of Cold Regions. (3) N

Geological and engineering importance of seasonal and perennially frozen ground (permafrost). Properties distribution and the origin of ice in the ground and its application to engineering and utilization problems. Possible weekend field trips. Prerequisites: GLG 101 and 435 and PHY 111 and 113 or instructor approval.

481 Geochemistry. (3) F

Origin and distribution of the chemical elements. Geochemical cycles operating in the earth's atmosphere, hydrosphere, and lithosphere. Cross-listed as CHM 481. Prerequisite: CHM 341 or 441 or GLG 321.

485 Meteorites and Cosmochemistry. (3) N
Chemistry of meteorites and their relationship to the origin of the earth-solar system, and universe. Cross-listed as CHM 485.

490 Topics in Geology. (1-3) F S SS

Special topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

500 Geology Colloquium. (1) F S

Presentation of recent research by faculty and invited guests. 1 semester required for a geology graduate student. May be repeated for total of 2 semesters. Research paper required. Prerequisite: instructor approval.

501 Geology of Arizona. (3) F S

Basic and historical geology, fossils, mineral energy resources, environmental problems, landscape development and meteorite cast examples from Arizona. Research paper required.

504 Geology of the Grand Canyon. (2) S

Review of the discovery history and geology of the Grand Canyon of the Colorado River in Arizona. 6-day field trip down the river (first 6 days after commencement in May) required at student's expense. Field research and term paper on trip also required.

510 Advanced Structural Geology. (3) N

Mechanics of rock deformation emphasizing relationship between field observation, theory, and experiment. Stress-strain, simple constitutive relationships, failure criteria, and the basis of continuum methods. Possible field trips. Prerequisites: GLG 310 and 424 or instructor approval.

520 Advanced Physical Volcanology. (2-3) A

Selected volcanological topics including explosive eruptive processes, lava flow mechanics and intrusive mechanisms. Field trips possible. Prerequisite: GLG 420 or instructor approval.

523 Advanced Mineralogy-Crystallography. (3) S

Crystallography principles of X-ray and electron diffraction, defects in crystals, electron microscopy of minerals. Prerequisite: CHM 441 or GLG 321 or equivalent.

524 Advanced Igneous Petrology. (3) N

Theoretical and practical aspects of the genesis of igneous rocks. Study of selected sites. Modern laboratory techniques. 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 424.

525 Advanced Metamorphic Petrology. (3) N

Theoretical and laboratory study of metamorphic rocks. Processes of contact and regional metamorphism. *Advanced methods and instrumentation.* 2 hours lecture, 3 hours lab, possible weekend field trips. Prerequisite: GLG 424.

561 Glacial Geology. (3) N

Properties distribution and origin of glacial deposits. Fundamental principles of the stratigraphy and correlation. Environmental geology problems. Neglected regions. 2 hours lecture, 3 hours lab, some field trips during lab, possible weekend field trips. Prerequisite: GLG 362.

562 Quaternary Geology. (3) N

Geology of the Quaternary Period in both glaciated and unglaciated areas. Stratigraphy, correlation, and environmental application of Quaternary deposits. Special reference to the Southwest. 2 hours lecture, 3 hours lab, some field trips during lab, possible weekend field trips. Prerequisite: GLG 362 or instructor approval.

581 Isotope Geochemistry. (3) N

Geochemistry and cosmochemistry of stable and radioactive isotopes. Geochronology; isotopic equilibrium. Cross-listed as CHM 581. Prerequisite: instructor approval.

582 Physical Geochemistry. (3) N

Application of thermodynamic and kinetic principles to geochemical processes. Prerequisite: CHM 341 or 441 or GLG 321.

583 Phase Equilibria and Geochemical Systems. (3) N

Natural reactions at high temperatures and pressures. Sulfide and oxide equilibria. Cross-listed as CHM 583. Prerequisites: GLG 582; instructor approval.

591 Seminar. (1-3) F, S, SS

Topics in a range of fields in geology. May be repeated for credit. Prerequisite: instructor approval.

598 Special Topics. (1-3) F, S, SS

Special topics in geology. May be repeated for credit. Prerequisite: instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

History

Retha M. Warnicke
Chair

(SS 204) 602/965-5778

PROFESSORS

BURG FUCHS GIFFIN, IVERSON,
KLEINFELD, LUCKENHAM,
MACKINNON ROTHSCCHILD,
STOWE, TAMBS, TULLMAN,
TRENNERT, WARNICKE

ASSOCIATE PROFESSORS

ADELSON, BATALDEN, DELLHEIM,
ESCOBAR, FULLINWIDER,
GRATTON, HURTADO, KAHN,
KEARNEY, ROSALES, RUSH,
SIMPSON, L. SMITH, R. SMITH,
SIMPSON, STONER,
VANDERMEER, WARREN-FINDLEY

ASSISTANT PROFESSORS

CARROLL GRAY, GULLETT HALL,
HENDRICKS, SOERGEL, WEINER

SENIOR INSTRUCTIONAL PROFESSIONAL

LUEY

PROFESSORS EMERITI

BARLOW, DANNENFELDT, HUBBARD,
KARNES, PAULSEN PHILLIPS,
SACKS TILDEN, WOOTTEN, YOUNG

HISTORY—B.A.

The program consists of 45 semester hours, of which 30 must be in history and 15 in related fields to be approved by the advisor in consultation with the student. Courses in related fields may also be used to satisfy general college requirements. HIS 498 Pro Seminar is required, except for honors students, who may substitute HIS 493 Honors Thesis. At least 18 hours in history courses and six hours in the related fields must be in upper division courses. At least six hours in history must be taken in each of two of the following areas: U.S., Latin American, British, Asian, and European history. A minimum GPA of 2.25 in the 30 hours of history courses is required. See "Degree Requirements," page 87.

HISTORY—B.S.

The program consists of 36 semester hours in history (including HIS 381 and 382) and 18 hours in closely related fields and quantitative studies, as approved by the program directors in consultation with the student. HIS 381 and 382 are required for all degree candidates and should be completed, in sequence, by the end of the junior year. Courses in related fields may also be used to satisfy general college requirements. At least 27 hours in history courses and nine hours in the related fields must be upper division. At least six hours in history must be taken in each of two of the following areas: U.S., Latin American, British, Asian, and European history. A minimum GPA of 2.25 in the 42 hours of history courses is required. Students must earn a minimum grade of "C" in HIS 381, 382, and their prerequisite, MAT 117. See "Degree Requirements," page 87.

Asian Studies Emphasis. Students majoring in History may elect to pursue an Asian studies emphasis combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 90, for more information.

Latin American Studies Emphasis. Students majoring in History may elect to pursue a Latin American studies emphasis combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

MINOR IN HISTORY

The History minor consists of 18 semester hours of course work, at least 12 hours of which are upper division.

SECONDARY EDUCATION—B.A.E.

History. The major teaching field consists of 42 semester hours, of which at least 30 must be in history courses. At least 18 of the history hours must be in upper-division courses. At least three semester hours must be taken in U.S. history. The remaining history and related area courses must be selected in consultation with an advisor from the Department of History. A minimum GPA of 2.25 in history courses is required for admission to practice teaching and for graduation. HIS 495 may

not be counted as part of the 42-hour requirement for the academic specialization.

The minor teaching field consists of 24 semester hours in history courses, of which at least nine must be in upper-division courses. The program must include at least three hours in U.S. history.

Social Studies. See page 153

GRADUATE PROGRAMS

The Department of History offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

HISTORY

- HIS 100 Western Civilization.** 3 F S
Traces origin and development of Western societies and institutions from the ancient world through the Middle Ages. *General studies: SB, H*
- 101 Western Civilization.** (3) F, S
Traces origin and development of Western societies and institutions from the Renaissance and Reformation through Age of Enlightenment. *General studies: SB, H*
- 102 Western Civilization.** (3) F, S
Traces origin and development of Western societies and institutions from the French Revolution to the present. *General studies: SB, G, H*
- 103 The United States.** (3) F, S
Growth of the Republic from colonial times through the Civil War period. *General studies: SB, H*
- 104 The United States.** (3) F, S
Growth of the Republic from the Civil War period to the present day. *General studies: SB, H*
- 107 Introduction to Japan.** (3) A
Historical survey of the people, culture, politics, and economy of Japan, supplemented by audiovisual presentations intended for nonmajors. *General studies: SB, G, H*
- 230 American Social History.** (3) F, S
American society from the colonial period to the present. Ethnicity, race, age, and sex as factors in historical experience. Lecture/discussion. *General studies: L1, H*
- 240 Introduction to Southeast Asia.** (3) F
An interdisciplinary introduction to the cultures, regions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240 GCU 240 POS 240 REL 240. *General studies: G*
- 270 Judaism in American History.** (3) N
A chronological analysis of Jews and Judaism in American history and letters. *General studies: SB, H*
- 271 European Jewish History.** (3) N
European Jewish experience from the Crusades to the emancipation of the Jews in the 18th and early 19th centuries. *General studies: SB, H*
- 273 American Military History.** (3) F
A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference. *General studies: SB, H*

294 Selected Topics in History. (3) N
A full description of topics for any semester is available in the History Department office. May be repeated for credit.

303 American Cultural History. (3) F, S
Culture in a broad connotation including ideas, the arts, and social and economic standards from the nation's colonial background and early national period. Cross-listed as AMS 320. *General studies: SB, H*

304 American Cultural History. (3) F, S
Culture in a broad connotation including ideas, the arts, and social and economic standards from the age of industrialism and modern America. Cross-listed as AMS 321. *General studies: SB, H*

305 Asian Civilizations. (3) F, S
The civilizations of China, Japan, and India to mid-17th century. *General studies: SB, G, H*

306 Asian Civilizations. (3) F, S
The civilizations of China, Japan, and India from the mid-17th century to present. May also include Southeast Asia. *General studies: SB, G, H*

311 Asian American Experiences: A Historical Perspective. (3) N
A survey of the history of Asian Americans in the United States since the mid-19th century. Lecture/discussion. *General studies: C*

320 Ancient Greece. (3) A
History and civilization of the Greek world from the Bronze Age to the Roman conquest of the Hellenistic kingdoms. *General studies: SB, H*

321 Rome. (3) A
History and civilization of Rome from the beginning of the Republic to the end of the Empire. *General studies: SB, H*

322 The Middle Ages. (3) A
Political, socioeconomic, and cultural developments of Western Europe during the Early Middle Ages. Prerequisite: HIS 100 or instructor approval. *General studies: SB, H*

323 The Middle Ages. (3) A
Political, socioeconomic, and cultural developments of Western Europe during the High Middle Ages. Prerequisite: HIS 100 or instructor equivalent. *General studies: SB, H*

324 Renaissance. (3) F
Antecedents and development of the Renaissance in Italy and its spread to the rest of Europe. *General studies: L2, SB, H*

325 Reformation. (3) S
The Protestant and Catholic Reformation in the 16th century. *General studies: L2, SB, H*

326 Early Modern Europe. (3) A
Socioeconomic, cultural, and political changes in 17th-century Europe. *General studies: SB, H*

327 Early Modern Europe. (3) A
Socioeconomic, cultural, and political changes in 18th-century Europe. *General studies: SB, H*

329 19th-Century Europe. (3) A
Political, socioeconomic, and intellectual currents in Europe from Napoleon to 1866. *General studies: SB, H*

330 19th-Century Europe. (3) A
Political, social, economic, and intellectual currents in Europe from 1866–1918. *General studies: SB, H*

- 331 20th-Century Europe.** (3) N Europe in its world setting since World War I, emphasizing major political and social issues, 1914–1945 *General studies: SB, G, H.*
- 332 20th-Century Europe.** (3) N Europe in its world setting since World War I, emphasizing major political and social issues from 1945 to the present *General studies: SB, G, H.*
- 333 Women and Society in Europe.** (3) N Women's role, status, and achievements in Europe, 1750–1950. Changes in everyday life, sex roles, family patterns, work, and culture *General studies: L2, HU, SB H*
- 335 Family, Class, and Society in Modern Europe.** (3) N Family life, sex roles, work, crime, population changes, and their relationship to political, economic, and social changes. Prerequisite: upper division standing or instructor approval *General studies: L2, SB, H*
- 351 England.** (3) F S Political, economic, and social development of the English people to the 17th century *General studies: SB, H.*
- 352 England.** (3) F, S Political, economic, and social development of the English people from 17th century to the present. *General studies: SB, H*
- 357 19th-Century West.** (3) F Social, political, and economic development of trans-Mississippi West beginning with Louisiana Purchase and ending in 1900 *General studies: SB, H.*
- 358 The West in the 20th Century.** (3) S Role of the western states in American history since 1890 with emphasis on politics, the environment, industry and labor, and the changing position of ethnic minorities *General studies: SB, H.*
- 362 American Indian History.** (3) F Examination of federal and state policy and cultural, economic, political, and social continuity and change of American Indian communities *General studies: SB, C, H.*
- 363 African-American History I.** (3) A The African American in American history, thought, and culture from slavery to 1865. *General studies: SB, C, H*
- 364 African-American History II.** (3) A The African American in American history, thought, and culture from 1865 to the present *General studies: SB, C, H*
- 365 Islamic Civilization.** (3) A An interdisciplinary survey of the art, history, and religion of Islam civilization *General studies: HU, G H*
- 366 The Modern Middle East.** (3) S Impact of the Western world upon Middle Eastern governments, religion, and society in the 19th and 20th centuries; problems of modernization and the role of the Middle East in world affairs. *General studies: SB, G H*
- 370 Women in U.S. History, 1600–1880.** (3) F Examination of lives of American women and women's social organizations *General studies: SB, H, C.*
- 371 Women in U.S. History, 1880–1980.** (3) S Examination of lives of American women and women's social organizations *General studies: SB, H, C*
- 375 History and Theory.** (3) N Historical and theoretical sources of modernity, particularly moral and cultural relativism, value-free social science, behaviorism, humanism, Marxism, and atheism
- 380 History of the Mexican-American.** (3) A Role of the Mexican-American in U.S. history *General studies: SB H*
- 381 Quantification in History.** (3) F Quantitative techniques including political analysis, new economic theory, demography, and social history. Research methods in social science including design, data collection, and computer skills. Prerequisite: MAT 117
- 382 Historical Statistics.** (3) S Historical data analysis including sampling distributions, tests of hypotheses, t-tests to multiple regression, and nonparametric techniques. Prerequisite: HIS 381 *General studies: N2*
- 383 Latin America.** (3) A Ancient civilization, explorers and conquerors, and colonial institutions *General studies: SB H.*
- 384 Latin America.** (3) A Nationalistic development of the independent republics since 1825 *General studies: SB, H*
- 394 Selected Topics in History.** (3) N A full description of topics for any semester is available in the History Department office. May be repeated for credit
- 401 American Colonial History.** (3) A Political, economic, social, and cultural history of the colonial era. Concentrates on English colonies, with some consideration of Spanish, French, and other colonial regions in North America *General studies: SB, H*
- 403 The American Revolution.** (3) N Political, social, and economic development in the Revolutionary era, 1763–1789.
- 404 The Early Republic, 1789–1850.** (3) A Political, social, economic, and cultural development of the United States from the Revolution to 1850. Prerequisite: HIS 103 or instructor approval *General studies: L2, SB, H.*
- 406 Civil War and Reconstruction.** (3) A Explores the causes, conduct, and consequences of the American Civil War, emphasizing politics and policy. Prerequisite: HIS 103 or instructor approval *General studies: L2, SB H*
- 407 The Emergence of Modern America.** (3) A The triumph of modern political, social, and economic structures and values, 1870–1918; role of religion, religion, race, and ethnicity. *General studies: SB H*
- 409 Recent American History.** (3) A The United States from 1913–1932, including Wilsonian diplomacy and the First World War, the 1920s, the origins of the Great Depression, Hoover administration. Prerequisite: HIS 104 or equivalent *General studies: SB H*
- 410 Recent American History.** (3) A The United States from 1932–1945, including the New Deal society during the Depression and Second World War. Prerequisite: HIS 104 or equivalent *General studies: SB, H*
- 411 Contemporary America.** (3) A The United States from 1945 to the present *General studies: SB, H*
- 414 The Modern American Economy.** (3) A Origins of 19th-century slavery and industrialization, 20th-century crises and regulation, political economy of an advanced capitalist democracy. Prerequisite: ECN 111 or 112 or HIS 103 or 104 *General studies: SB, H.*
- 415 American Diplomatic History.** (3) A American relations with foreign powers, 1776–1898. Prerequisite: HIS 103 or instructor approval *General studies: SB, H*
- 416 American Diplomatic History.** (3) A American relations with foreign powers from 1898 to the present. Prerequisite: HIS 104 or instructor approval *General studies: SB, G H.*
- 417 Constitutional History of the United States.** (3) N Origin and development of the American constitutional system from colonial origins through Reconstruction. Prerequisite: HIS 103 or instructor approval *General studies: SB H.*
- 418 Constitutional History of the United States.** (3) N Origin and development of the American constitutional system from Reconstruction to the present. Prerequisite: HIS 104 or instructor approval *General studies: SB H*
- 419 American Urban History.** (3) A The history of the city in American life from colonial times to the late 19th century *General studies: SB H*
- 420 American Urban History.** (3) A The history of the city in American life from the 19th century to the present *General studies: SB, H.*
- 421 History of American Labor.** (3) A American workers from the colonial period to the present, including farmers, slaves, housewives, the skilled and unskilled, organized and nonunionized. Prerequisite: HIS 103 or 104 or MGT 301. *General studies: SB H*
- 422 Rebellious Women.** (3) A Examination of the roles of rebellious women in history through the study of autobiography, biography, and theory *General studies: L2, SB H, C.*
- 423 Recent American Intellectual History.** (3) A Major movements in 20th-century science, religion, and philosophy. *General studies: SB H*
- 424 The Hispanic Southwest.** (3) N Development of the Southwest in the Spanish and Mexican periods to 1848 *General studies: SB, H.*
- 425 The American Southwest.** (3) N Development of the Southwest from 1848 to the present *General studies: L2, SB H.*
- 426 Indian History of the Southwest.** (3) S Comprehensive review of historical events from prehistoric peoples, the Spanish and Mexican periods, and the American period after 1846 to the present. Prerequisite: upper division standing or instructor approval. *General studies: SB, C, H.*
- 428 Arizona.** (3) A Emergence of the state from early times to the present. Prerequisite: upper division standing or instructor approval *General studies: SB, H*
- 430 20th-Century Chicano History.** (3) A Historical development of the Chicano community in the 20th century *General studies: SB, H*

431 The French Revolution and the Napoleonic Era. (3) N

Conditions in France before 1789 the Revolutionary decade from 1789 to 1799 the organization of France under Napoleon, and the impact of changes in France on European society Prerequisite upper division standing or instructor approval *General studies SB, H*

433 Modern France. 3 A

Social, political, economic, and cultural transformations of French society 1815–present Impact of industrialization on war and revolution on peoples Prerequisite upper division standing or instructor approval *General studies SB, G, H*

434 Hitler: Man and Legend. (3) N

A biographical approach to the German Third Reich emphasizing nature of Nazi regime World War I and historiography *General studies SB, H*

435 Modern Germany. 3 A

Germany since 1840 *General studies SB, G, H*

437 Eastern Europe and the Balkans. 3 A

Peoples and countries of eastern and southern eastern Europe in the 19th and 20th centuries from 1800 to 1914 emphasizing the Hapsburg and Ottoman Empires *General studies SB, H*

438 Eastern Europe and the Balkans. 3 A

Peoples and countries of eastern and southeastern Europe in the 19th and 20th centuries emphasizing the successor states from 1914 to the present *General studies SB, G, H*

441 Imperial Russia. (3) A

Development of Russian political, economic, social, religious and educational institutions and traditions from the end of the 17th century to the collapse of the tsarist autocracy in 1917 *General studies SB, H*

442 The Soviet Union. (3) A

An examination of Soviet politics, economic development, and foreign relations from the 1917 Revolution to the present *General studies SB, G, H*

443 Russia and the United States. 3 A

Official and unofficial relations between Russia and the United States from the late 18th century to the present emphasizing period following the Bolshevik Revolution *General studies SB, G, H*

445 Tudor England. (3) A

Political, social, economic, and cultural developments in 16th century England. *General studies SB, H*

446 Stuart England. (3) A

Political, social, economic, and cultural developments in 17th century England *General studies SB, H*

449 Modern Britain. (3) A

Factors contributing to British position as the world's leading power in the 19th century and its decline from that position in the 20th century *General studies SB, G, H*

450 British Constitutional History. 3 A

Historical development of the constitutional system of Great Britain from the Middle Ages to the present emphasizing the growth of democracy *General studies SB, H*

451 The British Empire 3 A

British imperialism and colonialism in Africa, the Americas, Asia, and the South Pacific. Prerequisite upper division standing or instructor approval *General studies SB, H*

452 Economic History of Europe. (3) N

Impact of industrialism upon the political, social, and cultural life of Europe from the Renaissance to the 19th century *General studies SB, H*

453 Economic History of Europe. (3) N

Impact of industrialism upon the political, social, and cultural life of Europe in the 19th and 20th centuries. *General studies SB, G, H*

454 Intellectual History of Modern Europe. 3 A

Major developments in European thought from the scientific revolution on Copernicus through Bentham Prerequisite upper division standing or instructor approval *General studies SB, H*

455 Intellectual History of Modern Europe. (3) A

Major developments in European thought from Karl Marx to the present. Prerequisite upper division standing or instructor approval *General studies SB, H*

456 History of Spain. 3 N

Cultural, economic, political, and social development of Spain from earliest days to 1700 *General studies SB, H*

457 History of Spain. 3 N

Cultural, economic, political, and social development of Spain from 1700 to the present *General studies SB, H*

460 Spanish South America. (3) N

Political, economic, and social development of the Spanish speaking nations of South America since independence 19th century developments *General studies SB, H*

461 Spanish South America. (3) N

Political, economic, and social development of the Spanish speaking nations of South America 20th century developments. *General studies SB, H*

463 Intellectual and Cultural History of Latin America. (3) N

Main currents of thought, the outstanding thinkers, and their impact on 19th and 20th century Latin America. Cultural and institutional basis of Latin American life *General studies SB, H*

464 The United States and Latin America. 3 N

The Latin American struggle for diplomatic recognition attempts at political union, participation in international organizations since 1810 and relations between the United States and Latin America *General studies SB, G, H*

466 Mexico. (3) A

Political, economic, social, and cultural developments from earliest times to 1810 *General studies SB, H*

467 Mexico. (3) A

Political, economic, social, and cultural developments from 1810 to the present *General studies SB, H*

468 Brazil. (3) N

Discovery, conquest, and settlement by the Portuguese achievement of independence rise and fall of the empire problems and growth of the republic to the present. *General studies SB, H*

469 Chinese Thought and Way. 3 N

Chinese classics in translation studied both for their intrinsic ideas and for the origins of Chinese thought *General studies SB, H*

470 Chinese Thought and Way. (3) N

Evolution of Confucian Tao (Way) synthesis of Taoism and Buddhism and 20th century reactions to that Tao *General studies SB, G, H*

471 The United States and Japan. (3) A

Cultural, political, and economic relations in the 19th and 20th centuries. Emphasis on post World War I period. *General studies SB, G, H*

472 The United States and China. (3) N

Emphasis on viewing from both sides the roller coaster ride of cultural, political, and economic relations in the 20th century *General studies SB, G, H*

473 China. (3) A

Political, economic, social, and cultural history of the Chinese people from early times to the late 17th century *General studies SB, H*

474 China. (3) A

Political, economic, social, and cultural history of the Chinese people from mid 17th century to the present *General studies SB, G, H*

475 The American Experience in Vietnam, 1945–1975. (3) N

Intersection of American and Asian histories in Vietnam viewed from as many sides as possible *General studies SB, G, H*

477 Japan. (3) A

Political, economic, social, and cultural history of the Japanese people from early times to the 19th century *General studies SB, H*

478 Japan. (3) A

Political, economic, social, and cultural history of the Japanese people from 19th century to the present *General studies SB, G, H*

479 The Chinese Communist Movement. (3) N

Analysis of the communist movement in 20th century China with emphasis on its historical setting *General studies SB, G, H*

481 The People's Republic of China. (3) N

Analysis of major political, social, economic and intellectual trends in China since the founding of the People's Republic in 1949 *General studies SB, G, H*

485 Historic Preservation. (3) N

Comparative approach to preservation of historical resources in Europe and the United States, analysis of regulatory framework and case studies.

495 Methods of Teaching History. (3) S

Methods in instruction organization and presentation of the subject matter of history and case studies

498 History Pro-Seminar. (3) F S

Required course for majors on topic selected by instructor introduction to historical research and writing writing intensive course related to the development of research skills and writing tools used by historians *General studies L2*

502 Public History Methodology. (3) F

Introduction to historical research methodologies, techniques, and strategies used by public historians Readings short papers, and guest speakers Required for students in the public history concentration

503 Public History Research. (3) S

Individual and group research projects utilizing the approaches and techniques of the public historian Required for public history business emphasis

512 Historians of Early Europe. (3) N

A study of the history of European history writing from the Greeks to the 18th century

513 Historians of Modern Europe. (3) N

A study of 19th and 20th century European history writing

514 Historians of the United States. (3) N

A study of the history of American history writing from the early colonial days to the 20th century

515 Studies in Historiography. (3) F, S

Methods and theories of writers of history. May be repeated for credit

525 Historical Resource Management. (3) F

Identification of documentation and interpretation of historical period buildings, sites, and districts. Emphasis on interdisciplinary efforts among historians, architects, and anthropologists

526 Historians and Preservation. (3) S

Preparation of historians for public and private historic preservation programs. Prerequisite: HIS 525 or instructor approval

527 Historical Administration. (3) F

Preparation of historians in administration of archives, historical sites, historical museums, historical societies, and historical offices in government agencies

530 American Business History. (3) F

Origins, evolution, and present form of various major U.S. industries. Required for public history business option

532 Community History. (3) N

Techniques and methods of community history emphasizing local resources. Required for community history option. Seminar.

551 Comparative Histories of War and Revolution. (3) A

A comparative field course of the themes of war and revolution

552 Comparative History of Family and Community. (3) N

A comparative course with a focus on family including minority and ethnic groups in society

553 Comparative History of State and Institutions. (3) N

A comparative course that explores the changing nature of central institutions and government.

554 Comparative Historical Population Studies: Ethnicity, Economy, and Migration. (3) N

A comparative course that explores the impact of social, cultural, or economic changes in the population

555 Comparative Historical Topics. (3) N

This course analyzes a variety of specific social, political, cultural, and intellectual topics

591 Seminar. (3) N

Topics may be selected from the following areas:

- (a) U.S. History
- (b) European History
- (c) English History
- (d) Latin American History
- (e) East Asian History
- (f) British History

May be repeated for credit

Omnibus Courses: See page 44 for omnibus courses that may be offered

SCHOLARLY PUBLISHING**PUB 501 Introduction to Scholarly Publishing.** (3) F

An introduction to the purpose, organization, and operation of scholarly publishing, including its history, societal role, and current issues. Lecture, discussion. Prerequisite: graduate standing

502 Scholarly Editing. (3) F

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

503 Advanced Scholarly Editing. (3) S

Advanced manuscript editing, acquisitions, development, editing, and indexing of scholarly books, textbooks, and scholarly journals. Lecture, discussion. Prerequisites: PUB 501, 502

510 Research in Scholarly Publishing. (3) S

Individual or group research projects on issues in scholarly publishing, including legal, economic, design, technology, and related topics. Directed research, discussion. Prerequisites: PUB 501 admission to scholarly publishing certificate program

584 Scholarly Publishing Internship. (1-6) A

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

598 Special Topics in Scholarly Publishing. (1) S

One-week short courses covering specific topics in scholarly publishing to be taught by visiting publishing professionals. Lecture, discussion. Prerequisites: PUB 501 admission to scholarly publishing certificate program

Omnibus Courses: See page 44 for omnibus courses that may be offered

Interdisciplinary Humanities Program

Charles J. Dellheim

Director

602/965-6747

HUMANITIES—B.A.

The major in Humanities is interdisciplinary and may be intercollegiate; it consists of 45 hours. It is recommended that students take 12 hours of supporting courses that may be credited toward general studies requirements where appropriate. In consultation with an advisor, the student takes 29 hours of interdisciplinary humanities courses, including:

- 1. a core of 14 hours: HUM 200, 301, 302, 498;

- 2. 16 hours of courses selected to develop an interdisciplinary cultural or area concentration (examples: medieval or Renaissance studies); and
- 3. 15 hours from those courses required for one of the humanities disciplinary majors

The humanities are those learned bodies of knowledge that are used to express ideas, to understand the meaning of words, and to explore the values and beliefs that underlie our culture and the cultures of others. As defined by congress, the humanities include history, literature, linguistics, philosophy, jurisprudence, ethics, comparative religion, archaeology, the history and criticism of the arts and those aspects of the social sciences that employ a philosophical or historical rather than quantitative approach to knowledge.

See this catalog for course descriptions for architecture, art, anthropology (cultural), dance, English, foreign languages, history, music, philosophy, religious studies, and theatre. Twelve additional hours of supporting courses in consultation with the advisor are recommended especially to broaden the student's historical and aesthetic understanding. The courses are to be selected from the following disciplines: architecture, art history, dance, English, foreign languages, history, music, philosophy, religious studies, theatre, and other approved disciplines

GRADUATE PROGRAM

The program also offers the Master of Arts degree in Humanities through the Graduate Committee on Humanities. Consult the *Graduate Catalog* for requirements.

HUMANITIES**HUM 110 Contemporary Issues in Humanities.** (3) F, S

Responses of literature, art history, history, philosophy, religion, and other disciplines to common problems affecting modern American life. *General studies HU, H.*

200 Encountering the Humanities. (3) S

Introduction to the languages, methods, and objectives of the study of the interdisciplinary humanities intersections of disciplines and cultural institutions. Lecture, studio workshop. Prerequisite: Humanities major. *General studies HU*

294 Special Topics in the Humanities. (3) A

(a) Introduction to Southeast Asia.
An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia.

301 Humanities in the Western World. (4) F
Interrelation of arts and ideas in Western Civilization, Hellenic through medieval. 3 hours lecture, 1 discussion meeting per week. *General studies: L1, HU, H.*

302 Humanities in the Western World. (4) S
Interrelation of arts and ideas in Western Civilization, Renaissance to the present. 3 hours lecture, 1 discussion meeting per week. *General studies: L1, HU, H.*

413 Comedy: Meaning and Form. (3) S
Nature and characteristics of comedy in the literary, fine, and performing arts. Prerequisites: HUM 301 and 302 or equivalents. *General studies: HU.*

414 Tragedy: Meaning and Form. (3) A
Nature and characteristics of literary and artistic expressions called tragic. Prerequisites: HUM 301 and 302 or equivalents. *General studies: HU.*

494 Special Topics in the Humanities. (3) N

Open to all students. Topics include:
(a) Western Historical or Contemporary Cultures
(b) Non-Western Cultures
(c) Cultures of Ethnic Minorities
(d) American Fine Arts
(e) Comparative Fine and Performing Arts

498 Pro-Seminar in the Humanities. (3) A
Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. For students with a major in humanities with upper-division standing. May be repeated for a total of 6 semester hours, when topics vary.

511 Structures of Knowledge. (3) F
Theories and examples of structures of knowledge, including such topics as metaphor, semiotics, and knowledge of the "other."

512 Writing Cultures. (3) S
Theories and methods of representing Western and non-Western cultures in literature, history, ethnography, and pictorial media.

513 Interpretation of Cultures. (3) A
Methodologies and comparative theories for the study of relationships between various aspects of culture, the history of ideas, and the arts. May be repeated for a total of 6 semester hours, when topics vary.

549 Contemporary Critical Theory. (3) F
An advanced survey of major schools of 20th-century literary and critical theory. Lecture, discussion. Cross-listed as ENG 502.

591 Seminar. (3) A
Topics include
(a) Comedy: Meaning and Form
(b) Tragedy: Meaning and Form
(c) Theory and Culture

598 Special Topics in the Humanities. (3) N
Open to all students. Topics include
(a) Western Historical or Contemporary Cultures
(b) Non-Western Cultures
(c) Cultures of Ethnic Minorities
(d) American Fine Arts
(e) Comparative Fine and Performing Arts

Omnibus Courses: See page 44 for omnibus courses that may be offered.



Languages and Literatures

Pier Raimondo Baldini
Chair
(LL B404) 602/965-6281

REGENTS' PROFESSORS

D. FOSTER, KELLER

PROFESSORS

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HORWATH, LOSSE, VALDIVIESO
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INSTRUCTORS

HABERMAN MORGAN, TU

LECTURERS

FOARD, L. FOSTER
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UR OSTE

PROFESSORS EMERITI

ACEVEDO, CARLSON, GROBE,
KNOWLTON, LAETZ LANDEIRA,
LOWE, LUENOW, MARTINEZ,
SCHUBACK, SHEPPARD, VIRG LLO,
VON DER HEYDT WILSON
WIRTZ, WOLLAM

BACHELOR OF ARTS DEGREE

The department offers majors in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish. Each major consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the major, a minimum of 24 hours must be taken above the 200 level and must include at least nine hours at the 400 level or above. Specific required courses for each major area are listed in a brochure available in the department. See "Degree Requirements," page 87.

MINORS

Each minor in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish consists of 18 hours, of which 12 hours must be upper division. Specific required courses for each area are listed in a brochure in the department.

Asian Studies Emphasis. Foreign language students majoring in Asian languages may elect to pursue an Asian Studies emphasis combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 90, for more information.

Latin American Studies Emphasis. Foreign language students majoring in Spanish may elect to pursue a Latin American Studies emphasis combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

Mexican American Studies Emphasis. This emphasis consists of 45 semester hours, of which 30 hours must be in Spanish (to include SPA 421, 464, and 471) and 15 hours in Mexican American content courses as related fields. Fulfillment of requirements is recognized on the transcript as a major in Spanish Mexican American studies emphasis.

Russian and East European Studies. Any undergraduate major can earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in the section on "Russian and East European Studies," page 91.

Southeast Asian Studies Emphasis. To earn a certificate in Southeast Asian Studies, a student must complete a minimum of 40 semester hours of course work related to Southeast Asia, including two years (20 semester hours) of a Southeast Asian language. See "Southeast Asian Studies," page 91, for more information.

SECONDARY EDUCATION— B.A.E.

Chinese, French, German, Japanese, Russian, and Spanish. Each of the major teaching fields consists of 45 semester hours, of which 30 must be in

one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the academic specialization, a minimum of 24 hours must be taken above the 200 level and must include at least nine hours at the 400 level or above. Specific required courses for each major area are listed in curriculum check sheets of the individual language areas available in the department.

The minor teaching field consists of a minimum of 24 semester hours in one foreign language, of which at least 18 hours must be taken above the 200 level. See individual language area curriculum check sheets for required courses in each minor area.

GRADUATE PROGRAMS

The Department of Languages and Literatures offers programs leading to the Master of Arts degree in French, German, and Spanish and the Doctor of Philosophy degree in Spanish. Consult the *Graduate Catalog* for requirements.

FOREIGN LANGUAGES FOR INTERNATIONAL PROFESSIONS

The sequence of two semesters, listed under numbers 107 and 207 in two languages (French and Spanish), integrates an accelerated study, a functional approach to course design, and preparation for international professions (e.g., business, diplomacy, international political economy). It is parallel to the traditional sequence of 101 through 202 and also satisfies the college's foreign language requirement. The sequence differs from traditional basic language programs in that all aspects of the language—vocabulary, grammar, and skill development—are practiced within the context of authentic communication for social and professional purposes in the target culture. Classes meet eight hours weekly, for eight semester hours in each of two semesters.

Those who have had success in learning one foreign language are encouraged to join this program in a second language. Students should contact the Department of Languages and Literatures before registration.

CERTIFICATE PROGRAM IN TRANSLATION

The Certificate Program in Translation is designed to provide the advanced training required for professional translation in both public and private sectors, preparation for the rigorous examinations required by national and international agencies, and training as an ancillary skill for professional fields, such as international business, public health and medicine, and law, in accordance with guidelines recommended by the American Translators' Association. The certificate is a nondegree program consisting of 15 semester hours of course work and two hours of in-service practicum primarily into the receptor language of English from the source languages of French and Spanish. It may be taken simultaneously with course work leading to an undergraduate or graduate degree, as a related area sequence, or as the sole program of study for members of the community who meet the admission requirements of the certificate program but who are not enrolled in a degree program. A complete brochure is available at the Department of Languages and Literatures, LL B404.

Admission Requirements. Since entrance to professional translation is through work, cultural experience, and examination, the two entrance requirements to this certificate program are (1) written proficiency examination in the source and the receptor languages at the level of completion of the fourth year or most advanced composition course in French or Spanish, which at ASU are FRE 412 and SPA 412 and (2) either an academic year at a university in a French speaking or Spanish speaking country, an extensive work experience using French or Spanish, or demonstrated bilingual facility, both written and oral, in English and either French or Spanish.

Certificate Requirements. The certificate program consists of 15 semester hours of required courses, including six hours general theory of linguistics and translation as a profession (FLA 400, 401), nine hours of applied translation electives in specialized areas (FLA 481, 482, 483, 485), and two hours of in-service practicum (FLA 484).

FOREIGN LANGUAGE REQUIREMENT AND PLACEMENT

The College of Liberal Arts and Sciences requires knowledge of one foreign language equivalent to the completion of two years' study at the college level. This normally includes a sequence of courses numbered 101 and 102 and 201 and 202 or 107 and 207. For important exceptions in French, Greek, and Portuguese, see the statement at the head of respective course descriptions.

Students who transfer from other postsecondary institutions with foreign language credits below the 202 level are placed in a course at the level directly above the work completed.

Students who have completed their secondary education in a school where the language of instruction was not English are considered to have satisfied the foreign language requirement. Certification of this status is made at the time of admission to ASU. Questions should be addressed to the foreign credentials evaluator at the Admissions Office.

The foreign language requirement can be met in languages not taught at ASU either by transferring credit from another institution or by passing a proficiency examination. When possible, the Department of Languages and Literatures recommends to the college an appropriate source for such examinations and proctors them. Grading is done by the institution that provides the examination, and the student pays any costs incurred. The examination can be used only to demonstrate proficiency; it does not produce semester hours of credit.

Ordinarily, no placement or proficiency examination is administered to students who wish to continue studying a foreign language for which high school credits have been earned. Students should be guided by the following principles of equivalency: (1) One unit (one academic year) of high school-level study is considered, for placement purposes only, to equal one semester of study of the same language at the university level. Thus, students with one year of high school study would enroll in the second semester course (102), students with two years of high school study, in the third semester course (201), and so on. (2) Students who feel that their high school

language preparation was inadequate may choose to place themselves on a lower level, but not lower than 111 with two or three years of high school study and 201 with four years of high school study.

Students with prior knowledge of a language may have all or part of their requirement waived in any one of the following ways:

1. by satisfactory results in a nonrepeatable college approved proficiency examination;
2. by achieving a grade of at least "C" in the last course of the required sequence; or
3. by achieving a grade of at least "C" in a course at the next higher level.

Students are expected to follow the progressive sequence of 100, 200, and 300. Once credit is earned in a 300 level class in a language, students may not earn lower division credit in that language.

First year foreign language courses taught by the Department of Languages and Literatures are not open to students who have spent one or more years in a country where that language is the predominant language. Individual language areas may have different policies. Students with questions about this policy should check with the appropriate language coordinator in the department.

If college transfers are uncertain about course equivalencies, they should contact the Department of Languages and Literatures.

LANGUAGE LABORATORY REQUIREMENT

All students enrolled in 101, 102, 201, and 202 language courses are expected to spend a minimum of one hour per week in the language laboratory or in other assigned audiolingual tape exercises in addition to the regular class periods.

FOREIGN LANGUAGES

FLA 150 Introduction to East Asian Culture. (3) S
An introduction to the cultures of China, Japan and Korea. *General studies HU G*

323 Survey of Soviet Literature in Translation. (3) F S
Knowledge of Russian is not required. Survey of the major literary movements, prominent authors and the most significant works of prose, poetry and drama of the Soviet period, 1917 to present. *General studies HU*

400 Linguistics. (3) S
Surveys major theories of current linguistics study and explores the application to specific issues of English the Romance Languages, and language teaching. Open to sophomores and juniors with instructor approval. *General studies SB*

401 Translation Theory and Practice. (3) N
Translation theories and professional practices and ethics bibliography computer technology and sample texts for natural and social sciences and humanities. Prerequisite: fourth year composition or instructor approval in respective language area

415 Bilingualism and Languages in Contact. (3) F
Analysis of linguistic aspects of bilingualism, e.g., pidgins and creoles code switching, and other contact phenomena, simultaneous/sequential bilingual language acquisition. Prerequisite: FLA 400 or equivalent or instructor approval. *General studies: SB.*

420 Foreign Literature in Translation. (3) F S
Topics may be chosen from the following:

- (a) Brazilian
- (b) Chinese
- (c) French
- (d) German
- (e) Greek
- (f) Italian
- (g) Latin
- (h) Portuguese
- (i) Russian
- (j) Soviet
- (k) Spanish
- (l) Spanish American

Not for language majors (except in Asian languages and Russian) open to language majors as a related-area course. Graduate students by permission. *General studies HU G.*

421 Japanese Literature in Translation. (3) F, S
Readings selected by theme or genre or period from various works of Japanese literature in English translation. May be repeated as topic changes. Graduate students by permission. Prerequisite: a course that satisfies the L1 general studies requirement. *General studies: L2, HU*

425 Cultural Heritage. (3) F SS
Aspects of political, intellectual, social and artistic development of a foreign culture. Not for language majors except as a related area course. Graduate students by permission.

480 Methods of Teaching Foreign Languages. (3) F
Teaching foreign languages and literatures at secondary and college levels. This course will not meet the Liberal Arts and Sciences general studies requirement for humanities and fine arts. Required for admission to SED 478. Prerequisite: 12 hours of upper division courses in 1 foreign language

481 Technical and Scientific Translation. (3) N
Resources, practices, strategies, and execution for translation of professional texts in subjects such as engineering architecture, agriculture, computer technology, electronics and physical and biological sciences. Prerequisite: FLA 401

482 Business and Financial Translation. (3) N
Resources, practices, strategies and execution for translation of professional texts in subjects such as economics, finance insurance management, marketing, accounting advertising, and real estate. Prerequisite: FLA 401.

483 Medical and Legal Translation. (3) N
Resources and strategies for translation of professional texts in subjects such as medicine, nursing public health criminology justice, and international law. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401.

485 Problems of Literary Translation. (3) N
Theory and practice with emphasis on application through individual translation projects. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401 or instructor approval in the respective language area

515 Second Language Acquisition. (3) S
Description and analysis of second language acquisition and learning simultaneously or sequentially in natural and artificial settings. Prerequisite: FLA 400 or equivalent or instructor approval

525 Trends and Issues in Foreign Language Teaching. (3) N
Advanced methods seminar designed for experienced teachers

Omnibus Courses: See page 44 for omnibus courses that may be offered

CHINESE

CHI 101 Elementary Chinese. (5) F
Pronunciation, grammar, elementary conversation, and development of basic reading and writing skills. Standard deductive 5 class hours

102 Elementary Chinese. (5) S
See CHI 101. Prerequisite: CHI 101 or equivalent

107 Chinese for International Professions I. (10) F
Accelerated program alternative to CHI 101-102 sequence. Functional approach to needs of international professions. 10 class hours.

201 Intermediate Chinese. (5) F
Systematic review of grammar. Development of vocabulary through reading and writing. Dr. naural/ora skills 5 class hours. Prerequisite: CH 102 or equivalent. *General studies G*

202 Intermediate Chinese. (5) S
See CHI 201. Prerequisite: CHI 102 or equivalent. *General studies G*

205 Chinese Calligraphy. (1) F S
An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required

205 Chinese Calligraphy. (1) F, S
An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required

207 Chinese for International Professions II. (10) S
Continuation of CHI 107 alternative to CHI 107 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours. Prerequisite: CHI 107 or instructor approval. *General studies G*

309 Chinese Conversation. (2) F
Aural/oral drills using contemporary stories, articles and essays. For students with lower level proficiency. Prerequisite: CH 202. *General studies G*

310 Chinese Conversation. (2) S
See CHI 309. Prerequisite: CHI 202. *General studies G*

311 Chinese Conversation. (2) F
Intensive aural/oral practice toward fluency in Modern Chinese, dealing with contemporary plays and/or radio and movie scripts. Prerequisite: CHI 202. *General studies G*

312 Chinese Conversation. (2) S
See CHI 309. Prerequisite: CHI 202. *General studies G*

313 Advanced Chinese. (3) F
The modern language in general or specific areas depending on the student's needs or interests. 3 hours lecture, arranged ab. Prerequisite: CHI 202 or equivalent. *General studies: G*

314 Advanced Chinese. (3) S
Continuation of CHI 313. Prerequisite: CHI 313. *General studies: G.*

321 Chinese Literature. (3) F
Selected representative works of the various genres and periods. Prerequisite: CH 202 or instructor approval. *General studies: HU*

322 Chinese Literature. (3) S
See CHI 321. Prerequisite: CH 202 or instructor approval. *General studies: HU G*

413 Introduction to Classical Chinese. (3) F
Reading in various genres of pre-20th century literature (wan-yen) with analysis of the structure of the classical writings. Prerequisite: CHI 202 or equivalent. *General studies: HU.*

414 Introduction to Classical Chinese. (3) S
Continuation of CHI 413. Prerequisite: CH 413. *General studies: HU.*

500 Bibliography and Research Methods. (3) N
Introduction to research materials on Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion

514 Advanced Classical Chinese. (3) N
Close readings in selected premodern texts with focus on specific grammatical features, and increased vocabulary. Lecture, discussions

520 Teaching of Chinese as a Second Language. (3) N
Theory and practice of teaching Chinese, including presentation, interaction and evaluation, with consideration given to cultural factors. Lecture, discussion

535 Advanced Readings. (3) N
Readings in primary and secondary sources in history art religious studies economics, or other fields. Lecture discussion.

543 Chinese Language and Linguistics. (3) F
Analysis and discussion, within the framework of linguistic theory, of selected problems in Chinese phonetics morphology, and syntax. Lecture discussion.

585 Problems of Translation. (3) N
Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture discussion.

591 Seminar. (3) N
Topics in literary linguistic or cultural studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered

FRENCH

To satisfy the foreign language requirement, students must take FRE 201 and either 203 or 205.

FRE 101 Elementary French. (4) F, S, SS
Intensive aural/oral drill in class and laboratory; basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab. Not open to students with credit in FRE 111.

102 Elementary French. (4) F, S, SS
See FRE 101. Prerequisite: FRE 101 or equivalent.

107 French for International Professions I. (8) F
Accelerated alternative to FRE 101, 102. Functional approach. Emphasis on speaking, understanding, writing, and reading for communication and competence for international professions.

111 Fundamentals of French. (4) F, S
Primarily for students with two years of high school French who need review to enter second year study. Not open to students with credit in FRE 101 or 102. 4 hours lecture, 1 hour lab.

201 Intermediate Grammar Review. (4) F, S, SS
A thorough review of French grammar, including full attention to literary usage. Prerequisite: FRE 102 or 111 or equivalent. *General studies: G*

203 French Conversation. (4) F, S, SS
Current usage recommended to improve speaking and comprehension before traveling in French-speaking countries or advancing to 300-level courses. 1 hour lab required. Prerequisite: FRE 201 or equivalent. *General studies: G*

205 Intermediate Reading. (4) F, S
Designed to increase vocabulary and to teach recognition of stylistic and grammatical elements. Prerequisite: FRE 201 or equivalent. *General studies: HU, G*

207 French for International Professions II. (8) S
Continuation of FRE 107. Alternative to FRE 201, 203 sequence. Expansions of communicative proficiency in specific areas of international professions. Prerequisite: FRE 107 or instructor approval. *General studies: G*

311 French Conversation. (3) F, S
Further practice in speaking French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisites: FRE 201 (or 205) and 203 or equivalents. *General studies: G*

312 French Composition. (3) F, S
Further practice in writing French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General studies: G*

315 French Phonetics. (3) F
Practice and theory of French pronunciation. Emphasis will be on standard French although an overview of regional varieties will be offered. Lecture and lab. Prerequisite: FRE 311 or equivalent.

319 Business Correspondence and Communication. (3) S
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: FRE 312 or instructor approval. *General studies: G*.

321 French Literature. (3) F, S
Representative masterpieces and significant movements of French literature of the middle ages through the century. Prerequisites: FRE 203 (or 311) and 205 or equivalents. *General studies: L2, HU, H*

322 French Literature. (3) F, S
Literature of the 19th and 20th centuries. Prerequisites: FRE 203 (or 311) and 205 or equivalents. *General studies: L2, HU*.

411 Advanced Spoken French. (3) F, S
Improvement of spoken French. Prerequisites: 9 hours of 300-level French, including FRE 311 or equivalents. *General studies: G*

412 Advanced Written French. (3) F, S
Improvement of composition skills. Prerequisites: 9 hours of 300-level French, including FRE 312 or equivalents. *General studies: G*

415 French Civilization I. (3) F
Political, intellectual, social, economic, and artistic development of France from its origins to the end of the 17th century. Prerequisite: 6 hours of upper-division French. *General studies: HU*.

416 French Civilization II. (3) S
Political, intellectual, social, economic, and artistic development of France from the 18th century to present. Prerequisite: 6 hours of upper-division French. *General studies: HU, G*

441 French Literature of the 17th Century. (3) N
From 1600 to 1660. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: HU*

442 French Literature of the 17th Century. (3) N
From 1660 to 1700. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: HU, H*

445 French Literature of the 18th Century. (3) N
Contributions of the philosophers and the development of the novel and drama. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: L2, HU*.

451 French Poetry of the 19th Century. (3) N
From Romanticism to Parnassian poetry to Symbolism. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.

452 French Novel of the 19th Century. (3) N
From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU*

453 Theater of the 19th Century. (3) N
From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Molière. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.

461 Pre-Atomic Literature. (3) F
Representative authors from Proust and Malraux to Sartre from 1900 to 1945. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU*

462 Post-Atomic Literature. (3) S
Representative authors including Camus, Duras, and Robbe-Grillet from 1945 to present. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU*

471 The Literature of Francophone Africa and the Caribbean. (3) N
Selected prose, poetry, and drama of Black authors from Africa and the Caribbean. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: L2, HU*

472 Franco-Canadian Civilization. (3) S '98
A study of the civilization of Quebec in particular through its history, language, literature, music, and customs. Prerequisite: 9 hours of 300-level French or instructor approval. Cross-listed as FRE 598.

500 Bibliography and Research Methods. (3) F
Required of all graduate students.

510 Explication de Textes. (3) N
Detailed analysis of literary texts.

515 Intellectual Currents in France, from the Middle Ages to the 18th Century. (3) N
Significant social, aesthetic, philosophical, and scientific ideas as presented by major writers of fiction and nonfiction.

516 Intellectual Currents in France, from the 19th Century to the 20th Century. (3) N
See FRE 515.

521 History of the French Language. (3) N
Principal phonological, morphological, and semantic developments of French from Latin to present, with emphasis on old and middle French. Prerequisite: some familiarity with Latin recommended.

531 Medieval French Literature. (3) F
Readings in the epics, early drama, roman courtois, and other representative literary genres of the Middle Ages.

535 French Literature of the 16th Century. (3) S
Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pléiade.

591 Seminar. (3) N
Topics may be selected from the following:
(a) French Literary Criticism
(b) Corneille, Molière, and Racine
(c) Diderot, Voltaire, and Rousseau
(d) Balzac
(e) Romanticism
(f) Proust
(g) Realism and Naturalism
(h) French Extant and Lost Literature
(i) Advanced Problems in French Literature
(j) Flaubert
(k) Stendhal and Zola

Omnibus Courses: See page 44 for omnibus courses that may be offered.

GERMAN

GER 101 Elementary German. (4) F, S, SS
Reading, writing, speaking, and understanding of basic German with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 111.

102 Elementary German. (4) F, S, SS
See GER 101. Prerequisite: GER 101 or equivalent.

111 Fundamentals of German. (4) F S
Primarily for students with two years of high school German who need review to enter second year study 4 hours lecture 1 hour lab Not open to students with credit in GER 101 or 102

201 Intermediate German. (4) F S SS
Intensive review of grammar with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab Prerequisite: GER 102 or 111 or equivalent. *General studies: G*

202 Intermediate German. (4) F, S SS
See GER 201 Prerequisite: GER 201 or equivalent. *General studies: G*

303 Scientific German. (3) N
Acquisition of a specialized vocabulary through the reading of German scientific publications Prerequisite: GER 202 or equivalent

304 Scientific German. (3) N
See GER 303 Prerequisite: GER 202 or equivalent

311 German Conversation. (3) F
Expansion of idiom through oral practice dealing with contemporary articles, essays and stories 3 semester hours limit for majors. Prerequisite: GER 202 or equivalent. *General studies: G*

312 German Conversation. (3) S
See GER 311. Prerequisite: GER 202 or equivalent. *General studies: G*

313 German Composition. (3) S
Intensive practice in writing emphasizing style, and grammar Prerequisite: GER 202 or equivalent. *General studies: G*

314 Introduction to German Literature. (3) F
Beginning study of German poetry, drama, the novel and the *Novelle* Prerequisite: GER 202 or equivalent

319 Business Correspondence and Communication. (3) N
Organization and presentation of clear, effective business communications: vocabulary applicable to modern business usage Prerequisite: GER 313 or instructor approval. *General studies: G*

321 German Literature. (3) F
From the beginning to classicism Prerequisite: GER 202 or instructor approval. *General studies: HU*

322 German Literature. (3) S
From Romanticism to the present Prerequisite: GER 202 or instructor approval. *General studies: L2, HU*

411 Advanced Grammar and Conversation. (3) F
Improvement of diction and idiom through intensive oral review Prerequisite: GER 311 or 312 or equivalent. *General studies: G*

412 Advanced Grammar and Composition. (3) S
Improvement of writing ability Prerequisite: GER 313 or equivalent. *General studies: G*

415 German Civilization. (3) S
Aspects of political, social, and cultural life of the German-speaking world from the beginning through 1600 Prerequisite: any 300-level course in German or instructor approval. *General studies: HU H*

416 German Civilization. (3) F
From 1600 through 1945 Prerequisite: any 300-level course in German or instructor approval. *General studies: HU H*

445 German Literature: Enlightenment to Classicism. (3) N
Major works of the literary epochs in the century Prerequisite: GER 321 or instructor approval

451 German Literature: Biedermeier to Naturalism. (3) N
Representative works of prose and poetry from 1820 to 1890 Prerequisite: GER 322 or instructor approval

461 Contemporary German Literature. (3) S, SS
German writers since 1945. Prerequisite: GER 322 or instructor approval

500 Bibliography and Research Methods. (3) N
Required of all graduate students.

511 German Stylistics. (3) N
Art of writing literary German comparative stylistics

521 History of German Language. (3) N
Linguistic development of German from the earliest records to the present

523 German Drama. (3) N
Drama of the 19th and 20th centuries.

525 German Novel. (3) N
Special studies in the German novel

527 The *Novelle*. (3) N
Special studies in the German short story

531 Middle High German Language and Literature. (3) N
Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres

551 Romanticism. (3) N
Treatment of early and late Romanticism.

555 Modern German Literature. (3) N
Major works from the period of Expressionism to 1945

591 Seminar. (3) N
Special topics are concerned with a figure, theme or work in German literature or Germanic studies Topics may be selected from the following
(a) Goethe
(b) Faust
(c) Scher
(d) Keist
(e) Kafka
(f) Hesse
(g) Grass and Bo
(h) Germanic Studies

Omnibus Courses: See page 44 for omnibus courses that may be offered

GREEK

Completion of GRK 101, 201 301, and 302 satisfies the Liberal Arts and Sciences language requirements.

GRK 101 Elementary Greek. (4) F
For beginning students only

201 Intermediate Greek. (4) S
Continuation of GRK 101 Prerequisite: GRK 101 or instructor approval.

301 Greek Literature. (3) F,
Readings in the masterpieces of ancient Greek literature, advanced grammar. Authors read are changed each year in accordance with needs of the class May be repeated for credit Prerequisite: GRK 201 or instructor approval. *General studies: HU.*

302 Greek Literature. (3) S
See GRK 301 Prerequisite: GRK 201 or instructor approval. *General studies: HU*
Omnibus Courses: See page 44 for omnibus courses that may be offered.

HEBREW

HEB 101 Elementary Modern Hebrew. (4) F
Reading writing, speaking, and understanding of basic modern Hebrew with emphasis on pronunciation and grammar 4 hours lecture, 1 hour ab

102 Elementary Modern Hebrew. (4) S
Reading writing, speaking, and understanding of basic modern Hebrew with emphasis on pronunciation and grammar 4 hours lecture 1 hour ab. Prerequisite: HEB 101 or equivalent

201 Intermediate Modern Hebrew. (4) F
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension reading, and writing 4 hours lecture 1 hour ab. Prerequisite: HEB 102 or equivalent

202 Intermediate Modern Hebrew. (4) S
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing 4 hours lecture 1 hour ab. Prerequisite: HEB 201 or equivalent

313 Advanced Modern Hebrew. (4) F
Continued development of ability to communicate orally and in writing Reading of selected literary works Prerequisite: HEB 202 or equivalent

314 Advanced Modern Hebrew. (4) S
Continued development of ability to communicate orally and in writing Reading of selected literary works Prerequisite: HEB 313 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered

INDONESIAN

IDN 101 Elementary Indonesian I. (5) F
Basic communication, reading and writing skills intensive oral/aural classroom drill supplemented by prose reading 4 hours lecture, 1 hour lab

102 Elementary Indonesian II. (5) S
Basic communication reading and writing skills intensive oral/aural classroom drill supplemented by prose reading 4 hours lecture, 1 hour lab Prerequisite: DN 101 or equivalent

201 Intermediate Indonesian I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 lectures, 1 hour ab Prerequisite: IDN 102 or equivalent

202 Intermediate Indonesian II. (5) S
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing 4 lectures, 1 hour ab. Prerequisite: DN 201 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered

ITALIAN

ITA 101 Elementary Italian. (4) F S
Aural/ora dr n c ass and laboratory and basic grammar supplemented by simple prose readings 4 hours lecture 1 hour lab

102 Elementary Italian. (4) F, S
See TA 101. Prerequisite: TA 101 or equivalent

201 Intermediate Italian. (4) F S
Intensive review of the fundamentals of Italian grammar structure to increase the student's ability in composition translation, and dramatic expression 4 hours lecture 1 hour lab Prerequisite: TA 102 or equivalent. *General studies: G.*

202 Intermediate Italian. (4) F, S
See TA 201 Prerequisite: ITA 201 or equivalent *General studies: G.*

311 Italian Composition and Conversation. (3) F, S
Development of writing ability and oral expressions on Prerequisite: TA 202 or equivalent *General studies: G*

312 Italian Composition and Conversation. (3) F, S
See TA 311 Prerequisite: TA 202 or equivalent *General studies: G*

314 Advanced Italian. (3) N
An advanced grammar and composition course with readings of selected literary works Prerequisite: TA 202 or instructor approval. *General studies: G*

325 Introduction to Italian Literature. (3) F
Italian literature through the interpretation of representative works in drama poetry and novel. Prerequisite: TA 312 or instructor approval. *General studies: HU.*

415 Italian Civilization. (3) N
A general survey of the history, literature art and music emphasizing its cultural contribution to Western civilization Prerequisite: 6 hours of upper division Italian *General studies: L2 HU G.*

430 Italian Literature of the Middle Ages. (3) N
Emphasis on "St. Novo," Dante's minor works Petrarch, and Boccaccio. Prerequisite: ITA 325 or instructor approval. *General studies: HU*

441 Dante: *Divina Commedia*. (3) N
Critical reading of the three *Cantiche* (*Inferno Purgatorio and Paradiso*) Prerequisite: TA 325 *General studies: HU*

443 Italian Literature of the Renaissance. (3) N
Emphasis on Lorenzo de Medici Poliziano Castiglione Machiavelli Ariosto and Tasso Prerequisite: ITA 325 or instructor approval *General studies: HU*

446 Italian Literature of the 18th and 19th Century. (3) N
Goldoni Parini, Alfieri the poetry of Foscolo and Leopardi, and the socio-historical novels of Foscolo Manzoni and Verga Prerequisite: TA 325 or instructor approval *General studies: HU*

449 20th-Century Italian Literature. (3) N
Major works figures and movements of contemporary Italian literature Prerequisite: ITA 325 *General studies: HU G*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

JAPANESE

JPN 101 Elementary Japanese. (5) F
Communication skills basic grammar basic reading and basic writing skills including hiragana, katakana and about 250 kanji 5 class hours a week

102 Elementary Japanese. (5) S
See JPN 101 Prerequisite: JPN 101 or equivalent

107 Japanese for International Professionals I. (10) F
Accelerated program alternative to JPN 101, 102 sequence. Functional approach to needs of international professions. 10 class hours a week

201 Intermediate Japanese. (5) F
Continued development of communication skills Increased emphasis on reading and writing Review of fundamentals of structure to increase student's abilities in composition and translation 5 class hours a week Prerequisite: JPN 102 or equivalent *General studies: G*

202 Intermediate Japanese. (5) S
See JPN 201 Prerequisite: JPN 102 or equivalent *General studies: G*

206 Calligraphy. (1) N
Introduction to the practice of calligraphy in Japan with emphasis on the derivation of Japanese kana syllabaries from Chinese characters Prerequisite: CH 205 or JPN 101

207 Japanese for International Professionals II. (10) S
Continuation of JPN 107 alternative to JPN 201 202 sequence. Expansion of communication proficiency in specific areas of international professions. 10 class hours a week. Prerequisite: JPN 107 or instructor approval *General studies: G*

309 Intermediate Japanese Conversation. (2) F
Practice in current usage in expression of ideas Recommended especially for those who have not had the opportunity to practice Japanese in Japan Prerequisite: JPN 202 *General studies: G*

310 Intermediate Japanese Conversation. (2) S
Continuation of JPN 309. Prerequisite: JPN 309. *General studies: G*

311 Japanese Conversation and Composition. (3) F
Intensive aural/oral practice leading toward conversational fluency Practice in writing Japanese, emphasizing current usage Prerequisite: JPN 202 *General studies: G.*

312 Japanese Conversation and Composition. (3) S
See JPN 311 Prerequisite: JPN 202 *General studies: G*

313 Advanced Japanese. (3) F
Continued development of ability to communicate orally and in writing Exposure to the variety of Japanese written styles. Prerequisite: JPN 202 or equivalent *General studies: G*

314 Advanced Japanese. (3) S
See JPN 313 Prerequisite: JPN 313 or instructor approval *General studies: G*

321 Japanese Literature. (3) N
Readings in representative masterpieces of modern Japanese literature. Authors read change each year in accordance with the needs of the class May be repeated for credit Prerequisite: JPN 313 or instructor approval *General studies: L2 HU G*

414 Introduction to Classical Japanese. (3) S
Readings from various genres of pre-20th century literature, with analysis of the structure of the classical language Prerequisite: JPN 313 or instructor approval *General studies: HU*

435 Advanced Readings. (3) N
Readings in history art religious studies economics or other fields Lecture discussion Prerequisite: JPN 314 or equivalent

485 Problems of Translation. (3) N
Theories and practice of translation: strategies for handling a variety of Japanese texts Lecture discussion. Prerequisite: JPN 314 or equivalent

500 Bibliography and Research Methods. (3) N
Introduction to research materials on Japanese both in Japanese and in Western languages Overview of research methods Lecture, discussion

514 Advanced Premodern Japanese. (3) N
Close readings of selected premodern texts, with focus on grammar and stylistic features Lecture discussion Prerequisite: JPN 414 or equivalent

520 Teaching of Japanese as a Second Language. (3) N
Theory and practice of teaching Japanese, including presentation interaction, and evaluation with consideration given to cultural factors Lecture, discussion

535 Advanced Readings. (3) N
Readings in primary and secondary sources in history art, religious studies literature, or other fields Lecture discussion. Prerequisite: JPN 414 or equivalent

543 Japanese Language and Linguistics. (3) N
Analysis and discussion of linguistic theories applied to Japanese phonology, morphology and syntax including psycholinguistics sociolinguistics and historical aspects Lecture discussion

585 Advanced Problems of Translation. (3) N
Theories and practice of translation; strategies for handling a variety of Japanese texts Lecture discussion Prerequisite: JPN 435 or equivalent

591 Seminar. (3) N
Topics in literary linguistic or cultural studies **Omnibus Courses:** See page 44 for omnibus courses that may be offered.

LATIN

LAT 101 Elementary Latin. (4) F S
For beginning students only

102 Elementary Latin. (4) F S
See LAT 101 Prerequisite: LAT 101 or equivalent

201 Intermediate Latin. (4) F
Selected Latin literature both classical and post-classical Vergil's *Aeneid*, advanced grammar Prerequisite: LAT 102 or instructor approval *General studies: HU*

202 Intermediate Latin. (4) S
See LAT 201 Prerequisite: LAT 102 or instructor approval *General studies: HU*

421 Roman Literature. (3) F
Readings in the Latin masterpieces. Authors read change each year in accordance with needs of the class. May be repeated for credit. Prerequisite: LAT 202 or instructor approval.

422 Roman Literature. (3) S
See LAT 421. Prerequisite: LAT 202 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PORTUGUESE

Completion of POR 101, 201, 313, and 314 satisfies the Liberal Arts and Sciences language requirements.

POR 101 Elementary Portuguese. (5) F
Basic grammar with intensive drills in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisites: 1 year of Spanish or French or Italian or instructor approval.

201 Intermediate Portuguese. (5) S
Continuation of POR 101. Intensive drill of fundamentals in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: POR 101 or instructor approval. *General studies: G.*

313 Portuguese Composition and Conversation. (3) F
Designed to develop skill in written Portuguese and corrected oral expression. Must be taken in sequence. Prerequisite: POR 101 or instructor approval. *General studies: G.*

314 Portuguese Composition and Conversation. (3) S
Continuation of POR 313. Prerequisite: POR 313 or instructor approval. *General studies: G.*

321 Luso-Brazilian Literature. (3) N
Representative masterpieces of Portuguese and Brazilian literature from the beginning to the present. Prerequisite: POR 313 or instructor approval. *General studies: HU.*

472 Luso-Brazilian Civilization. (3) N
Lectures, readings and discussion of important aspects of Luso-Brazilian civilization. Topics from music, art, folklore, literature, history, and politics. Prerequisite: POR 313 or instructor approval. *General studies: HU, G.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

RUSSIAN

RUS 101 Elementary Russian. (4) F, S, SS
Structural grammar and basic vocabulary. Introduction and reinforcement of oral reading and writing skills. 4 hours lecture, 1 hour lab.

102 Elementary Russian. (4) S, SS
See RUS 101. Prerequisite: RUS 101 or equivalent.

201 Intermediate Russian. (4) F, SS
Systematic review of grammar. Development of vocabulary through reading and writing. Drill in oral/aural skills. 4 hours lecture, 1 hour lab. Prerequisite: RUS 102 or equivalent. *General studies: G.*

202 Intermediate Russian. (4) S, SS
See RUS 201. Prerequisite: RUS 201 or equivalent. *General studies: G.*

211 Basic Russian Conversation. (3) F
Intensive oral drills to supplement reading and grammatical skills acquired in RUS 101, 102, 201, and 202. Required of Russian majors. Prerequisite: RUS 102. *General studies: G.*

212 Basic Russian Conversation. (3) S
See RUS 211. Prerequisite: RUS 102. *General studies: G.*

303 Scientific Russian. (3) F
Acquisition of scientific vocabulary through reading from current Soviet scientific publications. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. Prerequisite: RUS 102.

304 Scientific Russian. (3) S
See RUS 303. Prerequisite: RUS 102.

311 Russian Composition and Conversation. (3) F
Development of writing ability and oral expression. Prerequisite: RUS 202. *General studies: G.*

312 Russian Composition and Conversation. (3) S
See RUS 311. Prerequisite: RUS 202. *General studies: G.*

321 Survey of Russian Literature. (3) A
The main literary movements prominent authors, and the most significant works of prose, poetry, and drama to the 1917 revolution. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU, H.*

322 Survey of Russian Literature. (3) A
See RUS 321. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU.*

323 Survey of Soviet Literature. (3) A
The main literary movements prominent authors, and the most significant works of prose, poetry, and drama of the Soviet period from 1917 to present. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU, G.*

411 Advanced Composition and Conversation I. (3) F
Designed to improve oral discussion and self-expression in oral and written skills, emphasizing vocabulary building. Subject materials drawn from current Soviet publications. Prerequisite: RUS 312. *General studies: G.*

412 Advanced Composition and Conversation II. (3) S
See RUS 411. Prerequisite: RUS 312. *General studies: G.*

417 Applied Russian Phonetics I. (2) N
General improvement in the student's language skills through oral training in Russian phonology and analysis of Russian orthography. Prerequisite: RUS 102.

418 Applied Russian Phonetics II. (2) N
See RUS 417. Prerequisite: RUS 102.

420 Russian Poetry. (3) N
Development of Russian poetry from its beginnings to the present, including both native and emigre poets. Topics in criticism and the study of poets. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU.*

421 Pushkin. (3) N
Pushkin's poetry, plays and prose fiction including Eugene Onegin, *The Little Tragedies, Tales of Belkin, Queen of Spades, and The Captain's Daughter*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

423 Dostoyevsky. (3) N
Dostoyevsky's major works of fiction, including *Crime and Punishment* and *Brothers Karamazov*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

424 Tolstoy. (3) N
Tolstoy's major works including *War and Peace* and *Anna Karenina*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

425 Chekhov. (3) N
Chekhov's major works, representative short stories and major plays, including *The Cherry Orchard* and *Three Sisters*. Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

426 Soviet Dissident Literature (1917 Present). (3) N
Including such authors as Khvostov, Pasternak, Solzhenitsyn, Danilov, Novich, Zinov'ev, Belevica, Vencova, and others. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU, G.*

430 Russian Short Story. (3) N
Detailed study of representative works of the Russian short story genre. Authors included are from both Imperial and Soviet Russia. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU.*

440 History of the Russian Language. (3) N
Principles of historical linguistics presented through the evolution of the Russian language from Proto-Indo-European to the present. Readings of historical documents in Old Russian and Old Church Slavonic. Prerequisite: RUS 312 or instructor approval.

441 Survey of Russian Culture. (3) N
Interplay of artistic, social and political forces in the development of Russian culture from the Kievan period to the present. Exclusive use of Russian language source materials. Prerequisite: RUS 312 or instructor approval. *General studies: HU, G, H.*

- 591 Seminar.** (3) N
Topics may be selected from the following:
- (a) Pre-19th Century Russian Literature
 - (b) 19th-Century Russian Literature
 - (c) Russian Poetry to 1890
 - (d) Russian Poetry 1890 to Present
 - (e) Russian Literary Criticism
 - (f) Soviet Socialist Realism
 - (g) Contemporary Soviet Authors

Omnibus Courses: See page 44 for omnibus courses that may be offered.

SPANISH

Students who have completed their secondary education in a school where Spanish was the official language of instruction should begin the studies at the 325 level or above.

SPA 101 Elementary Spanish. (4) F, S, SS
Fundamentals of the language. Emphasis on listening, speaking, reading, and writing. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 111.

102 Elementary Spanish. (4) F, S, SS
See SPA 101. Prerequisite: SPA 101 or equivalent. Not open to students with credit in SPA 111.

107 Spanish for International Professions I. (8) F

Accelerated program alternative to SPA 101-102 sequence. Functional approach to needs of international professions

111 Fundamentals of Spanish. (4) F, S
Prerequisite for students with two years of high school Spanish who need review to enter second year study. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 101 or 102.

201 Intermediate Spanish. (4) F, S, SS
Continuation of fundamentals. Emphasis on the development of the skills of reading, listening, comprehension, speaking, writing, and culture. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111. *General studies: G*

202 Intermediate Spanish. (4) F, S, SS
See SPA 201. Prerequisite: SPA 201 or equivalent. *General studies: G*

203 Intermediate Spanish for Bilinguals. (4) F

Designed to meet the needs of the Spanish speaking student. May be taken in lieu of SPA 201 and 202. Emphasis on composition, literature, conversation, and review of grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111 or placement. *General studies: G*

204 Intermediate Spanish for Bilinguals. (4) S

See SPA 203. Prerequisite: SPA 203 or equivalent. *General studies: G*

207 Spanish for International Professions II. (8) S

Continuation of SPA 107, alternative to SPA 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: SPA 107 or instructor approval. *General studies: G*

311 Spanish Conversation. (3) F, S
Designed primarily for nonmajors to promote vocabulary building and communicative expression in Spanish through discussions based on cultural readings. Prerequisite: SPA 202 or equivalent.

312 Spanish Conversation. (3) F, S
See SPA 311. Prerequisite: SPA 311 or equivalent.

313 Spanish Conversation and Composition. (3) F, S, SS
Designed to develop skill and accuracy in spoken and written Spanish. Required of majors. SPA 313 and 314 must be taken in sequence. Prerequisite: SPA 202 or equivalent. *General studies: G*

314 Spanish Conversation and Composition. (3) F, S, SS
See SPA 313. Prerequisite: SPA 313 or equivalent. *General studies: G*

315 Spanish Conversation and Composition for Bilinguals. (3) F
Emphasis on comparing standard Spanish with regional Southwest Spanish. May be taken in lieu of SPA 313 and 314. Prerequisite: SPA 202 or 204 or instructor approval.

316 Spanish Conversation and Composition for Bilinguals. (3) S
See SPA 315. Prerequisite: SPA 315 or equivalent.

319 Business Correspondence and Communication. (3) N

Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G*

325 Introduction to Hispanic Literature. (3) F, S

A critical approach to and analysis of literary types including poetry, drama, short story, and novel. Required of a major. Prerequisite: SPA 202 or 204. *General studies: HU*

412 Advanced Conversation and Composition. (3) F, S

Oral and written Spanish communication skills with particular attention given to developing fluency and facility. Required of majors. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G*

413 Advanced Spanish Grammar. (3) F

Intensive analysis of the Spanish language. Required of teaching majors. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G*

417 Spanish Phonetics and Phonology. (3) F

Introduction to the theory and practice of Spanish phonetics and phonology. Prerequisite: SPA 314 or 316.

420 Applied Spanish Linguistics. (3) S

Application of linguistic principles to the acquisition, analysis, and teaching of Spanish. Prerequisite: FLA 400 or any other introductory linguistics course. *General studies: SB*

421 Spanish in the Southwest. (3) F

Analysis of Southwest spoken and written Spanish as compared to standard Spanish. Designed for students preparing for bilingual cultural work. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: SB*

424 Masterpieces of Hispanic Literature. (3) N

Selections from the literature of the Hispanic world and discussion of its cultural background. Required of but not limited to teaching majors. Prerequisite: SPA 325.

425 Spanish Literature. (3) F, S
Survey of Spanish literature from its beginning to the century. Prerequisite: SPA 325. *General studies: HU*

426 Spanish Literature. (3) F, S
Survey of Spanish literature from the century to the present. Prerequisite: SPA 325. *General studies: HU*

427 Spanish-American Literature. (3) F, S
Survey of major works, figures, and movements from the century to 1880. Prerequisite: SPA 325

428 Spanish-American Literature. (3) F, S
Survey of major works, figures, and movements from 1880 to the present. Prerequisite: SPA 325

429 Mexican Literature. (3) N
Selected readings from pre-Columbian writers/poets (e.g., Maculxochitl) through the novel of the Revolution to the present. Prerequisite: SPA 325

434 Drama of the Golden Age. (3) S
Dramatic works of Lope de Vega, Calderón de la Barca, and the contemporaries. Prerequisite: SPA 325

435 Cervantes—Don Quixote. (3) F
Don Quixote and the development of the novel. Prerequisite: SPA 325

454 19th-Century Spanish-American Narrative. (3) F

Principal works in the novel, short story, narrative fiction, and narrative (Gothic) poetry. Prerequisite: SPA 325

456 20th-Century Spanish-American Fiction. (3) S

Major works and movements. Prerequisite: SPA 325

464 Mexican American Literature. (3) F
Representative literature in Spanish and English by Mexican Americans, emphasizing social and cultural as well as literary values. Prerequisite: SPA 325. *General studies: HU*

471 Civilization of the Spanish Southwest. (3) S

The political, intellectual, social, economic, and artistic development of the Spanish speaking people of the Southwest. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU*

472 Spanish-American Civilization. (3) F
Growth of the institutions and cultures of Spanish-American people. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU, G, H*

473 Spanish Civilization. (3) S

Political, intellectual, social, economic, and artistic development of the Spanish nation from its origins to the present. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU, SB, G*

485 Mexican American Short Story. (3) N

Critical study of contemporary short stories by Mexican American authors with emphasis on their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

486 Mexican American Novel. (3) N

Social and literary contexts of representative novelists emphasizing the Spanish language writings. Prerequisite: SPA 325 or instructor approval.

487 Mexican American Drama. (3) N

Representative dramatic works with emphasis on the history and development of this genre from its origins to the present. Prerequisite: SPA 325 or instructor approval.

500 Bibliography and Research Methods. (3) F

Required of all graduate students

536 Generation of 1698. (3) N

Works of Unamuno, Baroja, Azorín, and their contemporaries, studied against the ideological background of the turn of century in Spain. Prerequisite: SPA 325

540 History of the Spanish Language. (3) S
Linguistic development of the Spanish language from the epoch of Vulgar Latin to the present day.

541 Spanish Language in America. (3) F
The major dialects of Spanish in the Americas and the historical, social, and cultural development. Prerequisite: SPA 540 or instructor approval.

542 Studies in the Spanish of the Southwest. (3) S

Examination of bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 or equivalent.

543 Structure of Spanish. (3) S
Analysis and discussion, within the framework of contemporary linguistic theories of selected problems in Spanish morphology, syntax, and semantics. Prerequisite: FLA 400 or equivalent.

545 Concepts of Literary Criticism. (3) S
Aims and methods of modern literary scholarship. Discussion of major theories of literary analysis.

555 Spanish-American Modernism. (3) N
Principal works and figures of literary Modernism, 1880–1920, with emphasis on international literary context of the movement. Prerequisite: SPA 325

557 Contemporary Spanish-American Poetry. (3) N

Major works and problems in contemporary poetry and poetics with emphasis on Paz, Parra, Cardena and new poetry since 1960. Prerequisite: SPA 325

560 Medieval Spanish Literature. (3) N
Major figures and works of the Middle Ages in Spain

561 Golden Age Spanish Prose Fiction. (3) N

Major figures and works of the 16th and 17th centuries with emphasis on the picaresque novel

562 Golden Age Spanish Poetry. (3) N
Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

563 Spanish Romanticism. (3) N
Principal figures and works of the Spanish Romanticism with emphasis on international literary context of the movement

564 19th-Century Spanish Prose Fiction. (3) N

Principal figures and works of Realism in the 19th-century novel, with emphasis on Galdós

565 20th-Century Spanish Drama. (3) N
Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

566 Generation of 1927. (3) N
Major poets of the Generation of 1927, with emphasis on works of Lorca, Guíen, Salinas and A e xandre

567 Contemporary Spanish Novel. (3) N
Major works of post-Civil War Spanish fiction.

570 Indigenous Literatures of Spanish America. (3) N

The indigenous literary traditions, with emphasis on Nahuatl, Mayan and Quechua literatures through readings in Spanish translations

571 Colonial Spanish-American Literature. (3) N

The major figures and works from Conquest to independence

572 Spanish-American Drama. (3) N
Major contributions of Spanish American drama with emphasis on contemporary dramatists

573 Spanish-American Essay. (3) N
Major works of the essay within the framework of intellectual history and literary movements.

574 Spanish-American Vanguard Poetry. (3) N
Examination of poetic developments, 1920–1940, with emphasis on Hu do bro Va le jo Neruda and the international context of the works.

575 Contemporary Spanish American Novel. (3) N

Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

576 Contemporary Spanish-American Short Story. (3) N

Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative

577 Regional Spanish-American Literature. (3) N

The figures and works of major nations (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated for different topics

578 Novel of the Mexican Revolution. (3) N
Representative works and authors of this genre (Guzmán, Azuela, Urquiza, Munoz and Romero) including related or peripheral offshoots in indigenous novels

581 Latin American Popular Culture. (3) N
Studies in selected topics of Latin American popular culture, with emphasis on appropriate academic models for the critical analysis of these materials

582 Studies in Latin American Film. (3) N
Examination of the role of film in contemporary Latin American culture. Films viewed and analyzed as casebook examples. Seminar

591 Seminar. (3) N
Spanish and Spanish-American literary, cultural and linguistic topics

691 Figures and Works Seminar. (3) N
Topics may be selected from Spanish and Spanish American literatures

Omnibus Courses: See page 44 for omnibus courses that may be offered

THAI

THA 101 Elementary Thai I. (5) F
Basic communication reading and writing skills. Intensive oral/aural classroom drill supplemented by prose readings in Thai script. 4 hours lecture, 1 hour lab.

102 Elementary Thai II. (5) S
Basic communication reading and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: THA 101 or equivalent

201 Intermediate Thai I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 102 or equivalent

202 Intermediate Thai II. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 201 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered. Check with the program office for a current listing

Mathematics

Christian Ringhofer

Chair

(PS A216) 602/965–3951

PROFESSORS

ARMBRUSTER, BREMNER, BUSTOZ, FELDSTEIN, GOLDSTEIN, GRACE, HELTON, IHR, G, JACKIEWICZ, JACOBOW TZ, KADELL, KIERSTEAD, KUIPER, LEONARD, McDONALD, MITTELMANN, N COLAENKO, RINGHOFER, H.A. SMITH, H.L. SMITH, THIEME, TROTTER, A. WANG, C. WANG, WEISS, YOUNG

ASSOCIATE PROFESSORS

DR SCOLL, FARMER, HASSETT, KAWSK, KOSTELICH, KUANG, KURTZ, MOORE, QUIGG, RENAULT, STEWART SWIMMER, TANG TAYLOR

ASSISTANT PROFESSORS

BAER BARCELO, BLOUNT, CHLDRESS, EDEN, FAN, HURLBERT, JONES, LOHR MAHALOV, McCARTER, PETRIE, PREWITT, SPIELBERG, WELFERT

PROFESSORS EMERITI

BEDIENT, FREUND, KELLY, LAKE, LISKOVEC, NERING, NIEMER, SANSONE, SAVAGE, SHERMAN, SINKOV, L. SMITH

MATHEMATICS—B.A.

Mathematics. The program consists of a minimum of 36 semester hours in mathematics and additional course work in closely related fields, as approved by the advisor, for a total of at least 51 semester hours. The required courses must include CSE 100 or 183, MAT 270, 271, 272, 274, 300, 342, 370 (or 371), four 400 level MAT or STP courses approved by the advisor. The department recommends a one-year sequence in some closely related field. Students who plan to attend graduate school in mathematics should choose the Bachelor of Science degree.

MATHEMATICS—B.S.

The program consists of a minimum of 42 semester hours in mathematics plus additional course work in closely related fields, as approved by the advisor, for a total of at least 55 semester hours. The required hours must include

CSE 100 or 183; MAT 270, 271, 272, 342. To satisfy the remaining required hours the student selects either the applied mathematics, computational mathematics, general mathematics, or statistics and probability option.

General Mathematics Option. For this option, the student must take MAT 274, 300, 371, 372, 410 (or 415 or 443 or 445), 461 (or 462 or 475), 464; STP 421; three more hours in a MAT course to be approved by the advisor. The department recommends a one year sequence in some closely related field.

Pure Mathematics Option. For this option, the student must take CSE 100; MAT 274, 300, 372, 442, 444, 472; two courses from MAT 410, 415, 445, or 461 or STP 421; and two more MAT or STP courses at the 400 level.

Applied Mathematics Option. For this option, the student must take MAT 274, 371, 372, 419, 451, 461, 462, and 464. PHY 121 and 131 also are required and the corresponding laboratory courses (PHY 122 and 132) are strongly recommended. Students should choose additional courses from CSE 101; IEE 476; MAT 415, 416, 419, 443, 463, 465, 472, 475; STP 421, 425, 427.

Computational Mathematics Option. For this option, the student must take CSE 100, 101 (or 200), 225, 226 (or 310); MAT 243 (or 300), 274, 371, 464, 465, 467; STP 326 (or 420 or 421). The remaining hours are to include three upper division courses, at least two of which must be mathematics, including one at the 400 level, and all of which must be approved by the advisor.

Statistics and Probability Option. For this option, the student must take MAT 300, 371 (or 472), 372; STP 420, 421, 427 (or 425). The remaining courses in mathematics and statistics, as approved by the advisor, may be selected from IEE 476; MAT 415, 419, 442, 464, 465, 466; STP 425, 427, 429. A coherent set of courses in a related field is also required.

MINOR IN MATHEMATICS

The minor in Mathematics consists of a minimum of 24 semester hours. Required courses are MAT 270, 271, 272, and 342. Electives are chosen in consultation with a mathematics advisor

and must include three upper division courses in mathematics and statistics. In addition, CSE 100 and 101 are recommended. An approved Minor Verification Form must be submitted to the Graduation Office of the College of Liberal Arts and Sciences.

SECONDARY EDUCATION— B.A.E.

Mathematics. Students pursuing the major teaching field may choose from two options

Option One. With this option, the academic specialization consists of at least 36 semester hours in mathematics. Required courses are CSE 100 or 181; MAT 270, 271, 272, 300 (or 243), 310, 342, 371, 443 (or 445); MTE 483; STP 420. MTE 482 is required as part of the 31 hour professional education requirement but cannot be counted as part of the 36 hour major requirement.

Option Two. This option may be exercised only in combination with option two in chemistry (page 101) or physics (page 142). The mathematics portion of this 60 hour program consists of 30 semester hours in mathematics. Required courses are MAT 270, 271, 272, 300, 310, 342, 274 (or 371 or 460), and 443. A computer science course (CSE 100 or 183) is recommended.

Mathematics. The minor teaching field consists of at least 24 semester hours. Required courses are as follows: MAT 270, 271, 272, 300, 310, 342, 274 (or 371 or 460).

GRADUATE PROGRAMS

The Department of Mathematics offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

MATHEMATICS

MAT 106 Intermediate Algebra. (3) F, S, SS
Topics from basic algebra such as linear equations, polynomials, factoring, exponents, roots, and radicals. Prerequisite: 1 year of high school algebra

114 College Mathematics. (3) F, S, SS
Applications of basic college-level mathematics to real-life problems. Appropriate for students whose major does not require MAT 117 or 170. Prerequisite: MAT 106 or 2 years of high school algebra. *General studies: N1*

117 College Algebra. (3) F, S, SS
Linear and quadratic functions, systems of linear equations, logarithmic and exponential functions, sequences, series, and combinatorics. Prerequisite: MAT 106 or 2 years of high school algebra. *General studies: N1*

119 Finite Mathematics. (3) F, S, SS
Topics from linear algebra, linear programming, combinatorics, probability, and mathematics of finance. Prerequisite: MAT 117 or equivalent. *General studies: N1*

170 Precalculus. (3) F, S, SS
Intensive preparation for calculus (MAT 260, 270, and 290). Topics include functions (including trigonometric), matrices, polar coordinates, vectors, complex numbers, and mathematical induction. Prerequisite: a grade of "B" in MAT 106 or "C" in MAT 117 or two years of high school algebra. *General studies: N1*

210 Brief Calculus. (3) F, S, SS
Differential and integral calculus of elementary functions with applications. Not open to students with credit in MAT 260, 270, or 290. Prerequisite: MAT 117 or equivalent. *General studies: N1*

242 Elementary Linear Algebra. (2) F, S, SS
Introduction to matrices, systems of linear equations, determinants, vector spaces, linear transformations, and eigenvalues. Emphasizes development of computational skills. Prerequisite: 1 semester of calculus or instructor approval. *General studies: N1*

243 Discrete Mathematical Structures. (3) F, S, SS
Introduction to lattices, graphs, Boolean algebra, and groups with emphasis on topics relevant to computer science. Prerequisite: 1 semester of calculus.

260 Technical Calculus I. (3) F, S, SS
Analytic geometry, differential, and integral calculus of elementary functions, emphasizing physical interpretation and problem solving. Not open to students with credit in MAT 210, 270, or 290. Prerequisite: MAT 170 or equivalent. *General studies: N1*

261 Technical Calculus II. (3) F, S, SS
Continuation of MAT 260. Prerequisite: MAT 260 or instructor approval.

262 Technical Calculus III. (3) F, S
Infinite series, an introduction to differential equations and elementary linear algebra. Prerequisite: MAT 261 or equivalent.

270 Calculus with Analytic Geometry I. (4) F, S, SS

Real numbers, limits and continuity, and differential and integral calculus of functions of one variable. Not open to students with credit in MAT 290. The sequence MAT 270, 271 may be substituted for MAT 290 to satisfy requirements of any curriculum. Prerequisites: MAT 170 or equivalent. *General studies: N1*

271 Calculus with Analytic Geometry II. (4) F, S, SS

Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, sequences, and series. Not open to students with credit in MAT 291. The sequence MAT 270 and 271 and 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite: MAT 270 or equivalent.

272 Calculus with Analytic Geometry III. (4) F, S, SS

Vector-valued functions of several variables, multiple integration, and introduction to vector analysis. The sequence MAT 270 and 271 and 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite: MAT 271 or equivalent.

274 Elementary Differential Equations. (3) F, S, SS

Introduction to ordinary differential equations, adapted to the needs of students in engineering and the sciences. MAT 272 or equivalent is recommended. Prerequisite: MAT 271 or equivalent.

290 Calculus I. (5) F, S

Differential and integral calculus of elementary functions; topics from analytic geometry essential to the study of calculus. Prerequisite: MAT 170 or equivalent. *General studies: N1.*

291 Calculus II. (5) F, S

Further applications of calculus, partial differentiation, multiple integrals, and infinite series. Prerequisite: MAT 290 or equivalent.

300 Mathematical Structures. (3) F, S

Introduction to rigor and proof in mathematics. Basic logic, set theory, mathematical induction, combinatorics, functions, relations, and probability. Prerequisite: 1 semester of calculus or instructor approval. *General studies: L2.*

310 Introduction to Geometry. (3) S

Congruence, area, parallelism, similarity and volume, and Euclidean and non-Euclidean geometry. Prerequisite: MAT 272 or equivalent.

342 Linear Algebra. (3) F, S, SS

Linear equations, matrices, determinants, vector spaces, bases, linear transformations and similarity, inner product spaces, eigenvectors, orthonormal bases, diagonalization, and principal axes. Pre- or corequisite: MAT 272 or equivalent.

362 Advanced Mathematics for Engineers and Scientists I. (3) F, S, SS

Vector analysis, Fourier analysis, and partial differential equations. Prerequisites: MAT 272 and 274 or equivalent.

370 Intermediate Calculus. (3) F, S

Theory behind basic one-variable calculus: continuity, derivative, Riemann integral, sequences, and series. Not open to students with credit in MAT 371. Prerequisites: MAT 272 and MAT 300.

371 Advanced Calculus I. (3) F, S

Continuity, Taylor's theorem, partial differentiation, implicit function theorem, vectors, linear transformations and norms in \mathbb{R}^n , multiple integrals, and power series. MAT 300 is recommended. Prerequisite: MAT 272 or equivalent. Pre- or corequisite: MAT 342.

372 Advanced Calculus II. (3) F, S

Maps from \mathbb{R}^n to \mathbb{R}^m , line and surface integrals, divergence and Stokes' theorems, \mathbb{R}^m -topology, series, uniform convergence, and improper integrals. Not open to students with credit in MAT 460. Prerequisite: MAT 371.

400 Computability and Unsolvability. (3) N

Turing machines and computability, computable and partial computable functions, recursive sets and predicates, recursively enumerable sets, and unsolvable decision problems and applications. Prerequisite: MAT 243.

401 Theory of Formal Languages. (3) A

Theory of grammar, methods of syntactic analysis and specification, types of artificial languages, relationship between formal languages, and automata. Cross-listed as CSE 457. Prerequisite: CSE 355.

410 Introduction to General Topology. (3) A

Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.

415 Combinatorial Mathematics I. (3) F

Permutations and combinations, recurrence relations, generating functions, graph theory, and combinatorial proof techniques. Prerequisites: MAT 300 and 342 or instructor approval.

416 Combinatorial Mathematics II. (3) S

Continuation of MAT 415 considering some advanced aspects of the theory as well as applications. Topics chosen from transport networks, matching theory, block designs, coding theory, Pólya's counting theory, and applications to the physical and life sciences. MAT 443 is recommended. Prerequisite: MAT 415 or instructor approval.

419 Linear Programming. (3) S

Linear programming and the simplex algorithm, network problems, quadratic, and non-linear programming. Prerequisites: MAT 242 or 342; 1 semester of college calculus. *General studies: N2.*

431 Foundations of Mathematics. (3) N

Topics from mathematical logic and set theory. May be repeated for credit with instructor approval. Prerequisites: MAT 300 and 342 or instructor approval.

442 Advanced Linear Algebra. (3) F

Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: MAT 300 and 342 or instructor approval.

443 Introduction to Abstract Algebra. (3) S

Introduction to concepts of abstract algebra. Not open to students with credit in MAT 444. Prerequisites: MAT 300 and 342 or instructor approval.

444 Intermediate Abstract Algebra. (3) S

Basic theory of groups, rings, and fields, including an introduction to Galois theory. Appropriate as preparation for MAT 543. Prerequisites: MAT 300 and 342.

445 Theory of Numbers. (3) F

Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive

roots, and quadratic reciprocity theorem. Prerequisites: MAT 300 and 342 or instructor approval.

451 Mathematical Modeling. (3) S

A detailed study of one or more mathematical models which occur in the physical or biological sciences. May be repeated for credit with instructor approval. Prerequisites: MAT 242 (or 342) and 274 or instructor approval. *General studies: N2.*

460 Applied Real Analysis. (3) S

Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit in MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

461 Applied Complex Analysis. (3) F, SS

Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 or equivalent.

462 Partial Differential Equations. (3) F, S, SS

Second order partial differential equations, emphasizing Laplace, wave, and diffusion equations. Solutions by the methods of characteristics, separation of variables, and integral transforms. Prerequisites: MAT 242 (or 342), 274.

463 Transform Theory and Operational Methods. (3) N

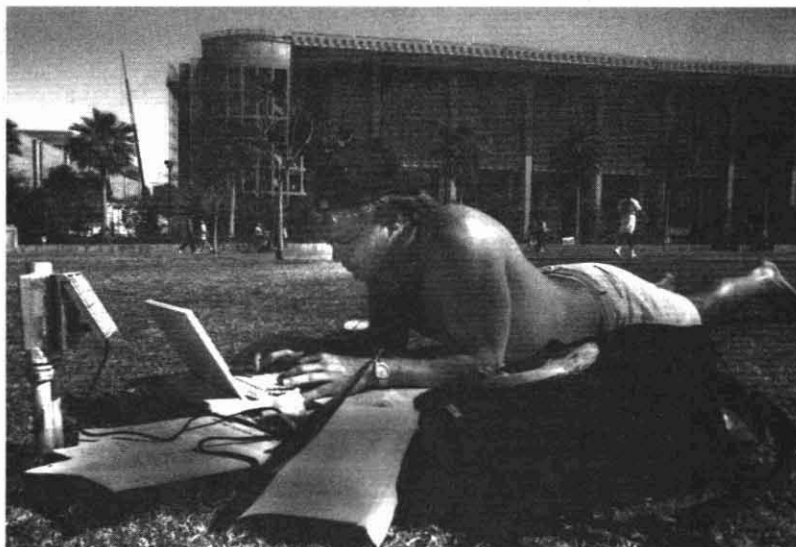
Fourier, Laplace, and other transforms; applications to boundary value problems; generalized functions and modern operational mathematics. Prerequisite: instructor approval.

464 Numerical Analysis I. (3) F

Theory and methods for numerical solution of algebraic and transcendental equations; iteration methods; approximation; quadrature; solution of differential equations. Those seeking a methods survey course should take MAT 466. Prerequisites: MAT 342 and 371 and fluency in computer programming (preferably FORTRAN) or instructor approval. *General studies: N3.*

465 Numerical Analysis II. (3) S

Continuation of MAT 464. Prerequisite: MAT 464. *General studies: N3.*



- 466 Applied Computational Methods.** (3) F
Numerical methods for quadrature, different a
equal roots of non-linear equations, inter-
polation, approximation, near equal roots,
Fourier series, MAT 271 (or equivalent) and
pendent cases, Hopf bifurcation, Prequ
s MAT 371 and 464 (or 466) or instructor
approval
- 467 Computer Arithmetic.** (3) S
Number systems, hardware software arith-
metic overflow, significance rounding mu-
ltiplication and automatic error control,
impact on languages, architecture, robust
program and software development
Prequ s CSE 101 or 200 or 383 or MAT
464 or 466 or instructor approval *General
Studies NS*
- 472 Intermediate Real Analysis.** (3) F
Introduction to analysis in metric spaces with
emphasis on the real line. Appropriate as
preparation for MAT 570. Prequ s MAT
300 342
- 475 Differential Equations.** (3) S
Asymptotic behavior of solutions of linear and
non-linear ordinary differential equations, sta-
bility, Sturm-Liouville problems, boundary
value problems, and singular point behavior of
autonomous systems. Prequisite: MAT 242
(or 342), 274.
- 485 History of Mathematics.** (3) N
Topics from the history of the origin and deve-
lopment of mathematical ideas. Prequ s te
MAT 272 or equivalent
- 510 Point Set Topology.** (3) F
Topological spaces, metric spaces, compact-
ness, connectedness, local properties, prod-
uct and decomposition spaces, mappings
covering properties, and separation proper-
ties. Prequ s MAT 371 or 410 or instruc-
tor approval
- 511 Point Set Topology.** (3) S
Continuation of MAT 510. Prequ s te, MAT
510 or instructor approval
- 520 Numerical Linear Algebra.** (3) A
Direct solution of linear systems, iterative
methods, eigenvalues and eigenvectors, sin-
gular value decomposition, the QR algorithm,
error propagation in arithmetic and stability.
Prequ s MAT 342 and 464 (or 466) or
instructor approval
- 521 Iterative Methods.** (3) N
Numerical methods for solving non-linear
systems of equations (symmetric, non-sym-
metric) iterative methods for linear systems,
conjugate gradient multigrid methods, pre-
conditioning, Krylov methods. Prequ s te:
MAT 371 and MAT 464 (or 466) or instructor
approval
- 523 Numerical Optimization.** (3) N
Linear programming, unconstrained non-linear
minimization, search algorithms, conju-
gate gradient, quasi-Newton methods, con-
strained non-linear optimization on gradient pro-
jection, and penalty methods. Prequisite:
MAT 342 or 371 or 460 or 520 or equivalent or
instructor approval
- 524 Parallel Numerical Algorithms.** (3) N
Algorithms for massively parallel, hypercube
networks for matrix multiplication, solution of
architectures, "parallel" FORTRAN, solution of
linear non-linear systems, partial differential
equations, iterative methods, multigrid do-
main decomposition. Prequ s te MAT 371
and 464 (or 466) or instructor approval
- 543 Abstract Algebra.** (3) F
Groups, modules, rings and fields. Galois
theory, homomorphisms, algebra, and the repre-
sentation theory. Prequisite: MAT 443 or in-
structor approval
- 544 Abstract Algebra.** (3) S
Continuation of MAT 543. Prequ s te MAT
543 or instructor approval
- 546 Applied Computational Methods.** (3) F
Numerical methods for quadrature, different a,
non-linear parameter-dependent differential
equations, numerical solution of differential
equations, and numerical linear algebra. May
be repeated for credit with instructor ap-
proval. Prequ s MAT 464 or instructor approval.
- 548 Advanced Numerical Analysis.** (3) N
Finite difference equations, orthogonal poly-
nomials, quadrature, approximation and integra-
tion theory, numerical solution of differential
equations, and numerical linear algebra. May
be repeated for credit with instructor ap-
proval. Prequ s MAT 464 or instructor approval.
- 549 Advanced Numerical Analysis.** (3) N
Continuation of MAT 528. Prequ s te MAT
528 or instructor approval
- 530 Numerical Solution of Ordinary Differ-
ential Equations.** (3) N
One step, near multi-step methods: cons-
tency, order, stability, convergence; discret-
ization, round-off errors, error estimation
adaptive strategies, implementation software
for nonlinear equations. Prequ s te, MAT 371
and 464 (or 466) or instructor approval
- 531 Numerical Solution of Stiff Differential
Systems.** (3) N
Runge-Kutta methods, order conditions, con-
struction of high stability methods, order stars,
error estimation, stepsize selection, con-
tractivity properties, near multi-step methods
Prequ s te, MAT 371 and 464 (or 466) or
instructor approval
- 533 Computational Elliptic and Parabolic
Partial Differential Equations.** (3) N
Parabolic and elliptic equations, finite differ-
ence, finite element methods, stability, consis-
tency, convergence, practical aspects, appli-
cations software. Prequ s te, MAT 371 and
464 (or 466) or instructor approval
- 534 Computational Hyperbolic Partial Dif-
ferential Equations.** (3) N
Numerical solutions of hyperbolic PDEs, finite
difference methods, wave-posedness, stability,
consistency, convergence, adaptive grids,
Maxwell's equations, elastostatic wave propaga-
tion, Navier-Stokes. Prequ s te, MAT 371
and 464 (or 466) or instructor approval.
- 535 Spectral Methods for Partial Differen-
tial Equations.** (3) N
Spectral pseudo-spectral theory, Galerkin
collocation methods, Tau methods, global ap-
proximation on properties, stability, convergence
solutions for linear, non-linear systems. Pre-
qu s te, MAT 371 and 464 (or 466) or in-
structor approval
- 536 Numerical Solution of Boundary Value
Problems.** (3) N
Difference methods, finite element methods
defect correction, irregular meshes, non-linear
problems, bifurcation boundary layers, and
sparse systems. May be repeated for credit
with instructor approval. Prequ s te, MAT
371 (or 460 or 462) and 464 (or 466) or in-
structor approval
- 543 Abstract Algebra.** (3) F
Groups, modules, rings and fields. Galois
theory, homomorphisms, algebra, and the repre-
sentation theory. Prequisite: MAT 443 or in-
structor approval
- 544 Abstract Algebra.** (3) S
Continuation of MAT 543. Prequ s te MAT
543 or instructor approval
- 546 Applied Computational Methods.** (3) F
Numerical methods for quadrature, different a,
non-linear parameter-dependent differential
equations, numerical solution of differential
equations, and numerical linear algebra. May
be repeated for credit with instructor ap-
proval. Prequ s MAT 464 or instructor approval.
- 548 Advanced Numerical Analysis.** (3) N
Finite difference equations, orthogonal poly-
nomials, quadrature, approximation and integra-
tion theory, numerical solution of differential
equations, and numerical linear algebra. May
be repeated for credit with instructor ap-
proval. Prequ s MAT 464 or instructor approval.
- 549 Advanced Numerical Analysis.** (3) N
Continuation of MAT 528. Prequ s te MAT
528 or instructor approval
- 550 Variational Methods.** (3) F
Calculus of variations and its applications to
extremal problems, classical mechanics and
part of differential equations. Prequisites:
MAT 274 and 462 or equivalent
- 551 Linear Operators and Integral Equa-
tions.** (3) S
Bounded linear and compact operators on Hil-
bert spaces, linear integral equations, Fred-
holm and Hilbert-Schmidt theory, and approx-
imate methods. Distributions. Prequisites:
MAT 242 and 462 or equivalent
- 559 Topics in Analysis.** (3) N
May be repeated for credit with instructor ap-
proval. Prequ s te, instructor approval
- 570 Real Analysis.** (3) S
Lebesgue integration, selected function
spaces, differential functional analysis
theory and elements of functional analysis
Prequ s te, MAT 372 or instructor approval
- 571 Real Analysis.** (3) F
Continuation of MAT 570. Prequ s te, MAT
570 or instructor approval
- 572 Complex Analysis.** (3) S
Continuation of MAT 572. Prequ s te, MAT
572 or instructor approval
- 574 Theory of Ordinary Differential Equa-
tions.** (3) N
Systems, existence proofs, singularities, as-
ymptotic behavior of solutions, boundedness
of solutions, eigenvalues and eigenvectors,
perturbation theory. Prequ s te, MAT
372 or instructor approval
- 575 Theory of Ordinary Differential Equa-
tions.** (3) N
Continuation of MAT 574. Prequ s te, MAT
574 or instructor approval
- 576 Theory of Partial Differential Equa-
tions.** (3) N
Existence and uniqueness theorems, bound-
ary value and initial value problems, charac-
teristics, Green's functions, maximum prin-
ciple, distributions, and weak solutions. Pre-
qu s te, knowledge of Lebesgue integration
or instructor approval
- 577 Theory of Partial Differential Equa-
tions.** (3) N
Continuation of MAT 576. Prequ s te, MAT
576 or instructor approval
- 578 Functional Analysis.** (3) N
Locally convex, normed and Hilbert spaces
Linear operators, spectral theory, and applica-
tions to classical analysis. Prequ s te, MAT
472 or 571 or instructor approval
- 579 Functional Analysis.** (3) N
Continuation of MAT 578. Prequ s te, MAT
578 or instructor approval
- 591 Seminar.** (1-3) N
Topics may be selected from the following
(a) Analysis
(b) Applied Mathematics
(c) Topology
(d) Algebra
(e) Mathematical Logic
(f) Numerical Analysis
(g) Combinatorics
- Omnibus Courses:** See page 44 for omnibus
courses that may be offered

MATHEMATICS EDUCATION

MTE 180 Theory of Elementary Mathematics. (3) F, S, SS
Number systems, intuitive geometry elementary algebra and measurement. Intended for prospective elementary school teachers. Prerequisite: MAT 117 or equivalent.

181 Theory of Elementary Mathematics. (3) A
Continuation of MTE 180. Prerequisite: MTE 180 or instructor approval.

380 Arithmetic in the Elementary School. (3) A
Historical numeration systems, overview of elementary number theory, number properties, factorization, divisibility, bases, modular systems, linear congruence, and continued fractions. Prerequisite: MTE 181 or instructor approval.

381 Geometry in the Elementary School. (3) N
Informal geometry, number concepts of length, area, volume, similarity and congruence. Classification of figures, straightedge and compass constructions, and motion geometry. Prerequisite: MTE 380 or instructor approval.

480 Mathematics in the Upper-Elementary Grades I. (3) N
An introduction to probability and statistics, including open-ended data gathering and processing, counting techniques, sampling strategies, estimation, and decision making. Prerequisite: MTE 381 or instructor approval.

481 Mathematics in the Upper-Elementary Grades II. (3) N
Elementary functions and their applications. A thorough investigation of some of the algorithms of basic arithmetic. Prerequisite: MTE 480 or instructor approval.

482 Methods of Teaching Mathematics in Secondary School. (3) F, SS
Examination of secondary school curricular material and analysis of instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Prerequisite: instructor approval.

483 Mathematics in the Secondary School. (3) S, SS
Topics in geometry, number theory, algebra, and analysis. Emphasis on unifying principles. Prerequisite: MAT 310 or instructor approval.

582 Modern Mathematics for Teachers. (3) A
Theory of sets, real number system, transfinite numbers, and other selected topics. Prerequisite: instructor approval.

583 Abstract Algebra for Teachers. (3) A
Postulational approach to algebra and elementary mathematical systems, including groups and fields. Prerequisite: instructor approval.

585 Modern Geometry for Teachers. (3) A
Euclidean, projective, and non-Euclidean geometries. Prerequisite: instructor approval.

587 Analysis for Teachers. (3) N
Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

588 Analysis for Teachers. (3) N
Continuation of MTE 587. Prerequisite: MTE 587 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

STATISTICS AND PROBABILITY

STP 226 Elements of Statistics. (3) F, S, SS
Basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling, and correlation. Not open to majors in mathematics or the physical sciences. Prerequisite: MAT 114 or 117 or equivalent. *General studies: N2*

326 Intermediate Probability. (3) F, S
Probability models and computations, joint and conditional distributions, moments, and families of distributions. Topics in stochastic processes, simulation, and statistics. Prerequisite: MAT 210 or equivalent. *General studies: N2*

420 Introductory Applied Statistics. (3) F, S, SS
Introductory probability, descriptive statistics, sampling distributions, parameter estimation, tests of hypotheses, chi-square tests, regression analysis, analysis of variance, and nonparametric tests. Prerequisite: MAT 117 or equivalent. *General studies: N2*

421 Probability. (3) F
Laws of probability, combinatorial analysis, random variables, probability distributions, expectations, moment-generating functions, transformations of random variables, and central limit theorem. Prerequisites: MAT 300 and STP 420 or equivalents.

425 Stochastic Processes. (3) S
Markov chains, stationary distributions, pure jump processes, second-order processes, and other topics in stochastic processes. Prerequisites: MAT 342, STP 421.

427 Mathematical Statistics. (3) S
Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisite: STP 421.

429 Experimental Statistics. (3) S
Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 or equivalent. *General studies: N3*.

525 Advanced Probability. (3) N
Measure-theoretic foundations of probability, distribution functions and characteristic functions, laws of large numbers and central limit theorems, conditional probabilities, martingales, and topics in stochastic processes. Prerequisites: MAT 571 and STP 421 or instructor approval.

526 Theory of Statistical Linear Models. (3) F
Multinomial distribution, distribution of quadratic forms, full and nonfull rank models, generalized inverses, unbalanced data, variance components, and the large sample theory. Prerequisites: STP 427, knowledge of matrix algebra.

527 Theory of Statistical Linear Models. (3) S
Continuation of STP 526. Prerequisite: STP 526 or instructor approval.

530 Applied Regression Analysis. (3) F
Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 or equivalent.

531 Applied Analysis of Variance. (3) S
Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance and multiple comparisons. Prerequisite: STP 420 or equivalent.

532 Applied Nonparametric Statistics. (3) F
One sample test, tests of two or more related or independent samples, measures of correlation, and tests of trend and dependence. Prerequisite: STP 420 or equivalent.

533 Applied Multivariate Analysis. (3) S
Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 or equivalent.

534 Applied Discrete Data Analysis. (3) N
Models for discrete and count data, measures of association and log-linear and regression models for contingency tables. Prerequisite: STP 420 or equivalent.

591 Seminar. (1-3) N
Topics may be selected from the following:
a) Statistics
b) Probability

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Microbiology

Edward A. Birge
Chair
(LSE 210) 602/965-1457

PROFESSORS

BURKE, MOSSMAN, SCHMIDT

ASSOCIATE PROFESSORS

BIRGE, HOFFMAN, JACOBS

ASSISTANT PROFESSORS

MISRA, STOUT

CLINICAL FACULTY

DOWNS, LEFEVRE, MASS, ROBERTS

PROFESSORS EMERITI

JOHNSON, LEATHERS,
NORTHEY, REEVES

MICROBIOLOGY—B.S.

This program consists of a minimum of 41 semester hours in microbiology and approved related fields. Students majoring in Microbiology are required to take the following courses: BIO 181, 182, 340; CHM 231 and 235 and 361 and 367 or CHM 331 and 332 and 335 and 336; MIC 206, 220, 302, 360, 401, 470; a minimum of eight semester hours of upper division electives in microbiology or approved related fields. The eight hours must include one laboratory course. In addition, students are required to fulfill the university

numeracy requirements with MAT 210 (or 270 or 290) as their N1 course and BIO 420 (or any CSE course that meets the N3 requirement). The required supplemental courses are as follows: CHM 113, 115; PHY 111, 112, 113, 114.

CLINICAL LABORATORY SCIENCES—B.S.

The goal of the clinical laboratory sciences program is to prepare individuals to practice in the field of clinical laboratory sciences, which includes the major disciplines of clinical chemistry, hematology, immunohematology, and microbiology. Employment opportunities exist in hospital, private, physician, and research laboratories and in government, sales, management, and education. After obtaining a B.S. degree in Clinical Laboratory Sciences, the graduate is eligible for national certification by examination.

A student majoring in Clinical Laboratory Sciences is required to take 40 hours of clinical laboratory sciences courses. Also required are the following: CHM 113, 231, 361; MIC 205 (or 220), 206; ZOL 360. Equivalent courses may be substituted upon approval of advisor. Students must consult with the clinical laboratory sciences advisor to select general electives courses. Completion of the degree is dependent upon acceptance of the student into the accredited professional study program, which consists of 40 hours of clinical laboratory sciences courses. The university does not guarantee all students to be accepted into the professional study program due to space limitations at the clinical affiliates and restrictions of program accreditation. To obtain further information regarding acceptance procedures and program standards, contact the department for a program brochure. For proper course planning, students must meet with a clinical laboratory sciences advisor.

MINOR IN MICROBIOLOGY

The minor in Microbiology consists of a minimum of 24 semester hours. Required courses are as follows: BIO 181, 182, 340; MIC 206, 220, 302, 360. The remaining upper division microbiology hours are chosen in consultation with an advisor.

GRADUATE PROGRAMS

The Department of Microbiology offers programs leading to the degrees of Master of Natural Science, Master of Science, and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

The department participates in the new interdisciplinary program for the Master of Science and Doctor of Philosophy degrees in Molecular and Cellular Biology. See page 140 for courses. For more information, contact Dr. Allan L. Bieber, PS D121, 602/965 3595.

MICROBIOLOGY

MIC 205 Microbiology. (3) F, S, SS
Basic course for persons without credit in BIO 181, emphasizing general principles; role of microorganisms in health, ecology and applied fields. Prerequisites: BIO 100 (or BOT 108) and CHM 101 or instructor approval. May not be used for Microbiology major credit unless a diagnostic test is passed. *General studies. S2 (if taken with MIC 206)*

206 Microbiology Laboratory. (1) F, S, SS
Principles and laboratory techniques used in identifying and handling microorganisms. 3 hours lab. Pre- or corequisite: M C 205 or 220. *General studies. S2 (if taken with MIC 205)*

220 Biology of Microorganisms. (3) F, S
Basic course for persons with credit in BIO 181. Detailed study of microbial cells, their structure, genetics, physiology, and taxonomy. Corequisites: BIO 182, CHM 115.

302 Advanced Bacteriology Laboratory. (2) S
Advanced laboratory techniques in bacterial growth, physiology, genetics, microscopy, and basic virology. Required of microbiology majors. 4 hours lab. Prerequisites: Completion of L1 requirement and either A or B. (A) MIC 206, 220 or (B) M C 205 and 206 or instructor approval. *General studies. L2 (if credit also earned in MIC 401)*

360 Bacterial Physiology. (3) F
Mechanisms and control of cellular metabolic structures, and functions. Prerequisite: M C 220. Pre- or corequisite: CHM 361 or instructor approval.

381 Pathogenic Microbes. (3) S
Host-microbial interactions in infectious disease with emphasis on pathogenesis, host defenses, and molecular mechanisms of microbial virulence. Prerequisite: M C 360 or 6 hours of microbiology with instructor approval.

401 Research Paper. (1) F, S, SS
A paper of 15 or more pages based on library or laboratory research in collaboration with a faculty member. Required of a Microbiology major. Prerequisites: M C 302, completion of L1 requirement. *General studies. L2 (if credit also earned in MIC 302)*

420 Introductory Immunology. (3) F
Fundamental concepts in research and medical cellular immunity, antibody and antigen, immunogenetics, immunoregulation, hypersensitivity, clinical immunology, and nervous-immune system interactions. Prerequisites: CHM 231 (or 331) and MIC 205 (or 220) or instructor approval.

421 Experimental Immunology. (2) F, S
An introduction to the basic techniques, methods, and assays used in immunology. 6 hours lab. Prerequisites: CHM 231 and 331 and M C 302 or instructor approval.

425 Advanced Immunology. (3) S
A survey of recent advances in immunology including lymphocyte membranes, lymphokines, biochemistry, molecular genetics, theoretical immunology, immunoregulation, neuro-immunology, and immunogenetics. Prerequisite: M C 420 or instructor approval.

441 Bacterial Genetics. (3) S
Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: BIO 340 and MIC 205 (or 220) or instructor approval.

442 Bacterial Genetics Laboratory. (1) F
Techniques of mutagenesis, mapping, and strain construction. 4 hours lab. Prerequisites: M C 206, 302. Pre- or corequisite: M C 441.

470 Bacterial Diversity and Systematics. (3) F
Enrichment culture, biology, and classification of the nonpathogenic bacteria. 1-hour lecture, 6 hours lab. Prerequisite: M C 302.

485 General Virology. (3) F, 94
Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: BIO 340 and CHM 331 or instructor approval.

486 General Virology Laboratory. (2) N
An introduction to the growth, assay, and detection of viruses. 6 hours lab. Prerequisite: M C 302. Pre- or corequisite: M C 485.

527 Neuroimmunology. (3) S '95
Study of the influence of immunity and the immune system's influence on the mind, neuro-immunogenetics, and the neuro-immunogenetics curriculum. Seminar. Prerequisite: MIC 420 or instructor approval.

530 Bacterial Differentiation. (3) N
Molecular biology of sporulation and germination in bacteria. Emphasis on the control of cellular differentiation. Prerequisite: BIO 443 or MIC 441 or instructor approval.

545 Recombinant DNA Methodology. (3) N
Principles of genetic engineering using in vitro DNA recombination, characteristics of plasmid and phage vectors, recombinant selection, and physical characterization. Prerequisites: BIO 443, MIC 441, instructor approval.

546 Recombinant DNA Laboratory. (2) N
Basic techniques in isolation of chromosomal plasmid and bacteriophage DNA; transformation; gene-splicing methods. Corequisite: M C 545.

581 Molecular Mechanism of Pathogenesis. (3) F
Pathogenic mechanisms and host responses in bacterial diseases. Prerequisites: M C 381 and 420 or instructor approval.

585 Molecular Virology. (3) S 96

Selected topics concern molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

591 Seminar. (1-3) F, S

Topics may be selected from the following:

- (a) Current Research in Microbiology
- (b) Molecular Virology
- (c) Enzymology
- (d) Genetics
- (e) Genetic Engineering
- (f) Immunology
- (g) Neuroimmunology
- (h) Bacteriology
- (i) Pathogenic Bacteriology

Omnibus Courses: See page 44 for omnibus courses that may be offered.

CLINICAL LABORATORY SCIENCES/ MEDICAL TECHNOLOGY

CLS 100 Introduction to Clinical Laboratory Sciences. (1) F

Introduction to the field of clinical laboratory sciences. Required for Clinical Laboratory Sciences majors.

Enrollment for the following CLS classes is restricted to students admitted to the Clinical Laboratory Sciences Professional Study Program.

310 Principles of Clinical Chemistry I. (6) S

Theory and application of principles of clinical chemistry with emphasis on laboratory techniques, pathophysiology, methods of analysis, and assessment of procedure. 3 hours lecture, 9 hours lab.

320 Principles of Clinical Microbiology I. (6) S

Emphasizes disease mechanisms, isolation and identification of medically significant fungi and bacteria, includes principles of laboratory safety and quality control. 3 hours lecture, 9 hours lab.

330 Principles of Clinical Hematology I/ Body Fluids. (3) F

Theory and application of principles in hematology, with emphasis on techniques to evaluate blood dyscrasias and analyze body fluids. 2 hours lecture, 3 hours lab.

410 Principles of Clinical Chemistry II. (2) SS

Continuation of Clinical Chemistry I, with emphasis on principles of automation, laboratory computers, and method evaluation. 1 hour lecture, 3 hours lab.

411 Advanced Applications of Clinical Chemistry. (4) F

Clinical application of theory, techniques from Principles of Clinical Chemistry. Emphasis on operation of common laboratory instrumentation, clinical correlation, and radioimmunoassay. Minimum 180 hours practicum.

420 Principles of Microbiology II. (2) SS

Disease mechanisms and identification of medical significance: parasitology, Mycobacterium, Actinomyces, Chlamydia, Rickettsia, Mycoplasma, and viruses. 1 hour lecture, 3 hours lab.

421 Advanced Applications of Clinical Microbiology. (4) S

Practical laboratory application of the principles of specimen collection, processing, detection, identification, and antimicrobial testing of medical significance: bacteria, fungi, and parasites. Minimum 180 hours practicum.

430 Principles of Clinical Hematology II/ Hemostasis. (3) F

Theory and application of principles in hematology with emphasis on etiology, pathophysiology, clinical manifestations, and treatment of blood dyscrasias/hemostatic defects. 2 hours lecture, 3 hours lab.

431 Advanced Applications of Clinical Hematology. (4) S

Practical laboratory application of methods/techniques used to evaluate and diagnose blood dyscrasias/hemostatic defects. Applied techniques in Body Fluid Analysis. Minimum 180 hours practicum.

440 Principles of Clinical Immunology/Immunohematology. (4) F

Theory and practical application of clinical immunology and immunohematology. Emphasizes serology, techniques that aid disease diagnosis and blood donor selection. 3 hours lecture, 3 hours lab.

441 Advanced Applications of Clinical Immunology/Immunohematology. (3) S

Practical laboratory application of the principles of serology, methods used in diagnosis and selecting blood components for transfusion therapy. Minimum 135 hours practicum.

450 Principles of Clinical Laboratory Administration. (2) F, S

Principles of management, with emphasis on the clinical laboratory. Basic management process, personnel supervision, identification and allocation of resources. Both CLS 450 and 460 must be taken to secure L2 credit. *General studies: L2.*

460 Principles of Clinical Laboratory Education. (1) S

Principles of learning with application to the development of instructional objectives, strategies, and evaluation for teaching learning situations in the laboratory. Both CLS 450 and 460 must be taken to secure L2 credit. *General studies: L2.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Military Science Army ROTC

Stephen J. Heynen, Lt. Col.
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(MAIN 240) 602/965-3318

PROFESSORS

DALGLESH, HEYNEN

ASSISTANT PROFESSORS

POLLOCK, RAKOWSK, SMITH

INSTRUCTORS

COX, GARRISON, POLLOCK
RINGENOLDUS, WHITAKER

PURPOSE

The Department of Military Science curriculum consists of the basic course (MIS 101, 102, 201, and 202) and the advanced course (MIS 301, 302, 401,

and 402). The goal of this professional education is to prepare selected students with the leadership potential to be commissioned Army officers. Objectives include developing the following characteristics in the students: their leadership and managerial skills, their abilities to think creatively; their abilities to speak and write effectively, their appreciation of the requirements for national security; and their understanding of the nature and functions of the U.S. Army. Upon successful completion of the advanced course and graduation, qualified students receive commissions in the Active Army (on a competitive basis), U.S. Army Reserve, or Army National Guard.

Commissions as second lieutenants in the Regular Army are available to outstanding students who demonstrate the highest qualities of leadership potential and academic excellence.

In addition to the Military Science curriculum, core courses in the field of national defense studies are both an integral and parallel source of the department's program. Integrally, they provide MIS courses at all levels with topical intensity and highlighting in such professionally related areas as military technology; weapons procurement; national intelligence, secrecy, and counter intelligence; civil military relations; security coalitions and regional defense communities; national, regional, and global levels of strategy; generalship skill in action; deterrence dynamics and structure; military doctrine; service branch livelihood, appropriations rivalry, and interservice cooperation; personnel recruitment, morale, training, advancement, and bureaucratic organization; military reform; threat and threat perception; military historical experience and analogy; media and biographical insights, the rationale and matrices of security analysis and research; and independently selectable topics.

The department also fields an independent but parallel set of 400 level courses in the areas of geostrategic, politico-strategic, and national defense policy and analysis available to students irrespective of Reserve Officers' Training Corps (ROTC) status, departmental major, or college affiliation for assigned credit toward general studies, social science, and global awareness requirements for graduation. Special emphasis is laid upon a single-semester course in Soviet foreign and

national defense policy and analysis, and a variable accredited course available for appropriately qualified students (see catalog qualifications for independent study and research) in independent study and research in national defense policy and analysis.

GENERAL QUALIFICATIONS

Basic Course. Any student who is enrolled in ASU (or approved by the professor of military science) can enter into military science basic classes. It is strongly recommended that the student be in sound physical shape because some of the curriculum requires physical exertion.

Advanced Course. Any student who is enrolled in ASU (or approved by the professor of military science) may enroll in military science advanced classes. However, to be competitive and obtain a commission in the U.S. Army, students must meet the following requirements:

1. be a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. be of sound physical condition and pass the U.S. Army physical fitness test;
3. meet the required professional military educational requirements; and
4. be at least 17 years of age for entrance into the advanced course and be able to complete all commissioning requirements before age 30.

Only those students in the basic and advanced courses who meet required military regulations are eligible to receive financial assistance through the U.S. Army. Members of the Department of Military Science are available during normal office hours to answer questions or provide counseling.

The following are various options that are open to students who wish to obtain a commission in the U.S. Army. Contact a professor of military science for more information.

Four-Year Program. Students may enroll in Army ROTC during their freshman year. They take the basic course during the first two years, receiving a total of 12 semester hours of credit for four semesters of study. Upon satisfying the requirements stated

above, they enter the advanced course, where they earn 12 additional semester hours for four semesters of study. Students are also required to attend a six week advanced summer camp at Ft. Lewis, Washington, between their junior and senior years. All commissioned officers must meet certain Professional Military Education requirements by completing courses in English, math, and computer literacy. Selected majors such as nursing, engineering, and architecture, among others, may require an additional semester or two, or summer school, to complete all the requirements for a degree and a commission and to preclude excessive course overloads. Upon successful completion of the advanced course and requirements for a degree, students are commissioned as second lieutenants in the Regular Army, U.S. Army Reserve, or Army National Guard.

Two-Year Program. Students must have at least two academic years of college work remaining, either at the undergraduate or graduate level. The student must also have junior status. This program is open to all students with the exception of three and four year scholarship winners (see "Scholarship Programs"). Students seeking enrollment in the two year program should make application during the spring semester of the calendar year in which they desire to enter the program. They must pass the ROTC Qualifying Examination and the Army physical fitness examination. After successfully completing a paid six-week basic camp at Fort Knox, Kentucky (conducted during June, July, and August), students may enroll in the advanced course. Students who have previous military experience or who are currently members of the National Guard or Reserves may be admitted directly into the two year program. They then follow the same program and meet the same requirements as stated for advanced course students in the four year program.

Qualifications for Admittance to the Advanced Course. The following qualifications are required for admittance to the advanced course.

1. successful completion of the basic course for the students in the four year ROTC program, for the students in the two year program, selection for and completion of the six week basic summer camp;
2. passing the ROTC Qualifying Examination;
3. passing the Army physical examination;
4. achieving and maintaining the minimum cumulative GPA required for graduation in the student's selected major;
5. attainment of at least sophomore class standing; and
6. maintenance of full time student status.

Pay and Allowances. Each advanced course student receives one half the pay of a second lieutenant during attendance at the six-week advanced camp. Uniforms, housing, and meals are provided at camp without cost to the students, and they are reimbursed at the current mileage rate for travel to and from the camp. Students who attend basic camp receive the pay of an army recruit during attendance at basic camp as well as the current mileage rate for travel to and from the camp. All students in the advanced course, regardless of scholarship status, are paid about \$1,000 tax-free for each of these two years.

Simultaneous Membership Program. Under this program, ROTC students may simultaneously be members of the Army Reserves or the National Guard. The combination of advanced course allowance and pay for Reserve or Guard participation provides more than \$1,000.00 for each semester's involvement.

Military Construction Option. The Department of Military Science and the Department of Construction of the College of Engineering and Applied Sciences have jointly developed the military construction degree option. It is composed of 70% technical studies and 30% electives in the areas of planning, management, and organization. It is distinctly military in orientation and is designed to prepare graduates to plan, manage, and direct large scale construction projects, such as roads, dams, air fields, bridges, and other public works. ROTC cadets enrolled in this program receive credit toward the degree for all military science courses (24 semester hours). Upon completion of the 132 hour program, cadets graduate with a Bachelor of Science degree in Construction.

Scholarship Programs. The Army ROTC offers scholarship programs for outstanding young men and women who are motivated toward a career as professional officers in the Regular Army. These scholarships pay for all fees and tuition and provide \$100.00 per month subsistence allowance while the scholarship is in effect. In addition, a flat rate is paid each semester toward the purchase of texts and some academic supplies. A scholarship for four years is available to freshmen who enter the four-year program. Applications must be submitted in accordance with a schedule furnished by high school counselors. Selection is made on a nationwide basis. Scholarships are also available for three- and two-year periods, commencing with the sophomore and junior years of ROTC respectively. Applications are open to all students in good standing with the university; previous ROTC or military experience is not required for application for three- and two-year scholarships. Selection is made by a review board at the national level. Acceptance of any of the three scholarship programs requires a service commitment to serve in the active army for a period of up to four years after commissioning and graduation.

Active Duty Requirements. Graduates of Army ROTC may serve as officers in the Active Army, Army National Guard, or Army Reserves. Active duty commitments may vary from four years to as little as three months. Scholarship students have up to a four-year active duty commitment.

Graduate and Professional Studies Programs. A delay from call to active duty for up to four years is available to outstanding students who desire to earn graduate or professional degrees. Special programs for graduate and professional studies are available to both Regular Army appointees and U.S. Army Reserve appointees in the following areas: medicine, osteopathy, and clinical psychology.

MILITARY SCIENCE

MIS 101 Introduction to the Military. (3) F Overview of mission, organization, and structure of the Army and its role in national defense; discussion of current military issues. 3 hours lecture-conference. 2 hours lab.

102 Land Navigation, First Aid, and Survival. (3) S Introduction to military maps and land navigation, first aid and lifesaving techniques; basic outdoor survival skills. 3 hours lecture-conference, 2 hours lab.

201 American Military History. (3) F A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture-conference, 2 hours lab.

202 Introduction to Leadership Dynamics. (3) S Introduction to interpersonal dynamics involved in military team operations; theory and application of military leadership principles. 3 hours lecture-conference, 2 hours lab.

205 ROTC Basic Camp. (4) SS Six-week training program emphasizing practical hands-on skills and leadership development. Taken in lieu of MIS 101, 102, 201, 202. Conducted at Fort Knox, Kentucky.

294 Special Topics. (1-4) F, S

301 Advanced Military Science I. (3) F Theory and dynamics of the individual soldier and military units in offensive combat operations. 2 hours lecture-conferences, 1.5 hours of Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalent. Corequisite: EPE 105 Army Master Fitness.

302 Advanced Military Science II. (3) S Theory and dynamics of military units in defensive combat operations. 2 hours lecture-conferences, 1.5 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 or equivalent. Corequisite: EPE 105 Army Master Fitness.

303 ROTC Advanced Camp. (4) SS 6-week training program emphasizing leadership development and advanced military skills including tactics, and navigation, and physical training. Conducted at Fort Lewis, Washington. Prerequisites: MIS 301, 302.

394 Special Topics. (1-4) F, S

401 Advanced Military Science III. (3) F The military legal system: preparation and conduct of military training; leadership development; ethics and professionalism of the military officer. 3 hours lecture-conferences, 2 hours Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Army Master Fitness.

402 Advanced Military Science IV. (3) S Military correspondence; career planning and personal affairs; service; conduct of training; leadership development; ethics and professionalism of the military officer. 3 hours lecture, 2 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Army Master Fitness.

410 American Defense Policy I. (3) F Evolution, organization, and execution of U.S. national security policy.

412 American Defense Policy II. (3) S Contemporary problems and analytical issues in the format of and importance of U.S. national security. Prerequisite: MIS 410.

414 Comparative Defense Policy Analysis. (3) F

Historical problems and analytical issues in the evolution, organization, application, and control of effective military establishments in various political systems.

416 Soviet/C.I.S. Foreign and Defense Policies. (3) S

Analysis of foreign and security policies of the Soviet Union/C.I.S. and of the successor states to the Warsaw Pact.

499 Independent Study: National Defense Analysis. (1-3)

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Molecular and Cellular Biology

Allan L. Bieber

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(PS D121) 602/965-0743

PROFESSORS

ARONSON, BACKHAUS, HOOBER, TRELEASE (Botany); BEBER, BLANKENSHIP, LOHR, ROSE (Chemistry and Biochemistry); BURKE, SCHMIDT (Microbiology); CHANDLER, DOANE, HAZEL, KAMMER, MCGAUGHEY, SATTERLIE (Zoology)

ASSOCIATE PROFESSORS

STUTZ, VERMASS (Botany); JACOBS (Microbiology); CAPCO, GOLDSTEIN, HOFFMAN, SMITH (Zoology)

ASSISTANT PROFESSORS

FRASCH, LOBRUTTO, ROBERSON, WEBBER (Botany); ALLEN, WOODBURY (Chemistry and Biochemistry); HOFFMAN, M. SRA, STOUT (Microbiology); COOPER (Zoology)

PROFESSOR EMERITUS

REEVES (Microbiology)

The interdisciplinary M.S. and Ph.D. degrees with a major in Molecular and Cellular Biology are administered by the Committee on Molecular and Cellular Biology. The participating faculty are drawn primarily from four core departments (the Departments of Botany, Chemistry and Biochemistry, Microbiology, and Zoology), with additional

faculty from the Departments of Anthropology and Physics and Astronomy. 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.

For more information, contact the director or refer to the *Graduate Catalog*.

MOLECULAR AND CELLULAR BIOLOGY

MCB 500 Research Methods in Molecular and Cellular Biology. (2 F S)

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

501 Seminar: Molecular and Cellular Biology Colloquium. (1) F, S

Presentation of current research by noted researchers in the field. May be repeated for credit.

555 Advanced Molecular and Cellular Biology I. (3) F

Study of structural and functional organization of biomolecules and cells based on current literature. 3 hours lecture/discussion. Prerequisite: BIO 443 or equivalent; CHM 461.

556 Advanced Molecular and Cellular Biology II. (3) S

Continuation of MCB 555. 3 hours lecture, discussion. Prerequisite: BIO 432 or equivalent; CHM 462.

591 Seminar: Current Literature in Molecular and Cellular Biology. (1) F, S

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

700 Research Methods in Molecular and Cellular Biology. (2) F, S

Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

701 Seminar: Molecular and Cellular Biology Colloquium. (1) F, S

Presentation of current research by noted researchers in the field. May be repeated for credit.

791 Seminar: Current Literature in Molecular and Cellular Biology. (1) F, S

Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Philosophy

Jane Maienschein
Chair

(PS A524) 602/965-3394

PROFESSORS

CREATH, FITCH, HUMPHREY
MAIENSCHIN MURPHY, WHITE

ASSOCIATE PROFESSORS

COHEN GULESERIAN,
KOBES MCGREGOR

ASSISTANT PROFESSORS

ARMENDT COWLES, DE MARNEFFE,
DRESSER, REYNOLDS

PROFESSORS EMERITI

ARNER, CARNEY GIESCHEN,
HOWELLS, L U, VOT CHENKO

PHILOSOPHY—B.A.

The major in Philosophy consists of 45 semester hours, 39 of which must be upper division hours. In exceptional cases, up to nine units may be in related fields as approved by the undergraduate advisor. Required courses are as follows: PHI 301, 302, 305, 312 (or 314), 316 (or 317), 333, 350, at least two PHI 400 level courses not to include 492, 493, or 499, except with special permission of the chair.

Students planning to do graduate work in philosophy should consult an advisor in order to develop an appropriate selection of courses at the 300 and 400 levels. A minimum grade of "C" is necessary for each course used to fulfill the major requirements. See "Degree Requirements," page 87.

History and Philosophy of Science.

The Department of Philosophy offers courses bearing the HPS prefix. With the consent of the director of undergraduate studies, these courses may be taken to satisfy the requirements of the Philosophy major.

MINOR IN PHILOSOPHY

A minor in Philosophy consists of 18 semester hours, of which at least 12 must be upper division and approved by an advisor in the department. All courses must be passed with a minimum grade of "C."

GRADUATE PROGRAM

The Department of Philosophy offers a graduate program leading to the de-

gree of Master of Arts that prepares one for either teaching in a community college or pursuing a Ph.D. in Philosophy. Consult the *Graduate Catalog* for requirements.

PHILOSOPHY

PHI 101 Introduction to Philosophy. (3) F, S, SS

Exploration of issues which philosophers have traditionally considered including morality, reality and knowledge. *General studies HU*

103 Principles of Sound Reasoning. (3) F, S, SS

Fallacies validity and soundness of arguments. May include syllogistic elementary symbolic inductive logic, and scientific method. *General studies L1 HU*

301 History of Ancient Philosophy. (3) F, H

History of western philosophy from its beginnings through the Hellenistic period. *General studies HU H.*

302 History of Modern Philosophy. (3) S, H

History of western philosophy from the Renaissance through Kant. *General studies HU H.*

304 Existentialism and Phenomenology. (3) N

Introduction to this movement through a study of its major figures, e.g., Kierkegaard, Dostoyevsk, Nietzsche, Husserl, Heidegger, Buber, Sartre, Camus, Merleau-Ponty, Binswanger, May, Frank, and Ricoeur. *General studies HU.*

305 Contemporary Ethics. (3) A

Current theories about the nature of morality (metaethics) and about what is right and wrong (normative ethics). Prerequisite: PHI 306 or 307 or instructor approval. *General studies HU*

306 Applied Ethics. (3) F, S, SS

Philosophical discussion of contemporary moral and political issues such as abortion, euthanasia, animal rights, affirmative action, and sexual rights. *General studies HU*

307 Philosophy of Law. (3) A

The nature and source of law and its relation to morality. Legal rights, legal enforcement of moral standards, and about what is right and wrong. Punishment, judicial reasoning, justice, property, and differences between theories of natural and positive law. *General studies HU*

308 Philosophy of Art. (3) A

Central problems in philosophy of art: e.g., the nature of a work of art, modern and traditional theories of art, aesthetic perception and experience, and objectivity and relativity in art criticism. *General studies HU*

309 Social and Political Philosophy. (3) A

Alternative principles and methods relevant to problems of human association and conflict: justice and power, freedom and equality, and autonomy and order are discussed. Prerequisite: PHI 305 or instructor approval. *General studies HU*

310 Environmental Ethics. (3) A

Examination of a full range of philosophical positions pertaining to our moral relationship to the natural world; anthropocentrism, non-vidualism, biocentrism.

311 Philosophy in Literature. (3) A

Selected works of literature introduce philosophical problems such as the nature of moral goodness and people's relation to the world and other people. *General studies HU*

312 Theory of Knowledge. (3) A

The nature, sources and limits of human knowledge theories of truth a priori concepts and knowledge empirical concepts and knowledge perception and induction, knowledge of the external world Prerequisites: 1 course from among PHI 101 103 301 302, 333 350 *General studies* HU

314 Philosophy of Science. (3) A

The structure and justification of scientific theories explanation and theory change. The roles of observation and laws theoretical concepts and entities reduction probability, confirmation space and time, and causation. *General studies* HU.

315 Philosophy of Language. (3) A

Problems pertaining to the nature of language including meaning reference truth, definition, analyticity translatability synonymy, and contrasts of contemporary linguistics Prerequisites: PH 103 or 333 or 350 *General studies* HU

316 Metaphysics. (3) A

Problems pertaining to the nature of reality Topics may include nature of person, minds substance universals space, time causation, and modality Prerequisites: 1 course from among PHI 101, 103 301 333 350 *General studies* HU

317 Philosophy of Mind. (3) A

Nature of consciousness The common sense view of mind and perception, behaviorism materialism dualism phenomenalism, self-knowledge, and knowledge of other minds Prerequisite: 1 course from among PH 101, 103, 301, 302, 333 350 *General studies* HU

318 Philosophy of Religion. (3) A

Nature and justification of religious belief Arguments for the existence of God mysticism theistic and pantheistic conceptions of God and creation *General studies* HU

325 Philosophy of Social Science. (3) N

Philosophical problems surrounding the aims structure and methods of theories in the social sciences. *General studies* HU, SB.

332 19th-Century Philosophy. (3) N

The history of 19th-century philosophical thought, emphasizing either the German or the British traditions Prerequisite: PHI 302 *General studies* HU

333 Introduction to Symbolic Logic. (3) A

Symbolic techniques emphasizing deductive and proofs in the propositional first and second order predicate calculus Either axiomatic or natural deductive systems may be used

335 History of Ethics. (3) A

Major works of moral philosophy, both ancient and modern such as those by Plato Aristotle Hobbes, Hume Kant and Mill Prerequisite: PHI 101 or 306 or 307 or instructor approval.

350 Philosophical Argument and Exposition. (3) S

The development of techniques of philosophical argument and exposition. Frequent written exercises. Course content may vary with instructor Prerequisites: major instructor approval. *General studies* L2

401 Rationalism. (3) N

Examination of either classical or contemporary philosophy rationalism, as in Descartes Spinoza Malebranche Leibniz, Broad Blanchard, or Chisholm Prerequisites: PH 302; 1 course from among PH 305, 309, 312 316, 317.

402 Empiricism. (3) N

Examination of representative(s) of either classical or contemporary philosophy e.g. Bacon Hobbes Locke Butler, Berkeley, Reid, Hume Mill Carnap and Ayer Prerequisites: PHI 302; 1 course from among PH 305, 309, 312 316 317. *General studies* HU.

403 Contemporary Analytic Philosophy. (3) A

Aims and methods of such 20th century philosophers as Frege, Moore, Russell, Wittgenstein Carnap, Ayer, Wisdom, Ryle Austin Strawson Quine, and Sellars, with application to metaphysics and epistemology. Prerequisites: PHI 302, 1 course from among PH 314 315, 316, 317 401 402. *General studies* HU.

413 Advanced Symbolic Logic. (3) N

Properties of formal systems axiomatizing propositional and first-order predicate logic. May also include modal logic, number theory, and limits of logicism Prerequisites: PHI 333.

420 Topics in Philosophy. (3) A

Course descriptions and prerequisites on file in department Topics may be selected from the following.

- (a) Metaphysics Epistemology
 - (b) Philosophy of Language Logic
 - (c) Value Theory
 - (d) History of Philosophy
 - (e) Philosophy of Science
- Courses may be repeated for credit

591 Seminar. (1 3) A

Topics may be selected from the following

- (a) Aesthetics
- (b) Epistemology
- (c) Ethics
- (d) History of Philosophy
- (e) Logic
- (f) Metaphysics
- (g) Philosophy of Language
- (h) Philosophy of Law
- (i) Philosophy of Science
- (j) Social and Political Philosophy

Omnibus Courses: See page 44 for omnibus courses that may be offered

HISTORY AND PHILOSOPHY OF SCIENCE

HPS 321 Man and Machine. (2) A

Relation of man to machine examined in historical, political and social terms. Comparisons with a look at artificial intelligence studies

322 History of Science. (3) F

Development and application of scientific thinking from ancient times through the 17th century. *General studies* HU, H

323 History of Science. (3) S

Development and application of scientific thinking from the 18th century to the present. *General studies* HU, H.

330 History of Biology: Conflicts and Controversies. (3) A

Focuses on the 19th and 20th centuries, considering biology as a discipline evolution, and problems of heredity, development, and cell theory Cross-listed as ZOL 316 *General studies* H.

331 History of Medicine. (3) A

Scientific study of the human body, changing theories of disease evolution of practical operations on treatment and the emerging institutionalization of medical practice Students may receive credit for this course and BIO 218. Cross-listed as ZOL 318. *General studies* H.

402 Technology, Society, and Human Values. (3) A

Values which motivate mankind to create technology Areas of conflict and resolution of conflict between values and technology Readings and discussions with visiting lecturers. Prerequisite: junior standing.

410 Professional Values in Science. (2-3) A

Considers issues related to values in science such as collaboration finances ethical issues media, mentoring ownership of ideas scientific integrity Discussion, student projects Cross-listed as BIO 410

Omnibus Courses: See page 44 for omnibus courses that may be offered

Physics and Astronomy

Susan Wyckoff

Chair

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REGENTS' PROFESSORS

J COWLEY, STEARNS

PROFESSORS

COMFORT, A. COWLEY, DOAK, DOW,
HANSON, HESTENES, JACOB,
KAUFMANN, LINDSAY, NIGAM, PAGE,
SANKEY, SMITH, SPENCE,
STARRFIELD, TOLLERY, TSONG,
VENABLES VOSS WYCKOFF

ASSOCIATE PROFESSORS

AANNESTAD, ACHARYA, BENIN,
BENNETT, BURSTEIN, CHAMBERLIN,
MARZKE, MENENDEZ, REZ,
RITCHIE, SCHEINFEIN SCHMIDT,
TSEN, WINDHORST

ASSISTANT PROFESSORS

ALARCON, CULBERTSON,
HERBOTS, HESTER

PROFESSORS EMERITI

KEVANE KYRALA, LU, MEISTER,
RAWLS, ROY, SNYDER,
STROJNIK, YALE

PHYSICS—B.S.

Students majoring in Physics may pursue one of two options.

Option I. Designed for students who wish to pursue physics at the bachelor or graduate degree levels, this option consists of 45 semester hours. Required courses are PHY 121 and 122 or 150, PHY 131 and 132 or 151; PHY 201, 252, 302, 310, 311, 314, 315, 333, 334, 412, 416, 441, and 465. Additional courses in physics and other related fields are selected with the approval of the advisor. Supporting mathematics courses MAT 270, 271 and 272 are required in addition to the

45 semester hour major requirement. MAT 290 and 291 may be substituted for MAT 270, 271, and 272. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Option II. An interdisciplinary program designed for students who wish to obtain an undergraduate physics preparation for entry into other professions or graduate programs. A total of 53 hours are required, including PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 201, 252, 302, 310, 311, 314, 315, 333, 334, 412, and 441. The remaining courses are selected from physics and an area of concentration as approved by the student's advisor. Examples of possible areas of concentration are astronomy, astrophysics, materials science, physical chemistry, applied mathematics, geophysics, biological physics, philosophy of science, scientific journalism, and pre-medical and pre-law programs. Related non-major courses necessarily include MAT 290 and 291. MAT 270, 271, and 272 may be substituted for MAT 290 and 291. French, German, or Russian is strongly recommended to fulfill the foreign language requirement.

Course Changes. The department has established new degree requirements and is in the process of making changes to the course offerings over the next few years. Full details are available from the department.

Emphasis in Astronomy

The astronomy faculty offer courses in astronomy both for nonscience majors and for science and Physics majors. For an emphasis in astronomy, the following courses (or their equivalents) should be taken: AST 321, 322, 421, 422, 499.

MINOR IN ASTRONOMY

This minor consists of a minimum of 24 semester hours. Required courses are as follows: AST 125, 126, 321, 322; PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 252. Electives are chosen with the approval of an astronomy advisor from upper division courses in physics and astronomy.

MINOR IN PHYSICS

This minor consists of a minimum of 27 semester hours. Required courses are as follows: PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 201, 252, 310, 311, 314. Electives are chosen with the approval of the physics advisor from upper division courses in physics and astronomy.

SECONDARY EDUCATION— B.A.E.

Physics Two options are available for physics as the major teaching field.

Option One. The major teaching field consists of 42 semester hours. Required courses are as follows: PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 201, 252, 310, 311, 314, 333; two or more hours in 480 or 484. (PHY 111, 112, 113, and 114 may be substituted for PHY 150, 151, and 252, or equivalents, on approval of the advisor.) Electives are chosen in physics or other closely related fields, subject to the approval of the advisor.

Option Two. An interdisciplinary 60-hour program that consists of 30 semester hours in physics and an additional 30 semester hours in either chemistry (see page 101) or mathematics (see page 132). The physics portion of this program requires the following courses: PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 252. (PHY 111, 112, 113, and 114 may be substituted for PHY 150, 151, and 252, or equivalents, on approval of the advisor.) Also required are the following: PHY 310, 311, 333, and 361 or 314; two or more hours in 480 or 484. Electives to complete the 30-hour physics portion are chosen from physics or closely related fields, subject to the approval of the physics advisor.

Minor Teaching Field. The minor teaching field consists of 24 semester hours. Required courses are as follows: PHY 121 and 122 *or* 150; PHY 131 and 132 *or* 151; PHY 252. Also required are the following: PHY 314 or 361; two hours in 480 or 484. (PHY 111, 112, 113, and 114 may be substituted for PHY 150, 151, and 252, or equivalents, on approval of advisor.) The remaining hours are selected from upper division courses in physics or astronomy (including AST 125 and 126), subject to approval of the advisor.

GRADUATE PROGRAMS

The Department of Physics and Astronomy offers programs leading to the degrees of Master of Science, Master of Natural Sciences, and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

PHYSICS

Changes are planned for some PHY courses. Note statements about the timing of these changes.

PHY 101 Introduction to Physics. (4) F, S. Emphasizes applications of physics to life in the modern world. Understanding of elementary algebra is presumed. 3 hours lecture, 1 recitation, 2 hours lab. *General studies:* S1, S2

105 Basic Physics. (3) F. One semester survey of the principles of physics. Primarily for students who intend to take PHY 121-131 but have not taken high school physics. 3 hours lecture, 1 recitation. Prerequisites: algebra and trigonometry.

111 General Physics. (3) F, S, SS. Noncalculus treatment of the principles of physics for nonphysics majors. Students whose curricula require a laboratory course must also register for PHY 113. 3 hours lecture, 1 recitation. Prerequisite: trigonometry. *General studies:* S1, S2 (if credit also earned in PHY 113)

112 General Physics. (3) F, S, SS. Continuation of PHY 111. Students whose curricula require a laboratory course must also register for PHY 114. Prerequisite: PHY 111. *General studies:* S1, S2 (if credit also earned in PHY 114)

113 General Physics Laboratory. (1) F, S, SS. Elementary experiments in physics. 2 hours lab. Outline preparation for experiments and report writing are required. May be taken concurrently with, or subsequent to, PHY 111. *General studies:* S1, S2 (if credit also earned in PHY 111).

114 General Physics Laboratory. (1) F, S, SS. See PHY 113. May be taken concurrently with or subsequent to PHY 112. *General studies:* S1, S2 (if credit also earned in PHY 112)

121 University Physics I: Mechanics. (3) F, S, SS. Kinematics, Newton's laws, work, energy, momentum, conservation laws, dynamics of particles, solids, and fluids. 3 hours lecture, 1 hour recitation. Prerequisite: MAT 270 or 290 or instructor approval. *General studies:* S1, S2 (if credit also earned in PHY 122)

122 University Physics Laboratory I. (1) F, S, SS. Lab accompanying PHY 121. Pre- or corequisite: PHY 121. *General studies:* S1, S2 (if credit also earned in PHY 121)

131 University Physics II: Electricity and Magnetism. (3) F, S SS

Electric charge and current, electric and magnetic fields in vacuum and in materials and induction. AC circuits, displacement current and electromagnetic waves. 3 hours lecture, 1 hour recitation. Prerequisites: MAT 271 or 291 or instructor approval. PHY 121. Corequisite: MAT 272 or instructor approval. *General studies: S1 S2 (if credit also earned in PHY 132)*

132 University Physics Laboratory II. (1) S SS

Lab accompanying PHY 131. Pre- or corequisite: PHY 131. *General studies: S1 S2 (if credit also earned in PHY 131).*

150 Physics I. (4) S
Effective spring 1995

Introductory physics for majors. Kinematics, Newton's Laws, gravitational, electromagnetic and elastic forces, energy, momentum, conservation laws, rotations, special relativity. 3 hours lecture, 2 hours lab. Prerequisite: MAT 270 or 290 or equivalent.

151 Physics II. (4) F
Effective fall 1995.

Continuation of PHY 150. Electrical fields, potentials, DC circuits, magnetic fields and materials, Ampere's and Faraday's Laws. AC circuits. Maxwell's equations, electromagnetic radiation. 3 hours lecture, 2 hours lab. Prerequisites: MAT 271 (or 291 or equivalent) PHY 121 and 122 or PHY 150.

190 Seminar: Physics as a Curriculum and a Profession. (1) F S

Seminar for new Physics majors. Instruction and information on curriculum, departmental functions, and professional preparation. Weekly meetings and excursions. Pass/fail grading.

201 Introduction to Mathematical Physics I. (3) S 96

Effective spring 1996, replaces PHY 401
Mathematica methods for upper-division physics. Includes complex analysis, linear equations, matrices, determinants, differential equations. Fourier series, vectors, generalized coordinates. Prerequisite: MAT 272 or equivalent.

241 University Physics III: Thermodynamics, Optics, and Wave Phenomena. (3) F, S

Heat, entropy and the laws of thermodynamics. wave propagation, geometric and physical optics. introduction to special relativity. 3 hours lecture 1 recitation. Prerequisite: PHY 131. Concurrent enrollment in ab (PHY 242) is recommended. *General studies: S1, S2 (if credit also earned in PHY 242)*

242 University Physics Laboratory III. (1) F, S

Lab accompanying PHY 241. Pre- or corequisite: PHY 241. *General studies: S1, S2 (if credit also earned in PHY 241)*

252 Physics III. (4) S '96

Effective spring 1996; replaces PHY 241 and 242.

Continuation of PHY 151. Hydrostatics. wave phenomena, harmonic resonance. physical optics, thermodynamics, kinetic theory. blackbody radiation. 3 hours lecture 2 hours lab. Prerequisites: MAT 272 or equivalent; PHY 131 and 132 or PHY 151 or equivalent.

302 Mathematical Methods in Physics II. (2) F 96

Effective fall 1996, replaces PHY 402

310 Classical Particles, Fields and Matter I. (3) F 96

Effective fall 1996, replaces PHY 321.

311 Classical Particles, Fields and Matter II. (3) S '97

Effective spring 1997, replaces PHY 331.

314 Quantum Physics I. (3) F '96

Effective fall 1996, replaces PHY 362

315 Quantum Physics II. (3) S 97

Effective spring 1997; replaces PHY 471.

321 Newtonian Mechanics. (3) F

Vector calculus. Kinematics and dynamics of particles. Conservation, resistive, and central forces. Dynamics of a charged particle. Many particle systems. The two body problem and collisions. Rigid body dynamics. Motion in non-inertial reference frames. Prerequisites: MAT 274 and 291 and PHY 131 or equivalents. Corequisite: MAT 242 or equivalent.

322 Analytical Mechanics. (3) S

Lagrange's and Hamilton's equations, constraints; coupled oscillators. Elements of continuum mechanics; elastic and hydrodynamics. Prerequisite: PHY 321

331 Electricity and Magnetism. (3) F

Static and quasistatic electric and magnetic fields, electric current, electromagnetic induction in fields in matter and introduction to Maxwell's equations. Prerequisites: MAT 242, 274. Corequisite: PHY 321 or 401.

332 Electromagnetic Fields. (3) S

Maxwell's equations and applications, radiation, and propagation of electromagnetic waves. Prerequisite: PHY 331

333 Intermediate Physics Laboratory I. (3) F S

Basic physics measurements techniques with emphasis on modern electrical and electronic instrumentation. 1 hour lecture 3 hours lab. Equivalent effort outside of the lab is required. Prerequisites: MAT 274 (or equivalent) and PHY 122 and 132 and 242 and 321 or instructor approval.

333 Electronic Circuits and Measurements. (3) F, S

Effective fall 1996; replaces PHY 333.

334 Intermediate Physics Laboratory II. (3) F, S

Experiments selected in consultation with instructors to suit the student's needs and interests. 3 hours lab. Equivalent effort outside of the lab is required. Prerequisites: PHY 310 314, 333. *General studies: L2.*

334 Advanced Laboratory I. (2) F S

Effective spring 1997; replaces PHY 334

351 Optics. (3) F

Matrix methods in geometric optics, interferometry, part coherence and selective absorbers. Fresnel and Fraunhofer diffraction, Fourier transform spectroscopy. Prerequisites: MAT 272 or 291; PHY 241

361 Introductory Modern Physics. (3) F S

Special relativity and introductory quantum theory with applications drawn from atomic, nuclear, and solid state physics. 3 hours lecture, 1 recitation. Prerequisite: PHY 131.

362 Modern Physics. (3) F, S

Special relativity, foundations and theoretical concepts of quantum theory. Introduction to atomic, molecular, solid state and subatomic physics. Prerequisite: PHY 241. Corequisite: MAT 274 or equivalent.

401 Mathematical Methods in Physics. (3) F

Elements of vector calculus. complex variables. ordinary and partial differential equations. integral transforms, special functions. determinants. matrices, probability and statistics. Prerequisite: PHY 321

402 Mathematical Methods in Physics. (3) S

Continuation of PHY 401. Prerequisite: PHY 401

412 Classical Particles, Fields and Matter III. (3) F

Effective fall 1997, replaces PHY 332.

416 Quantum Physics III. (3) F

Effective fall 1997; replaces PHY 472

420 Research Paper. (1) F, S

Effective spring 1997

441 Statistical and Thermal Physics I. (3) F

Statistical and experimental basis of heat, temperature, and entropy. Mechanical and statistical basis of the laws of thermodynamics. Applications of macroscopic thermodynamics. Phase equilibrium. Prerequisite: PHY 362

442 Statistical and Thermal Physics II. (3) S

Principles and applications of statistical mechanics. Quantum statistics of ideal gases and solids. Equilibrium of phases and chemical species. Transport theory. Irreversible processes and fluctuation. Prerequisite: PHY 441.

452 Advanced Optics. (3) S

Linear systems theory. coherent and incoherent imaging, spatial filtering. Elements of radio astronomy. antenna theory, and heat flow problems. holography; coded apertures; reciprocity and symmetry in X-ray electron, and optical diffraction. PHY 401, 402 recommended. Prerequisites: PHY 331, 351

452 Physical Optics. (3) F

Effective fall 1997, replaces PHY 452

462 Nuclear Physics. (3) F

Static properties of nuclei, natural and induced radioactivity. nuclear reactions, nuclear models and energy levels. mesons and hyperons, and interaction of photons and electrons with matter. Prerequisite: PHY 362

462 Nuclear and Particle Physics. (3) S

Effective spring 1998, replaces PHY 462

463 Physical Measurements. (1) F

Experiments in mechanics and heat, electricity and magnetism, optics and modern physics. Designed for teachers and students not majoring in physics. 3 hours lab. May be repeated for a maximum of 3 hours credit. Prerequisite: PHY 112.

465 Advanced Physics Laboratory I. (3) F, S

Continuation of PHY 334 at a more advanced level. 3 hours lab. Equivalent effort outside of the lab is required. Upon approval, student may substitute research lab project. Lab. Prerequisite: PHY 334. Corequisite: PHY 362 or instructor approval.

465 Advanced Laboratory II. (2) F S

Effective fall 1997; replaces PHY 465

466 Advanced Physics Laboratory II. (1-3) F, S

Continuation of PHY 465. May be repeated for credit. Prerequisite: PHY 465

466 Advanced Laboratory III. (1-3) F S

Effective spring 1998; replaces PHY 466

- 471 Quantum Mechanics.** (3 F)
Wave mechanics Schrödinger's equation, barrier problems, operators and eigenfunctions, harmonic oscillator, and one electron atoms. Prerequisites: MAT 242 and 274 and PHY 362 or instructor approval
- 472 Quantum Mechanics.** (3 S)
Matrix mechanics angular momentum perturbation on theory and the scattering theory Prerequisite: PHY 471 or instructor approval
- 480 Methods of Teaching Physics.** (3 S)
Evaluation of various approaches to the teaching of high school physics Preparation of demonstrations and experiments Organization of a laboratory Designed for secondary school physics teachers Prerequisite: instructor approval
- 481 Solid State Physics.** (3 S)
Structure, elastic properties and dynamics of crystals electron motions in crystals under applied fields. Prerequisite: PHY 362.
- 484 Internship: Physics Teaching.** (1-4) F, S, SS
Preparation for high school physics teaching Student will work closely with a faculty member in the elementary physics program May be repeated for a total of 6 semester hours Prerequisite: instructor approval
- 495 Project Research.** (1-3) F, S
Supervised project in physics or astrophysics May be repeated for credit Note: Approval of faculty member under whose direction the work is to be done must be obtained before registration Prerequisite: instructor approval
- 501 Methods of Theoretical Physics.** (3) F, S
Provides mathematical foundations for graduate students in basic and applied physics Complex variables, vector spaces, operators, matrixes, ordinary differential equations, integral equations and transforms, and special functions May include additional topics Prerequisites: PHY 401 and 402 or instructor approval
- 502 Methods of Theoretical Physics.** (3) F, S
Continuation of PHY 501 Prerequisite: PHY 501.
- 503 Physical Applications of Group Theory.** (3) N
Fundamentals and applications of the theory of finite and continuous groups as they occur in physics. Atomic molecular, solid state, and elementary particle physics. Prerequisite: instructor approval
- 521 Classical Mechanics.** (3 F)
Variational principles, Lagrange's and Hamilton's equations, rigid body motion, canonical transformations, Hamilton-Jacobi theory Prerequisite: PHY 321
- 522 Advanced Topics in Classical Mechanics.** (3) S
Continuum mechanics elements of hydrodynamics, elasticity theory and special relativity Prerequisites: PHY 322 521
- 523 Relativity.** (3) N
Special and general theories of relativity Prerequisites: PHY 522 and 532 or instructor approval
- 531 Advanced Electricity and Magnetism.** (3) F
Electrostatics and magnetostatics potential theory and theory of conservative fields on Maxwell's equations the wave equation, plane electromagnetic waves cavities and waveguides Prerequisite: PHY 331 or instructor approval
- 532 Electrodynamics.** (3) S
Special theory of relativity, covariant formulation of electromagnetic interactions, inhomogeneous wave equations, Lienard-Wiechert potentials, and radiation fields, interactions of charged particles and electromagnetic waves scattering, dispersion Prerequisites: PHY 332 and 531 or instructor approval
- 541 Statistical Physics.** (3) F
Probability theory and principles of statistical inference evaluating experimental data foundations of statistical mechanics general laws of thermodynamics from microscopic theories calculation of special properties of bulk matter PHY 442 recommended Prerequisites: PHY 441 471
- 542 Advanced Topics in Statistical and Thermal Physics.** (3) S
Theory of irreversible processes, Onsager reciprocity laws and the fluctuation-dissipation theorem relaxation and transport processes fluids and plasmas, Luttinger equation on the BBGKY hierarchy of distribution functions kinetic theory hydrodynamics from many-body theory, phase changes and equilibrium, ferromagnetism Prerequisite: PHY 541.
- 551 X-Ray and Electron Diffraction.** (3) S
Fresnel and Fraunhofer diffraction integrals formulation of diffraction of X-rays and neutrons by crystal lattices structures of solids, including crystal structure analysis theory and techniques of electron microscopy diffraction of crystal and noncrystalline specimens. Prerequisite: PHY 481 or instructor approval
- 561 Nuclear Physics.** (3) F, S
Two nucleon interaction, Heisenberg-Gordon coefficients, nuclear forces, meson theory and high energy scattering nuclear binding energy nuclear modes, transition probabilities estimates nuclear reactions and beta decay Prerequisites: PHY 462 and 576 or instructor approval.
- 562 Nuclear Physics.** (3) F, S
Continuation of PHY 561. Prerequisite: PHY 561 or instructor approval
- 568 Elementary Particle Physics.** (3) N
Classification of particles, phenomenology of strong electromagnetic and weak interactions cross sections, and decay rates, spin and higher symmetries, structure of reaction amplitudes Prerequisite: PHY 577
- 569 Elementary Particle Theory.** (3) N
Continuation of PHY 568 Prerequisite: PHY 568
- 576 Quantum Theory.** (3) F, S
Abstract approach to quantum mechanics in Hilbert space observables and the corresponding operators eigenstates and eigenvalues quantum dynamics approximate methods systems of identical particles angular momentum and group representation on theory collision processes relativistic quantum theory Prerequisites: PHY 471 521
- 577 Quantum Theory.** (3) F, S
Continuation of PHY 576 Prerequisite: PHY 576
- 578 Relativistic Quantum Theory.** (3) F, S
Relativistic one-particle equations Klein-Gordon equation Dirac equation second quantization theory of scattering, S-matrix, Feynman diagrams quantum electrodynamics, and renormalization procedures Prerequisite: PHY 577.
- 579 Relativistic Quantum Theory.** (3) F, S
Continuation of PHY 578 Prerequisite: PHY 578.
- 581 Solid State Physics.** (3) F
Quantum theory of solids, including phonons, lattice specific heats, band structure models Fermi surfaces thermal expansion plasmons, electron-phonon interactions, and scattering by lattice defects Pre- or corequisites: PHY 472 481, 576
- 582 Solid State Physics.** (3) S
Elements of transport theory, thermal conductivity on electronic conduction in metals mobility in semiconductors Hall effect magnetoresistance, and selected topics of current research Prerequisite: PHY 581.
- 587 Quantum Optics.** (3) F, S
Quantization of the electromagnetic field Quantum theory of coherence, photon counting, photon statistics, density operators, and atomic Raman scattering Prerequisite: PHY 471
- 588 Quantum Optics.** (3) F, S
Continuation of PHY 587 Prerequisite: PHY 587
- Omnibus Courses:** See page 44 for omnibus courses that may be offered.

ASTRONOMY

AST 111 Introduction to Astronomy I. (3) F, SS

History, properties of light, instruments study of solar system and nearby stars For non Science majors Opt onal lab (AST 125) *General studies: S1, S2 (if taken with AST 125).*

112 Introduction to Astronomy II. (3) S, SS

Structure and evolution of stars star clusters galaxies; cosmology For non science majors Opt onal lab (AST 126) *General studies: S1 S2 (if taken with AST 126)*

125 Astronomy Laboratory I. (1) F
Astronomical observations and experiments designed to help the student become familiar with the sky telescopes, and astronomical measurements. 2.5 hours lab Pre- or corequisites: AST 111 or 321 a working knowledge of high school algebra and geometry. *General studies: S1 S2 (if taken with AST 111 or 321)*

126 Astronomy Laboratory II. (1) S
Similar to AST 125 but material chosen to supplement AST 112 and 322. 2.5 hours lab. Pre- or corequisites: AST 112 or 322; a working knowledge of high school algebra and geometry *General studies: S1 S2 (if taken with AST 112 or 322)*

301 Discovering the Sun and its Planets. (3) F
Comprehensive first course in astronomy for non Science majors Course will include lectures, written assignments and laboratory work Not open to students with credit in AST 111 or equivalent. Prerequisites: algebra and geometry or instructor approval

302 Modern Astronomy. (3) S

Second course in astronomy for non Science majors. Covers such events and controversies of 20th century astronomy through lectures, written assignments, and laboratory work. Not open to students with credit in AST 112 or equivalent. Prerequisite: AST 301 or instructor approval.

321 Introduction to Planetary and Stellar Astrophysics. (3) F

Physical laws, celestial mechanics, properties of planets, the sun, and other stars. Formation and evolution of stars and planetary systems. Prerequisites: MAT 270 or 290, PHY 121 or 150. *General studies: S1, S2 (if taken with AST 125).*

322 Introduction to Galactic and Extragalactic Astrophysics. (3) S

Evolved stars, interstellar matter, structure and dynamics of galaxies, cosmology. Prerequisite: AST 321 or instructor approval. *General studies: S1, S2 (if taken with AST 126).*

421 Astrophysics I. (3) F

Aspects of observational astronomy, atomic properties of matter, stellar atmospheres, stellar structure, evolution, nucleosynthesis, compact objects, close binary systems. Prerequisites: AST 312, 322, PHY 311, 314.

422 Astrophysics II. (3) S

Interstellar medium; gaseous nebulae; shock waves, stellar dynamics, star clusters and stellar populations, galaxies and their evolution; cosmology. Prerequisites: AST 321, 322, PHY 412.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PHYSICAL SCIENCES**PHS 110 Fundamentals of Physical Science.** (4) F, S

One semester survey of the principles of physics and chemistry. Understanding of elementary algebra presumed. 3 hours lecture, 2 hours lab. *General studies: S1, S2.*

361 Science and Society. (2) F, S

Fundamental principles of physical science as a creative human enterprise and its relationship to technology and the environment.

362 Science and Society. (2) F, S
See PHS 361.**375 The Energy Crisis.** (2) (3) F, S

Current problems in energy resources, production, consumption, and conservation. No physics or mathematics prerequisites. Students registered for 3 hours participate in lecture and discussion.

410 Origins of the Physical Sciences. (3) N

Origins of astronomy, chemistry, physics, and mathematics in the cultures of Mesopotamia, Egypt, China, and India.

411 Development of the Physical Sciences. (3) N

Historical mathematics, physics, chemistry, and astronomy. Arabs and the physical sciences and their role in spreading the physical sciences to Europe; the development of the physical sciences in Europe until the time of Newton.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Political Science

Stephen G. Walker

Chair

(SS 410) 602/965-6551

REGENTS' PROFESSOR

MILLER

PROFESSORS

BERMAN, CHAUDHURI, JONES,
McDONOUGH, McGOWAN, SIMON,
WALKER, YOUNGBLOOD

ASSOCIATE PROFESSORS

ASHLEY, DAGGER, DANTICO,
GEER, KENNEY, McGAW,
MITCHELL, OLSON, READER,
STOOKEY, WATSON

ASSISTANT PROFESSORS

BOWER, CRITTENDEN, DOTY,
HERRERA, KAHN, KEATING

PROFESSORS EMERITI

ALISKY, HINK, JO, KAMINSKY,
MASON, PEEK, RICE, SWAGERT,
WHITE, WOLF

POLITICAL SCIENCE—B.A.

This program consists of 42 semester hours, of which 30 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Economics, Geography, History, Psychology, and Sociology and the Women's Studies Program. At least 15 hours in political science must be in upper division courses. The following courses are required: POS 101, 110 (or 310), 150 (or 160), 301.

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper division courses that count toward the major must have "C" grades or better; no more than one "D" grade in a lower division course may be counted in the major. See "Degree Requirements," page 87.

No more than six hours of POS 484 Internship may be applied to the major.

POLITICAL SCIENCE—B.S.

The program consists of 48 semester hours, of which 36 must be in political science and 12 in related fields consisting of courses selected from the Departments of Anthropology, Economics, Geography, History, Psychology, and Sociology and the Women's Studies

Program. At least 21 hours in political science must be in upper division courses. The following courses are required: POS 101, 110 (or 310), 150 (or 160), 301, 401.

Students who major in Political Science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper division courses that count toward the major must have "C" grades or better; no more than one "D" grade in a lower division course may be counted in the major. See "Degree Requirements," page 87.

No more than six hours of POS 484 Internship may be applied to the major.

Asian Studies Emphasis. Students majoring in political science may elect to pursue an Asian Studies emphasis combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 90 for more information.

Latin American Studies Emphasis.

Students majoring in political science may elect to pursue a Latin American Studies emphasis combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

MINOR IN POLITICAL SCIENCE

The minor consists of 18 semester hours in political science courses, 12 hours of which must be in upper division courses. Required courses are POS 110 (or 310) and 150 (or 160). No more than three hours of POS 484 Internship and three hours of POS 499 Independent Study may be applied to the minor.

Students who minor in Political Science must have a minimum GPA of 2.00 for all courses that count toward the minor. Upper division courses that count toward the minor must have "C" grades or better; no more than one "D" grade in a lower division course may be counted toward the minor.

**SECONDARY EDUCATION
B.A.E.**

Political Science. The major teaching field consists of 45 semester hours, 30 of which must be in political science and 15 in closely related fields. The following six courses are required: POS 101, 110 (or 310), 150 (or 160), 301, 417, and 480. Courses may be substituted for POS 417 and 480 with departmental approval. Students who pursue

this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the major. Upper division courses that count toward the major must have "C" grades or better; no more than one "D" grade in a lower division course may be counted in the academic specialization. No more than six hours of POS 484 Internship may be applied to the major.

The minor teaching field consists of 24 semester hours in political science courses. The following six courses are required: POS 101, 110 (or 310), 150 (or 160), 301, 417, and 480. Students who pursue this academic specialization in political science must have a minimum GPA of 2.00 for all courses that count toward the academic specialization. Upper-division courses that count toward the academic specialization must have "C" grades or better; no more than one "D" grade in a lower division course may be counted in the minor.

Social Studies. See page 153.

GRADUATE PROGRAMS

The Department of Political Science offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

POLITICAL SCIENCE

- POS 101 Political Ideologies.** (3) F S
Leading political ideas and belief systems, e.g. Marxism, liberalism, conservatism, theories of democracy and alternative futures. *General studies: SB*
- 110 Government and Politics.** (3) F, S
Major institutions of modern government and processes of individual and group political activity, with emphasis on the American experience. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 310. *General studies: SB*
- 120 Political Issues and Public Policy.** (3) A
Contemporary social problems and political issues, particularly development of public policy. *General studies: SB, G*
- 150 Comparative Government.** (3) F, S
Political institutions and processes in selected foreign countries including origins, strengths and weaknesses of contemporary political systems and political development. *General studies: SB, G*
- 160 Global Politics.** (3) F, S
The nature of contemporary world politics through the study of both general theoretical topics and specific geographical areas. *General studies: SB, G*

- 170 American Legal System.** (3) F, S
Concepts, institutions, classifications, and functions of law. The role of the courts and the impact of judicial decisions on making social change. *General studies: SB*
- 240 Introduction to Southeast Asia.** (3) F
An interdisciplinary introduction to the cultures, religions, political systems, geography and history of Southeast Asia. Cross-listed as ASB 240 GCU 240/HIS 240 REL 240. *General studies: G*
- 301 Empirical Political Inquiry.** (3) F, S
Logic of political inquiry including research problems, concepts, hypotheses, theories, measurement, data collection and analysis. *General studies: SB*
- 310 American National Government.** (3) F, S
Powers, functions and agents of American political institutions. Meets the federal government requirement for teacher certification. Not open to students with credit for POS 110. *General studies: SB*
- 311 Arizona Constitution and Government.** (2) F, S
Constitution and government of the State of Arizona. Not open to students having credit for POS 316 or 417. Meets the Arizona constitution requirement for teacher certification. May not be counted for the major or a teaching major or minor in Political Science. *General studies: SB*
- 313 The Congress.** (3) A
Lawmaking process in the U.S. Congress. *General studies: SB*
- 314 The American Presidency.** (3) A
Office, role and power of the American presidency in the American political system. *General studies: SB*
- 315 The Supreme Court.** (3) A
Role of the Supreme Court in American society and politics, examination of decisions on making process and impact of decisions, restraint versus activism. *General studies: SB*
- 316 State and Local Government.** (3) A
Survey of the operations, problems and policies of state and local governments in the United States. *General studies: SB*
- 320 Public Administration.** (3) A
Role of the administrator in the political process with an examination of the basic concepts of bureaucracy. *General studies: SB*
- 325 Public Policy Development.** (3) A
Relationships between policy development and administrative processes as affected by the various roles of executive, legislative and administrative agencies. *General studies: SB*
- 330 Current Issues in National Politics.** (3) F, S
Major issues facing national governments in the domestic field. *General studies: SB*
- 331 Public Opinion.** (3) A
Formation, expression and influence of individual and organized opinion on political institutions. *General studies: SB*
- 332 American Political Parties.** (3) A
Development of the American party system. Party organization and functions. *General studies: SB*

- 333 Interest Groups.** (3) A
Examines how minority, corporate labor, farm, consumer, environmental, health, education and public interest groups and single issue movements influence government. *General studies: SB*
- 336 Electoral Behavior.** (3) A
Voting behavior and the attitudes, perceptions and activities of the citizen in the political process. *General studies: SB*
- 350 Comparative Politics.** (3) A
Theoretical approaches and political institutions such as parties, pressure groups, legislatures and executives from a cross-national perspective. *General studies: SB, G*
- 351 The British Nations.** (3) A
Examines such parliamentary systems as Great Britain, Ireland, Canada, Australia, and New Zealand. *General studies: SB, G*
- 352 Revolution and the Social System.** (3) A
Causes and consequences of revolution. Identification of systemic structures and institutions conducive to radical and moderate patterns of conflict resolution. *General studies: SB*
- 356 Western Europe.** (3) A
Structures and behavior of governmental institutions and political processes in selected countries of Western Europe. *General studies: SB, G*
- 360 Current Issues in International Politics.** (3) F, S
An analysis of major current problems in world politics. *General studies: SB, G*
- 361 American Foreign Policy.** (3) A
United States in world affairs; foreign policy since World War I. Techniques in formulating American foreign policies. *General studies: SB, G*
- 401 Political Statistics.** (3) F, S
Basic concepts in statistics as they facilitate the description, explanation and prediction of social and political phenomena. *General studies: N2*
- 410 Urban Government and Politics.** (3) A
Governmental organizations, decisions on making structures and problems of urban political systems. *General studies: SB*
- 417 The Arizona Political System.** (3) N
Contemporary political problems within the context of Arizona's political, social, and constitutional frameworks. Meets the Arizona Constitution requirement for teacher certification.
- 422 Politics of Bureaucracy.** (3) N
Bureaucracy as a political entity; internal dynamics of public agencies; the relationship between public agencies and other political entities. *General studies: SB*
- 423 Politics of Budgeting.** (3) N
The policy process in budgeting strategies used to influence the process and recent reforms in public budgeting. *General studies: SB*
- 424 Regulatory Politics.** (3) N
Development and implementation of governmental policies regulating business activity, e.g. antitrust, consumer and environmental protection and labor relations. *General studies: SB*

- 426 Elements of Public Policy.** (3) A Each section may cover one of the following topics: consumer protection, natural resources, criminal justice, environmental protection, science and technology, or theories of public policy. May be repeated for credit when topics vary. *General studies: SB*
- 435 Women, Power, and Politics.** (3) N The roles and treatment of women within various political contexts. Specific focus may vary with instructor. *General studies: SB*
- 439 Minority Group Politics in America.** (3) N Role of minority groups in American politics. *General studies: SB, C*
- 440 History of Political Philosophy I.** (3) A Western political philosophers and their theories to the 17th century. *General studies: HU H*
- 441 History of Political Philosophy II.** (3) A Western political philosophers and their theories from the 17th to the 20th century. *General studies: HU H*
- 442 American Political Thought.** (3) A Political theories and movements from the colonial period to the present. *General studies: HU*
- 443 Topics in Contemporary Political Theory.** (3) A Major problems and theories in contemporary political thought. *General studies: HU*
- 445 Asian Political Thought.** (3) A Contemporary political ideas and theories in selected Asian countries, including the impact of Marxist and non-Marxist theories on revolutionary processes. *General studies: SB, G*
- 446 Problems of Democracy.** (3) A Issues and problems in democratic theory, e.g., the nature of democracy, majority rule, representation, equality, and the value of political participation. *General studies: HU*
- 450 Soviet Union and Eastern Europe.** (3) A Description and analysis of political institutions and practices in the Soviet Union and the nations of Eastern Europe. *General studies: SB, G*
- 451 China, Japan, and the Koreans.** (3) A A comparative analysis of the political modernization on experiences of China, Japan, and the two Koreas, focusing on their differing reactions to the West. *General studies: SB, G*
- 452 China.** (3) A Background of the Communist revolution, political processes, and developmental problems in China from a comparative perspective. *General studies: SB, G*
- 453 South America.** (3) A Governmental institutions, political processes, and developmental problems of the South American states. *General studies: SB, G*
- 454 Mexico.** (3) A Mexican federal, state, and local governmental institutions. *General studies: SB, G*
- 455 Central America and the Caribbean.** (3) A Governmental institutions, political processes, and developmental problems of the nations and dependent areas of Central America and the Caribbean. *General studies: SB, G*
- 456 Comparative Legislative Processes.** (3) A Lawmaking process followed in selected legislative bodies; composition of membership, organization, and powers; impact of internal and external forces on legislation.
- 458 Southeast Asia.** (3) A Political background, governmental institutions, political dynamics, and developmental problems of Southeast Asian nations. *General studies: SB, G*
- 459 Sub-Saharan Africa.** (3) N Governmental institutions and processes of politics south of the Sahara. *General studies: SB, G*
- 460 World Politics.** (3) A Theoretical examination of one or more aspects of international politics, e.g., foreign policy negotiations, alliances, crises, wars, and international systems. *General studies: SB, G*
- 462 Soviet Foreign and Defense Policies.** (3) A Examination and analysis of foreign and defense policies of the Soviet Union. *General studies: SB, G*
- 463 Inter-American Relations.** (3) A Diplomatic relations among the Latin American states. Development of U.S. foreign policy toward Latin America. *General studies: SB, G*
- 464 American Defense Policy.** (3) A Problems and issues of the organization and control of the defense establishment of the United States. *General studies: SB*
- 465 International Organization and Law.** (3) A History, practical political significance, and future of international institutions, transnational regimes, and international law. *General studies: SB, G*
- 467 Comparative Defense Policy.** (3) A Problems and issues of the organization and control of effective defense establishments within the context of various political systems. *General studies: SB, G*
- 468 Comparative Asian Foreign Policies.** (3) A Foreign policies of the Asian states, emphasizing their security relations and movements toward regionalism. *General studies: SB, G*
- 470 Law and Society.** (3) A Nature, purposes, and sanctions of law; sources of law; private and public law; common and civil law, courts and administration of justice. *General studies: SB*
- 471 Constitutional Law I.** (3) A Development of the U.S. Constitution as reflected in decisions of the Supreme Court; jurisdiction and organization of the federal courts, judicial review, separation of powers, federalism, the commerce clause; national taxing and spending power; state police power. *General studies: SB*
- 472 Constitutional Law II.** (3) A Development of the United States Constitution as reflected in decisions of the Supreme Court: due process; equal protection of laws; individual rights; civil liberties. *General studies: SB*
- 480 Methods of Teaching Government.** (3) N Methods of instruction, organization, and presentation of subject matter in political science. Prerequisite: 15 hours in Political Science or instructor approval.
- 484 Internship.** (1–12) A
- 485 Political Economy.** (3) A Problems, policies, and possibilities of various political-economic systems and the interrelationship of capitalism, socialism, and democracy. *General studies: SB*
- 486 International Political Economy.** (3) A Contending approaches to historical and contemporary issues of international political economy, including global welfare, equality, ecology, and peace. *General studies: SB, G*
- 494 Special Topics in Political Science.** (3) A Chosen from the various fields of political science.
- 498 Pro-Seminar.** (3) A Small group study and research for advanced students within their major area. Prerequisite: major in the department or instructor approval. *General studies: L2*
- 501 Methods of Political Science.** (3) A Problems of method and knowledge in political science, strategies of political inquiry, and issues in philosophy of social science.
- 502 Philosophy of Political Inquiry.** (3) A Problems of knowledge and method in political science, with attention to both empirical and evaluative analysis.
- 503 Empirical Political Inquiry.** (3) A Research methods and techniques of the discipline, emphasizing empirical foundations and analytic methods employed in subfields. Prerequisites: POS 401 or equivalent instructor approval.
- 530 American Politics.** (3) A Examines major debates in the study of American political processes. Covers parties, media, elections, public opinion, norms, and social choice theory. Seminar.
- 532 American Political Institutions.** (3) N Examines major debates in the study of American governmental institutions. Covers legislative branch, executive branch, judicial branch, and interest groups. Seminar.
- 545 Themes in Political Thought.** (3) N Examination of a particular theme or problem in political thought from both a historical and contemporary perspective. Seminar. Prerequisite: instructor approval. Course may be repeated with approval of the director of graduate studies.
- 550 Comparative Politics.** (3) A Surveys major approaches across topical areas such as revolutions, authoritarianism, policy processes, interest groups, and electoral politics. Focus varies with instructor. Seminar.
- 560 International Relations.** (3) A Surveys major theoretical approaches and debates in international relations. Seminar.
- 563 Comparative Asian Security Policies.** (3) N Analyzes domestic and international constraints, belief systems, and economic components in security decisions by major powers and Asian nations. Seminar. Prerequisite: instructor approval.
- 591 Seminar.** (3) A
(a) Global Politics
(b) Comparative Politics
(c) Political Theory
(d) American Politics

598 Special Topics. (3) A

- (a) Global Politics
- (b) Comparative Politics
- (c) Political Theory
- (d) American Politics

601 Advanced Experimental Research. (3) N

Introduces experimental and quasi-experimental research designs in political research including laboratory techniques and topics in the analysis of variance. Prerequisite: POS 503 or equivalent.

602 Advanced Survey Research. (3) N

Presents design and conduct of political surveys, including sampling, instrument design, scaling, and statistical and graphical analysis of survey data. Prerequisite: POS 503 or equivalent.

603 Polometrics I. (3) A

Introduces theory and practice of linear regression analysis. Provides skills to read, understand, and evaluate professional literature using regression analysis. Prerequisite: POS 401, 503 or instructor approval.

604 Polometrics II. (3) A

Apply quantitative techniques to research topics producing published papers through exposure to time series, logit and probit, and simultaneous equations. Prerequisite: POS 401, 503, 603, or instructor approval.

635 State Politics and Public Policy. (3) N

Introduction to comparative state politics emphasizing policy or performance differences among the states and the reasons for these differences. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

636 Electoral Behavior. (3) N

Introduces fundamental concepts of electoral behavior. Emphasizes presidential elections and examines why people vote and how the votes are determined. Seminar. Prerequisites: POS 530 and 603 or instructor approval.

638 Law and Politics. (3) N

Emphasizes research into such topics as constitutional law, women and the law, American legal system, judicial process, and judicial selection. Seminar. Prerequisite: instructor approval.

651 Politics of Change and Development. (3) N

Examines competing approaches to national social and political change. Seminar. Prerequisite: instructor approval.

660 The Modern World System. (3) N

Theoretically driven, historical analysis of the organization and operation of the international political economy since the 16th century. Seminar. Prerequisite: instructor approval.

661 The State. (3) N

Examines theories of state-state-society relations, and interstate politics emphasizing questions of sovereignty, territoriality, violence, representation, democracy, and change. Seminar. Prerequisite: instructor approval.

662 International Organization. (3) N

History, practical political significance, and future of international institutions, transnational regimes, and other approaches to international organization. Seminar. Prerequisite: instructor approval.

664 War, Peace, and Conflict Processes. (3) N

The systematic analysis of the causes of war, the preconditions for peace, and approaches to the resolution of conflict. Seminar. Prerequisite: instructor approval.

665 Foreign Policy Theory. (3) N

Examines foreign policy theory and methods. Development and critique of research designs analyzing foreign policy processes within and among nations. Seminar. Prerequisite: instructor approval.

792 Research. (3) F S

Projects in various areas of political science. Prerequisite: doctoral student.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Psychology

J. Jay Braun
Chair

(PSY 237) 602/965-3326

REGENTS' PROFESSORS

CIALDINI, EISENBERG

PROFESSORS

AIKEN, BARRERA BERNAL,
BRAUN, BRAVER, CHASSIN,
HAYGOOD, HOMA, JONES, KAROLY,
KENRICK KILLEEN, KNIGHT,
LANYON, LINDER, OKUN,
PARKINSON, PRESSON, REICH,
RUSSO, SANDLER, SOMERVILLE,
WEST, WOLCHIK, ZAUTRA

ASSOCIATE PROFESSORS

CASTRO, CHARTER, FEHR,
LESHOWITZ, ROSSI, SADALLA,
STONE, VANORDEN

ASSISTANT PROFESSORS

CASTENEDA FABRICIUS,
GOLDINGER, GONZALES,
MACKINNON, MADDOX, NAGOSHI,
NEISEWANDER, NEMEROFF,
NEUBERG, SAENZ

INSTRUCTOR

WE GAND

PROFESSORS EMERITI

BARDRICK LEVINE
MEYERSON, VESTRE

The Department of Psychology maintains an Undergraduate Advisement Office staffed by trained personnel. All Psychology majors are encouraged to meet with an undergraduate advisor once each semester to ask questions regarding the student's choice of courses. Failure to do so may prevent graduation at the expected time. It is the responsibility of the student to consult with an undergraduate advisor.

PSYCHOLOGY—B.A.

The program consists of 31 semester hours in psychology, including at least 15 upper division hours. Required courses, which must be passed with a minimum grade of "C," are as follows: PGS 101, 315 (or 341 or 350); PSY 230, 290, 323 (or 320 or 324 or 325); one additional upper division PSY course excluding PSY 490 and 499; two additional upper division courses (PGS or PSY), two additional psychology courses, excluding PGS 270. No more than a total of three hours in PGS 399 and 499 and PSY 499 combined may be used to complete the 15 hours of upper division requirements. Students may take a maximum of six hours of PGS 399 and six hours of PGS 499 and PSY 499 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of "C." They must be approved by an undergraduate advisor and include MAT 119 (or higher), in addition to one course from among CSE 100, 181, and 183. See "Degree Requirements," pages 87.

PSYCHOLOGY—B.S.

The program consists of 31 semester hours in psychology, including at least 15 upper division hours. Required courses, which must be passed with a minimum grade of "C," are as follows: PGS 101, 315 (or 341 or 350); PSY 230, 290, 323 (or 320 or 324 or 325); one additional upper division PSY course (excluding PSY 490 and 499), two additional upper division courses (PGS or PSY), two additional psychology courses excluding PGS 270. No more than a total of three hours in PGS 399 and 499 and PSY 499 combined may be used to complete the 15 hours of upper division requirements. Students may take a maximum of six hours of PGS 399 and six hours of PGS 499 and PSY 499 combined. Eighteen hours in courses related to psychology must be passed with a minimum grade of "C." They must be approved by an undergraduate advisor and include MAT 210, one life science lab course (BIO, MIC, or ZOL); one physical science lab course (AST, CHM, GLG, or PHY); and one course from among CSE 100, 181, and 183. Further, the science courses taken to satisfy the Bachelor of Science requirements can not be used to meet the College of Lib

eral Arts and Sciences natural science distribution requirements See "Degree Requirements," pages 87.

MINOR IN PSYCHOLOGY

The minor consists of 22 hours in psychology, including the following: PGS 101, 315 (or 341 or 350); PSY 230, 290, 323 (or 320 or 324 or 325), and two additional upper division psychology courses (PGS or PSY) excluding PGS 270. A maximum of three hours of research (PGS 399, 499; PSY 499) may be used to meet the minor requirements. Students with an appropriate equivalent course may exclude PSY 230 from the requirements. All courses must be passed with a minimum grade of "C."

SECONDARY EDUCATION— B.A.E.

Psychology. The minor teaching field consists of 24 semester hours. See a departmental advisor.

Social Studies. See page 153.

GRADUATE PROGRAMS

The Department of Psychology offers programs leading to the Ph.D. degree. Consult the *Graduate Catalog* for requirements.

PSYCHOLOGY (PGS)

PGS 101 Introduction to Psychology. (3) F, S, SS

Major areas of theory and research in psychology. Participate in department sponsored research or an educational equivalent alternative activities required. *General studies: SB*

222 Human Sexual Behavior. (3) F, S
Patterns of sexual behavior including variations and deviations; theories of sexual attraction, sex differences and sexual dysfunction and treatment. Prerequisite: PGS 101. *General studies: SB*

270 Psychology of Adjustment. (3) F, S, SS
Principles of mental health, adjustment, conflict, stress, and coping processes derived from clinical and experimental research. Intended for nonmajors; cannot be used for major credit. Prerequisite: PGS 101. *General studies: SB*

304 Effective Thinking. (3) A
Understanding and improving your intellectual and behavioral skills: information analysis, inference, logic, problem solving, and decision making. Prerequisite: MAT 119 or PSY 230 or equivalent. *General studies: L1*

306 Environmental Psychology. (3) F, S, SS
Concepts and research strategies in the study of behavior in interaction with physical environment. Prerequisite: PGS 101. *General studies: SB*

315 Personality Theory and Research. (3) F, S, SS
Definition and description of personality in terms of theoretical and methodological approaches. Prerequisites: PGS 101, PSY 290. *General studies: SB*

341 Developmental Psychology. (3) F, S
Behavior development analyzed in terms of psychological principles. Current research in human development. Prerequisites: PGS 101, PSY 290. *General studies: SB*

344 Directed Child Study. (3–4) F, S, SS
Theories and methods of intervention with preschool children and supervised practicum in the Child Study Laboratory. 1-hour lecture, 6–8 hours practicum. Prerequisite: CDE 232 or PGS 341; instructor approval. *General studies: L2*

350 Social Psychology. (3) F, S, SS
Human social behavior, including such concepts as aggression, attraction, attribution, conformity, groups, helping, person perception, and persuasion. Prerequisite: PGS 101. *General studies: SB*

351 Honors Social Psychology. (3) N
A critical analysis of human social behavior for honors students; topics include stereotyping, social influence, attraction, aggression, helping, groups, and attitudes. Lecture, discussion. Open only to students without previous credit for PGS 350. Prerequisites: PGS 101 honors standing; instructor approval. *General studies: L2, SB*

365 Community Psychology. (3) F, S
Mental health and psychological well-being in the community, emphasizing current issues and related research. Prerequisite: PGS 315 or 350. *General studies: SB*

399 Supervised Research. 1–3) F, S, SS
Experience within the context of current faculty research projects. Student assignments dependent on qualifications. "Y" grade only. May be repeated for a total of 6 hours. Prerequisite: instructor approval of faculty member prior to registration; "B" average in major. Prerequisite: PSY 230 or equivalent.

414 History of Psychology. (3) F, S
Historical development of psychology from its philosophical beginnings to the present. Prerequisites: PGS 101, PSY 230, 290. *General studies: L2, SB*

427 Psychology of Aging. (3) N
Analysis of loss, maintenance, and gain associated with cognitive and affective aging. Individual differences in coping with normative life transitions. Prerequisites: PGS 101, 341. *General studies: L2, SB*

430 Industrial Psychology. (3) F, S, SS
Organizations and management systems; motivation and work performance; human factors in systems design and evaluation, personnel selection and testing. Prerequisite: MGT 301 or PGS 101.

431 Gender Role Development. (3) N
Theories and research in the development of sexual differentiation; concepts of femininity and masculinity; social roles and attitudes. Prerequisite: PGS 341. *General studies: L2, SB*

441 Cognitive Development. (3) F, S
Experimental and theoretical literature in child development and behavior. Prerequisite: PGS 341 or instructor approval. *General studies: L2, SB*

442 Life Span Development. (3) N
Methods and findings of recent studies of the development, growth, and problems of adolescents and adults, with implications for education. Prerequisite: PGS 341. *General studies: SB*

443 Abnormal Child Psychology. (3) F, S
The major disorders of childhood and adolescence (e.g., autism, hyperactivity, phobias, and delinquency) are covered, including cause, diagnosis, treatment, and prevention. Prerequisites: PGS 101 and 1 course from among PGS 315, 341, 350 or instructor approval. *General studies: L2, SB*

444 Adolescent Psychology and Psychopathology. (3) N
An advanced level survey of normal adolescent psychological development and psychological disorders of this age period. Lecture, discussion. Prerequisites: PGS 101, 341, PSY 290. *General studies: L2*

445 Child Language and Drawing. (3) F
Language acquisition and developmental changes in drawing, considered in the context of cognitive developmental stages. Children's representation and communication of knowledge through language and drawing. Prerequisite: PGS 341. *General studies: SB*

446 Social Development. (3) N
Theory, research, and issues regarding social development are discussed. Example topics: formation of attachments, prosocial development, and gender-role development. Lecture, seminar. Prerequisite: PGS 341. *General studies: L2*

450 Social Perception and Cognition. (3) N
A critical analysis of human social perception and social cognition. Topics include attribution, inference, memory, attention, impression formation, stereotype change. Lecture, discussion. Prerequisites: PGS 101, 350. *General studies: L2*

451 Stereotyping, Prejudice, and Discrimination. (3) N
A critical investigation of the processes underlying, and the factors contributing to, stereotyping, prejudice, and discrimination. Lecture, discussion. Prerequisites: PGS 101, 350. *General studies: L2*

452 Applied Social Psychology. (3) F
The study of applications of social psychological theory and concepts in natural research design and data analysis. Lecture, lab type activities. Prerequisites: PGS 101, 350; PSY 230. *General studies: L2*

453 Organizational Behavior. (3) N
A survey of psychological theory and research as applied to the behavior of individuals in organizations. Lecture, discussion. Prerequisites: PGS 101, 350.

458 Group Dynamics. (3) F
Theories and methods of group leadership, group effectiveness, communication within groups, and relations between groups and individual members. Prerequisite: PGS 350.

461 Interpersonal Influence. (3) N
Principles and procedures that affect the process of social influence: consideration of attitude, compliance, induction, and perceptual influences. Prerequisite: PGS 350. *General studies: SB*

462 Health Psychology. (3) F S
Contributions of psychology to health promotion and fitness prevention, adaptation to acute and chronic illness, and to the health care system Prerequisites PSY 230, 290

463 Advanced Psychology of Adjustment. (3) F
Critical analysis and effective expression of psychological theory and research of the topic of adjustment Lecture, discussion writing Prerequisites PSY 230, 290; completion of first year English requirements L1 course
General studies: L2

464 Minority Issues in Psychology. (3) S
Psychological issues relating to the diversity of human cultural experiences and among ethnic minorities in the U.S. Prerequisite PSY 290.

465 Psychology of Stress and Coping. (3) F
Readings in theory and research in the area of stress and coping Lecture, discussion, class presentations Prerequisites PGS 315 or 350, PSY 290
General studies: L2

466 Abnormal Psychology. (3) F, S SS
Historical and current definitions, theory and research concerning abnormal behavior Major categories of psychopathology, including related treatment approaches Prerequisites PGS 101, PSY 290.
General studies: SB

467 Psychology of Magical Beliefs. (3) N
The psychological nature and bases of magical beliefs and their impact on health behaviors, eating practices, and interpersonal relations Lecture, seminar. Prerequisites PGS 315, 466, PSY 434 or instructor approval
General studies: L2

468 Psychology and Law. (3) F, S
Theories, research and practice in psychology as related to law including criminal, civil, domestic relations, and professional issues Lecture discussion Prerequisite PGS 101.

471 Personnel Testing. (3) S
Methods and theory of psychological testing, various types of psychological tests; consideration of ethical, social, and legal aspects of testing Prerequisites MGT 311 or PGS 430; PGS 101 1 course in statistics

472 Clinical Psychology. (3) F, S
Clinical psychology as a science and professions on Historical development methods of interviewing assessment, and therapeutic intervention Prerequisite PGS 466.

Omnibus Courses: See page 44 for omnibus courses that may be offered

PSYCHOLOGY (PSY)

PSY 230 Introduction to Statistics. (3) F S SS
Basic concepts in descriptive and inferential statistics, emphasizing applications to psychology The course has both self-paced (PSI) and lecture sections. Prerequisites MAT 117, PGS 101
General studies: N2

290 Research Methods. (4) F, S
Planning execution analysis, and reporting of experiments Literature procedures, and instruments in representative areas of psychology research 3 hours lecture 3 hours lab Prerequisite PSY 230.
General studies: L1 S2

320 Learning and Motivation. (3) F S, SS
Principles of conditioning and motivation, approaches to learning including acquisition of verbal material concepts, and motor skills, memory and transfer. Prerequisite PSY 290

323 Sensation and Perception. (3) F S
Underlying processes of vision, audition and the other senses Application of current research and theory in a laboratory environment Prerequisite PSY 290 or instructor approval

324 Memory and Cognition. (3) F S SS
Processes underlying information storage and retrieval including different kinds of memory, forgetting depth of processing, and control processes Prerequisite PSY 290

325 Physiological Psychology. (3) F, S SS
Relationships of physiological processes to behavior Emphasis on nervous system functioning. Prerequisites PSY 290 or two courses in biology or science instructor approval.

330 Statistical Methods. (3) S
Advanced applications of statistics to psychology. Highly recommended for students interested in attending graduate school 3 hours lecture 1 hour lab Prerequisite PSY 230.
General studies: N2

390 Experimental Psychology. (3) S
Continuation of concepts in PSY 290, with emphasis on multivariate designs and programmatic sequence of experiments Lecture lab Prerequisite PSY 290
General studies: L2

420 Analysis of Behavior. (3) N
Research applications, and philosophy of the analysis and control of human behavior Prerequisite PSY 290
General studies: L2

424 Genetic Psychology. (3) S
Introduction to the concepts methodologies and findings of behavioral genetics for psychology majors Prerequisites PGS 100; PSY 230, 290

425 Biological Bases of Behavior. (3) N
Critical study of physiological psychology, brain mechanisms underlying motivation and learning Prerequisite PSY 325.
General studies: L2

426 Neuroanatomy. (4) N
Structure and function of mammalian brain, including sheep brain dissection 3 hours lecture 3 hours lab Prerequisite PSY 325 or equivalent
General studies: L2

433 Human Psychophysiology. (3) S
Emphasis on human physiological behaviors relationships Topics include physiological change associated with imagery stress attention skill learning and biofeedback Prerequisite PSY 325

434 Cognitive Psychology. (3) S
The human organism as a processor of information, from perception to cognition Abstract concepts semantic memory, attention, and mental imagery Prerequisite PSY 323 or 324 or instructor approval.
General studies: L2

437 Human Factors. (3) F
Emphasis on human factors in high technology systems. Specific topics include systems development systems analysis techniques, displays and controls Prerequisites PSY 290 and upper division standing or instructor approval
General studies: L2

470 Psychopharmacology. (3) F S
Basis of drug action at physiological and behavioral levels. Psychology and medical applications and imitations of drugs used in the treatment of mental illness Prerequisites PSY 325 1 semester each of biology and chemistry

490 Course Programming. (2) F S
Supervised experience in the development and administration of programmed instruction Designed for students who proctor self-paced or personalized courses May be repeated for a total of 4 credits Prerequisites PSY 230, instructor approval

501 Supervised Teaching. (4) F
Experience and examination of perspectives on teaching undergraduate psychology Prerequisites graduate standing in psychology instructor approval

506 Survey of Research in Environmental Psychology. (3) F
Major topics and paradigms in the study of man-environment relationships Prerequisite instructor approval.

512 Advanced Learning. (3) N
Principles and theories of learning emphasizing research literature. Prerequisite instructor approval.

524 Advanced Physiological Psychology. (3) N
Contributions of physiological processes and brain function to fundamental behavioral processes. Prerequisite instructor approval

528 Sensation and Perception. (3) N
Principles of sensory and perceptual processes emphasizing research literature Prerequisite instructor approval

529 Correlation and Psychometric Theory. (3) S
Principles of correlational techniques, including regression and multiple correlation. Psychometric theory including reliability and validity Prerequisite instructor approval

530 Intermediate Statistics. (3) F
Continuation of PSY 529. Psychological statistics emphasizing the analysis of variance and the design of experiments. Prerequisite PSY 529 or instructor approval

535 Cognitive Processes. (3) N
Theoretical and empirical issues in the study of the human organism as a processor of information including abstract, memory structure problem solving and thinking Prerequisite instructor approval

541 Research in Cognitive Development. (3) N
Theoretical and empirical issues in the study of children's knowledge and cognitive processes Comparison of research in Piagetian and other traditions Prerequisite admission to Psychology Ph.D. program or instructor approval

542 Social Development. (3) N
Major issues in the area of social development are topics for review and critique. Theory, research and content are covered Prerequisite instructor approval

543 Moral Development. (3) N
A variety of issues in moral development including positive and negative behaviors are considered Theory and research are major focus Prerequisite instructor approval.

550 Advanced Social Psychology. (3) F, S
Theory and research concerning interpersonal perception decision making attitude formation and change group processes social motivation and interaction processes Prerequisite instructor approval

551 Advanced Social Psychology. (3) F, S
Continuation of PSY 550 Prerequisite PSY 550 or instructor approval

553 Social Influence. (3) N

Research literature relevant for example, to attitude formation and change, conformity, obedience, power, compliance and altruism. Prerequisite: PSY 551 or instructor approval.

555 Experimental and Quasi-Experimental Designs for Research. (3) N

Review of research techniques. Laboratory and field research analyzed; applications to specific topics. Prerequisite: instructor approval.

556 Social Perception. (3) N

Theoretical and empirical implications of topics in social perception and cognition, e.g., attribution, attraction and impression formation. Prerequisite: PSY 551 or instructor approval.

558 Interpersonal Processes. (3) N

One or more topics chosen from the following: empathy, modeling, vicarious processes, contagion, group phenomena, social communication and behavior exchange. Prerequisites: PSY 550 and 551 or instructor approval.

564 Somatopsychology. (3) N

Theory and research in the psychological aspects of chronic illness, physical disability, and mental retardation. Prerequisite: instructor approval.

565 Somatopsychology. (3) N

Continuation of PSY 564. Prerequisite: PSY 564 or instructor approval.

569 Advanced Study of Personality. (3) N

Personality as a theoretical concept in psychology including definitional problems, behavior and traditional approaches, the measurement of personality and current research issues. Prerequisite: instructor approval.

572 Psychological Assessment. (3) F

Theory and research on assessment of personality, psychopathology and intelligence and construction of psychological assessment instruments. Prerequisite: admission to clinical Ph.D. program or instructor approval.

573 Psychopathology. (3) F

Theory and research relating to the contribution of psychological, social, physiological, and genetic factors to the development and persistence of abnormal behavior. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

574 Psychotherapy. (3) S

A detailed survey of the theoretical and empirical literature relating to verbal psychotherapy and interviewing methods. Structured role playing practice in the major procedures. Prerequisite: admission to the clinical Ph.D. program or instructor approval.

575 Behavior Therapy. (3) F

Theory and research relating to the use of behavior therapy to modify abnormal behavior. Structured practice. Prerequisite: admission to the clinical Ph.D. program or instructor approval.

578 Child Psychopathology. (3) N

Major theories and research related to the development of deviant behaviors in children including some supervised experience in child assessment. Prerequisite: PSY 572 or instructor approval.

582 Community Psychology. (3) SS

Community systems intervention techniques, consultation models, history and current status of community mental health movement, and conceptualization of the roles of community psychologists in social system intervention. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

588 Consultation Methods. (3) N

Several theories and strategies of organizational consultation. The development of consultational skills through simulation and practical experience. Prerequisite: advanced standing in Psychology Ph.D. program or instructor approval.

589 Social-Learning Theory. (3) N

Social-learning approach to the study of adaptive and maladaptive behavior patterns including theoretical and empirical research foundations of behavior therapy strategies. Prerequisite: admission to Psychology Ph.D. program or instructor approval.

624 Clinical Neuroscience. (3) S

An examination of the biological underpinnings of psychological disorders at the molecular, cellular, and system levels (schizophrenia, depression, anxiety, etc.). Lecture-proseminar. Prerequisite: graduate standing; instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Religious Studies

Linell E. Cady

Chair

(LL B605) 602/965-7145

PROFESSORS

FELDBAUS, WENTZ

ASSOCIATE PROFESSORS

CADY, FOARD, GEREBOFF, MARTIN,
MORRISON, WOODWARD

ASSISTANT PROFESSORS

CLAY, MOORE,
SCHOBER, SWANSON

RELIGIOUS STUDIES—B.A.

The program consists of 45 semester hours, 30 of which must be in religious studies (including 21 upper division hours) and 15 of which must be in related fields. In order for the student to become acquainted with a variety of religious phenomena, as well as with major issues and methods in the study of religions, the 30 semester hours in religious studies must include the following: REL 305; at least one course in religions from each of three distinct geographic regions or cultural traditions; two research seminars, including REL 405, which may be repeated for credit.

All majors must plan their programs in consultation with a departmental advisor. A minimum GPA of 2.50 is required in the 30 hours of religious studies courses. See "Foreign Language Requirement," page 87.

MINOR IN RELIGIOUS STUDIES

The minor in Religious Studies consists of 18 semester hours, at least 12 of which must be upper division. Both REL 305 and 405 are required.

GRADUATE PROGRAM

The Department of Religious Studies offers a graduate program leading to the degree of Master of Arts for those who wish to seek the Ph.D. in the study of religions, for those who wish to teach at the community college level, and for those in nonacademic careers who desire general competence in the academic study of religions. Consult the *Graduate Catalog* for requirements.

RELIGIOUS STUDIES

REL 100 Religions of the World.

 (3) F S

An introduction to the history of religious traditions of the world including Buddhism, Christianity, Hinduism, Islam, Judaism and others. Not open to students who have completed REL 200. *General studies:* HU, G.

200 The Study of Religious Traditions.

 (3) A

A writing-intensive course introducing analytical skills necessary for understanding religious traditions. Beliefs, practices and communities of several religious traditions of the world. Not open to students who have completed REL 100. *General studies:* L1 HU, G.

201 Religion and the Modern World.

 (3) A

An introduction to the nature and role of religious beliefs and practices in shaping the lives of individuals and societies, with particular attention to the modern world. *General studies:* L1 HU

210 Introduction to Judaism.

 (3) A

The beliefs, ceremonies, festivals, and institutions of Judaism emphasizing the contemporary era. The course presupposes no previous knowledge about Judaism. *General studies:* L1, HU, H

225 African-American Religion.

 (3) A

Introduction to the history and development of the African-American religious tradition. Lecture, discussion.

240 Introduction to Southeast Asia.

 (3) F

An interdisciplinary introduction to the cultures, religions, political systems, geography, and history of Southeast Asia. Cross-listed as ASB 240 GCU 240 HS 240/POS 240. *General studies:* G.

270 Introduction to Christianity.

 (3) A

The beliefs, ceremonies, festivals and institutions of Christianity, emphasizing the contemporary era. The course presupposes no previous knowledge about Christianity. *General studies:* HU

305 Ritual, Symbol, and Myth.

 (3) A

Ritual, symbol, and myth as types of religious expression, with examples selected from the non-iterate religions of the world. *General studies:* L2, HU, G

- 310 Western Religious Traditions.** (3) F
Religious traditions of Judaism, Christianity, and Islam, comparing their doctrinal institutions, and ritual systems and social histories. Lecture, discussion. *General studies H*
- 315 Hebrew Bible (Old Testament).** (3) A
The nature, content, background, historical situation, and message of the books of the Hebrew Bible in English translation. *General studies L2, HU H.*
- 316 Types of Early Judaism.** (3) A
Developments in Judaism during the intertestamental period. *General studies HU H*
- 317 Introduction to Rabbinic Judaism.** (3) A
A historical analysis of the thought, literature, and institutions of rabbinic Judaism. *General studies HU, H*
- 320 Religion in America.** (3) F, S
The emergence of religious ideas and institutions up to the Civil War. *General studies HU.*
- 321 Religion in America.** (3) F, S
The emergence of religious ideas and institutions from the Civil War to the present. *General studies HU*
- 330 Native American Religious Traditions.** (3) A
World views and religious thought presented through the art, architecture, literature, music, mythology, ritual, and folklore of representative tribes in North America. *General studies HU.*
- 331 History of Native American Religious Traditions.** (3) N
The role of religion in Native American history, including missions and religious adaptation, prophetic messianic and religious revitalization movements. *General studies: L2 HU, H*
- 340 Confucianism and Taoism.** (3) A
Issues in classical Chinese religious thought. Readings include Confucius, the Tao Te Ching, Mencius, Chuang Tzu, and the I Ching. *General studies L2, HU.*
- 345 Asian Religious Traditions.** (3) F
Introduction to the major concepts of religious beliefs, rituals, and practices in Hinduism and Buddhism. Lecture, discussion. *General studies HU, G*
- 350 Hinduism.** (3) A
The study of diverse forms of Hinduism through its institutions, literature, folk art, and architecture. *General studies L2 HU, G, H.*
- 351 Buddhism.** (3) A
Doctrines, practices, and institutions of the Buddhist religion, emphasizing its role in the history and culture of Asian societies. *General studies: L2, HU G*
- 365 Islamic Civilization, 700–1300.** (3) F
An introduction to Islamic religion, culture, and societies from 700 to 1300. *General studies. HU G H*
- 366 Islam as Civilization, 1300 to Present.** (3) F
Introduction to Islamic religion, culture, and societies from 1300 to present. Lecture, discussion.
- 371 New Testament.** (3) A
Origin and nature of early Christian communities, historical investigations of the types of oral and written tradition in the New Testament. *General studies HU*
- 372 Formation of the Christian Tradition.** (3) A
Origins, development, and expansion of Christianity, major themes and tensions from the New Testament world to the beginning of the Middle Ages. *General studies HU*
- 373 Women in Judaism.** (3) S
A study of the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as WST 372
- 381 Religion and Moral Issues.** (3) A
The manner in which human religiousness relates to social concerns, e.g., sexuality, the environment, bio-ethical issues, and violence. *General studies: L2 HU*
- 385 Contemporary Western Religious Thought.** (3) A
Introduction to contemporary Jewish and Christian thought. Topics include religion and politics, problem of evil, interpretations of God and feminist theology. *General studies L2 HU*
- 390 Women and Religion.** (3) A
The role of women in several organized religions and/or religious sects, including a study of myth and symbols as they are used to establish maintenance and enforce sex roles within specific religions. *General studies: HU, G.*
- 405 Problems in Religious Studies.** (3) A
Selected topics and methodological problems in religious studies involving students in the research interests of the instructor. May be repeated for credit when topics vary.
- 410 Judaism in Modern Times.** (3) N
Variety of expressions of Judaism and Jewishness in the modern period. Topics may include American Judaism or religious responses to the Holocaust. *General studies: HU, H*
- 415 The Jewish Mystical Tradition.** (3) A
Examination of some of the esoteric lore of Judaism. Movements and literature such as Hasidism and Kabbalah will be studied. *General studies. HU*
- 420 Religion in American Life and Thought.** (3) A
The influence of religion on American society, culture, and ideas; the distinctive character of religion in America. Prerequisite: REL 320 or 321 or equivalent. *General studies L2, HU*
- 426 American Preachers and Preaching: The Sermon in America.** (3) N
The life and work of notable American preachers. The emergence of the preacher as representative of American religion. Prerequisite: REL 320 or 321 or equivalent. *General studies L2 HU.*
- 427 American Religious Thought.** (3) N
The thought of representative American religious thinkers, e.g., Jonathan Edwards, William Ellery Channing, Horace Bushnell, and Reinhold Niebuhr. Prerequisite: REL 320 or 321 or equivalent. *General studies: HU, H*
- 435 Problems in Native American Religions.** (3) A
An in-depth consideration of selected problems in Native American religions. *General studies HU.*
- 444 Religion in Japan.** (3) A
Role of religion in Japanese history and culture. Emphasis on the impact of Buddhism and its transformation in Japan, the vitality of folk religion, the intimacy of religion and the arts, the deities of the samurai, and religion in modern Japan. *General studies HU, G, H*
- 454 Hindu Religious Thought.** (3) A
Readings in classical systems such as Samkhya and Vedanta and in the works of modern Hindus, such as Aurobindo and Gandhi. REL 351 recommended
- 460 Studies in Islamic Religion.** (3) A
Issues in the interpretation and understanding of Islamic texts, history, society, culture, and rituals. Prerequisites: REL 365 and Religious Studies major or instructor approval. *General studies HU G*
- 464 The Islamic Mystical Tradition.** (3) N
Asceticism, mysticism, and the cult of the saint in Islamic society, implications for Islamic religion and social history. Prerequisites: REL 365 and Religious Studies major or instructor approval. *General studies: HU G*
- 470 Religion in the Middle Ages.** (3) A
Religious aspects of medieval life and thought; variety of forms of dissent, heresy, and reform movements from the 4th to 13th centuries. *General studies. HU, H*
- 471 Reformation and Modern Christianity.** (3) A
Protestant Reformation to contemporary Christian movements, includes factors in the dissolution of the Medieval Christian synthesis, variety of reform movements and reformation patterns, Catholic counter-reform measures, formation of liberal theology, ecumenical movement, and the World Council of Churches. *General studies HU, H*
- 486 Modern Critics of Religion.** (3) A
Major theories and critiques of religion among modern social, philosophical, and religious thinkers. *General studies. HU.*
- 494 Special Topics in Religious Studies.** (3) N
Open to all students, freshmen by instructor approval only. Topics may be selected from various areas.
- 498 Pro-Seminar in Religious Studies.** (3) A
For students with a major or minor emphasis in Religious Studies.
- 501 Research Methods in Religious Studies.** (3) F
An exploration of the major themes and methods in the study of religion, with primary focus on classical texts. Lecture, discussion.
- 502 Research Methods in Religious Studies.** (3) F, S
An exploration of the major themes and methods in the study of religion, with primary focus on contemporary texts. Lecture, discussion.
- 591 Seminar.** (3) N
Topics on methodological issues in the study of religion. Prerequisite: Religious Studies graduate student or instructor approval.
- 598 Special Topics.** (3) F, S
Topics are selected from the following areas:
(a) Study of Religion, Comparative Religion
(b) Comparative Western/Ancient/Near East Judaism
(c) Religion in America
(d) Native American Religion
(e) Religion in East Asia
(f) Religion in South Asia
(g) Islam
(h) Christian/Greco-Roman Religion
(i) Western Religious Thought/Ethics
(j) Problems in Religious Studies
May be repeated for credit.
- Omnibus Courses:** See page 44 for omnibus courses that may be offered.



ROUTING SLIP
ARIZONA STATE UNIVERSITY

TO	DATE
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ACTION REQUIRED

<input type="checkbox"/> Copy	<input type="checkbox"/> Word Process
<input type="checkbox"/> Type	<input type="checkbox"/> See me _____ (initials)
<input type="checkbox"/> Circulate	<input type="checkbox"/> Deliver to: _____
	<input type="checkbox"/> Pick up _____
	From _____
	For _____

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FROM	EXT.

Sociology

A. Wade Smith
Chair
(SS 321) 602/965 3546

PROFESSORS

GORDON, LANER, NAGASAWA,
SMITH, SNOW, THOMAS
WEITZ, WHITAM

ASSOCIATE PROFESSORS

BENIN, COBAS HARDERT, KULIS,
MILLER-LOESSE, SULLIVAN,
VAUGHAN (ASU WEST)

ASSISTANT PROFESSORS

ESPINOSA JACOBSON, KEITH,
MUELLER (ASU WEST),
RIDDLE ROLISON

LECTURER

MAYO

PROFESSORS EMERITI

AXELROD, FARBER GUILLOT,
HENZE, HOULT, LINDSTROM,
PFUHL SEBALD

SOCIOLOGY—B.A.

See the opening portion of "College of Liberal Arts and Sciences" section for the departmental requirements for the B.A. degree, described on page 87.

The departmental requirement for either degree consists of 45 semester hours, of which 30 must be in sociology and 15 in closely related fields to be approved by the advisor in consultation with the student. The 30 hours must include SOC 101 (or 301), 391, 395, 483 (or 485 or 486) and one course from at least four of the following seven areas: family, intergroup relations and social psychology, political/comparative historical, racial/ethnic relations, social problems and processes, stratification/occupations organization, and urban sociology demography. Details are available in the department office. One sociology course in racial/ethnic relations is required. At least 18 semester hours must be in upper division courses, and at least 12 upper division semester hours in the major are required for residency. See "Degree Requirements," page 87.

MINOR IN SOCIOLOGY

The minor in Sociology consists of 18 hours in sociology, including the following. SOC 101 (or 301), 391 or 483 or 485 or 486; four remaining courses to be chosen by the student in consultation with a sociology advisor. Twelve hours must be in upper division courses, and at least six semester hours in upper division courses in the minor are required for residency.

SECONDARY EDUCATION—B.A.E.

Social Studies The major teaching field of social studies education consists of 63 semester hours, of which 30 hours may be in criminal justice, economics, geography, history, political science, psychology, and sociology and are exactly those courses required for the B.A. or B.S. degree in Sociology. Of the remaining hours, two groups of 12 hours each and one of six hours are generally taken in related social sciences plus SED 480.

The minor teaching field consists of 24 semester hours, at least six of which are upper division. SOC 101 or 301 is required. The remaining 21 hours must be approved by the sociology advisor in consultation with the student and must include at least one course from at least four of the following seven areas: family, intergroup relations and social psychology, political/comparative historical, racial/ethnic relations, social problems and processes, stratification/occupations organization, and urban sociology demography, (details are available in the department office). One sociology course in racial/ethnic relations is required.

GRADUATE PROGRAMS

The Department of Sociology offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

SOCIOLOGY

SOC 101 Introductory Sociology. (3) F, S, SS
Fundamentals of sociology, organization of human groups and society, processes of interaction and social change. Not open to students who have credit for SOC 301. 2 hours lecture, 1 hour discussion. *General studies: SB.*

294 Special Topics: Introduction to Southeast Asia. (3) N

301 Principles of Sociology. (3) F, S, SS
Intensive and critical analysis of the concepts of sociology. Not open to students who have credit for SOC 101. *General studies: SB.*

312 Sociology of Adolescence. (3) F, S
Cultural values and the social processes that help explain the development of the phenomenon of modern adolescence including investigation of adolescent subcultures and cross-cultural references. *General studies: SB.*

315 Courtship and Marriage. (3) F, S, SS
An overview of courtship, marriage, and related processes, focusing on problematic aspects of these institutions from the sociological perspective. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: SB.*

318 Overview of Aging. (3) F
Multidisciplinary introduction to gerontology. Explores the characteristics, experiences, problems, and needs of older persons. *General studies: SB.*

321 Sociology of Work. (3) S
Social and cultural analysis of industry, occupational roles, status, and social participation of workers. Prerequisite: SOC 101 or 301. *General studies: SB.*

332 The Modern City. (3) F, S
Growth characteristics and problems of the modern city. Prerequisite: SOC 101 or 301. *General studies: SB.*

333 Population. (3) F, S, SS
Theories of population change, births, deaths, and migration, population policies. Prerequisite: SOC 101 or 301. *General studies: SB, G.*

340 Sociology of Deviant Behavior. (3) F, S, SS

A sociological analysis of stigmatized behaviors and conditions including the causes, effects, and management of stigma. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: SB.*

341 Modern Social Problems. (3) F, S, SS
Race relations, poverty, unemployment, and other current issues. *General studies: SB.*

352 Social Change. (3) F, S
Patterns of social change, resistance to change, and change-producing agencies and processes. Prerequisite: SOC 101 or 301. *General studies: SB, G, H.*

360 Sociological Psychology. (3) F, S
Interaction patterns between the sociocultural order and individual socialization process; norms, roles, and statuses, collective behavior. Prerequisite: SOC 101 or 301. *General studies: SB.*

361 Variant Sexuality. (3) F
Sociological research and theories dealing with homosexuality, transvestism, transsexualism, and other variations in sexual orientation and gender identity. Prerequisite: SOC 101 or 301. *General studies: SB.*

365 The Sociology of Mass Communication. (3) F, S

A sociological exploration of the major mass media as a communicative process in American society. *General studies: SB.*

368 Sociology of Everyday Life. (3) F, S
Examination of routine everyday behavior as related to problems of social order, control, change, identity, and relationships. Prerequisite: SOC 101 or 301 or instructor approval.

- 391 Sociological Research.** (3) F, S, SS
Methods of sociological research including the fundamental assumptions underlying research and some practical experience in research design, data collection techniques and data analysis. Prerequisites: SOC 101 or 301 or instructor approval. *General studies: SB*
- 395 Social Statistics I.** (3) F, S, SS
Application of descriptive and inferential statistical methods to research problems in sociology. Prerequisites: SOC 101 (or 301), 391; N1 course. *General studies: N2*
- 415 The Family.** (3) F, S, SS
The family considered from the institutional viewpoint, its historical development and its adaptation to a changing culture, the family system in many cultures. Prerequisite: 6 hours in sociology including SOC 101 or 301 or instructor approval. *General studies: SB*
- 416 Marriage Problems in Contemporary Society.** (3) S
Marriage and family problems in today's society from the viewpoint of personal and cultural adjustment. Prerequisites: SOC 101 or 301 and an additional 3 hours in sociology or instructor approval. *General studies: L2, SB*
- 417 Family Violence.** (3) F, S
Study of current research and theory on several aspects of domestic violence, including child abuse, spousal aggression, and courtship violence. Prerequisite: instructor approval. *General studies: SB*
- 418 Aging and the Life Course.** (3) F, S
Social aspects of aging. Theoretical and methodological perspectives and problems of aging such as life satisfaction, retirement and adjustment to role loss. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: SB*
- 420 Sociology of Religion.** (3) S
Interrelationship of culture, society and religion; religion and social stratification, religious, economic, and political institutions, social change and religion. Emphasis on American society and institutions. Prerequisite: 6 hours in sociology including ASB 102 or SOC 101 or 301 or instructor approval. *General studies: L2, SB*
- 421 Sociology of Education.** (3) S
Contemporary sociological perspectives are used to examine effects of schools and schooling on individuals and society. Prerequisite: SOC 101 or 301 or instructor approval.
- 422 Sociology of Complex Organizations.** (3) F
Sociological studies of government agencies, industrial firms, labor unions, military establishments, and other large-scale organizations. Prerequisite: 6 hours in sociology including SOC 101 or 301 or instructor approval. *General studies: L2, SB*
- 423 Social Class and Stratification.** (3) S
Social classes and the function of these groupings in a society. Prerequisite: 6 hours in sociology, including SOC 101 or 301 or instructor approval. *General studies: L2, SB*
- 427 Sociology of Health and Illness.** (3) F
Social aspects of physical and mental illness and sociological analysis of the health care system and its practitioners. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: L2, SB*
- 428 AIDS and Society.** (3) F
This course provides a socio-historical perspective on stigma and illness in general and on AIDS in specific. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: L2*
- 429 Sociology of Law.** (3) S
Examination of law as an institution; its ongoing operations, and consequences. Emphasis on contemporary legal issues and problems. Prerequisite: SOC 446 or instructor approval. *General studies: SB*
- 432 Human Ecology.** (3) F, S
Patterns and laws of societal adjustments to the physical environment; distribution of communities and institutions. Prerequisite: SOC 101 (or 301) and 3 additional hours in sociology and college algebra or instructor approval. *General studies: SB*
- 433 Demographic Methods.** (3) S
Science of population analysis: problems in measurements of size, composition and changes in population. Prerequisites: SOC 101 (or 301), 333; college-level algebra. *General studies: SB*
- 446 Sociology of Crime.** (3) F
The process of criminalization, explaining the behavior of the definers of crime, and the behavior of those defined as criminals. Prerequisites: SOC 101 (or 301) and 340 or instructor approval. *General studies: SB*
- 451 Comparative Sociology.** (3) F
Cross-cultural study of basic social institutions; the methodology of cross-cultural research. Prerequisite: ASB 102 or SOC 101 or 301 or instructor approval. *General studies: SB, G*
- 455 Collective Behavior.** (3) S
Social causes and consequences of such non-institutionalized forms of behavior as crowds, cults, public movements, and revolutions. Prerequisite: 6 hours in sociology, including SOC 101 or 301 or instructor approval. *General studies: SB*
- 456 Political Sociology.** (3) S
Social factors associated with voting; nature and structure of the electorate and political parties and the nature of national and international power structure. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: SB, G*
- 462 Social Control.** (3) F
Significance of social control in society and the various methods used by individuals and groups to control others. Prerequisite: SOC 360 or instructor approval. *General studies: SB*
- 464 Women's Roles.** (3) S
Sociological analysis of the development, nature and consequences of traditional and alternative roles of women in contemporary society. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: L2, SB, C*
- 470 Racial and Ethnic Minorities.** (3) F, S, SS
Problems of minorities in the United States and in other racial and ethnic heterogeneous societies. Evaluation of theories of prejudice and of research dealing with discrimination, desegregation and assimilation. Prerequisites: SOC 101 (or 301) and 3 additional hours in sociology and college-level algebra or instructor approval. *General studies: SB*
- 474 Afro-American in Modern Society.** (3) F, S, SS
Social and cultural heritage of Black Americans; achievements and current trends. Lecture/discussion. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: L2, SB, C*
- 483 History of Social Thought.** (3) S, SS
Social thought in human culture. Background of modern sociology. Prerequisite: SOC 101 (or 301) and 3 additional hours in sociology or instructor approval. *General studies: L2, SB*
- 485 Sociology of Knowledge.** (3) F
Relationship between social conditions and the development of knowledge in modern society. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: L2, SB*
- 486 Contemporary Theory.** (3) S
Contemporary issues and crises in social theory with major focus on particular theorists. Ideological factors in theory, philosophical issues, the nature of theory and its relationship with methodology. Prerequisite: SOC 101 or 301 or instructor approval. *General studies: SB*
- 501 Practicum in Survey Research.** (3) F, S
A research practicum in survey fieldwork analysis and reporting in the Phoenix Area Study. Prerequisite: SOC 391 or equivalent.
- 502 Practicum in Survey Research.** (3) F, S
Continuation of SOC 501. Prerequisite: SOC 501.
- 505 Social Statistics II: Multivariate Analysis.** (3) F, SS
Analysis of variance, multiple regression, dummy variables, regression path analysis, and related topics. Computer application to problem solving. Prerequisites: SOC 395 or equivalent. *General studies: SB*
- 507 Social Statistics IIIA: Categorical Data Analysis.** (3) F
Logistic and log-linear models through computer applications. Social mobility, dynamic analysis and discriminant analysis may also be included. Prerequisite: SOC 505 or instructor approval.
- 508 Social Statistics IIIB: Structural Equation Analysis.** (3) S
Structural equation models are taught using LISREL and other computer packages. Topics include multiple group analyses and endogenous variables. Prerequisite: SOC 505 or instructor approval.
- 515 Studies of the Family.** (3) S
Current developments in the study of marriage and the family. Prerequisite: instructor approval.
- 585 Development of Sociology.** (3) F
Major sociological theorists, including Durkheim, Weber, Marx, Parsons, Merton, Dahrendorf, Homans, and Mead. Prerequisite: instructor approval.
- 586 Contemporary Sociological Theory.** (3) S
Analysis of major theories, including structural-functional, conflict, social exchange, symbolic interaction, and role theory. Prerequisite: instructor approval.
- 587 Metasociology.** (3) S
Nature of sociological assumptions. Nature and form of sociological theories. Context of discovery-grounded theory. Context of justification. Prerequisite: instructor approval.

588 Methodological Issues in Sociology.

3 S
Basic methodological issues in the application of scientific methods to the study of human social life. Emphasizes on a limited number of major works with contrasting approaches to issues. Prerequisite: SOC 391 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered

Speech and Hearing Science

M. Jeanne Wilcox
Chair
(LLA145) 602/965-2374

PROFESSORS

BACON CASE CLUFF DORMAN,
LaPOINTE, MOWRER, WILCOX

ASSOCIATE PROFESSORS

CHUBRICH, SAMMETH

FACULTY ASSOCIATES

BROWN, BUDRZYNSKY HUEFFNER,
MINTZ WEXLER WILSON

CLINIC DIRECTOR

CASE

PROFESSOR EMERITUS

PRATHER

SPEECH AND HEARING SCIENCE—B.S.

The program consists of 45 semester hours of speech and hearing science courses emphasizing the developmental and scientific aspects of language, speech, and hearing. The following courses, or their approved equivalents, are required: SHS 250, 310, 311, 375, 376, 384, 400, 402, 450, and 465, plus one three-hour course in disorders of speech and one three-hour course in disorders of language. The remaining speech and hearing science courses to complete the major are determined by the students in consultation with an advisor. A list of approved electives is available through the department. Supporting courses from related fields must include the following or their equivalents: MAT 118; PGS 101; PHY 111, 113; PSY 230, ZOL 201

GRADUATE PROGRAMS

The Department of Speech and Hearing Science offers programs leading to the Master of Natural Science degree with a concentration in communication

disorders, Master of Science degree in Communication Disorders, and Doctor of Philosophy degree in Speech and Hearing Science. Consult the *Graduate Catalog* for requirements.

SPEECH AND HEARING SCIENCE

SHS 174 American Sign Language I. (3) F, S

Basic receptive expressive conversational skills; basic grammar and syntax rules. Orientation to deafness and deaf culture. Lecture, drill, practice, dialogue and discussion.

250 Introduction to Phonetics. (3) F

An introduction to English phonetics with emphasis on phonetic transcription articulation, phonology and disorders of speech.

274 American Sign Language II. (3) F, S

Further development of receptive expressive conversational skills in ASL: finger spelling. Continued exploration of deaf culture. Lecture, discussion, drill, practice. Prerequisite: SHS 174.

305 Survey of Communication Disorders. (3) F, S

An overview of normative and disordered processes of human communication. Designed for majors as well as nonmajors.

310 Anatomical and Physiological Bases of Speech. (3) F

A noncadaveric study of anatomical systems that underlie human speech and language including respiratory phonation articulation and related nervous system processes.

311 Physical and Physiological Bases of Hearing. (3) F, S

Study of the physical characteristics of sound and of the structure and function of the human auditory system. Prerequisites: MAT 117, PHY 111, 113.

367 Speech and Language Development. (3) F

Process of speech and language development from birth through adulthood.

374 American Sign Language III. (3) F, S

Develop greater fluency and speed. Emphasis on deaf culture and folklore including storytelling and idioms. Beginning technical and interpreting signs. Lecture, discussion, drill, practice. Prerequisite: SHS 274.

375 Speech Science. (3) F

Normative aspects of speech hearing and language. Prerequisites: SHS 310, 311.

376 Psychoacoustics. (3) S

Introduction to acoustics cochlear anatomy and physiology and the perception of sound. Prerequisite: SHS 311 or instructor approval.

384 Hearing Disorders. (3) S

Pathologies of the ear and associated peripheral and central hearing disorders: characteristics management and effects on communication. Prerequisites: SHS 311, 376.

400 Introduction to Audiologic Evaluation. (4) F

Measurement of the basic audiologic test battery including audiograms, masking, speech recognition and immittance. 3 hours lecture, 3 hours lab. Cross-listed as SHS 500. Prerequisites: SHS 311, 376, 384.

402 Modifying Communicative Behavior. (3) S

Principles and techniques of modifying speech and language behavior. Prerequisite: SHS 250 or equivalent.

431 Nature of Fluency Disorders. (2) S

History and nature of fluency disorders.

435 Hearing Conservation. (3) S

The causes and prevention of noise-induced hearing loss, and approaches to industrial audiology programs. Cross-listed as SHS 535. Prerequisite: SHS 400.

450 Observation. (1) F, S

Opportunity to obtain observation experience at the ASU Speech and Hearing Center or at external sites. Prerequisite: instructor approval.

465 Language Acquisition. (3) F, S

Language development in the normal child. Cross-listed as SHS 565.

470 Childhood Language Disorders. (3) S

Introduction to the nature and treatment of language disorders in children. Cross-listed as SHS 570. Prerequisite: SHS 465 or instructor approval.

483 Professional Issues in Communication Disorders. (3) F

Topics related to professional certification accreditation, code of ethics graduate education and other issues in speech-language pathology and audiology.

494 Special Topics. (3) F, S

Topics may be selected from the following:

- (a) Hearing Disorders
- (b) Speech and Language Disorders
- (c) Research

May be repeated for credit. Prerequisite: instructor approval.

495 Disorders of Articulation. (3) F

Detailed analysis of disorders of articulation. Cross-listed as SHS 585. Prerequisites: SHS 250, 310.

496 Aural Rehabilitation. (3) S

Approaches to aural rehabilitation of children and adults. Introduction to educational audiology and assistive listening devices. Cross-listed as SHS 596. Prerequisites: SHS 375, 400.

501 Introduction to Audiologic Evaluation. (4) F

Measurement of the basic audiologic test battery including audiograms, masking, speech recognition, and immittance. 3 hours lecture, 3 hours lab. Cross-listed as SHS 400. Prerequisite: SHS 311 and 376 and 384 or equivalents.

502 Advanced Audiologic Evaluation I. (4) F

Differential diagnosis of cochlear and retrocochlear disorders including measurement of auditory evoked responses. 3 hours lecture, 2 hours lab. Prerequisite: SHS 400 or 500 or equivalent.

504 Hearing Aids. (4) S

Operational application and fitting of amplification devices for the hearing impaired. 3 hours lecture, 2 hours lab. Prerequisite: SHS 400 or 500 or equivalent.

505 Computers and Current Technology in Audiology and Speech-Language Pathology. (3) F

Computer applications and current technology as applied to service administration and delivery in the fields of audiology and speech language pathology. Lecture/lab.

508 Pediatric Audiology. (3) F

Audiologic assessment, screening, and development considerations for infants and young children. Prerequisite: SHS 400 or 500 or equivalent.

510 Advanced Hearing Science. (3) N
Anatomical, physiological and psychophysical aspects of audition. Prerequisite: SHS 376 or instructor approval

511 Auditory Perception by the Hearing Impaired. (3) F 94

A study of how and why sensorineural hearing loss alters the perception of sound. Prerequisite: SHS 376 or instructor approval

512 Medical Aspects of Speech and Hearing. (3) F S

Correlation of history and physical findings with pathologic physiology and test results in speech and hearing abnormalities

515 Audiologic Instrumentation and Calibration. (3) S

Electronic instruments used to produce modify and measure characteristics of sound. Measurement standards and methods for calibration of audiologic equipment. Lecture, lab. Prerequisite: SHS 400 or 500 or equivalent

516 Advanced Audiologic Evaluation II. (3) S

Continuation of SHS 502, including behavioral and physiological measures of the central auditory nervous system and vestibular assessment. Lecture, lab. Prerequisite: SHS 502

535 Hearing Conservation. (3) S

The causes and prevention of noise-induced hearing loss and approaches to industrial audiologic programs. Cross-listed as SHS 435. Prerequisite: SHS 400 or 500 or equivalent

545 Speech Perception and Production. (3) F

Current knowledge regarding the production and perception of speech. Introduces speech perceptual problems of the hearing impaired, and cochlear implants. Prerequisite: SHS 375 or instructor approval

552 Otoacoustic Emissions as a Diagnostic Tool. (3) F 94

Study of the types of otoacoustic emissions on the theoretical implications and application to clinical diagnosis. Lecture-discussion, lab. Prerequisite: SHS 376 or instructor approval

555 Cochlear Implants. (3) S

Current status of cochlear implant research and development. Prerequisite: SHS 504 and 545 or instructor approval

565 Language Acquisition. (3) F

Language development in the normal child. Cross-listed as SHS 465

566 Psychology of Language. (3) S

Language and thought interaction

570 Childhood Language Disorders. (3) F

Introduction to the nature and treatment of language disorders in children. Cross-listed as SHS 470. Prerequisites: SHS 465 or 565 or equivalent.

571 Augmentative Communication and Language Programming. (3) S

Focus on individuals across the age span who are or who are at risk for being unable to communicate with spoken language. Lecture, lab

572 Language Assessment and Intervention in Early Childhood. (3) F

Focus on the birth to 5-year-old population who are at risk for or have communication and language disabilities. Prerequisite: SHS 470 or 570 or equivalent

574 Fluency Disorders and Treatment. (3) F

Phenomena, etiology, assessment, and theories of stuttering are presented followed by various treatment procedures for children and adults who stutter. Prerequisite: SHS 431 or equivalent

575 Aphasia and Related Neurogenic Language Disorders. (3) F

Assessment and treatment of acquired neuro-linguistic impairment. Prerequisite: SHS 310 or equivalent

576 Neuromotor Speech Disorders. (3) S

Evaluation and treatment of the dysarthrias and apraxia of speech. Emphasis on acquired adult disorders

577 Craniofacial Disorders of Communication. (3) S SS

Communication disorders related to anomalies of the craniofacial structures including orofacial clefting of the lip and palate. Prerequisite: SHS 310 or equivalent

578 Disorders of Voice. (3) S

Communication disorders related to dysfunction of the phonatory and resonance systems of voice production, assessment and treatment. Prerequisite: SHS 310 or instructor approval

580 Clinical Practicum. 1-6) F S, SS

Supervised practicum in audiology or speech-language pathology. 1 hour staffing and 3 hours of client contact per week per hour of credit. May be repeated for credit. Prerequisites: instructor approval. Student must not have previous admission status.

582 Differential Diagnosis of Communication Disorders. (3) F

Procedures for assessing speech-language disorders in children and adults. 3 hours lecture, 2 hours lab. Prerequisite: instructor approval

584 Internship. (1-6) F S SS

Off-campus directed experiences in audiology or speech-language pathology. May be repeated for credit. Prerequisites: SHS 580. Student must consult with coordinator before registration

585 Disorders of Articulation. (3) F

Detailed analysis of disorders of articulation. Cross-listed as 4995. Prerequisites: SHS 250 and 310 or equivalent.

591 Seminar. (3) F, S SS

Selected topics regularly offered:

(a) Autism and Pervasive Language Disorders

(b) Multiply Handicapped Child

596 Aural Rehabilitation. (3) S

Approaches to aural rehabilitation in children and adults. Introduction to educational audiology and assistive listening devices. Cross-listed as SHS 496. Prerequisite: SHS 375 or 400 or 500 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered

Women's Studies Program

Mary Logan Rothschild

Director

(SS 103) 602/965-2358

PROFESSORS

KOSS-CH ONO (Anthropology),

CODELL, MAGENTA (Art);

K. VALENTINE (Communication)

EDELSKY (Curriculum and Instruction);

BATAILLE, LGHTFOOT, NILSEN,

SHINN (English); WELLS (Exercise

Science and Physical Education);

KRONENFELD (Health Administration

and Policy), FUCHS, GIFFIN

ROTHSCHILD, WARNICKE (History);

JOHNSON, KELLY (Justice Studies)

AHERN, LOSSE (Languages and

Literatures) BERNSTEIN, CHASSIN

EISENBURG, RUSSO (Psychology)

HACKETT, KERR (Psychology in

Education); COUDROGLOU (Social

Work); GORDON, LANER,

SMITH, WEITZ (Sociology)

ASSOCIATE PROFESSORS

BRANDT (Anthropology); FAHLRAN,

SCHLEIF (Art), CARLSON

C. VALENTINE (Communication)

WILSON (Curriculum and Instruction),

ADAMS, GUTIERREZ, MENER

MORGAN, SENSIBAR (English);

BAKER, MARTIN (Family Resources

and Human Development); STONER

(History); FERRARO, JURK, ZATZ

(Justice Studies); RODD (Languages

and Literatures); COOK (Management);

WILLIAMSON (Music); KENNEY

(Nursing), DANTICO (Political Science);

METHA, MOORE (Psychology in

Education); WOODMAN (Social Work);

BENIN, MILLER-LOESSE (Sociology)

ASSISTANT PROFESSORS

HULICK (Art); HORAN (English);

DOUTHWAITE, GRUZINSKA

(Languages and Literatures);

WASSERMAN (Planning), BOWER

(Political Science); SAENZ (Psychology)

LECTURERS

HOPKINS, SCHENNER (Women's

Studies Program)

PROFESSOR EMERITUS

SHAFER (Educational Leadership

and Policy Studies)

The Women's Studies Program is an interdisciplinary university program, housed in the College of Liberal Arts and Sciences. Core and affiliated faculty hold tenure or tenure track positions in traditional academic departments. Information on faculty affiliation is provided in parentheses for reference.

**WOMEN'S STUDIES—
B.A. OR B.S.**

The program consists of 45 semester hours of which 36 must be in Women's Studies and nine of which must be in a closely related field. At least 36 of the 45 semester hours required for the major must be completed in upper division courses. In addition, for the B.S. degree, students must complete six hours in statistics, computer science, or quantitative research methods. This sequence must be approved by a women's studies advisor.

Required Courses. Five courses are required. Students must complete the following:

1. WST 100 or 300;
2. WST 376;
3. WST 484 Internship (3);
4. WST 498;
5. an upper division course that provides a historical perspective on the lives and contributions of women;
6. an upper division course that provides a humanities or fine arts perspective on the lives and contributions of women; and
7. an upper division course on women in non-Western societies or a course on minority or ethnic women in American society.

A list of approved courses is available each term in the program office.

The historical perspective requirement may be fulfilled by completing HIS 333, 370, 371, or 422. The humanities perspective requirement may be fulfilled by completing ARA 485, ENG 461 or 462, or REL 390 (or an approved special topics course). No course may be used to satisfy more than one requirement.

Electives in a Closely Related Field. Majors must complete nine hours of courses in a field closely related to Women's Studies, thereby completing the minimum core requirements in a single field. These courses may be

used to satisfy the general education requirements in the College of Liberal Arts and Sciences.

Minor in Women's Studies

The Women's Studies minor consists of 18 semester hours. Required courses are WST 100 (or 300) and 498 and 12 additional hours of approved women's studies courses taken after consultation with a women's studies advisor. Students pursuing a minor must register at least one semester before graduation.

**CERTIFICATE PROGRAM IN
WOMEN'S STUDIES**

The certificate program is equivalent to an interdisciplinary minor, consists of 21 hours, and is recommended for students outside the College of Liberal Arts and Sciences, graduate students, and nondegree students. Students pursuing a certificate must consult with a Women's Studies advisor. See page 91 for a description of the certificate program.

GRADUATE STUDIES

Although the Women's Studies Program does not offer a graduate degree, it is possible to pursue a graduate degree in some existing programs with a thesis or dissertation topic related to women's studies. Information on such programs can be obtained from the Women's Studies Program office.

COURSES IN WOMEN'S STUDIES

The following courses available through departments also count toward the 36 hours of courses in women's studies *when taught by women's studies faculty (or approved by petition)*:

	<i>Semester Hours</i>	
ARA 485	3	Women's View of Art
ARS 498	3	Women and Art in the Middle Ages and the Renaissance
ARS 591	3	Women and Art in the Middle Ages and the Renaissance
ASB 211	3	Women in Other Cultures
CED 591	3	Women. Sense of Identity
COM 316	3	Gender and Communication
CPY 674	3	Counseling Women
ENG 461	3	Women and Literature
ENG 462	3	20th Century Women Authors
EPE 441	3	Physiology of Women in Sport
FRE 471	3	The Literature of Franco phone Africa and the Caribbean

HIS 370	3	Women in U.S. History: 1600-1880.
HIS 371	3	Women in U.S. History: 1880-1980.
HIS 422	3	Rebellious Women
JUS 329	3	Domestic Violence
JUS 422	3	Women, Law, and Social Control
JUS 560	3	Women and Crime
PGS 431	3	Gender Role Development
REL 390	3	Women and Religion
SOC 417	3	Family Violence
SOC 464	3	Women's Roles
SPF 515	3	Education of Women

Additional courses appear as Special Topics. These vary by semester. Check with the program office or the department for a current listing.

WOMEN'S STUDIES

WST 100 Women and Society. (3) F, S
Interdisciplinary introduction examining critical issues in women's studies. Not open to students who have credit for WST 300. *General studies: SB, C.*

300 Women in Contemporary Society. (3) F, S, SS
Intensive interdisciplinary examination of such topics as gender roles, work, education, sexuality, politics, health, and law. Not open to students who have credit for WST 100. *General studies: SB, C.*

372 Women in Judaism. (3) S
The impact of feminism on the legal, social, and cultural status of Jewish women in various historical and contemporary societies. Cross-listed as REL 373.

373 La Chicana. (3) F, S
This course examines the important role Mexican American women, or Chicanas played in historical, social, and political developments of the Southwest. *General studies: SB, C.*

376 Introduction to Feminist Theory. (3) F, S
Introduction to feminist theories and exploration of the intersection of gender, race, ethnicity and class through critical analyses. Prerequisite: WST 100 or 300. *General studies L1, C.*

457 Third-World Women. (3) F
Economic, sociopolitical, and demographic context for understanding the roles of third-world women in health, family, work, education, and community. Cross-listed as NUR 457. Prerequisite: 6 hours of social science credit or instructor approval. *General studies: SB, G.*

484 Internship. (1-3) A
Practical experience to enhance the academic perspectives that emerge from women's studies instruction. Prerequisite: preapproval by internship coordinator required.

498 Pro-Seminar: Theoretical Issues in Women's Studies. (3) A
Reading and research on important theoretical issues in women's studies. *General studies: L2.*

Omnibus Courses: See page 44 for omnibus courses that may be offered. Check with the program office for a current listing.

Zoology

James P. Collins
Chair
 (LS C226) 602/965-3571

REGENTS' PROFESSOR ALCOCK

PROFESSORS
 ALVARADO, CHANDLER, CHURCH,
 COLLINS, DOANE, FAETH, FISHER,
 HADLEY, HAZEL, HEDRICK,
 LAWSON, MAIENSCHNEIN, MARKOW,
 McGAUGHEY, MCKLEY, OHMART,
 RISSING, RUTOWSKI SATTERLIE,
 A. SMITH, WALSBURG

ASSOCIATE PROFESSORS
 CAPCO, FOUQUETTE, GOLDSTEIN,
 MOORE, G. SMITH

ASSISTANT PROFESSORS
 COOPER, DOWLING,
 ELSENER HARRISON

PROFESSORS EMERITI
 BENDER, CAZIER, CLOTHIER, COLE,
 GERKING, HANSON, JUSTUS,
 LANDERS, PATTERSON,
 RASMUSSEN, WOLFF

BIOLOGY—B.S.

The major in Biology is offered jointly by the Department of Zoology and the Department of Botany. Students are advised by a member of either department. This major serves students desiring a broader program in the biological sciences than provided by the more specialized majors of the individual departments.

The major consists of 43 hours and 20 hours in supplementary areas, plus a mathematics proficiency. The required major courses totaling 31 hours are as follows: BIO 181, 182, 320, 340; BOT 300, 360 (or ZOL 360); MIC 206, 220; ZOL 350. The remaining 12 upper division hours are selected so that the total major hours reflect a balance between the two departments. Required supplementary courses are as follows: CHM 113, 115; CHM 231 or the sequence CHM 331 and 332 and 335 and 336; CSE 181 or 183; MAT 210 or any calculus; PHY 101 or the sequence PHY 111 and 112 and 113 and 114.

WILDLIFE CONSERVATION BIOLOGY—B.S.

Two options are available: the terrestrial and the aquatic option. Both op-

tions consist of 62 hours in the major and supplementary courses, plus mathematics proficiency. Courses required for both options are as follows: BIO 181, 182, 217, 320, 340, 415; CHM 113, 115; CHM 231 or the sequence CHM 331 and 332 and 335 and 336; ENG 301; MAT 210 or any calculus; ZOL 360, 410, 411, 413.

Terrestrial Option. Additional required courses for this option are as follows: BOT 370; ERA 370 or 360; ZOL 471 or 472.

Aquatic Option. Additional required courses for this option are as follows: BIO 426; ZOL 370 (or 350), 473.

These requirements meet the minimum for eligibility for the Federal Register. Students planning to enter graduate school from either option should take CHM 331, 332, 335, and 336 in stead of CHM 231 and should take PHY 111, 112, 113, and 114.

ZOOLOGY—B.S.

The major in Zoology consists of 40 hours in major courses and 17 hours in required supplementary courses, plus math proficiency. Required courses are as follows: BIO 181, 182, 320, 340, 445; CHM 113, 115; CHM 231 or the sequence CHM 331 and 332 and 335 and 336; MAT 210 or any calculus; PHY 101 or the sequence PHY 111 and 112 and 113 and 114; ZOL 280, 330, 331, 360, 370 (or 350 or 354). The remaining six hours may be selected from upper division BIO or ZOL courses.

Undergraduate Thesis Option. To fulfill the six semester hours of zoology electives, a student may arrange to conduct a laboratory or field research project under the supervision of a member of the Zoology faculty. At least three semester hours are taken as BIO 310 or ZOL 499 and three semester hours as ZOL 495 Undergraduate Thesis. This option culminates in the production of a thesis by the student that describes the research project and a thesis defense. See the Department of Zoology office for a complete description of this option.

MINOR IN ZOOLOGY

The Zoology minor consists of 24 semester hours in BIO and ZOL courses, including BIO 181 and 182, and 16 hours selected with approval of an advisor in the Department of Zoology; at least 12 hours must be in the upper di-

vision. Courses not available for credit in the Zoology major cannot be used for the minor (e.g., BIO 100, ZOL 201). This minor is not available to students majoring in the life sciences.

SECONDARY EDUCATION— B.A.E.

See pages 96-97 for information on the academic specialization in biological sciences.

GRADUATE PROGRAM

The Department of Zoology offers programs leading to the degrees of Master of Natural Science, Master of Science, and Doctor of Philosophy (with a concentration in ecology for the Master of Science and the Doctor of Philosophy). Consult the *Graduate Catalog* for requirements.

The department participates in the new interdisciplinary program for the Master of Science and Doctor of Philosophy degrees in Molecular and Cellular Biology. See pages 139-140 for courses. For more information, contact Dr. Douglas Chandler, LS C592, 602/965-5662.

BIOLOGY

For courses in biology, see "Biological Sciences," pages 96-97

ZOOLOGY

ZOL 113 Contemporary Zoology. (4) F, S
 Topics emphasizing socially relevant problems. Cannot be used for major credit in the biological sciences. 3 hours lecture 3 hours lab. *General studies:* S2.

120 Human Physiology. (4) F, S
 Basic concepts of general science will be discussed using current issues and basic concepts of human physiology as a focus. Cannot be used for major credit in biological sciences. 3 hours lecture 3 hours lab. *General studies:* S2.

201 Human Anatomy and Physiology I. (4) F, S, SS
 Structure and dynamics of the human mechanism. Cannot be used for major credit in the Department of Zoology. 3 hours lecture, 3 hours lab. *General studies:* S2

202 Human Anatomy and Physiology II. (4) F, S, SS
 Continuation of ZOL 201. Cannot be used for major credit in the Department of Zoology. 3 hours lecture 3 hours lab. Prerequisite: ZOL 201 or instructor approval.

241 Human Genetics. (3) F, S
 Introduction to human heredity and variation. Cannot be used for major credit in the Department of Zoology. Prerequisite: a course in the life sciences.

280 Animal Behavior. (3) F
 Evolutionary, genetic, physiological, and ecological bases of animal behavior. Prerequisite: 4 hours of BIO or ZOL or instructor approval.

- 300 Biogenetics of Man.** (4) S
Concepts of ecology, heredity, evolution and their relation to human affairs. Cannot be used for major credit in life sciences.
- 311 Animal Microtechnique.** (2) N
Zooogical microtechnique including the preparation for microscopic examination of animal structures, tissues, cells, and whole mounts. 6 hours lab. Prerequisite: BIO 182.
- 316 History of Biology: Conflicts and Controversies.** (3) N
Focuses on 19th and 20th centuries, considering biology as a discipline evolving, and problems of heredity development, and cell theory. Cross-listed as HPS 330 *General studies: H*.
- 318 History of Medicine.** (3) N
Scientific study of the human body, changing theories of disease, evolution of practical operations on treatment, and the emerging institution of medical practice. Cross-listed as HPS 331 *General studies: H*.
- 330 Developmental Anatomy.** (3) F
General developmental biology (embryology) and comparative structure of organ systems illustrated mainly by vertebrate examples. Prerequisite: BIO 182.
- 331 Laboratory in Vertebrate Developmental Anatomy.** (2) F, S
Morphology of representative embryonic and adult vertebrates. Two 3-hour labs. ZOL 330 recommended. Prerequisite: BIO 182.
- 350 Comparative Invertebrate Zoology.** (4) F
Characteristics, life cycles, adaptations, and evolution of invertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.
- 354 General Entomology.** (4) S '96
Form and function, and classification of insects. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.
- 360 Basic Physiology.** (4) F, S
Physiological mechanisms of the higher vertebrates. 3 hours lecture, 3 hours lab. Prerequisites: BIO 182, CHM 115, MAT 117.
- 370 Vertebrate Zoology.** (4) S
Characteristics, classification, evolution and natural history of the major groups of vertebrate animals. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182.
- 380 Sociobiology.** (3) S
Survey of animal and human social behavior examined from an evolutionary perspective. Suitable for nonmajors. ZOL 280 is recommended.
- 394 Special Topics (Nonmajors).** (2-3) N
Topics of current or special interest in one or more aspects of animal biology. Topics vary. Cannot be used for major credit in life sciences. Prerequisite: junior standing.
- 410 Techniques in Wildlife Conservation Biology.** (3) F
Field and analytical techniques used in evaluating population structure, viability and environmental impacts. Lecture, lab. Prerequisites: BIO 217 and 320 or instructor approval. *General studies: L2*.
- 411 Biology and Management of Terrestrial Wildlife.** (3) S
Principles, theories and practices of managing terrestrial wildlife from habitat and population perspectives. Prerequisites: BIO 217 and 320 and ZOL 471 and 472 or instructor approval.
- 413 Biology and Management of Aquatic Resources.** (3) F
Principles, theories and practices of managing aquatic resources. Prerequisites: BIO 217 and 320 and ZOL 473 or instructor approval.
- 420 Field Zoology.** (3) N
Experience in zoogical field techniques. Requires weekend or longer field trips. Prerequisite: instructor approval.
- 423 Population and Community Ecology.** (3) N
Organization and dynamics of population and communities emphasizing animal Theoretical and empirical approaches. Prerequisite: BIO 320 or instructor approval.
- 425 Animal Ecology.** (3) N
Physiological and behavioral adaptations of individual animals to both abiotic and biotic environments. Prerequisite: BIO 320.
- 433 Animal Histology.** (4) S
Microscopic study of animal tissues. 3 hours lecture, 3 hours lab. Prerequisite: BIO 182 or instructor approval.
- 440 The Nucleus.** (3) N
Experimental studies in chromatin and chromosome structure. Molecular mechanisms of chromosome movement and mechanisms, cell population kinetics, the nucleus and the nuclear envelope. Prerequisites: BIO 340, CHM 261, 335 (or 361).
- 441 Principles of Human Genetics.** (3) N
Genetics in human populations, including medical aspects. Prerequisite: BIO 340.
- 454 Aquatic Insects.** (3) N
Systematics and ecology of aquatic insects. Prerequisite: ZOL 354.
- 465 Neurophysiology.** (3) S '96
Detailed treatment of cellular and organismal neurophysiology and nervous system function. Prerequisite: ZOL 360.
- 466 Neurophysiology Laboratory.** (2) S '96
Intracellular and extracellular electrophysiological recording techniques, histological preparation, and dye filling techniques. 6 hours lab. Pre- or corequisite: ZOL 465.
- 470 Systematic Zoology.** (3) S '95
Philosophy, theory and practice in interpreting patterns of animal diversity, including species concepts and speciation, nomenclature and taxonomy, and evolutionary and phylogenetic classification. Prerequisites: junior standing, 18 hours in life science. *General studies: L2*.
- 471 Ornithology.** (3) S
The biology of birds. 2 hours lecture, 3 hours lab, weekend field trips. Prerequisite: ZOL 370 or instructor approval.
- 472 Mammalogy.** (4) F '94
Classification, structure, habits, ecology, and distribution of mammals emphasizing North American forms. 3 hours lecture, 3 hours lab or field trip, weekend field trips. Prerequisite: ZOL 370 or instructor approval.
- 473 Ichthyology.** (3) S '95
Systematics and biology of recent and extinct fishes. 2 hours lecture, 3 hours lab or field trip, weekend field trips required. Prerequisites: ZOL 370 and 425 or instructor approval. *General studies: L2*.
- 474 Herpetology.** (3) S '96
Systematics and biology of recent and extinct reptiles and amphibians. 2 hours lecture, 3 hours lab or field trip. Prerequisite: ZOL 370.
- 481 Research Techniques in Animal Behavior.** (3) S '96
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: ZOL 280. *General studies: L2*.
- 495 Undergraduate Thesis.** (3) F, S, SS
Guided research culminating in the preparation of an undergraduate thesis based on supervised research done in this and previous semesters. Prerequisites: At least 3 hours of BIO 310 or 499 or ZOL 499, formal conference with instructor, instructor and department chair approval.
- 508 Scientific Data Presentation.** (2) F
Techniques necessary for presentation of scientific data used in journal publications, grant proposals, and various presentations. Lecture, lab. Prerequisite: instructor approval.
- 515 Populations: Evolutionary Genetics.** (3) F
Mathematical models in the description and analysis of the genetics of populations. Prerequisites: BIO 320 and 415 and 445 or instructor approval.
- 516 Populations: Evolutionary Ecology.** (3) S
Principles of population biology and community ecology within an evolutionary framework. 2 hours lecture, 2 hours recitation. Prerequisites: BIO 320, 415 (or MAT 210); ZOL 515.
- 517 Techniques in Evolutionary Genetics.** (4) S
Practical experience in modern techniques for the study of evolution. Lecture, lab. Prerequisites: BIO 340, 445 or instructor approval.
- 532 Developmental Genetics.** (3) S '96
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 443.
- 560 Comparative Physiology.** (3) S '95
The analysis of function in invertebrates and vertebrates, emphasizing evolutionary trends in physiological systems. Prerequisite: ZOL 360 or equivalent.
- 566 Environmental Physiology.** (3) S '96
Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: BIO 320, ZOL 360.
- 568 Mammalian Physiology.** (3) F '95
Detailed treatment of mammalian organ system functions emphasizing integrative mechanisms. Prerequisite: ZOL 360 or equivalent.
- 569 Cellular Physiology.** (3) F '94
Emphasizing the molecular basis for cell structure and function. Prerequisites: ZOL 360 and organic chemistry.
- 591 Seminar.** (1-3) F, S
Topics such as the following will be offered:
(a) Behavior
(b) Cell Biology
(c) Ecology
(d) Genetics
(e) Physiology
(f) Evolution
(g) Adaptations
(h) Genetic Engineering
May be repeated for credit.
- Omnibus Courses:** See page 44 for omnibus courses that may be offered.

College of Architecture and Environmental Design

John Meunier, M.Arch.
Dean

PURPOSE

The practice of architecture and environmental design is the culturally responsible shaping of our environment from the scale of the cities in which we live to the buildings and interiors we inhabit and the artifacts and products we use. What we design must be durable, useful, beautiful, appropriate to its context, and not be a waste of resources, energy, or materials. Designing our environment is an art, a technology, and a social science that has a history as long as human culture. The goals of the faculty include offering students an education that becomes the basis for life-long growth and improvement as professionals, advancing the discipline in both theory and practice, and improving the quality of the environment by making the expertise and knowledge of the faculty available to other professionals and to the public.

ORGANIZATION

Academic Organization. The college is composed of three academic units: the School of Architecture, the School of Design, and the School of Planning and Landscape Architecture. Administration of the college is the responsibility of the dean, who in turn is responsible to the president of the university through the senior vice president and provost.

College Facilities. With the opening of an award-winning 100,000 square foot expansion to the existing building in 1989, all the college's programs are now housed in a single complex. Facilities include the Architecture and Environmental Design Library, computer laboratories; design studios; the Gallery of Design; lecture and seminar rooms; the Media Center; offices for faculty, administration, and student organizations; the shop, the slide collection; and technology laboratories. The bridge between the original building and the expansion places the college's review and display space at the heart of the complex.

Architecture and Environmental Design Library. As a branch of the university libraries, the Architecture and Environmental Design Library provides easy access to books, periodicals, and reference materials for students, faculty, and the professional community. The collection includes the Architecture Library, with more than 28,000

volumes, and special research collections on the work of Alfred Newman Beadle, Blaine Drake, Paul Schweikher, Paolo Soleri, and Frank Lloyd Wright.

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

Special Facilities. College programs are supplemented by several kinds of special laboratories. New spaces include the computer-aided design and graphics lab, the high bay research lab, the lighting lab, the solar research lab, the solar roofdeck work area, an extensive shop equipped to handle wood, plastic, and metal, the Materials Resource Library, and space for the college's community outreach activities and programs of the Herberger Center for Design Excellence. The college's photographic lab and darkroom provide high quality equipment and space for research projects. The Media Center includes traditional graphics and audio-visual equipment as well as portable gear. The slide collection, with more than 90,000 images, is available for instructional use, and the college maintains an array of materials testing equipment. The college is also home to a computer site managed by Computing and Network Consulting Services.

ADMISSION

Lower-Division Programs. A new or transfer student who has been admitted to the university and has selected a college major is admitted to the lower division program of his or her choice. A separate application procedure is required for entry to upper division programs and graduate programs. Acceptance into lower division programs does not guarantee acceptance to upper division programs. Acceptance into lower division programs requires a TOEFL score of 500 or higher for international students whose native language is not English.

Transfer Credits. While the university accepts credits transferred from other accredited institutions, transfer credits are not applied to specific degree programs until reviewed and accepted by the appropriate academic units. Transfer course work must be equivalent in both content and level of

offering. In addition, a review of samples of work (portfolio of work) from previous studio classes is required. Change of major transfers into the College of Architecture and Environmental Design, or one of its program areas, requires a minimum 2.50 cumulative GPA.

Upper-Division Programs. Admission to upper-division programs is competitive. Consult requirements of each major for details. Students applying to more than one program must make a separate application to each and must submit separate portfolios. Students not enrolled at ASU when they apply to upper-division programs must also make a separate application to the university. Students not admitted to the upper division are not dismissed from the university and may reapply or may transfer to other programs. Students who plan to reapply should contact the college academic advisor. Transfers into upper-division programs are considered only if vacancies occur, and such transfers are limited to students with equivalent course work who are competitive with continuing students. Acceptance into upper-division programs requires a TOEFL score of 550 or higher for international students whose native language is not English.

Graduate Programs. For admission to the graduate programs in the College of Architecture and Environmental Design, see requirements and procedures under the respective academic units in this catalog and in the *Graduate Catalog*. Students must make separate applications and be admitted by both the Graduate College and the academic unit administering the degree program selected.

ADVISEMENT

While the college and its academic units provide academic advising, it is *ultimately the responsibility of each student to fulfill academic and program requirements*. Advising and record-keeping for lower-division programs are the responsibility of the college academic advisor. Records for upper-division program students are kept in the appropriate academic units, and advising is by the faculty and the head of the academic unit. General career advising is available from all faculty members. Administration of program requirements is the responsibility of the head of the academic unit and the dean.

Appeals Procedures. Academic appeals and requests for variances are typically made first to the student's advisor and then, if necessary, to the head of the appropriate academic unit, the College Standards Committee, and, finally, the dean. A student who feels he or she has been unjustly treated in academic or other matters relating to his or her career as a student may contact the college academic advisor or may take the grievance to the college ombuds-person.

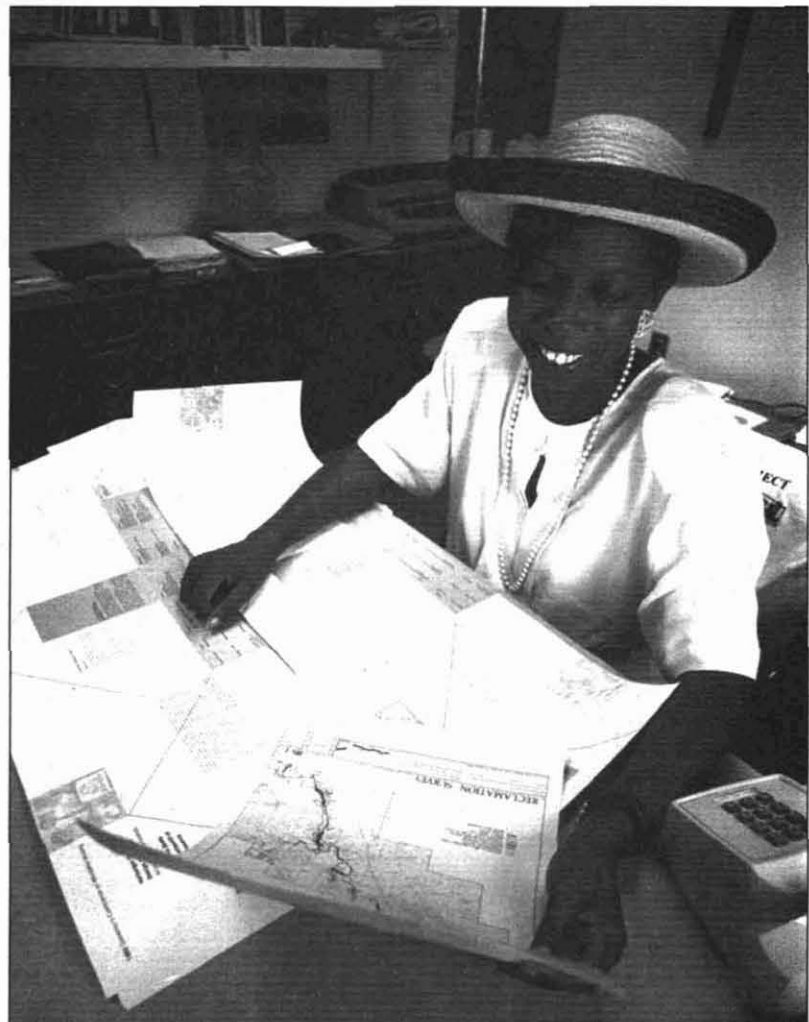
DEGREES

Undergraduate. The college offers curricula leading to four- or five-year undergraduate degrees: the Bachelor of Science in Design, the Bachelor of Science in Planning, and the Bachelor of Science in Landscape Architecture. A student selects one of the majors within the respective academic units shown in

the "College of Architecture and Environmental Design Degrees, Majors, and Concentrations" table, page 162.

Each undergraduate program is divided into a lower-division and an upper-division program. Completion of a lower-division program does not guarantee advancement to an upper-division program.

Graduate. The Graduate College awards the master's degree to candidates who have successfully completed graduate programs offered in this college. Four degrees are offered: the NAAB-accredited professional degree Master of Architecture (M.Arch.), the PAB-accredited professional degree Master of Environmental Planning (M.E.P.), the Master of Science (M.S.) degree with a major in Building Design, and the Master of Science in Design (M.S.D.) degree with majors in Industrial Design and Interior Design.



**College of Architecture and Environmental Design
Degrees, Majors, and Concentrations**

Major	Degree	Administered by
Baccalaureate Degrees		
Architectural Studies	B.S.D.	School of Architecture
Design Science	B.S.D.*	School of Design
Housing and Urban Development	B.S.D.	School of Planning and Landscape Architecture
Industrial Design	B.S.D.	School of Design
Interior Design	B.S.D.	School of Design
Landscape Architecture	B.S.L.A.	School of Planning and Landscape Architecture
Urban Planning	B.S.P.	School of Planning and Landscape Architecture
Graduate Degrees		
Architecture	M.Arch.	School of Architecture
Building Design	M.S.	School of Architecture
Concentrations: building energy performance, climate responsive architecture, computer aided design, facilities development and management		
Environmental Planning	M.E.P.	School of Planning and Landscape Architecture
Concentration: urban planning		
Industrial Design	M.S.D.	School of Design
Concentrations: design methodology, theory, and criticism; facilities planning and management; human factors in design		
Interior Design	M.S.D.	School of Design
Concentrations: design methodology, theory and criticism; facilities planning and management; human factors in design		

* Applications are not being accepted.

DEGREE REQUIREMENTS

Students seeking the Bachelor of Science in Design degree must satisfactorily complete a curriculum of a minimum of 132 to 156 semester hours, depending on the major. The Bachelor of Science in Planning degree requires 128 semester hours, depending on the concentration. The Bachelor of Science in Landscape Architecture requires 125 semester hours. These requirements include six semester hours for English proficiency and meet or exceed the university general studies requirements.

Major	<i>Semester Hours</i>
Architectural Studies.....	133
Housing and Urban Development.....	134
Industrial Design.....	134
Interior Design.....	156
Landscape Architecture.....	125
Urban Planning.....	128

Dean's List. Undergraduate students who earn 12 or more graded semester hours ("A," "B," "C," "D," or "E") dur

ing a semester in residence at ASU with a GPA of 3.50 or better are eligible for the Dean's List. A notation of achieving the distinction of being listed on the Dean's List appears on the final grade report for that semester.

Special Honors at Graduation. At the time of graduation, students with academic distinction are awarded the respective designation *cum laude*, *magna cum laude*, or *summa cum laude*. Also see university requirements for graduation with academic recognition, page 73.

GENERAL STUDIES REQUIREMENTS

Each curriculum offered by the college meets or exceeds the university general studies requirements. Courses are regularly reviewed to determine whether they meet one or more general studies requirements. See the listing of courses, pages 53-71. The key to general studies credit abbreviations appears on page 52.

GRADUATION REQUIREMENTS

In addition to completing departmental degree requirements, students must fulfill university graduation requirements. Students must apply and pay a fee for a graduation requirements review.

ACADEMIC STANDARDS

Lower-Division Retention Standards.

A student in one of the college's lower division programs is placed on probation when he or she fails to maintain a cumulative GPA of 2.00. Students on probation must observe rules or limitations the college Standards Committee imposes on their probation as a condition of retention. If, after one semester on probation, the overall GPA is not at least a 2.00 and the conditions of probation have not been met, the student is disqualified for a minimum of two full academic semesters. Appeals may be made to the college Standards Committee. Also see university retention standards, page 48.

Upper-Division Retention Standards. Students in upper-division programs are placed on probation when they fail to meet *any* of the following requirements:

1. failure, incomplete, or withdrawal from any required course;
2. a semester GPA below 3.00;
3. a grade of "D" or "E" in a design studio or a design laboratory; or
4. violation of the college *Code of Student Responsibilities* or any admission agreement.

Students on probation must observe rules or limitations that the Standards Committees or an academic unit places on their probation as a condition of continuation. Students may be removed from a program (but not necessarily the university) if

1. after one semester on probation, the requirements imposed are not met or the probationary semester GPA is below 3.00;
2. failures or withdrawals in required courses are not resolved at the next offering of the course,
3. failures or withdrawals from required sequential courses are not resolved; or
4. incompletes in required sequential courses are not completed before the first day of class of the next semester.

A student removed from a program is not guaranteed reinstatement in the program even if probation requirements or requirements placed on readmission are fulfilled. Appeals may be made first to the appropriate academic unit and, if necessary, to the college Standards and Appeals Committee. Also see university retention standards, page 48.

Incompletes. It is the student's responsibility to contact the instructor regarding the process of requesting and fulfilling an incomplete. Tardiness in contacting the instructor may result in a failing grade. Students must obtain an official "Request for Grade of Incomplete" form from their academic units. The completed form must include a justification, a listing of requirements that have not been fulfilled, and a proposed schedule of completion. The instructor reviews the request, proposes modifications if necessary, and submits a copy of the request to the appropriate pro-

gram head (for upper division students) or the college academic advisor (for lower division students). An incomplete in an upper-division course that is a prerequisite for sequential courses automatically places the student on probation and denies enrollment in subsequent courses. Also see university requirements on incompletes, page 45.

Withdrawals. University withdrawal regulations apply to lower division courses. In addition, because the college's upper-division curricula are modular and sequential and because space in the programs is limited, a student is expected to progress through the curriculum with his or her class. Withdrawal from a required upper-division course automatically places a student on probation. Withdrawal from a required upper division course in a required sequence automatically removes the student from the program beginning the subsequent semester. Also see university requirements on withdrawals, page 46.

Credit/No Credit. The only courses accepted toward graduation with a grade of pass/fail or credit/no credit are internships and field studies.

Foreign Study. The College of Architecture and Environmental Design maintains active communications with several foreign institutions offering professional course work similar to the programs of the college. This opportunity is available for students who wish to pursue professional studies at a foreign institution in lieu of resident course work for up to a maximum of one academic year. Any interested student is encouraged to inform the head of his or her academic unit at the earliest possible date of any intentions for foreign study.

Exchange programs currently exist with the Universität Stuttgart, Germany; Wageningen Universiteit in de Landbouw en Milieu Wetenschappen, the Netherlands; and the Universidad Autónoma de Guadalajara, Mexico. Foreign study programs in France and Italy and summer off-campus courses are offered by the School of Architecture. The School of Planning and Landscape Architecture offers a summer landscape planning course in Europe.

Students are also encouraged to consider foreign travel for either a semester or an entire academic year. A leave of

absence must be requested for foreign study and foreign travel. Each academic unit reserves the right to evaluate the content and the student's competency in each of the courses completed at foreign institutions.

Internships. Upper division students in the college are required to complete an internship program during the summer, normally between the third and fourth years of study.

Code of Student Responsibility. The purpose of this code is to promulgate standards of conduct for students of the College of Architecture and Environmental Design and to establish procedures for reviewing violations. Students are expected to support and maintain the highest professional standards with regard to their individual conduct and their personal and common environments in the college. Copies of the *Code of Student Responsibilities* are available from the Office of the Dean and the college academic advisor.

Attendance. Attendance is expected at all classes, laboratories, and seminars and is a criterion for evaluating performance. Absences and missing work due to absences may result in failure of a course or academic probation. A student may not be excused from attending a class except for medical reasons or other serious personal conditions beyond his or her control. Requests for special consideration must be submitted in writing to the instructor. If accepted, a student may be allowed to take a late or special examination or submit missing work. Tardiness in contacting the instructor is cause for denying acceptance. Also see university policy regarding religious holidays, page 1.

Employment. It is difficult for students in professional programs to carry part time employment while in school. Acceptance to any of the college's upper division programs presumes a commitment of a minimum of eight hours a day for professional studies. Prior work experience is not a requirement for admission to upper division programs.

Retention of Student Work. The college reserves the right to retain any or all projects or work submitted to meet course requirements for the college's future instructional, publication, and exhibition use.

Student Leave of Absence. Upper-division students who withdraw from classes or do not continue sequentially in enrollment must request both a leave of absence and readmission in writing from the head of the appropriate academic unit. Leaves of absence are for one year increments and may be approved for personal reasons, travel, work, or additional study in other disciplines. A student on leave must make the written request for readmission before May 1 for the fall semester of the year of return or before November 1 for the spring semester so that a space may be reserved. Failure to request a leave of absence may result in removal from the program.

SPECIAL PROGRAMS

The college and its academic units regularly sponsor lecture series, symposia, and exhibits. In addition, there are regional and national meetings of educators and professionals that students and faculty attend. Academic units sponsor student awards programs and regularly invite professionals and critics to reviews of student projects. The college also participates with the University Honors College and offers courses accepted in that college.

GENERAL INFORMATION

Accreditation. See page 16 for information on the accreditation of programs in the College of Architecture and Environmental Design.

College of Architecture and Environmental Design Alumni Association. The College Alumni Association encourages graduates to contribute to the college by acting as liaisons among the college community, students, and practicing professionals. The college also calls on the members of the Architecture Guild of Arizona State, the Arizona Design Institute, the Council for Design Excellence, and the Planning Advisory Committee for advice and to promote the goals of the college.

Council for Design Excellence. The Council for Design Excellence has been created to consolidate a partnership between the College of Architecture and Environmental Design and key

community leaders who share a vital interest in the development of high quality in the built environment of the Phoenix metropolitan area. By joining together professionals, business and civic leaders, students, and faculty in a common pursuit of design excellence, the council seeks to make a profound difference in the quality of life.

Affiliations. The College of Architecture and Environmental Design maintains active affiliations with the following organizations:

Architecture Arizona Society of Architects, the Association of Collegiate Schools of Architecture, and the Central Arizona and the Rio Salado Chapters of the American Institute of Architects
Industrial Design the Industrial Designers Society of America
Interior Design the American Society of Interior Designers, the Institute of Business Designers, and the Interior Design Educators Council
Planning and Landscape Architecture the American Planning Association, the American Society of Landscape Architects, the Association of Collegiate Schools of Planning, and the Council of Educators in Landscape Architecture

Student Professional Associations.

The purpose of the student associations is to assist students with the transition into professional life and to acquaint them with the profession relating to their program of study. These include the following associations:

American Institute of Architecture Students
College of Architecture and Environmental Design Pre Studies Organization
Student Association of the College of Architecture and Environmental Design
Student Association of Interior Designers
Student Chapter/American Planning Association
Student Chapter/American Society of Landscape Architects
Student Chapter/Industrial Designers Society of America
Women in Architecture

School of Architecture

Michael Underhill
Director
(AED 162D) 602/965-3536

REGENTS' PROFESSOR COOK

PROFESSORS
BOYLE, McSHEFFREY, MEUNER,
PETERSON, RAPP
SCHEATZLE UNDERHILL

RESEARCH PROFESSOR JONES

ASSOCIATE PROFESSORS
EL DIASTY, FIFIELD, LOOPE,
McGINTY, McINTOSH SHEYDAYI,
UNDERWOOD, ZYGAS

ASSISTANT PROFESSORS
BERTELSEN, BILN CURRY, FIELDS,
HARDIN, HARTMAN, INABA,
KROLOFF, WOOLSEY

PROFESSORS EMERITI
CHRISTENSEN, ELLNER, HINSHAW
JAKOB, OLIVER, RUMMEL,
STRAUB, WHIFFEN

PURPOSE

The architecture program at Arizona State University offers an integrated curriculum of professional courses and focuses on the design laboratory. The program reflects an awareness of the complex factors affecting the quality of the built environment. It seeks through scholarship, teaching, research, design, and community service to develop the discipline and the knowledge necessary to address the important environmental and design issues faced by society.

In addition to developing knowledge and skills in architectural design, building technology, and professional practice, students are encouraged to select electives from a broad range of approved courses both within the college and across the university. These electives may be selected to devise a minor, to further professional study, or in some other fashion to enrich the student's academic experience.

ORGANIZATION

The School of Architecture's program is organized by the faculty under the direction and administration of the director and standing committees of the faculty.

DEGREES AND MAJORS

The faculty of the School of Architecture offer three degrees: the Bachelor of Science in Design with a major in Architectural Studies, the Master of Architecture, and the Master of Science with a major in Building Design.

The program in architecture culminates with the professional degree Master of Architecture, which is accredited by the National Architectural Accrediting Board. Completion of the program is intended to take six years.

Admission to the professional program in architecture is competitive and begins after completion of lower division requirements (see "Admission" and "Degree Requirements" below). The professional program includes two years of upper division study leading to the Bachelor of Science in Design (with a major in Architectural Studies) and two years of graduate study leading to the Master of Architecture (see "Upper Division Professional Program" below).

In cooperation with the University Honors College the school offers a special honors curriculum for students with University Honors College standing. Please consult the advising officers in each college for information.

In cooperation with the College of Business, a dual degree program, Master of Architecture/Master of Business Administration, has been established. Students contemplating dual matriculation should see an advisor for help in selecting electives appropriate to this program at the undergraduate level.

The Master of Science degree with a major in Building Design provides opportunities for advanced and specialized studies and research in building science. Concentrations include computer aided design, energy performance of buildings, facilities development and management, and solar architecture. Students entering this program typically have the professional Bachelor of Architecture or Master of Architecture degrees or undergraduate degrees in areas such as physics, engineering, or design. For particulars, see the *Graduate Catalog*.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected Architectural Studies are admitted to the lower division architecture

program without separate application to the School of Architecture. Completion of lower division requirements does not assure acceptance to the upper division professional program.

Transfer credits for the lower division program are reviewed by the college faculty. To be admissible to this curriculum, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. Consult the college academic advisor for an appointment.

Entering lower division students who are not prepared to enroll in some of the required courses are required to complete additional university course work. These additional prerequisite courses do not apply to the Bachelor of Science in Design degree requirements.

Upper-Division Professional Program. Admission to the upper division, professional program is competitive and limited by available resources. Admission is awarded to those applicants demonstrating the highest promise for professional success, including evidence of ability and prospect for significant public service.

Transfer students who have completed the equivalent required lower-division course work may apply to the upper division program. Prior attendance at ASU is not required for application to the upper division program. Applicants who already hold a bachelor's degree in another field may be accepted to the upper division program if they have accomplished the lower division requirements.

To be eligible for admission to the upper division program, the following is required:

1. admission to ASU (note that application and admission to ASU is separate from application and admission to the upper division program);
2. completion of lower division requirements (a minimum of 63 semester hours) or equivalents as approved by a college academic advisor and the faculty of the school;
3. a minimum university cumulative GPA of 3.00 as well as a 3.00 GPA based only on the required lower division courses or equivalents; and
4. submission of a portfolio (for detailed information about this requirement, see page 166)

In an unusual circumstance, when the admission standard deficiency is slight, written evidence of extenuating circumstances is convincing, and promise for success is evident, a student may be granted admission to the upper division on a *provisional* basis.

Students not admitted to the upper division program are not dismissed from the school and may reapply or may transfer to other programs. Students who intend to reapply should meet with the college academic advisors.

Applications for transfer into the upper-division professional program are considered only if vacancies occur. Transfer applicants must demonstrate that equivalent course work has been completed, and applicants must be academically competitive with continuing students.

Students who successfully complete the upper division requirements receive the Bachelor of Science in Design degree (B.S.D.) with a major in Architectural Studies. This is not a professional degree. To complete the professional architecture program, students must attain the National Architectural Accrediting Board accredited Master of Architecture degree. Students who receive the B.S.D. are eligible to apply for the graduate program and should consult the *Graduate Catalog* for proper application procedures. This application process is competitive and based on a thorough review of a student's undergraduate preparation and performance.

Students with the four year Bachelor of Science in Design degree (with a major in Architectural Studies or an equivalent degree from another school that offers an accredited professional degree in architecture) should apply directly to the graduate program.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to the college academic advisor for the application form well in advance of the application deadline. For additional information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from the college academic advisor. The following dates and procedures are for students applying to 1995-96 upper division programs.

Upper-Division Application Deadlines. April 14, 1995. Portfolio and application documents are due in the school office by 5:00 P.M.

June 9, 1995. If the spring 1995 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 9. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Office of Undergraduate Admissions. Application is not complete until the university receives official transcripts for transfer course work. For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1995. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school or department by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation An accepted student is expected to begin his or her upper division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Portfolio Format Requirements. Each applicant is responsible for obtaining the following documents and including them in the portfolio. Application materials are submitted at one time in a presentation binder (portfolio) with plastic sleeves (8.5' x 11' format only) The student's name is to be affixed to the outside. Items must appear in the following order:

Page 1. The application form should be completely filled out with the first page visible. Application forms are available from the college academic advising office.

Page 2. The second page of the application should be visible.

Page 3. Application Essay

Page 4. All high school transcripts should be put into one sleeve.

Page 5. All college transcripts for both ASU and transfer work should be in

cluded through the fall 1994 semester. Copies are acceptable. The academic advisor forwards 1995 ASU transcripts. (Those wishing to transfer spring semester 1995 work are responsible for submitting these transcripts by June 12 so that they may be added to their portfolios. The student is also responsible for getting an official transfer transcript sent directly to the Office of the Registrar.)

Page 6. A certificate of admission is necessary only for those students who have been newly admitted for fall 1995 and who are applying directly into an upper division program. The certificate is not required for students currently attending ASU.

Following Pages (usually 10-20 sheets). Students should present work sufficient to demonstrate the depth and breadth of their creative activity. This work should include (but is not limited to) examples of two- and three dimensional design and graphics. Each project should be clearly identified (course, length of project, etc.), with a concise accompanying description of the assignment.

Students are encouraged to include additional materials, written or pictorial, that provide additional evidence of skills and abilities and of the aptitude and commitment to the major. When any work submitted is not completely original, the source must be given. When work is of a team nature, the applicant's role should be clearly indicated. Original examples or slides must not be submitted. All examples must be photographs or other reproduction graphic media.

Return of Portfolios. Application documents (pages 1 through 6) remain the property of the College of Architecture and Environmental Design. However, the remaining portfolio is returned after the admissions review, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after July 1, 1995. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school.

ADVISEMENT

Advising for the lower-division curriculum is through the college academic advising office. Advising for upper-division students is by assigned faculty advisors and administrative personnel from the School of Architecture.

DEGREE REQUIREMENTS

The Bachelor of Science in Design degree with a major in Architectural Studies requires a minimum of 134 hours of course work. Most lower division students pursue option A; however, those who intend eventually to seek an advanced degree in either engineering or building science are encouraged to fulfill the requirements outlined in option B.

The accredited professional degree Master of Architecture requires an additional 56 hours of approved graduate-level course work. For detailed information, consult the *Graduate Catalog*.

**Architectural Studies—B.S.D.
Lower-Division Requirements**

**Option A¹
Freshman Year**

		<i>Semester Hours</i>
Fall (15)		
APH 100	Introduction to Environmental Design ²	3
ENG 101	First Year Composition	3
MAT 118	Precalculus Algebra and Trigonometry	3
	or approved N1 elective ²	
PHI 103	Principles of Sound Reasoning	3
	or approved philosophy elective	
SB elective		3
Spring (16)		
ADE 120	Design Fundamentals I ³	3
ECN 112	Microeconomic Principles ² or ECN 111 Macroeconomic Principles	3
ENG 102	First Year Composition	3
MAT 210	Brief Calculus ²	3
HU elective		3

Sophomore Year

Fall (16)		
ADE 221	Design Fundamentals II ³	3
APH 200	Introduction to Architecture ²	3
PHY 111	General Physics ²	3
PHY 113	General Physics Laboratory ²	1
L1 elective ²		3
Approved elective		3

Spring (16)

ADE 222	Design Fundamentals III ³	.....3
CSE 181	Applied Problem Solving with BASIC	.....3
PHY 112	General Physics ²	.....3
PHY 114	General Physics Laboratory ²	.....1
SB elective		.....3
Approved elective		.....3
Lower division total		62

¹ Transfer credits are reviewed by the college and evaluated for admissibility to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.

² This course satisfies a general studies requirement. See the course description for specific requirements the course fulfills.

³ Portfolio review is required for transfer studio work. See the college academic advisor for an appointment.

Architectural Studies B.S.D. Lower-Division Requirements Option B¹

English Proficiency (6	<i>Semester Hours</i>
ENG 101, 102 First Year Composition or ENG 105	.. 6
Advanced First Year Composition ³ plus an HU elective ²	

Literacy and critical inquiry³	
Approved L1 elective	3

Numeracy (9)	
ECE 105 Introduction to Languages of Engineering	.. 3
ECE 106 Introduction to Computer Aided Engineering	.. 3
MAT 274 Elementary Differential Equations	.....3
MAT 290 Calculus I	.....5
MAT 291 Calculus II	.....5

Option B Engineering Requirement (3)	
ECE 210 Engineering Mechanics I: Statics	.....3

Humanities and Fine Arts (9)	
APH 100 Introduction to Environmental Design ²	3
APH 200 Introduction to Architecture ²	.....3
Approved HU elective ²	.....3

Social and Behavioral Sciences (6)	
ECN 112 Microeconomic Principles ² or ECN 111 Macroeconomic Principles (3) or approved business course	3
Approved SB elective	.....3

Natural Sciences (8)

PHY 121 University Physics I: Mechanics	.....3
PHY 122 University Physics Laboratory I	.....1
PHY 131 University Physics II Electricity and Magnetism	.. 3
PHY 132 University Physics Laboratory II	.....1

Studio Courses³ (10)	
ADE 20 Design Fundamentals I ³	3
ADE 221 Design Fundamentals II	.....3
ADE 222 Design Fundamentals III	.....3
Lower division minimum total	63

¹ Transfer credits are reviewed by the college and evaluated for admissibility to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.

² This course satisfies a general studies requirement. See the course description for specific requirements the course fulfills.

³ Portfolio review is required for transfer studio work. See the college academic advisor for an appointment.

ECE 312, 313, and 383 may be taken at the upper division level as approved electives and are not required before admission to the upper division program. However, conflicts in course time can be avoided by taking them before applying to the upper division

Architectural Studies—B.S.D. Upper-Division Professional Program Requirements Junior Year

Fall (17)	<i>Semester Hours</i>
ADE 321 Architectural Studio I	.....5
APH 313 History of Western Architecture I ^{1,2}	.....3
ATE 353 Architectural Construction	.....3
AVC 301 Architectural Communication	.....3
Approved elective	.....3

Spring (17)	
ADE 322 Architectural Studio II	.....5
ANP 331 Analysis and Programming	.....3
APH 314 History of Western Architecture II ^{1,2}	.....3
ATE 361 Building Structures I ³	.....3
Approved elective	.....3

Summer (3)	
ARP 484 Clinical Internship	.....3

Senior Year

Fall (17)	
ADE 421 Architectural Studio III	.....5
ATE 451 Building Systems I	.....3
ATE 462 Building Structures II ³	.....3
Approved elective	.....3
Professional elective	.....3
Spring (17)	
ADE 422 Architectural Studio IV	.....5
ATE 452 Building Systems II	.....3
Architectural history elective	.....3
Approved L2 elective	.....3
Professional elective	.....3
Upper division total	71
B S D minimum total	133

¹ These courses may be completed before admission to the upper division. If already completed, a student may substitute an approved elective.

² This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.

³ Approved substitute courses are accepted from the College of Engineering and Applied Sciences for option B students.

Master of Architecture Graduate Division Professional Program Requirements Fifth Year

Fall (14)	<i>Semester Hours</i>
ADE 521 Advanced Architectural Studio I	.....5
ATE 553 Building Systems III	.....3
ATE 563 Building Structures III	.....3
Professional elective	.....3
Spring (14)	
AAD 551 Architectural Management I	.....3
ADE 522 Advanced Architectural Studio II	.....5
APH 681 Architectural Theory	.....3
Professional elective	.....3

Sixth Year	
Fall (14)	
AAD 552 Architectural Management II	.....3
ADE 621 Advanced Architectural Studio III	.....5
ANP 681 Project Development	.....3
Professional elective	.....3

Spring (14)	
AAD 681 Professional Seminar Capstone	.....3
ADE 622 Advanced Architectural Studio IV	.....5
Approved elective	.....3
Professional elective	.....3
Graduate division total	56

GENERAL INFORMATION

Professional Electives. A student, with the approval of his or her advisor, selects required upper division professional emphasis electives from the following areas:

1. architectural office management (also courses in the College of Business);
2. construction technology and administration (also courses in the Del E. Webb School of Construction);
3. landscape architecture (also courses in the School of Planning and Landscape Architecture and the Department of Botany, and the School of Agribusiness and Environmental Resources);
4. structural systems design (also courses in the College of Engineering and Applied Sciences);
5. architectural history, theory, or preservation (also courses in art history in the College of Fine Arts or philosophy in the College of Liberal Arts and Sciences);
6. environmental research, analysis, and programming (also courses in the Departments of Psychology and Sociology);
7. solar design and technology (also courses in the College of Engineering and Applied Sciences);
8. energy conservation and adaptive reuse (also courses in the School of Planning and Landscape Architecture);
9. urban and regional planning, environmental psychology, and sociology; interior architecture (also courses in the School of Design);
10. computer-aided design (also courses in the Department of Computer Science and Engineering); and
11. advanced architectural communication.

GENERAL STUDIES REQUIREMENTS

The architecture curriculum exceeds the general studies requirements of the university. For more information about university general studies requirements, see pages 50–52. Specific courses in the curriculum that fulfill the required general studies distribution requirements are indicated with a letter

and number code. See page 52 for the key to general studies credit abbreviations.

COURSES

Subject matter within the school is categorized in the following instructional areas:

Architectural Administration and Management. AAD courses focus on the organizational and management aspects of architectural practice, including management coordination, administrative procedures, ethics, legal constraints, and the economics of practice.

Architectural Design and Technology Studios. ADE courses require the synthesis of knowledge and understanding gained from other course work and develop an understanding of design theory and design skill through a series of comprehensive design projects. Students apply analytical methods, compare alternative solutions, and develop sophisticated technical and conceptual results.

Architectural Philosophy and History. APH courses develop an understanding of architecture as both a determinant and a consequence of culture, technology, needs, and behavior in the past and present. Studies are concerned with the theory as well as the rationale behind methods and results of design and construction. Case studies are both American and international.

Architectural Technology. ATE courses develop knowledge of the technical determinants, resources, and processes of architecture. These studies focus on the science and technology of design and construction, including materials, building systems, acoustics, lighting, structural systems, environmental control systems, computer applications to design and technology, and both passive and active solar systems. Emphasis is on measurable and quantifiable aspects.

Environmental Analysis and Programming. ANP courses develop the ability to analyze and program environmental and human factors as preconditions for architectural design using existing and emerging methods of evaluation and analysis.

Architectural Communication. AVC courses develop the student's understanding of communication theory as it

applies to architectural design and practice as well as skills in drawing, graphics, photography, presentation design, and the design process.

Architecture Professional Studies. ARP courses provide students with off-campus opportunities, educational experience in group and individual studies relative to specific student interests, and faculty expertise, including summer internships and field trips.

Those courses that are required in the upper division and graduate levels of the professional program are not open to nonmajors or those not admitted to the upper division program.

ARCHITECTURAL ADMINISTRATION AND MANAGEMENT

AAD 551 Architectural Management I. (3) S Organizational, human performance, and market influences on architecture firms and projects. Readings case studies, and analysis of managerial problems and solutions. Lecture, discussion. Prerequisite: graduate-level standing. Corequisite: ADE 522

552 Architectural Management II. (3) F Design delivery coordination of construction documents, cost estimating, bidding and negotiations, construction observation and post construction services. Case studies. Lecture discussion. Prerequisite: AAD 551. Corequisite: ADE 621

553 Advanced Architectural Management. (3) A Current issues in the business and practice of architecture. Financial management, project management, and design delivery strategies. Includes case studies. Lecture, discussion. Prerequisite: AAD 551 or instructor approval

554 Advanced Construction Contract Administration. (3) N Advanced topics and problems in construction contract administration. Prerequisite: AAD 552 or instructor approval.

555 Architect as Developer. (3) A Development building, real estate construction funding, land acquisition, and the sources for capital. Prerequisite: instructor approval

558 Advanced Specifications and Cost Analysis. (3) N Coordination of working drawings, construction specifications and cost estimates. Emphasis on methods, office procedures, contract conditions, bonds, and bidding procedures. Prerequisite: instructor approval

560 Contemporary Architectural Practice. (3) A Advanced issues and directions in design delivery, firm and project management, global markets and expanding cultural responsibilities. Includes case studies. Seminar. Prerequisite: instructor approval

681 Professional Seminar: Capstone. (3) S Examination of ethical, political, social, economic, ecological, and cultural issues confronting the practice of architecture. Readings and case studies. Seminar. Prerequisite: AAD 552. Corequisite: ADE 622.

Omnibus Courses: See page 44 for courses that may be offered

ARCHITECTURAL DESIGN AND TECHNOLOGY STUDIOS

ADE 120 Design Fundamentals I. (3) F, S SS

Development of visual literacy introduced on to drawing and graphic representation as methods of seeing and problem solving. Studio. Prerequisite: major in College of Architecture and Environmental Design

221 Design Fundamentals II. (3) F

Exercises in basic design, stressing creative problem-solving methods, principles of composition, and aesthetic evaluation. Development of vocabulary for environmental design. Lecture, studio. Pre- or corequisite: ADE 120.

222 Design Fundamentals III. (3) S

Application of design fundamentals with an emphasis on architectural issues. Lecture, studio. Prerequisite: ADE 221 with a grade of "C" or higher; APH 200.

321 Architectural Studio I. (5) F

Introductory building design problems. Emphasis on design process, communication methods, aesthetics, construction, and technology. Lecture, studio and field trips. Prerequisite: admission to upper division. Corequisites: ATE 353 AVC 301

322 Architectural Studio II. (5) S

Site and building design problems. Emphasis on programmatic and environmental determinants and building in natural and urban contexts. Lecture, studio and field trips. Prerequisite: ADE 321. Corequisite: ANP 331.

421 Architectural Studio III. (5) F

Topical design problems of intermediate complexity including interdisciplinary problems. Lecture, studio and field trips. Prerequisites: ADE 322 and ARP 484 for Architecture. Studies majors, permission of the school director for other majors in the college.

422 Architectural Studio IV. (5) S

Topical design problems of intermediate complexity, including interdisciplinary problems. Lecture, studio and field trips. Prerequisite: ADE 322 for Architecture. Studies majors: permission of the school director for other majors in the college.

510 Foundation Architectural Studio. (6) SS

Fundamentals of architectural design, methodology, visualization and representation. Lecture, studio, and field trips. Prerequisite: admission to graduate program.

511 Core Architectural Studio I. (6) F

Application of design fundamentals in architectural problems, including construction, technology, programmatic and environmental determinants. Lecture, studio, and field trips. Prerequisites: ADE 510; APH 200, 509. Corequisite: ATE 353.

512 Core Architectural Studio II. (6) S

Application of architectural design fundamentals to increasingly complex problems, including specific sites and activities. Lecture, studio, and field trips. Prerequisite: ADE 511

521 Advanced Architectural Studio I. (5) F

Design problems emphasizing theory, aesthetics, and tectonics as influences on architectural form. Lecture, studio and field trips. Prerequisite: admission to graduate program

522 Advanced Architectural Studio II. (5) S

Design problems emphasizing the comprehensive integration of building systems and technologies as influences on architectural form. Lecture, studio, and field trips. Corequisites: AAD 551 ADE 521

621 Advanced Architectural Studio III. (5) F

Design problems emphasizing the urban context, planning issues, and urban design theory as influences on architectural form. Lecture, studio, and field trips. Corequisites: AAD 552, ADE 522, instructor approval

622 Advanced Architectural Studio IV. (5) S

Individual student-initiated project reflecting a cumulative synthesis of architectural ideas. Studio. Prerequisites: ADE 621 ANP 681. Corequisite: AAD 681

661 Bioclimatic Design Studio. (6) A

Sustainable architecture and site synthesis at a variety of scales emphasizing bioclimatic criteria and the use of passive and low energy systems. Prerequisite: professional degree or instructor approval. Corequisite: ATE 558

Omnibus Courses: See page 44 for courses that may be offered

ENVIRONMENTAL ANALYSIS AND PROGRAMMING

ANP 331 Analysis and Programming. (3) S

Analysis of natural and human environmental determinants as the basis of the programming and design of the built environment. Lecture, studio. Corequisite: ADE 322

431 Architectural Programming Methods. (3) N

Theory and methods of architectural programming including determinants of architecture, information gathering techniques, program preparation and methods of evaluation. Prerequisite: professional level standing

433 Building Codes and Ordinances. (3) N

Analysis of national, state, and local building codes and ordinances relative to their impact in architectural programming, design and construction documentation

442 Site Planning Principles and Analysis. (3) S

Effects of topography, climate, energy, zoning, and landscaping upon design development of external spaces. Programming and analysis and integration of architectural design to the site and site to the region

475 Computer Programming in Architecture. (3) F, S

Computer programming for architectural problems and applications. Lecture, lab. Prerequisite: CSE 183 or equivalent

477 Computer Applications to Design Problems. (3) F

Examination of generic microcomputer software in solving architectural design problems. Emphasis on the logic of problem formulation. Lecture, lab. Prerequisite: instructor approval.

530 Computer Graphics in Architecture. (3) A

Fundamentals of computer graphics programming in architecture including graphics hardware, device independent packages, 2- and 3-dimensional transformations, and data structures. 2 hours lecture 3 hours lab. Prerequisite: ANP 475 or instructor approval

561 Architectural Information Processing Systems. (3) A

Applications of information processing systems to architectural problems. Analysis of computing tools with respect to assumptions and theories. Lecture, lab. Prerequisites: graduate standing; instructor approval

562 Information Systems for Facilities Management. (3) N

Introduction to database design and implementation. Assessment of facility management problems from information system points of view. Seminar/lab. Prerequisites: ANP 477 or 561, graduate standing

576 Community Housing. (3) N

History, practices, trends, and forms of housing, including growth of public programs, national and local programs, zoning law, housing distribution, planning principles and policies, design review, standards and private development practice

577 Housing Environments. (3) A

Contemporary housing environments, housing types, and lifestyles as determined by user preference, density, development and property standards, cost, community and privacy, security, identity, movement, and the need for open space

581 Urban Structure and Design. (3) F

The nature and dynamics of urbanization and its relationship to architecture and urban design, including growth, decay, socialization, planning processes, and visual perception. Case studies. Prerequisite: professional level standing

Omnibus Courses: See page 44 for courses that may be offered.

ARCHITECTURAL PHILOSOPHY AND HISTORY

APH 100 Introduction to Environmental Design. (3) F, S SS

Survey of environmental design including historic examples and the theoretical, social, technical, and environmental forces that shape them. Cross-listed as DSC PUP 100. *General studies HU G H*

200 Introduction to Architecture. (3) F

Survey of issues and problems affecting current architectural theory and practice. Lecture/discussion. *General studies HU G*

300 World Architecture I/Western Cultures. (3) F

Historical and contemporary built environments of Western civilizations: Mediterranean, Europe, and the Americas as manifestations of cultural history and responses to environmental determinants. Non-Architecture majors only. *General studies HU, G, H*

301 World Architecture II/Eastern Cultures. (3) S

Historical and contemporary built environments of Eastern civilizations: Middle East, Central Asia, Far East, and South Pacific as manifestations of cultural history and responses to environmental determinants. *General studies G*

304 American Architecture. (3) N

Architecture in the United States from earliest colonial times to present. Non-Architecture majors only. *General studies HU*

305 Contemporary Architecture. (3) N Europe and America from the foundations of the modern movement to the present. Non Architecture majors only *General studies HU*

313 History of Western Architecture I. (3) F Representative buildings and settings with emphasis on the physical and social settings from antiquity through the Middle Ages. Prerequisite: junior standing or instructor approval. *General studies HU*

314 History of Western Architecture II. (3) S Representative examples of architecture and urban design with emphasis on the social and historical contexts, from the Middle Ages to the present. Prerequisite: junior standing or instructor approval

348 Theory of Built Environments. (3) N Focused study of built environmental forms, their theoretical foundation and their relation to social processes. Prerequisite: sophomore standing. *General studies HU*

411 History of Landscape Architecture. (3) F The physical record of human attitudes toward the land. Selected examples of ancient through contemporary landscape planning and design. Cross-listed as PLA 310. *General studies H*

414 History of the City. (3) F The city from its ancient origins to the present day with emphasis on cities of Europe and America during the last five centuries. Cross-listed as PUP 412.

441 Ancient Architecture. (3) N Architecture of the ancient Mediterranean world with selective emphasis on major historical complexes and monumental sites. Prerequisite: APH 313. *General studies HU*

442 Preservation Planning. (3) F Principles and practices in planning for preservation, conservation and neighborhood redevelopment. Emphasis on evaluation of historical resources. Off-campus field practicum required. Prerequisite: instructor approval

443 Renaissance Architecture. (3) N Selected examples of Renaissance architecture and urbanism with emphasis on the historical and cultural settings. Prerequisite: APH 314. *General studies HU*

444 Baroque Architecture. (3) N Selected examples of Baroque architecture and urbanism with emphasis on relationships between architecture and other arts. Prerequisite: APH 314. *General studies HU*

445 19th-Century Architecture. (3) N Architecture and urbanism in Europe and North America from the French Revolution to Art Nouveau. Emphasis on the challenge of new materials and techniques in the context of revived and traditional architecture. Prerequisite: APH 314. *General studies HU H*

446 20th-Century Architecture I. (3) F Architecture in Europe and America from the foundations of the modern movement to the culmination of the international style. Prerequisite: major in college. *General studies HU.*

447 20th-Century Architecture II. (3) S Developments in architecture since the international style. Prerequisite: APH 446. *General studies HU*

509 Foundation Seminar. (3) SS Historical, technical, theoretical, environmental, and professional issues in architecture. Lecture/seminar, field trips. Prerequisite: ADE 510

511 Energy Environment Theory. (3) F Solar and other energy sources, designed and natural environments; architectural, urban and regional implications of strategies using other renewable resources.

681 Architectural Theory. (3) S An examination of architectural theory. Emphasis on application of theory to practice. Seminar. Prerequisite: instructor approval

682 Architectural Criticism. (3) F An examination of architectural criticism emphasizing specific methods of criticism and their application for aesthetic judgment. Seminar. Prerequisite: instructor approval

683 Critical Regionalism. (3) N Critical inquiry in cultural grounding the definition of place in architectural theory and practice. Lecture, field studies. Prerequisite: APH 446 or 447

Omnibus Courses: See page 44 for courses that may be offered.

ARCHITECTURAL TECHNOLOGY

ATE 353 Architectural Construction. (3) F Materials and methods of construction. Aesthetic, code and cost considerations. Lecture, lab. Corequisite: ADE 321

361 Building Structures I. (3) S Introduction to load distribution on structures. Static analysis of determinate beams, trusses, arches, and rigid frames. Computer applications. Lecture/lab. Prerequisite: admission to upper division

451 Building Systems I. (3) F Principles of solar radiation on heat and moisture transfer, and environmental control systems as functions. Energy conservation design. Lecture/lab. Prerequisite: admission to upper division

452 Building Systems II. (3) S Architectural design implications of heating, ventilation and air conditioning systems. Principles of lighting, daylighting and acoustics and their applications. Lecture/lab. Prerequisite: ATE 451

453 Advanced Architectural Construction. (3) N Study of construction materials assembly and architectural detailing. Lecture, lab. Prerequisite: ATE 353.

462 Building Structures II. (3) F Strength of materials. Stresses in beams and columns. Thermal effects on structures. Analysis, design and detailing of wood structural systems. Lecture/lab. Prerequisite: ATE 361

501 Introduction to Solar Energy. (3) N Introduction to theoretical and practical aspects of use of solar radiation and nocturnal cooling for control of building environments

521 Building Environmental Science. (3) F Scientific principles relating to comfort and environmental control. Heat and moisture transfer. Solar/natural energies for heating, cooling and lighting. Lecture, lab. Prerequisite: MAT 290 or equivalent.

522 Desert Habitation Technology. (3) N Analysis of habitation approaches in nontechnological and technological societies arising from the nature of desert areas

530 Daylighting Design. (3) S Daylight analysis, availability, design sky measurements, modeling and simulation. Integration with passive heating, cooling, building design and energy considerations. Lecture, lab

533 Building Performance Simulation and Visualization. (3) S

Simulation, analysis, and evaluation of building energy, lighting and acoustic systems using computer software packages. Lecture/lab

534 Earth Sheltering. (3) S Fundamentals of earth-atmosphere interaction, thermal and moisture effects, soil appraisal, underground passive techniques, comfort and energy efficiency. Lecture/lab.

544 Solar Thermal Subsystem Design. (3) N

Fundamental understanding and practical applications of solar subsystems such as controls, heat exchangers, heat transfer fluids in buildings emphasized. Prerequisite: ATE 541

550 Passive Cooling in Buildings. (3) N Theory, analysis, and application of passive and low energy cooling systems for thermal comfort in buildings. Prerequisite: ATE 521

551 Passive Heating in Buildings. (3) N Theory, analysis and application of passive and low energy heat systems for thermal comfort in buildings. Prerequisite: ATE 521

552 Energy Parameters in Buildings. (3) N Advanced modeling. Transient and multidimensional analysis of thermal and daylight performance using variable weather data. Prerequisite: ATE 551 or instructor approval.

553 Building Systems III. (3) F Design and integration of building systems, including mechanical, electrical, plumbing, security, communication, fire protection, and transportation. Prerequisite: admission to upper division or instructor approval.

554 Building Energy Efficiency. (3) S Impact of building design on energy performance. Climate responsiveness, operations dynamics, and subsystems integration in thermal comfort and efficiency. Prerequisite: ATE 452.

557 Construction Documents I. (3) S Production of architectural working drawings, legal status, organization, layout, site survey plans, sections, elevations, details, schedules, and coordination. Lecture/lab. Prerequisite: admission to upper division

558 Bioclimatic Parameters. (3) S Theory, analysis, and application of energy-related parameters of site, climate, human comfort and building program for design synthesis

560 Building Energy Analysis. (3) F Computer simulation of building thermal behavior. Software review. Detailed study of selected simulation models using case study projects. Lab. Prerequisites: ANP 475 or 477, ATE 582.

561 Energy Analysis Techniques. (3) F Mathematical models of building envelope and comfort conditions as bases for optimization techniques. Prerequisite: ATE 560

562 Experimental Evaluation. (3) A Instrumentation, measurement and computational techniques for analysis of building components, and assessment of thermal and uniform performance. Prerequisite: ATE 521.

563 Building Structures III. (3) F

Analysis, design and detailing of steel buildings and frames. Latera analysis of small and braced frame systems. Lecture, lab. Prerequisite: ATE 462 or equivalent.

564 Advanced Structures: Concrete. (3) A

Analysis, design, and detailing of concrete systems considering continuity, multistory frames and shear walls and latera analysis. Computer application. Prerequisite: ATE 563 or instructor approval.

565 Advanced Structures: High Rise. (3) A

Developments in high rise construction. Effects of wind and seismic forces. Preliminary analysis, design and detailing considering code requirements. Lecture, lab. Prerequisite: ATE 563 or instructor approval.

582 Environmental Control Systems. (3) A

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

Omnibus Courses: See page 44 for omnibus courses that may be offered.

ARCHITECTURAL COMMUNICATION**AVC 141 Design Graphics.** (2) N

Orthographic, parallel, axonometric, and perspective projection, shades and shadows and basic descriptive geometry for designers. 1 hour lecture, 4 hours studio. Prerequisite: major in college.

161 Advanced Freehand Perspective Drawing. (2) N

Introduction to color media and analytical and design drawing exercises. 4 hours studio. Prerequisite: major in college.

301 Architectural Communication I. (3) F

Communication skills for architecture studios. Emphasis on graphics, drawing conventions, media, computer aided design, design of presentations and oral presentations. Lecture studio. Corequisite: ADE 321.

410 Architectural Presentation Techniques. (3) F, S

Special techniques of graphic communications as primary presentation tools for the design professional. Prerequisite: AVC 301 or instructor approval.

411 Architectural Watercolor Presentation Techniques. (2) N

Introduction of architectural presentation techniques using watercolor as a primary media. Emphasis on color composition, and technique. Prerequisite: AVC 301 or instructor approval.

444 Architectural Photography. (2-3) N

Use of photography as a means of architectural study, evaluation, and recording. Introduction to 35mm camera and darkroom techniques. Lecture/lab. Prerequisite: instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

ARCHITECTURE PROFESSIONAL STUDIES**ARP 451 Architecture Field Studies.** (1-6) F, S SS

Organized field study of architecture in specified national and international locations. Credit/no credit. May be repeated with approval of director.

484 Clinical Internship. (3) SS

Full-time internship under the supervision of practitioners in the Phoenix area or other locations. Credit/no credit. Prerequisite: instructor approval.

684 Professional Internship. (2-6) S

Field experience in an architectural firm specializing in an area directly related to the student's advanced study. Integration of theory and state-of-the-art practices. Credit/no credit. Prerequisite: instructor approval.

Omnibus Courses: See page 44 for courses that may be offered.

School of Design

Robert L. Wolf

Director

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PROFESSORS

BUSH, KROELINGER,
REZNIKOFF, WOLF

ASSOCIATE PROFESSORS

BRANDT, JOHNSON, NIELSEN, WITT

ASSISTANT PROFESSORS

CUTLER, DiCICCO, McDERMOTT,
RATNER, SADLER

PROFESSORS EMERITI

BENZINGER, KNIGHT,
QUESADA, STREUFERT

PURPOSE

The School of Design educates designers for a professional world that needs informed and developed talent. The curricula emphasize preparation in building bridges between the academic world and the professions. The faculty believe that the designers have a responsibility to the public and the communities that they serve; the student learns not only the history and theory of the professions and their practical application, but an understanding of systems, functions, scientific, and technical data related to public welfare, safety, and human factors. Students integrate aesthetic values into the products and spaces they design and consider the aspirations of the world in which they live. The goal is to create

the best design curricula possible and to develop technically accomplished and conceptually sophisticated graduates who continue to evolve as practicing professionals. With the help of an international network and a faculty of active design professionals, the aim is to educate creative individuals who will achieve a comprehensive understanding of both products and interiors as related to the different cultures in which they exist.

ORGANIZATION

Programs in the School of Design are organized by the faculty of the school under the direction and administration of the director.

DEGREES AND MAJORS

The faculty of the School of Design offer the Bachelor of Science in Design degree. Two majors are available: Industrial Design and Interior Design.

Industrial Design. The program in Industrial Design prepares creative individuals to shape the objects used by people daily. The Industrial Design profession serves the needs of both manufacturers and consumers by developing products that are attractive, useful, safe, convenient, and comfortable to use. The designer's special talents and skills include an aesthetic sense, knowledge of materials and processes, and an understanding of the physical and psychological needs of the user. Designers often serve as a catalyst among management, marketing, and engineering staffs.

Through studio projects, students learn to visualize ideas and communicate them to others and to refine skills in freehand sketching, computer aided design, and model making. Assignments balance conceptual aspects with practical techniques. Typical projects include electronics, toys, furniture, sports equipment, and packaging. Stress is placed on the role of the designer in a team effort. Third year students perform internships in a large corporation or in a consulting design agency.

Interior Design. The program in Interior Design is accredited by the national accrediting agency, the Foundation for Interior Design Education Research. The five year curriculum emphasizes

design process, technical skill development, problem solving, and the management skills needed to work in collaboration with the allied design professions. The goal is to create high quality environments for human use.

Significant changes in the interior design profession over the last two decades are reflected in the program. The school is committed to integrating computer technology into each level of the curriculum. In doing so, the program offers an excellent environment for experimenting with and testing innovative applications of computer aided design and simulation to interior design.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected Industrial Design or Interior Design as a major are admitted to the appropriate lower division program. Transfer credits for the lower-division program are reviewed by the college and evaluated as admissible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. Consult the college academic advisor for an appointment.

Entering lower division students who are not ready to take some courses in the curriculum (for example, algebra and trigonometry or a second course in computer programming) are required to take additional courses that do not apply to the Bachelor of Science in Design degree. If these courses are needed, it may take an additional year to complete the lower division program.

Completion of lower-division requirements does not assure acceptance to an upper division professional program

Upper-Division Program. When students have completed the lower-division curriculum requirements, they may apply for acceptance to upper division programs in Industrial Design or Interior Design. In addition to the portfolio review, the faculty in charge of the interior design program conduct an eight hour required design charette to measure minimum competency and understanding of the design process. The limited spaces available each year are awarded to applicants with the highest promise for professional success. The

faculty of the School of Design retain the right to admit any meritorious student who may be deficient in a published school criterion. Such admission requires an extraordinary review of the applicant by the school's admissions committee. Should the faculty choose to admit such an applicant, the student is placed automatically on a provisional admission status with stipulations as to what is required to be removed from probation. See "Application to Upper-Division Programs."

Students not admitted to upper division programs are not dismissed from the university and may reapply or may transfer to other programs. Students who intend to reapply should meet with the college academic advisor.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to the college academic advisor for the application form well in advance of the application deadline. For additional information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from the college academic advisor. The following dates and procedures are for students applying to 1995-96 upper division programs.

Upper-Division Application Deadlines. *April 14, 1995.* Portfolio and application documents are due in the school office by 5:00 P.M. In addition to the portfolio submittal, the interior design faculty conducts a half-day *required design charette* to measure minimum competency and understanding of the design process. The date is announced when the portfolio is submitted. Students who do not complete the charette are not considered for upper division admission.

June 9, 1995. If the spring 1995 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 9. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Office of Undergraduate Admissions. Application is not complete until the university receives official transcripts for transfer course work. For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1995. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school or department by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation. An accepted student is expected to begin his or her upper division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Portfolio Format Requirements.

Each applicant is responsible for obtaining the following documents and including them in the portfolio. Application materials are submitted at one time in a presentation binder (portfolio) with plastic sleeves (8.5" x 11" format only). The student's name is to be affixed to the outside. Items must appear in the following order:

Page 1. The application form should be completely filled out with the first page visible. Application forms are available from the college academic advising office.

Page 2. The second page of the application should be visible.

Page 3. Application Essay.

Page 4. All college transcripts for both ASU and transfer work should be included through the fall 1994 semester. Copies are acceptable. The academic advisor forwards 1995 ASU transcripts. (Those wishing to transfer spring semester 1995 work are responsible for submitting these transcripts by June 12 so that they may be added to their portfolios. The student is also responsible for getting an official transfer transcript sent directly to the Office of the Registrar.)

Page 5. A certificate of admission is necessary only for those students who have been newly admitted for fall 1995 and who are applying directly into an upper division program. The certificate is not required for students currently attending ASU.

Following Pages (usually 10-20 sheets). Students should present work sufficient to demonstrate the depth and breadth of their creative activity. This work should include (but is not limited to) examples of two and three dimensional design and graphics. Each

project should be clearly identified (course, length of project, etc.), with a concise accompanying description of the assignment.

Students are encouraged to include additional materials, written or pictorial, that provide additional evidence of skills and abilities and of the aptitude and commitment to the major. When any work submitted is not completely original, the source must be given. When work is of a team nature, the applicant's role should be clearly indicated. Original examples or slides must not be submitted. All examples must be photographs or other reproducible graphic media.

Return of Portfolios. Application documents (pages 1 through 6) remain the property of the College of Architecture and Environmental Design. However, the remaining portfolio is returned after the admissions review, provided the applicant encloses a self-addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after July 1, 1995. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school.

ADVISEMENT

Advising for the lower and upper division curricula is through the college academic advisor.

DEGREE REQUIREMENTS

The Bachelor of Science in Design degree requires the following minimum number of hours of required and approved courses for its majors:

Bachelor of Science in Design

Major	Semester Hours
Industrial Design	134
Interior Design	156

The program includes required field trips. Students are responsible for these additional costs. Foreign study opportunities are available for honors students. An internship is a required part of the program.

Industrial Design. The curriculum in Industrial Design is divided into a lower division and an upper division program:

	Semester Hours
Lower division program	64
Upper division program	70
Total	134

The lower division curriculum balances a foundation in academic subjects such as English, algebra and trigonometry, computers, and physics with departmental courses that include history as well as studio courses in drawing, design fundamentals, human factors, and materials and processes.

The upper division curriculum includes studio and laboratory work in industrial design, graphics, material design, professional practice, and a number of approved program electives. A supervised summer internship is part of the curriculum.

Upper division studios emphasize projects which promote an interdisciplinary approach to solving problems and which develop the student's intellectual understanding of the philosophy and direction of methods and theories related to industrial design. Problems proceed from small consumer products with simple task functions to larger and more complex problems and systems. Studio projects also emphasize the design processes: problem resolution through concept ideation, dialogue with specialists in related areas, and product development, presentation, and marketing.

Graduates of the program accept entry level positions in industry and firms doing product and packaging design. They may focus on consumer products, transportation, electronics, medical devices, health products, recreational products, or materials application. Students may also choose to continue their education with graduate studies to enrich their design skills, to specialize, or to prepare for college level teaching.

**Industrial Design—B.S.D.
Lower-Division Requirements¹**

Freshman Year		Semester Hours
Fall (15)		
CSE 180	Introduction to Computer Literacy	3
	or approved elective	
DSC 100	Introduction to Environmental Design ² ..	3
DSC 160	Freehand Drawing for Industrial Design	3
ENG 101	First Year Composition	3
	or ENG 105 (3) if qualified	
MAT 117	College Algebra ² ..	3

Spring (18)

DSC 101	Contemporary International Design/Theory ² ...	3
DSC 161	Technical Drawing for Industrial Design	3
ECN 112	Microeconomic Principles ² ..	3
ENG 102	First Year Composition	3
MAT 118	Precalculus Algebra and Trigonometry ² ..	3
PGS 100	Introduction to Psychology ² ..	3

Sophomore Year

Fall (15)

DSC 227	Visual Methods for Problem Solving	3
DSC 242	Materials and Design	3
DSC 260	Industrial Design I	3
DSC 316	20th Century Design I ²	3
DSC 344	Human Factors in Design	3

Spring (16)

DSC 228	Imaging and Visualization ..	3
DSC 243	Process and Design	3
DSC 261	Industrial Design II	3
DSC 317	20th Century Design II ²	3
PHY 111	General Physics ²	3
PHY 113	General Physics Laboratory ²	1

Lower division total

¹ Transfer credits for the lower division program must be equivalent in both content and level of offering. Samples of studio work must be provided for evaluation. See the college academic advisor for an appointment.

² This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.

**Industrial Design—B.S.D.
Upper-Division Requirements
Junior Year**

	Semester Hours	
Fall (17)		
COM 225	Public Speaking ² or approved elective (3)	3
DSC 318	History of Graphic Design ¹	3
DSC 327	Presentation Graphics	3
DSC 354	Principles of Product Design	3
DSC 360	Industrial Design III	5
Spring (16)		
DSC 328	Graphic Design ..	3
DSC 355	Plastics Design	3
DSC 361	Industrial Design IV	5
DSC 483	Pre-internship Seminar	1
Approved S1	or S2 elective with approved laboratory ¹ ..	4
Summer (3)		
DSC 484	Internship	3

Senior Year

Fall (17)	
DSC 460	Design Project I..... 5
DSC 470	Professional Practice for Industrial Design 3
ENG 301	Writing for the Professions ¹ 3
Approved N1, N2 or N3 elective ¹ .. 3	
Approved technology elective 3	
Spring (17)	
DSC 461	Design Project II 5
DSC 474	Industrial Design Seminar/ Studio 3
ICG 310	Computer Graphics Fundamentals 3
C elective ¹ 3	
HU or SB electives ¹ .. 3	
Upper division total 70	
B.S.D. minimum total 134	

¹ This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.

² A list of courses that fulfill approved program and technology electives is available from the departmental academic advisor

Interior Design. The curriculum in Interior Design is divided into a lower division (first and second year) and an upper-division program (third, fourth, and fifth years):

	<i>Semester Hours</i>
Lower division program	62
Upper division program	94
Total	156

The lower division curriculum balances a foundation in academic subjects such as English, algebra and trigonometry, computer technology, and physics with departmental courses that include history and theory, as well as studio courses in drawing, design fundamentals, and conceptual design.

The upper division curriculum includes studio work in interior design, furniture design, construction methods/structures, codes as related to materials and finishes, human factors, environmental control systems, as well as lecture courses in the history of interior design, decorative arts, and textiles. An eight-week supervised summer internship is a part of the curriculum. The fifth year is an interdisciplinary year in which students address real life environmental problems.

Graduates from the program accept entry level professional positions in a variety of settings, including interior design firms, department of space planning, or interior design in architectural firms, public institutions or industry. Students may also choose to continue

their education through graduate studies, which offer greater enrichment in studio disciplines and which contribute to the possibility for postsecondary level academic appointments, giving the recipients highly sought-after academic credentials.

Interior Design—B.S.D. Lower-Division Requirements¹

First Year	
	<i>Semester Hours</i>
Fall (15)	
COM 100	Introduction to Human Communication 3
or approved SB elective ² (3)	
DSC 100	Introduction to Environmental Design ² . 3
DSC 170	Visualization for Interior Design 3
ENG 101	First Year Composition . 3
or ENG 105 (3) if qualified	
MAT 117	College Algebra ² 3
Spring (15)	
DSC 171	Vocabulary for Interior Design 3
DSC 223	Interior Design Issues and Theories ² ... 3
ENG 102	First Year Composition 3
or HU elective if ENG 105 is taken	
MAT 118	Precalculus Algebra and Trigonometry ² 3
Approved elective 3	

Second Year

Fall (16)	
CSE 180	Computer Literacy 3
or CSE 181 Applied Problem Solving with BASIC ² (3)	
DSC 220	Media for Design Development 3
DSC 231	Concepts for Interior Design 3
PHY 111	General Physics ² 3
PHY 113	General Physics Laboratory ² 1
Approved elective 3	
Spring (16)	
ARS 102	Art of the Western World II ² 3
COM 225	Public Speaking ² .. 3
or approved elective (3)	
DSC 235	User Needs and Behavior in Interior Design 3
S1 or S2 elective with laboratory ² 4	
Approved elective 3	
Lower division total 62	

¹ Transfer credits for the lower division program must be equivalent in both content and level of offering. Samples of studio work must be provided for evaluation. See the college academic advisor for an appointment

² This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.

Interior Design—B.S.D. Upper-Division Requirements

Third Year	
	<i>Semester Hours</i>
Fall (17)	
DSC 310	History of Interior Design I..... 3
DSC 340	Interior Codes Public Welfare and Safety 3
DSC 344	Human Factors in Design..... 3
DSC 364	Interior Design Studio I 5
DSC 366	Construction Methods in Interior Design 3
Spring (15)	
DSC 311	History of Interior Design II..... 3
DSC 341	Interior Materials and Finishes 3
DSC 365	Interior Design Studio II 5
DSC 455	Environmental Control Systems 3
DSC 483	Pre internship Seminar 1
Summer (3)	
DSC 484	Internship 3
Fourth Year	
Fall (17)	
DSC 412	History of Decorative Arts in Interiors 3
DSC 442	Specifications and Documents for Interiors... 3
DSC 457	Acoustics for Interior Design 3
DSC 464	Interior Design Studio III ... 5
ENG 301	Writing for the Professions . . 3
Spring (14)	
DSC 413	History of Textiles in Interior Design 3
DSC 458	Lighting for Interior Design 3
DSC 465	Interior Design Studio IV 5
SB elective ¹ 3	
Fifth Year²	
Fall (14)	
DSC 422	Facilities Planning and Management I 3
DSC 446	Furniture Design and Production 3
DSC 466	Interior Design Studio V 5
Approved C elective ¹ 3	
Spring (14)	
DSC 423	Facilities Planning and Management II 3
DSC 467	Interior Design Studio VI . . 5
DSC 472	Professional Practice for Interior Design 3
Approved degree project elective 3	
Upper division total 94	
B S D. minimum total 156	

¹ This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.

² During the fifth year, the student concentrates on research related to the development of a comprehensive project. This year is self-directed in nature and prepares the student for independent thinking and creative problem solving. The fifth year experience promotes high expectations for producing professional work that represents the culmination of the major's academic experience. It should be noted that the fifth year studio sequence is designed to draw majors from the upper division programs of industrial design, architecture, and planning, thus furthering a real life interdisciplinary problem solving experience.

GENERAL STUDIES REQUIREMENTS

The Interior Design and Industrial Design curricula meet the general studies requirements of the university. For more information about university general studies requirements, see pages 50–52. For the key to general studies credit abbreviations, see page 52.

DESIGN

DSC 100 Introduction to Environmental Design. (3) F, S, SS

Survey of environmental design including historical examples and the theoretical, social, technical, and environmental forces that shape them. Cross-listed as APH PUP 100. *General studies HU, G, H*

101 Contemporary International Design/ Theory. (3) F, S

Survey of contemporary European, American, and Asian design in light of historical events, economic forces, cultural values, and aesthetic ideals. *General studies HU, G*

160 Freehand Drawing for Industrial Design. (3) F

Freehand perspective drawing techniques of objects. Observation and visualization on experiences. Light and shade. 5 hours studio. Prerequisite: major in college.

161 Technical Drawing for Industrial Design. (3) S

Orthographic and perspective projection, dimensions, and basic descriptive graphic methods for design, layout, and technical lettering. 5 hours studio. Prerequisite: DSC 160 or equivalent.

170 Visualization for Interior Design. (3) F
Development of an understanding of drawing space and product sequential development of 2- and 3-dimensional drawing skills. 1-hour lecture, 4 hours lab. Prerequisite: major in college.

171 Vocabulary for Interior Design. (3) S
Projects in the vocabulary of design including color composition, character, and form as related to design. 2- and 3-dimensional graphic representation. 1-hour lecture, 4 hours lab. Prerequisite: DSC 170.

220 Media for Design Development. (3) F
Graphic representation methods used to describe and analyze space. Emphasis on quick presentation techniques. 6 hours studio. Prerequisite: DSC 171.

223 Interior Design Issues and Theories.

(3) F, S
Interior issues, theories, and philosophies. Emphasis on unique social and cultural factors that shape 20th-century design concepts. *General studies HU*

226 Color Sketching. (3) N

Field markers, quick representation, and concept communication sketching. Forms in space, light, and shade. Material reflectance properties. 6 hours studio. Prerequisites: DSC 161 or equivalent; Industrial Design major.

227 Visual Methods for Problem Solving. (3) F

Introduction to conceptual design activity based on the mind-eye-media feedback loop. Graphic language used to represent conjecture, analysis, synthesis of objects, and their contexts. Seminar studio. Prerequisite: DSC 161 or equivalent.

228 Imaging and Visualization. (3) S

Design activities stressing graphic language abstract on practical for presentation. Structure of criticalism, including description, interpretation, and evaluation are discussed. Seminar studio. Prerequisite: DSC 227.

231 Concepts for Interior Design. (3) F

Conceptual design development including scale and proportion, light, texture, form, volume, and spatial hierarchy. Passage and repose. 1-hour lecture, 4 hours lab. Prerequisite: DSC 171.

235 User Needs and Behavior in Interior Design. (3) S

Applications of conceptual design to issues of programming and space planning, user needs, and behavior. 1-hour lecture, 4 hours lab. Prerequisite: DSC 231.

242 Materials and Design. (3) F

Material application in design. Introduction to characteristics and properties of metals and organic materials including plastics and nonorganic materials.

243 Process and Design. (3) S

Influences of industrial processing on design. Introduction to basic material processing and post-forming processes. Emphasis on appearance enhancement and design constraints of material processing. Prerequisite: DSC 242.

260 Industrial Design I. (3) F

Introduction to the method and process of the industrial designer. Determinants necessary in small product design. 1-hour lecture, 2 hours studio. Prerequisite: DSC 161 or equivalent.

261 Industrial Design II. (3) S

Issues of physical form development related to product and design form development. Properties of paper, fibers, wood, metal, and plastics. 1-hour lecture, 2 hours studio. Prerequisite: DSC 260 or equivalent.

310 History of Interior Design I. (3) F

The design of interior spaces as an expression of cultural influences to 1835. Prerequisite: ARS 102 or instructor approval. *General studies HU, H*

311 History of Interior Design II. (3) S

Design of interiors as an expression of cultural influences from 1835 to the present. Prerequisite: DSC 310 or instructor approval. *General studies HU, H*

316 20th Century Design I. (3) F

Modern European and American design from 1900 to 1940. Emphasis on transportation product furniture exhibition and graphic design. *General studies HU, H*

317 20th-Century Design II. (3) S

Modern European, Asian, and American design since 1940. Emphasis on transportation product furniture exhibition, and graphic design. *General studies HU, H*

318 History of Graphic Design. (3) F

Survey of development in the graphic arts, innovative printing methods, aesthetic values, and social and cultural environments that shape them. *General studies HU*

327 Presentation Graphics. (3) F

Methods for portfolio and professional product presentation using graphic media for information transfer are studied. Aesthetic judgment, organization, and craftsmanship are stressed. Seminar, studio. Prerequisite: DSC 228.

328 Graphic Design. (3) S

Packaging applications and planning are investigated and applied to the development of an identity for a product line structured as a system. Lab. Prerequisite: DSC 327.

340 Interior Codes: Public Welfare and Safety. (3) F

Codes and regulations as performance criteria for interior design. Corequisite: DSC 366.

341 Interior Materials and Finishes. (3) F

General analysis of quality control measures relating to interior design materials, finishes, and performance criteria. Prerequisite: DSC 340.

344 Human Factors in Design. (3) F

Man-machine environment systems, human characteristics and behavior applied to design of products, systems, and their operating environment.

354 Principles of Product Design. (3) F

Influences of physical and mechanical concepts in product design, mechanisms, kinematics, and fastening systems. Concepts of analysis for product design. Influences of concepts on aesthetics. Prerequisites: MAT 117, PHY 111.

355 Plastics Design. (3) S

Mold design for part requirements; molded houses; threads, inserts, fastening and joining; decorating reinforced plastics. Prerequisite: DSC 354.

360 Industrial Design III. (5) F

Methods of visualization thinking, conceptualization, and deal on related to building sketches in professional design presentation techniques. 10 hours studio. Prerequisite: department approval.

361 Industrial Design IV. (5) S

Emphasis on developing ideas into a complete functional product, including survey and application of aesthetics, human factors, materials, and manufacturing. 10 hours studio. Prerequisite: DSC 360.

364 Interior Design Studio I. (5) F

Studio problems in interior design related to behavior, response, personality, and small group spaces. 10 hours studio. Prerequisite: department approval.

365 Interior Design Studio II. (5) S

Studio problems in interior design with emphasis on issues of public and private use of interior spaces of assembly. 10 hours studio. Prerequisite: department approval.

366 Construction Methods in Interior Design. (3) F, S

Design theory related to analysis, materials, and building techniques of horizontal and vertical construction interior design. Lecture field trips. Corequisite: DSC 340.

367 Electronic Packaging. (3) N

Industry design problems in packaging electronic devices. Emphasis is placed on packaging designs and controls. Prerequisite: instructor approval

412 History of Decorative Arts in Interiors. (3) F

The design of decorative arts as an expression of cultural influences and as an extension of interior spaces. Prerequisite: DSC 311 or instructor approval. *General studies HU*

413 History of Textiles in Interior Design. (3) S

Cultural and historical expression of textiles as related to interiors. May include field trips. Prerequisite: DSC 412 or instructor approval

421 Concept and Style in Presentation Documents. (3) F

Methods of analyzing portfolio design for interiors. Forming presentation on concepts and establishing a communication style. Prerequisite: senior standing

422 Facilities Planning and Management I. (3) F

The facility management process in large-scale organizations. Planning long range forecast and productivity. Project management methodologies using micro-based software programs. Prerequisite: senior standing

423 Facilities Planning and Management II. (3) S

The format of facilities policies, procedures and standards. The facilities database, space allocations and management process. Evaluation of programming criteria. Prerequisites: DSC 422, senior standing

442 Specifications and Documents for Interiors. (3) F

Contract specifications, documents, schedules and bidding procedures for interior design. Prerequisites: DSC 341, 365. *General studies L2*

446 Furniture Design and Production. (3) F

Design construction, cost estimating and installation in interior furniture and millwork. 1-hour lecture. 4 hours studio. Prerequisite: DSC 465

455 Environmental Control Systems. (3) S

Survey of environmental control systems and their application in the design of buildings. Interiors. Lecture, field trips. Prerequisites: MAT 117, 118, PHY 111, 113, junior standing

457 Acoustics for Interior Design. (3) F

Physical properties of sound. Studies pertaining to sound-absorbing materials, constructions and room acoustics. Prerequisites: MAT 118, PHY 111, 113, senior standing

458 Lighting for Interior Design. (3) S

Light as an aspect of interior design. Evaluation of light sources for distribution, color, and cost. Prerequisite: senior standing

460 Design Project I. (5) F

Complete analysis of the product unit as an element of mass production, featuring marketing technology, human factors, and visual design. Emphasis on professional standards. 10 hours studio. Prerequisites: DSC 361, 484

461 Design Project II. (5) S

Product design, with emphasis on systems interaction. Comparison of design process and technique. Individual project direction encouraged. 10 hours studio. Prerequisite: DSC 361.

464 Interior Design Studio III. (5) F

Studio problems in interior design related to commercial spaces. 10 hours studio. Prerequisites: DSC 365, 484

465 Interior Design Studio IV. (5) S

Studio problems in interior design related to health and educational facilities. 10 hours studio. Prerequisite: DSC 464

466 Interior Design Studio V. (5) F

Advanced interior design problem solving design theory and criticism. Thesis project development based upon the major's concentration. 10 hours studio. Prerequisite: department approval

467 Interior Design Studio VI. (5) S

Advanced series of specialized projects or continuation of thesis project based upon the major's concentration. 10 hours studio. Prerequisite: department approval

470 Professional Practice for Industrial Design. (3) F

Business procedures, management techniques, accounting systems, ethics, and legal responsibilities of the design professions. May be repeated for credit. Prerequisite: senior standing

472 Professional Practice for Interior Design. (3) S

Business procedures, project control, fees, structures, and professional productibilities. Prerequisite: senior standing

474 Industrial Design Seminar/Studio. (3) S

Large-scale interdisciplinary class project involving project planning and control, design prototype development, feasibility study and reporting. Seminar studio. Prerequisites: senior standing, instructor approval

483 Pre-internship Seminar. (1) S

Preparation of internship materials that produce and enhance a successful internship experience. Seminar. Prerequisite: 3rd-year major in the department

484 Internship. (3) SS

Full-time summer internship under supervision of practitioners in the Phoenix area or other locations. Prerequisite: instructor approval

520 Design Forecasting: Methods and Applications. (3) F S

Projected applications in design production, planning, and decision-making processes. Lecture/seminar. Prerequisites: DSC 310 and 311 or equivalents

524 Illumination and Acoustics. (3) N

Research and laboratory investigation of advanced illumination and acoustics issues of facility design. Emphasis on human factors and performance aspects. Prerequisites: DSC 457 and 458 or equivalents

525 Design Methodologies. (3) F

Practical exercises and studies in problem-solving strategies; problem definition and supporting theory for the designer. Lectures, seminars/lab. Prerequisite: senior or graduate standing

527 Modern Design Theory. (3) S

Aesthetic, political, economic and social theories that have shaped modern design theory as the basis for design philosophies. Lectures/seminars. Prerequisite: DSC 525 or equivalent

529 Design Criticism. (3) F

Critical methods applied to design as material culture and human expression. Evaluation of achievement versus intention. Lecture/seminar. Prerequisite: DSC 527 or equivalent

544 Human Factors Systems and Documentation. (3) F

Advanced topics associated with theory and methods of human factors in design and individual projects stressing problem organization, evaluation and documentation. Lectures, seminars/lab. Prerequisite: DSC 344 or equivalent

552 Computer Simulation in Design. (3) F

The use of computer graphics as a medium to develop and present images of the environment for analysis and perception. Lecture, lab. Prerequisite: senior or graduate standing

553 Computer Imaging and Visual Perception. (3) S

Issues and applications of computer simulation as a tool for describing and testing human interface with the environment. Lecture, lab. Prerequisite: senior or graduate standing

558 Daylighting. (3) N

Daylighting as a design determinant. Concepts, techniques, methodology, experiments, and case studies. Lecture/studio. Prerequisite: senior or graduate standing

580 Practicum: Methods of Teaching Design. (3) F

Background and development of design education theories. Concepts of studio teaching methods. Comprehensive student project development and evaluation methods. Prerequisite: graduate standing

591 Seminar: Graduate Design. (3) F

Introduction to the School of Design graduate programs, professional career planning, current problems and topics in the design professions. Prerequisite: graduate standing

Omnibus Courses: See page 44 for omnibus courses that may be offered

School of Planning and Landscape Architecture

Frederick Steiner

Director

(AED 158A) 602/965-7167

PROFESSORS

LAI, PIJAWKA, STEINER

ASSOCIATE PROFESSORS

COOK, K. M. SAN MARTIN

ASSISTANT PROFESSORS

McSHERRY, WASSERMAN, YABES

PROFESSOR EMERITUS

ELMORE

PURPOSE

The faculty of the School of Planning and Landscape Architecture offer a curriculum that provides an education for careers in environmental planning, urban and regional development, landscape architecture, and urban design. The goal of the faculty is to advance the profession of planning through scholarship, teaching, research, and community service.

Planners work on projects that range in scale from site and landscape development to the design of entire communities and the formulation of policies that shape urban and regional growth. Planning graduates work for both private firms and government agencies. Their work typically involves fields such as land use planning, housing, natural resource management, urban transportation, development controls, and environmental impact assessment.

ORGANIZATION

The programs are organized by the faculty of the school under the direction and administration of the director.

DEGREES AND MAJORS

The faculty of the School of Planning and Landscape Architecture offer the undergraduate degrees Bachelor of Science in Planning, Bachelor of Science in Landscape Architecture, and Bachelor of Science in Design and the graduate degree Master of Environmental Planning. The Bachelor of Science in Planning degree offers the major in Urban Planning. The Bachelor of Science in Design degree offers the major in Housing and Urban Development.

Urban Planning. The Bachelor of Science in Planning (B.S.P.) degree with a major in Urban Planning requires four years of study. Following two years of preparatory work, students take two years of courses that include site planning, landscape architecture, urban design, comprehensive planning, socioeconomic and environmental analysis, computer and analytical methods, planning law, and public policy formulation and administration. An internship is required between the third and fourth years. Many students continue to specialize in planning at the graduate level. Students in Urban Planning are exposed to the theories, methods, and interdisciplinary approaches of the profession of planning.

Landscape Architecture. The new Bachelor of Science in Landscape Architecture (B.S.L.A.) degree prepares students to be professional landscape architects. Students explore the reasons for and the techniques involved in the analysis, planning, and design of the environment, both natural and built.

Housing and Urban Development. The Bachelor of Science in Design degree with a major in Housing and Ur-

ban Development familiarizes students with housing planning and development in both the public and private sectors. Students interested in this upper division program should contact the school director for more information. The lower division program is the same for the Bachelor of Science in Planning degree.

Master of Environmental Planning. The School of Planning and Landscape Architecture offers specialization areas in urban and regional development, urban design, and landscape ecological planning, under the Master of Environmental Planning degree (M.E.P.), a professional planning degree. This degree is a two year program and includes 25 hours of core courses, 15 hours in an area of specialization, an optional three hour internship, three hours of approved electives, and a five hour thesis, for a total of 51 semester hours or 48 without the internship. For further information, see the *Graduate Catalog*.

ADMISSION

Lower-Division Program. New and transfer students who have been admitted to the university and who have selected a program in the School of Planning and Landscape Architecture as a major are admitted to the lower division program. Transfer credits for the lower division program are reviewed by the college and evaluated for admission to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering. A review of samples of work is required for studio classes. See the college academic advisor for an appointment.

Completion of lower division requirements does not assure acceptance to the upper division professional program. Admission to the upper division is competitive and limited to the space available. Admission requires formal application and acceptance.

Upper-Division Program. Admission to the upper division programs of the School of Planning and Landscape Architecture is limited to applicants who have completed the lower division program requirements and who are determined by the admissions committee to have the best potential for academic success. Spaces in the program are limited by available facilities, faculty,

and qualified applicants. A lower division program GPA of 3.00 may be required. See "Application to Upper-Division Programs" below.

Students not admitted to upper division programs are not dismissed from the university and may reapply later or may transfer to other programs. Students who plan to reapply should meet with the college academic advisor.

Applications for admission to the upper division Housing and Urban Development program are made directly to the school director. Applications must include a proposed curriculum developed in conjunction with a faculty advisor and acceptable to the department faculty.

APPLICATION TO UPPER-DIVISION PROGRAMS

Upper-Division Application Procedures. Students should write to the college academic advisor for the application form well in advance of the application deadline. For additional information on portfolios, ask for a copy of the *Portfolio Seminar* brochure from the college academic advisor. The following dates and procedures are for students applying to 1995-96 upper division programs.

Upper-Division Application Deadlines. *April 14, 1995.* Portfolio and application documents are due in the school office by 5:00 P.M.

June 9, 1995. If the spring 1995 semester includes transfer course work (i.e., course work taken at an institution other than ASU), a student must submit his or her transcripts to the school no later than June 9. These transcripts may be unofficial copies. A second set of official transcripts must be sent to the university Office of Undergraduate Admissions. Application is not complete until the university receives official transcripts for transfer course work. For those transfer students whose academic term ends in June rather than May, this deadline may be extended upon the written request of the applicant.

July 1, 1995. Acceptance notices are mailed no later than July 1.

Return of Letter of Acceptance. A signed receipt of acceptance of admission must be received by the school by the date indicated on the Notice of Acceptance. Alternates may be accepted at a later date if space becomes available.

Matriculation An accepted student is expected to begin his or her upper division professional program at the beginning of the immediate fall term. There is no spring admission to the upper division.

Portfolio Format Requirements.

Each applicant is responsible for obtaining the following documents and including them in the portfolio. Application materials are submitted at one time in a presentation binder (portfolio) with plastic sleeves (8.5' x 11' format only) The student's name is to be affixed to the outside. Items must appear in the following order:

Page 1 The application form should be completely filled out with the first page visible. Application forms are available from the college academic advising office.

Page 2. The second page of the application should be visible

Page 3. Application Essay.

Page 4. All high school transcripts should be put into one sleeve.

Page 5 All college transcripts for both ASU and transfer work should be included through the fall 1992 semester. Copies are acceptable. The academic advisor forwards 1995 ASU transcripts. (Those wishing to transfer spring semester 1995 work are responsible for submitting these transcripts by June 12 so that they may be added to their portfolios. The student is also responsible for getting an official transfer transcript sent directly to the Office of the Registrar.)

Page 6. A certificate of admission is necessary only for those students who have been newly admitted for fall 1995 and who are applying directly into an upper division program. The certificate is not required for students currently attending ASU.

Following Pages (usually 10-20 sheets). Students should present work sufficient to demonstrate the depth and breadth of their creative activity. This work should include (but is not limited to) examples of two and three dimensional design and graphics. Each project should be clearly identified (course, length of project, etc.), with a concise accompanying description of the assignment.

Students are encouraged to include additional materials, written or pictorial, that provide additional evidence of skills and abilities and of the aptitude

and commitment to the major. When any work submitted is not completely original, the source must be given. When work is of a team nature, the applicant's role should be clearly indicated. Original examples or slides must not be submitted. All examples must be photographs or other reproduction graphic media.

Return of Portfolios. Application documents (pages 1 through 6) remain the property of the College of Architecture and Environmental Design. However, the remaining portfolio is returned after the admissions review, provided the applicant encloses a self addressed return mailer with sufficient prepaid postage. Portfolios may be claimed in person after July 1, 1995. If the applicant provides written permission, another person may claim the portfolio. After one year, unclaimed portfolios are discarded. While care is taken in handling the portfolios, no liability for lost or damaged materials is assumed by the college or school

ADVISEMENT

Advising for the lower-division curriculum is provided through the college academic advisor. Advising for the upper division curriculum is provided by the school director and faculty advisors.

DEGREE REQUIREMENTS

The Bachelor of Science in Planning degree requires the following minimum number of hours of required and approved courses for its majors.

**Bachelor of Science in Planning,
Major in Urban Planning**

	<i>Semester Hours</i>
Lower division courses	61
Upper division courses core	57
Approved electives	6
Internship	3
Total	127

**Bachelor of Science in Planning,
Major in Urban Planning
Lower-Division Major in Urban
Planning Requirements**

	<i>Semester Hours</i>
English Proficiency (6)	
ENG 101, 102 First Year Composition	6
or ENG 105 Advanced First Year Composition 3) plus an HU elective ²	

Literacy and Critical Inquiry (3)

PUP 301 Introduction to Urban Planning	3
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Numeracy (6)

MAT 117 College Algebra	3
or MAT 118 Precalcu Algebra and Trigonometry (3 ²	
Approved N2 elective ²	3

Humanities and Fine Arts (9)	
APH/PUP 100 Introduction to Environmental Design ²	3
Approved HU or SB elective ²	3
Approved HU elective ²	3

Social and Behavioral Sciences (6)

ECN 112 Microeconomic Principles ²	3
Approved SB elective ²	3

Natural Sciences (11)

BIO 100 The Living World ²	4
BIO 330 Ecology and Conservation ²	3
GPH 111 Introduction to Physical Geography ²	4

General studies electives (3)

HU or SB elective ²	3
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Studio and Planning Courses³ (18)

First Year	
ADE 120 Design Fundamentals I ³	3
Second Year	
ADE 221 Design Fundamentals II ³	3
PLA 201 Landscape Architecture and Society	3
PUP 261 Urban Planning I Reading the Landscape ³	4
PUP 264 Urban Planning II Planning Communication ³	4
Lower division minimum total	61

¹ Transfer credits are reviewed by the college and evaluated as admissible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering

² This course satisfies a general studies requirement. See course description for specific requirement(s) each course fulfills.

³ Portfolio review is required for transfer studio work. See the college academic advisor for an appointment

**Bachelor of Science in Planning
Major in Urban Planning
Upper-Division Major
in Urban Planning**

**Professional Program Requirements
Junior Year**

	<i>Semester Hours</i>
Fall (17)	
GCU 361 Urban Geography ¹	3
PUP 322 Planning Methods Using Computers	3
PUP 361 Urban Planning III	5
PUP 412 History of the City ¹ H)	3
PUP 424 Planning Methods I Planning Research Methods	3

Spring (17)

PLM 405	Urban Transportation	3
PUP 362	Urban Planning IV	5
PUP 420	Theory of Urban Design	3
PUP 442	Environmental Planning	3
Approved elective ²		3

Summer (3)

PUP 484	Internship	3
	or approved elective	
PUP 485	International Field Studies in Planning and Landscape Architecture (elective credit)	12

Senior Year

Fall (15)

PUP 425	Urban Housing Analysis	3
PUP 432	Planning and Development Control Law	3
PUP 461	Urban Planning V	5
PUP 494	Environmental Planning Economics	3
PUP 498	Senior Pro Seminar	1

Spring (14)

PUP 452	Ethics and Professional Practice (L2 ¹)	3
PUP 462	Urban Planning VI	5
PUP 475	Environmental Impact Assessment	3
Approved elective ²		3
Upper division minimum total		66
B.S.P in Urban Planning minimum total		127

¹ This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.
² Courses that fulfill approved electives should be selected in consultation with departmental advisors.

Bachelor of Science in Landscape Architecture

	<i>Semester Hours</i>	
Lower division courses	61	
Upper division courses core	57	
Approved electives	3	
Internship	3	
Total	124	

Bachelor of Science in Landscape Architecture Lower-Division Requirements¹

	<i>Semester Hours</i>	
English Proficiency (6)		
ENG 101, 102	First Year Composition	6
	or ENG 105	
	Advanced First Year Composition (3) plus an HU elective ²	
Numeracy (9)		
MAT 117	College Algebra ²	3
MAT 118	Precalculus Algebra and Trigonometry ²	3
Approved N2 elective ²		3

Humanities and Fine Arts (9)

APH/PUP 100	Introduction to Environmental Design ²	3
ARS 101	Art of the Western World I ²	3
	or approved elective	
ARS 102	Art of the Western World II ²	3
	or approved elective	

Social and Behavioral Sciences (6)

HIS 101	Western Civilization ²	3
	or HIS 102 Western Civilization or approved elective	
Approved SB elective ²		3

Natural Sciences (11)

BIO 100	The Living World ²	4
	or approved elective	
BIO 330	Ecology and Conservation ²	3
GPH 111	Introduction to Physical Geography ²	4
	or approved elective	

Studio and Planning Courses³ (21)

First Year

ADE 120	Design Fundamentals I	3
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Second Year

ADE 221	Design Fundamentals II ³	3
PLA 201	Landscape Architecture and Society	3
PLA 261	Landscape Architecture I Reading the Landscape	4
PLA 264	Landscape Architecture II: Landscape Communication ³	4
PUP 301	Introduction to Urban Planning	3

Lower division minimum total 61

¹ Transfer credits are reviewed by the college and evaluated as admissible to this curriculum. To be admissible, transfer courses must be equivalent in both content and level of offering.
² This course satisfies a general studies requirement. See course description for specific requirement(s) each course fulfills.
³ Portfolio review is required for transfer studio work. See the college academic advisor for an appointment

Bachelor of Science in Landscape Architecture Upper-Division Professional Program Requirements Junior Year

	<i>Semester Hours</i>	
Fall (17)		
PLA 310	History of Landscape Architecture ^{1,2}	3
PLA 361	Landscape Architecture III	5
PLA 442	Landscape Construction I	3
PUP 322	Planning Methods Using Computers	3
PUP 412	History of the City ¹	3

Spring (14)

BOT 380	Landscape Plants or PLA 432 Plant Materials (3)	3
PLA 362	Landscape Architecture IV	5
PLA 420	Theory of Urban Design	3
PLA 444	Landscape Construction II	3

Summer (3)

PLA 484	Internship	3
	or approved elective ³	
PLA 485	International Field Studies in Planning and Landscape Architecture (elective credit)	12

Senior Year

Fall (15)

PLA 363	Landscape Planting Design	3
PLA 461	Landscape Architecture V	5
PLA 498	Senior Professional Seminar	1
PUP 432	Planning and Development Control Law	3
Approved HU or SB elective ¹		3

Spring (14)

PLA 443	Landscape Architecture Theory and Criticism ³	3
PLA 452	Ethics and Professional Practice ¹	3
PLA 462	Landscape Architecture VI	5
PUP 442	Environmental Planning or PUP 546 Urban Design Policy (3)	3

Upper division minimum total 63
 B.S.L.A. minimum graduation total 124

¹ This course satisfies a general studies requirement. See the course description for specific requirement(s) the course fulfills.
² This course is offered every other year. The next time it will be offered will be fall 1995. Fall 1994 juniors should select an approved elective and plan to take PLA 310 in their senior year.
³ Courses that fulfill approved electives should be selected in consultation with departmental advisors.

Major in Landscape Architecture (PLA)

Students in the new B.S.L.A. program explore the reasons for and the techniques involved in the analysis, planning, and design of land and the exterior environment, both natural and built.

Major in Urban Planning (PUP)

The major in Urban Planning exposes the student to the theories, methods, and interdisciplinary concerns of the urban planning field.

GENERAL STUDIES REQUIREMENTS

The curricula for the majors in Urban Planning and Landscape Architecture meet the general studies requirements of the university. For more information about university general studies requirements, see pages 50–52. For the key to general studies credit abbreviations, see page 52.

INQUIRIES

For further information on the lower division or upper division programs in planning, contact the college academic advisor:

COLLEGE OF ARCHITECTURE AND
ENVIRONMENTAL DESIGN
ARIZONA STATE UNIVERSITY
BOX 871605
TEMPE AZ 85287 1605

URBAN PLANNING

PUP 100 Introduction to Environmental Design. (3 F, S SS)

Survey of environmental design includes historic examples and the theoretical, social, technical and environmental forces that shape them. Cross-listed as APH DSC 100. *General studies: HU, G, H*

200 The Planned Environment. (3 F)

Environmental, aesthetic, social, economic, political and other factors influencing urban development. *General studies: HU, H*

261 Urban Planning I. (4) F

Reading the landscape: observing, experiencing, and graphically expressing the symbolic and aesthetic significance of natural landscapes. Studio. Cross-listed as PLA 261. Prerequisites: ADE 120, GPH 111.

264 Urban Planning II. (4) S

Planning communication: communication techniques for urban planning and landscape architecture communication. Cross-listed as PLA 264. Prerequisites: ADE 120; PLA/PUP 261.

301 Introduction to Urban Planning. (3) F S, SS

Theoretical and practical aspects of city planning. Interrelationships among physical planning, environment, government and society. *General studies: L1*

322 Planning Methods Using Computers. (3) F

Planning methods using database, word processors, spreadsheets, CAD, and mapping packages on microcomputers. Lecture/lab. Cross-listed as PLA 322

361 Urban Planning III. (5) F

Site planning, analysis of natural and cultural features, site systems and implications for planning and design. Studio. Cross-listed as PLA 361. Prerequisite: department major or instructor approval.

362 Urban Planning IV. (5) S

Planning elements: one or more factors addressed, including and use: housing, environment, transportation, circulation, open space, economic development, urban design. Studio. Cross-listed as PLA 362. Prerequisite: department major or instructor approval.

412 History of the City. (3) F

The city from its ancient origins to the present day. Emphasis on European and American cities during the last five centuries. Cross-listed as APH 414. *General studies: H*

420 Theory of Urban Design. (3) S

Analysis of the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Cross-listed as PLA 420. Prerequisite: junior or standing. *General studies: HU*

424 Planning Methods I: Planning Research Methods. (3) F

Tools useful for urban planning research: emphasis on research design and survey methods. Prerequisite: PUP 301 or instructor approval.

425 Urban Housing Analysis. (3) F

Nature, dimensions, and problems of urban housing; government policy, environment, and underlying economics of the housing market.

432 Planning and Development Control Law. (3) F

Case studies on police power, eminent domain, zoning, subdivisions, controls, excisions on preservation, urban redevelopment, and aesthetic and design regulation.

433 Zoning Ordinances, Subdivision Regulations, and Building Codes. (3) F, S

Analysis of zoning ordinances, subdivision regulations, building codes, and other planning implementation on techniques relative to local development.

442 Environmental Planning. (3) S

Environmental planning problems: including flood plains, water quality and quantity, solid and hazardous waste, air quality, lands, design, and noise. Field trips. Prerequisite: PUP 301 or instructor approval.

444 Preservation Planning. (3) S

Principles and practices in planning for preservation, conservation, and neighborhood redevelopment. Emphasis on evaluation of historic resources. Off-campus field practicum required. Prerequisite: instructor approval.

445 Women and Environments. (3) F

Examines the role women play in shaping the built environment: ways built/natural forms affect women's lives. Focus on contemporary U.S. examples. Prerequisite: upper division or graduate status. *General studies: C*

452 Ethics and Professional Practice. (3) S

Ethical problems and issues in planning, professional practice, and decision making. Prerequisite: department major or instructor approval. *General studies: L2*

461 Urban Planning V. (5) F

Comprehensive planning: collection and analysis of economic, social and environmental data relevant to urban planning; development of and use plans. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

462 Urban Planning VI. (5) S

Final planning or design project: students select and develop projects relating to topics of individual interest or designated specialization. Studio. Prerequisite: PUP 461 or instructor approval.

475 Environmental Impact Assessment. (3) S

Criteria and methods for compliance with environmental laws; development of skills and techniques needed to prepare environmental impact statements/assessments.

484 Internship. (3) F, S SS (SS1 only)

Full-time internship under the supervision of practitioners in the Phoenix area or other locale. Credit/no credit. Prerequisite: department major or instructor approval.

485 International Field Studies in Planning and Landscape Architecture. (1–12) F, S SS

Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with department approval. Study abroad. Cross-listed as PLA 485.

510 Citizen Participation. (3) S

Theory and practice of citizen participation in planning. Examinations and critiques; participation techniques and roles of planners. Prerequisite: instructor approval.

520 Planning Theories and Processes. (3) F

Review of past and current theoretical developments related to social change perspectives; the role and ethics of planners. Prerequisite: instructor approval.

524 Planning Methods I: Planning Research Methods. (3) F

Tools useful for urban planning research; emphasis on research design and survey methods. Prerequisite: PUP 301 or instructor approval.

525 Urban Housing Analysis. (3) F

Nature, dimensions, and problems of urban housing; government policy, environment, and underlying economics of the housing market.

531 Planning and Development Control Law. (3) S

Case studies on police power, eminent domain, zoning, subdivisions, controls, excisions on preservation, urban redevelopment, and aesthetic and design regulation.

532 Advanced Urban Planning Law. (3) S

Advanced study on selected issues in planning law, such as urban design controls, excisions, onerous practices, compensation, regulation and tax policy. Prerequisite: PUP 432 or instructor approval.

544 Urban Land Use Planning. (3) F

Theory and methods of urban and use planning, including the rational planning process, comprehensive, functional, and neighborhood plans. Prerequisite: PUP 301 or instructor approval.

546 Urban Design Policy. (3) F, S

Advanced study of local, state and federal urban design policy. Cross-listed as PLA 546. Prerequisite: PLA/PUP 420.

561 Urban Design Studio. (4) N

Current urban form and urban landscape design problems with the Phoenix-centered region. Studio. Prerequisite: PLA/PUP 420 or instructor approval.

572 Planning Studio I: Data Inventory and Analysis. (4) F

Comprehensive planning workshop dealing with real community problems. Focus on the data gathering and analysis steps of the planning process. Prerequisite: Master of Environmental Planning student or instructor approval.

361 Landscape Architecture III. (5) F
Site planning; analysis of natural and cultural features; site systems and implications for plan making and design. Studio. Cross-listed as PUP 361. Prerequisite: department major or instructor approval.

362 Landscape Architecture IV. (5) S
Site design; site specific design of configured space by the creative development of form. Studio. Prerequisite: department major or instructor approval.

363 Landscape Planning Design. (3) F
Functional and aesthetic use of plants in arid region landscape design. Design philosophies are explored through planting design problems. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

420 Theory of Urban Design. (3) F
Analysis of the visual and cultural aspects of urban design. Theories and techniques applied to selected study models. Cross-listed as PUP 420. Prerequisite: junior standing. *General studies: HU.*

432 Plant Materials. (3) N
Natural components of landscape design; use, field trips.

442 Landscape Construction I. (3) F
Landscape construction focusing on landform transformations. Topics include landform analysis, grading, and earthwork. Studio. Prerequisite: admission to department approval.

443 Landscape Architecture Theory and Criticism. (3) S
Landscape architecture theories and projects are critically analyzed to evaluate validity of design and contribution to society. Prerequisite: PLA 310, 361, 420. PUP 412.

444 Landscape Construction II. (3) S
Characteristics of materials and methods used in landscape architectural construction. Studio. Prerequisite: PLA 442 or instructor approval.

461 Landscape Architecture V. (5) F
Landscape ecological planning: collection and application of ecological data relevant to planning and design at landscape scale. Studio. Prerequisite: PLA/PUP 362 or instructor approval.

462 Landscape Architecture VI. (5) S
Urban design: Analysis and design of the contemporary city emphasizing cultural and environmental influences of urban form. Prerequisite: department major or instructor approval.

484 Internship. (3) F, S, SS (SS1 only)
Full-time internship under the supervision of practitioners in the Phoenix area or other locations. Credit/no credit. Prerequisite: department major or instructor approval.

485 International Field Studies in Planning and Landscape Architecture. (1-12) F, S, SS
Organized field study of planning and landscape architecture in specified international locations. May be repeated for credit with department approval. Study abroad. Cross-listed as PUP 485.

546 Urban Design Policy. (3) F
Advanced study of local, state, and federal urban design policy. Cross-listed as PUP 546. Prerequisite: PLA/PUP 420.

Omnibus Courses: See page 44 for omnibus courses that may be offered.



574 Planning Studio II: Options and Implementation. (4) S
Comprehensive planning workshop dealing with real community problems. Focus on the development of options, plan making, and plan implementation. Studio. Prerequisite: PUP 572 or instructor approval.

575 Environmental Impact Assessment. (3) S
Criteria and methods for compliance with environmental laws; development of skills and techniques needed to prepare environmental impact statements/assessments.

584 Internship. (3) F, S, SS (SS1 only)
Internship under the supervision of practitioners in the Phoenix area or other locales. Credit/no credit.

622 Planning Methods II: Quantitative Planning Analysis. (3) S
Methods and models used as the basic quantitative techniques of urban, regional, and environmental planning and policy analysis. Prerequisite: PUP 424; statistics; instructor approval.

642 Land Economics. (3) F
Land use and locational impact of economic activity and the urban real property market. Prerequisite: instructor approval.

644 Public Sector Planning. (3) N
Urban fiscal problems and public goods provision in state and local government. Prerequisite: instructor approval; 1 course in microeconomics.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PLA 201 Landscape Architecture and Society. (3) F, S
The relevance of landscape architecture to the creation of humanized environments, with emphasis on natural factors.

261 Landscape Architecture I. (4) F
Reading the landscape: observing, experiencing, and graphically expressing the symbolic and aesthetic significance of natural landscapes. Studio. Cross-listed as PUP 261. Prerequisite: ADE 120; GPH 111.

264 Landscape Architecture II. (4) S
Landscape communication: communication techniques for urban planning and landscape architecture communication. Cross-listed as PUP 264. Prerequisites: ADE 120; PLA/PUP 261.

310 History of Landscape Architecture. (3) F
Physical record of human attitudes toward the land. Ancient through contemporary landscape planning and design. Cross-listed as APH 411. *General studies: H.*

322 Planning Methods Using Computers. (3) F
Planning methods using database, word processors, spreadsheets, CAD, and mapping packages on microcomputers. Lecture, lab. Cross-listed as PUP 322.

359 Resort Planning and Recreation Design. (3) F
Interrelationships of social, economic, and physical aspects of total resort design; emphasis on physical development of tourist centers and resort areas.

College of Business

Larry E. Penley, Ph.D.
Dean

PURPOSE

The primary objective of the College of Business is to prepare students for positions of responsibility in the business community. The undergraduate and graduate degree curricula are designed to provide

1. a background of general education helpful to informed, thinking citizens;
2. a mastery of basic business tools and skills with a clear understanding of business procedures, and
3. a specialized and professional knowledge of a selected field of business.

To attain these objectives in the undergraduate program, the curriculum has been devised so that the student completes 50% of work in general education and other nonbusiness courses and 45% in courses offered by the College of Business, with the remaining 5% selected from either area by the student in consultation with an advisor.

The college is a member of the American Assembly of Collegiate Schools of Business (AACSB), the official accrediting organization in the field of business. The undergraduate and graduate programs and the School of Accountancy of the College of Business are accredited by this organization.

The college is host to a chapter of Beta Gamma Sigma, a national society that recognizes high academic achievement in AACSB accredited schools. Selection to Beta Gamma Sigma is the highest scholastic honor a student in business can earn.

In addition to the regular degree curricula, other programs of study in the college are designed to meet special needs. Evening and continuing education courses are conducted for qualified persons who are regularly employed and who otherwise would be unable to enroll in college courses. Short courses and institutes on a noncredit basis are organized in cooperation with various business groups for the furtherance of in-service training of employed personnel.

ORGANIZATION

The courses offered by the College of Business are organized into groups so that a related sequence may be established for the various subject fields. For administrative purposes, these

fields are organized into the following academic units: Accountancy, Business Administration, Decision and Information Systems, Economics, Finance, Management, and Marketing.

The School of Health Administration and Policy offers a master's degree program designed to prepare qualified individuals for management careers in hospitals, group practices, health maintenance organizations, consulting firms, long term facilities, and other health services organizations. The school also offers a concentration in health services research in the Ph.D. in Business Administration.

ADMISSION

The Prebusiness Program. Each student admitted to the College of Business is designated as a prebusiness student. The student follows the freshman and sophomore sequence of courses listed in the curriculum outline. Students are required to follow the recommendations of an academic advisor in completing the prescribed background and skill courses in preparation for the subsequent professional program. The skill courses are shown below.

			<i>Semester Hours</i>
ACC	230	Uses of Accounting Information I	3
ACC	240	Uses of Accounting Information II	3
CIS	200	Computers in Business	3
ECN	111	Macroeconomic Principles	3
ECN	112	Microeconomic Principles	3
ENG	101, 102	First Year Composition	6
		or ENG 105	
		Advanced First Year Composition (3)	
MAT	119	Finite Mathematics	3
MAT	210	Brief Calculus	3
QBA	221	Statistical Analysis	3

Completion of lower-division requirements does not assure acceptance to the upper division professional program. Prebusiness students are not allowed to register for 300- and 400 level business courses.

The Professional Program. The junior and senior years constitute the professional program of the undergraduate curriculum. Admission to the professional program is competitive and limited by available resources. Admission is awarded to those applicants demonstrating the highest promise for professional success.

To be considered for admission to the professional program, students must obtain an application to the professional program in the Undergraduate Programs Office in the College of Business. This application contains complete information concerning academic qualifications for admission to the professional program

Nonbusiness Students. A nonbusiness student is permitted to register for selected 300 and 400 level business courses only if, (1) at the time of registration, the student has junior standing (56 semester hours completed) and (2) the student has a minimum cumulative GPA of 2.50 at ASU and a minimum GPA of 2.50 for all business courses completed at ASU. Students who have 56 semester hours completed but have never attended ASU are given a one semester period to register and to establish a GPA at ASU. Students must meet all prerequisites and course requirements as listed in the catalog.

Nonbusiness majors are limited to a maximum of 15 semester hours of selected upper division business courses (excluding economics courses).

Minor. A business minor is available to nonbusiness students with an interest in this area. To complete the minor, students must obtain the requirements from the Undergraduate Programs Office in the College of Business and complete the specified business courses with a grade of "C" or better. The upper division courses for the minor are restricted to students with 56 semester hours and in good standing in the university and are not available to students with a major in the College of Business.

Nondegree Undergraduate Students. A nondegree undergraduate student is permitted to enroll in selected 300- and 400 level business courses only during online registration and only if (1) the student has an ASU cumulative GPA of at least 2.50 and an ASU cumulative business GPA of at least 2.50 at the time of online registration or (2) the student has never attended ASU, in which case he or she is given a one semester period to register during online registration and to establish a GPA at ASU. Students must meet all prerequisites and course requirements as listed in the catalog.

Nondegree undergraduate students are limited to a maximum of 15 semester hours of selected upper division business courses (excluding economics courses).

Nondegree Graduate Students. A graduate student not declaring a degree program is permitted to enroll in selected 300 and 400 level business courses only during online registration and only if (1) the student has an ASU cumulative GPA of at least 2.50 and an ASU cumulative business GPA of at least 2.50 at the time of online registration or (2) the student has never attended ASU, in which case he or she is given a one semester period to register during online registration and to establish a GPA at ASU. Students must meet all prerequisites and course requirements as listed in the catalog.

Nondegree graduate students are limited to a maximum of 15 semester hours of selected upper division business courses (excluding economics courses).

ADVISEMENT

The student should follow the sequence of courses in the curriculum outline below and the recommendations of the academic advisor in completing the prescribed background and skill courses in preparation for the subsequent professional program.

**Curriculum Outlines
Prebusiness Program**

		<i>Semester Hours</i>
First Semester		
ENG 101	First Year Composition . . .	3
MAT 119	Finite Mathematics	3
S1 course	. . . . .	4
PGS or SOC course	. . . . .	3
General studies	. . . . .	3
		16
Second Semester		
COM 100	Introduction to Human Communication	3
		or COM 230 (3) or COM 259 (3)
ENG 102	First Year Composition	3
MAT 210	Brief Calculus	3
S2 course	. . . . .	4
PGS or SOC course	. . . . .	3
		16

Third Semester		
ACC 230	Uses of Accounting Information I	3
ECN 111	Macroeconomic Principles or ECN 112 (3)	3
QBA 221	Statistical Analysis	3
General studies	. . . . .	7
		16

Fourth Semester		
ACC 240	Uses of Accounting Information II	3
ECN 112	Microeconomic Principles or ECN 111 (3)	3
CIS 200	Computers in Business	3
General studies	. . . . .	7
		16
Total	. . . . .	64

Students who are employed or who wish to take a reduced load may choose to complete the prebusiness program in five semesters. The following outline is recommended for these students.

Optional Curriculum Outline

		<i>Semester Hours</i>
First Semester		
ENG 101	First Year Composition . . .	3
MAT 119	Finite Mathematics	3
S1 course	. . . . .	4
General studies	. . . . .	3
		13

Second Semester		
COM 100	Introduction to Human Communication	3
		or COM 230 (3) or COM 259 (3)
ENG 102	First Year Composition	3
MAT 210	Brief Calculus	3
S2 course	. . . . .	4
		13

Third Semester		
ACC 230	Uses of Accounting Information I	3
ECN 111	Macroeconomic Principles or ECN 112 (3)	3
PGS or SOC course	. . . . .	3
General studies	. . . . .	4
		13

Fourth Semester		
ACC 240	Uses of Accounting Information II	3
ECN 112	Microeconomic Principles or ECN 111 (3)	3
PGS or SOC course	. . . . .	3
General studies	. . . . .	4
		13

Fifth Semester

CIS 200 Computers in Business	3
QBA 221 Statistical Analysis	3
General studies	6
	12
Total	64

Professional Program. Students admitted to the Professional Program should select the necessary upper division business courses to complete the major by consulting their departmental advising guide and faculty advisor.

Transfer Credit. Credit from other institutions is accepted subject to the following guidelines. Students planning to take their first two years of work at a community college or another four year college should take only those courses in business and economics that are offered as freshman- or sophomore-level courses at any of the three state-supported Arizona universities. These lower division courses are numbered 100 through 299 at the three Arizona universities. *A maximum of 30 hours of business and economics courses from community colleges are accepted toward a bachelor's degree in business.*

Students may transfer a maximum of nine semester hours of approved upper division business course work required for the business degree to ASU Main Professional business courses taught in the junior or senior year in the three state universities may not be completed at a two year college for transfer credit in the business core or major. The introductory course in the legal, ethical, and regulatory issues in business is accepted as an exception to this policy, but only lower division credit is granted. Such courses may be utilized in the free elective category *subject to the 30 hour limitation.* Courses taught as vocational or career classes at the community colleges that are not taught in the colleges of business at any one of the three state universities are not accepted for credit toward a bachelor's degree. Courses taught in the upper division business core at the three state universities must be completed at the degree granting institution unless transferred from an accredited four year school. Normally, upper-division transfer credits are accepted only from AACSB accredited schools. To be accepted for credit as part of the professional program in business, all courses transferred from other institutions must

carry prerequisites similar to those of the courses they are replacing at ASU.

The following general pattern of courses is recommended for students completing their first two years of work in an Arizona community college and who plan to transfer to ASU without the loss of credit:

	<i>Semester Hours</i>
Business Courses	30
Uses of Accounting Information I and II (business core) (6)	
Business communication (other general studies) (3)	
Computers in business (business core) (3)	
Economics (business core) (6)	
Legal, ethical, and regulatory issues in business (business core) (3)	
Quantitative methods in business (math general studies) (3)	
Statistical analysis (business core) (3)	
Lower-division business courses (electives) (3)	
General studies and	
English proficiency	34
Communication	
English	
Global awareness	
Humanities and fine arts	
Laboratory science	
Mathematics	
Social and behavioral sciences	
Total	64

Students should consult with an academic advisor in the Undergraduate Programs Office to plan curriculum requirements.

DEGREES

The College of Business awards the Bachelor of Science degree upon successful completion of a four year curriculum of 126 or 127 semester hours as prescribed. Students may select one of the majors shown in the "College of Business Degrees, Majors, and Concentrations" table, page 185. Each major is administered by the academic unit indicated.

Master's Degrees

The Master of Business Administration degree, the Master of Health Services Administration degree, the Master of Accountancy degree, the Master of Science degree with a major in Decision and Information Systems, the Master of Taxation, and the Master of Science degree in Economics are awarded upon successful completion of programs detailed in the *Graduate Catalog*.

Master of Business Administration.

The central theme of the M.B.A. program is to build and to strengthen capabilities in three areas: knowledge and analysis of the functional areas of business, basic skills, and managerial abilities. There is a strong team emphasis throughout the ASU curriculum, and the faculty are working with new cooperative learning techniques that emphasize student participation. An important feature is the attention to diversity both in the ability to manage in a diverse environment and in the student body composition.

Master of Health Services Administration.

This program is designed to prepare qualified individuals seeking careers as administrators of hospitals and health care organizations and as consultants to health management firms, accounting firms, and policy makers in state and federal agencies. This preparation is carried out by providing the students with selected theories, tools and techniques the understanding, analysis, and application that are essential for effective health services administration.

The program consists of a minimum of 51 semester hours: 15 hours of business, 27 hours of health services administration, and nine hours of electives. Students serve internships and residencies in major organizations throughout the United States and abroad. During the course of their training, students act as consultants to major health care organizations throughout the United States. This is accomplished through the program's innovative Graduate Technical Assistance Program (GTAP).

Master of Accountancy. This program is designed to provide professional competency in a variety of fields in accounting. In addition to a broadly oriented degree program, the student may choose to specialize in accounting information systems/electronic data processing auditing.

Decision and Information Systems—M.S. This is a specialized program that stresses the application of decision and information systems to business, economic, governmental, and social issues. It includes substantial familiarization with computer-based systems and quantitative methods to facilitate managerial planning, decision analysis, and control. The program of study consists

College of Business Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Accountancy	B.S.	School of Accountancy
Computer Information Systems	B.S.	Department of Decision and Information Systems
Economics	B.S.	Department of Economics
Finance	B.S.	Department of Finance
Management	B.S.	Department of Management
Marketing	B.S.	Department of Marketing
Purchasing and Logistics Management	B.S.	Department of Business Administration
Real Estate	B.S.	Department of Business Administration
Graduate Degrees		
Accountancy	M.Acc.	School of Accountancy
Business Administration	M.B.A.	College of Business
Business Administration Concentrations: accountancy, decision and information systems, finance, health services research, management, marketing, purchasing and logistics management	Ph.D.	College of Business
Decision and Information Systems	M.S.	Department of Decision and Information Systems
Economics	M.S., Ph.D.	Department of Economics
Health Services Administration	M.H.S.A., Ph.D.	School of Health Administration and Policy
Statistics	M.S.*	Committee on Statistics
Taxation	M Tax.	School of Accountancy

* This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

of a minimum of 30 semester hours with six hours in required study and 24 hours in electives to support an area of specialization. The Department of Decision and Information Systems also participates with the Department of Mathematics to allow students to earn the Master of Science degree with a major in Statistics.

Economics—M.S. This is a specialized program for students who desire to teach in community colleges, to prepare for research positions in business and government, or to take additional graduate work in economics. The master's program in Economics requires graduate work in macroeconomic analysis, microeconomic analysis, and quantitative methods.

Master of Taxation. This is a specialized program to equip persons with the highly technical and demanding skills required to administer the tax laws in both the private and public sectors of the economy.

Business Administration—Ph.D.

The Doctor of Philosophy degree (Ph.D.) in Business Administration prepares individuals to teach and conduct scholarly research in a specialized area of concentration in the field of business and prepares individuals for positions in business or government for which the required educational background is doctoral-level study. Prerequisites for the Ph.D. degree program include computer skills and mathematical competence through linear algebra and calculus. 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. The degree is granted upon the completion of an approved program of graduate study, the successful completion of comprehensive written and oral examinations, and the submission of an acceptable original research project presented in a dissertation.

Economics—Ph.D.

The Doctor of Philosophy degree in Economics is awarded upon the successful completion of the program as described in the *Graduate Catalog*. Primary objectives of this degree program are to prepare persons for research positions in public agencies and private business organizations and for teaching and research in institutions of higher learning. The degree is granted upon the completion of an approved program of graduate study, the successful completion of comprehensive written and oral examinations, and the submission of an acceptable original research project presented in a dissertation.

GRADUATION REQUIREMENTS

B.S. Students seeking a Bachelor of Science degree in the College of Business must satisfactorily complete a curriculum of 126–127 semester hours as follows:

	<i>Semester Hours</i>
Business core curriculum	40
Major	18 24
General studies requirements	62
Electives	0-6
Total	126-127

Business Core Requirements

To obtain an understanding of the fundamentals of business operation and to develop a broad business background, every student seeking a Bachelor of Science degree in the College of Business must complete the following courses:

Lower-Division Business Core

	<i>Semester Hours</i>
ACC 230 Uses of Accounting Information I	3
ACC 240 Uses of Accounting Information II	3
CIS 200 Computers in Business	3
ECN 111 Macroeconomic Principles	3
ECN 112 Microeconomic Principles	3
QBA 221 Statistical Analysis	3
Total lower division business core	18

Upper-Division Business Core

The upper-division business core courses consist of a combination of studies in management communication, finance, legal, ethical and regulatory issues in business, management and organizational behavior, strategic management, marketing, and operations and logistics management and a business forum.

Total upper division business core	22
Total business core	40

Core Proficiency Requirement. Students must receive grades of "C" or better in upper division business core courses to graduate. If a student receives a grade below "C" in any of these courses, the course must be repeated. University policy states a course may be repeated only one time.

Major Requirements

A major consists of a pattern of 18 24 semester hours in related courses falling primarily within a given subject field. Majors are available in Accounting, Computer Information Systems, Economics, Finance, Management, Marketing, Purchasing and Logistics Management, and Real Estate.

Major Proficiency Requirements. Students must receive grades of "C" or

better in upper-division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper division course in the major, the student is no longer eligible to take additional upper division courses in that major.

General Studies Requirements

All students in the College of Business are required to complete a total of 62 hours of general studies course work. By carefully selecting them, students can take courses that also satisfy the university general studies requirement. Courses that meet both the 35 hour university general studies requirement and the total 62 hour general studies requirement of the College of Business are listed in the *General Catalog*. Students must select their general studies courses from these lists. Business courses may not be used in any of the general studies areas.

Specific courses from the following areas must be taken.

	<i>Semester Hours</i>
Humanities and fine arts	9
At least one course from HU or SB must be from the upper division (Any foreign language courses must be nonspeaking courses.)	
Social and behavioral sciences	15
This must include one course with a PGS prefix and one course with a SOC prefix. At least one course from HU or SB must be from the upper division.	
Science and mathematics	14
This must include two laboratory sciences (eight hours) and MAT 119 and 210 or a more advanced course)	
Historical awareness or cultural diversity in the United States	3
General studies requirements must include one approved H course or one approved C course. This course may be selected to fulfill another general studies area simultaneously.	
Communication	9
All students must complete both ENG 101 and 102 or ENG 105 with a grade of "C" or better. See pages 71-77 for details. Also COM 100 or 230 or 259 must be completed.	
Global awareness	9
These courses may fulfill another area simultaneously.	

Other courses

Additional general courses that provide breadth and cultural background must be taken to bring the student's total credits up to the 62 hour minimum. These courses may be selected from any of the general studies areas or from the *General Studies Policy Statement* of additional courses accepted by the College of Business. The *General Studies Policy Statement* is available in the Undergraduate Programs Office

Total 62

Elective Courses

Sufficient elective courses are to be selected by the student to complete the total of 126-127 semester hours required for graduation. Free electives by business majors are restricted to a maximum of six semester hours of ASU business courses.

Pass/Fail

Business majors may not include among the credits required for graduation any courses taken at this university on a pass fail basis.

Additional Graduation Requirements

In addition to completion of the pattern of courses outlined above, to be eligible for the Bachelor of Science degree in the College of Business, a student must

1. have completed at least 30 semester hours at ASU Main;
2. have attained a cumulative GPA of 2.00 or higher for all courses taken at this university, for all business courses taken at this university, and for all courses for the major taken at this university,
3. have earned a "C" or better in each course in the business core and each course in the major; and
4. have earned a minimum of 51 semester hours in traditional courses designed primarily for junior or senior students and completed in an accredited, four-year degree granting institution.

Exceptions. Any exception to the above requirements must be approved by the Standards Committee of the College of Business.

Application for Graduation. A professional program business student must complete a formal program of study during the semester in which the student completes 87 semester hours.

ACADEMIC STANDARDS

Probation. All students, freshman through senior, must maintain a minimum GPA of 2.00 for all courses completed at ASU. If these standards are not maintained, the student is placed on probation.

Disqualification. A student who is on probation becomes disqualified if (1) the student obtains a semester GPA below 2.50 or receives a grade below "C" in one or more courses or if (2) the student has not returned to good standing by the end of two consecutive semesters.

Students who have been academically disqualified are not permitted to enroll in upper division business courses during summer sessions.

Reinstatement and Readmission.

Students seeking reinstatement (after disqualification) or readmission (after an absence from the university) should contact the Undergraduate Programs Office regarding procedures and guidance for returning to good standing.

Academic Dishonesty. The faculty of the College of Business have adopted a policy on academic dishonesty. A copy of the policy may be obtained in the Office of the Dean, Undergraduate Programs.

Student Appeal Procedure on Grades.

The faculty of the College of Business have adopted a policy on the student appeal procedure on grades. A copy of the policy may be obtained in the Office of the Dean, Undergraduate Programs.

SPECIAL PROGRAMS

Academic Access Program. The Academic Access Programs (AAP) Office has been established to serve the College of Business in achieving its mission of increasing the ethnic diversity of the student body throughout its academic programs. To that end, AAP is charged with increasing targeted minority student representation and graduation rates through effective development, design, and implementation of programs, projects, and activities that

facilitate and fulfill the student affirmative action goals and objectives of the college. Therefore, efforts of the AAP are programmatically directed to the attainment of objectives evolved from this mission and are compatible with and supportive of the philosophical stance embodied in the mission of the college and university. For more information, contact the AAP Office at 602/965-4066.

Asian Studies. Students in the College of Business may pursue a program with emphasis in Asian studies. As part of the Bachelor of Science degree requirements in business, at least 30 upper division semester hours of the program must be in Asian studies content courses. Reading knowledge of an Asian language is required. The Asian studies content program must be approved by the Center for Asian Studies (see page 90). Fulfillment of the requirements is recognized on the transcript as a bachelor's degree with a designation of the Asian studies discipline. It is possible to complete the certificate program in International Business Studies and the Asian studies emphasis concurrently.

Certificate in International Business Studies. See page 198 for the requirements of this certificate.

Honors Program. The Business Honors Program provides opportunities for academically talented business students to interact with other such students and faculty both inside and outside the classroom. The result is a challenging and enriched business education. The program focuses on students in the professional business program. However, freshmen and sophomores are offered honors breakout sections in core courses and are invited to attend selected events, such as seminars and luncheons with top business leaders.

Upon acceptance into the program, an enriched learning experience begins. The honors course work, consisting of at least 18 hours of upper division honors courses, offers a demanding curriculum taught by highly motivated faculty. Some aspects of the program extend beyond the normal classroom setting in order to broaden the education experience, including special honors scholarships, student/faculty mixers, corporate breakfasts, professional seminars and panel discussions, and "Shadow Day" events with top busi-

ness leaders. An academic advisor is assigned strictly to assist honors students in course selection, to monitor progress toward the honors degree, and to be actively involved in career and educational guidance upon completion of the degree.

To graduate with an honors degree from the College of Business, professional program business students must

1. take at least 18 hours of upper division honors course work;
2. take the College of Business honors omnibus course, which features lectures by faculty, local, and national leaders and provides preliminary thesis direction;
3. have a minimum of three hours of upper division honors credit outside the college;
4. complete the honors thesis project;
5. actively participate in the program; and
6. graduate from the University Honors College.

For more information, call 602/965-8710. Interested students should also contact the University Honors College at 602/965-2359.

Latin American Studies. Students in the College of Business may pursue a program with emphasis in Latin American area studies. At least 30 upper division semester hours of the program must be in Latin American content courses, including 15 semester hours of Latin American content courses in the College of Business listed on page 198 under International Business Studies (except ECN 365) and 15 semester hours of Latin American content courses in other disciplines. A reading knowledge of either Spanish or Portuguese is required; a reading knowledge of both is recommended. The Latin American content program must be approved by the Center for Latin American Studies (see page 91). Fulfillment of the requirements is recognized on the transcript as a bachelor's degree with a designation of the Latin American studies discipline. It is possible to complete the certificate program in International Business Studies and the Latin American emphasis concurrently.

Pre-law Studies. Pre law students may pursue a program of study in the College of Business. Courses in accounting, economics, finance, insurance, labor relations, and statistics are

recommended for any student planning to enter the legal profession

The admission requirements of colleges of law differ considerably. The student should communicate with the dean of the law school the student hopes to attend to plan a program to meet the requirements of that school. Most law schools, including the ASU College of Law, require a baccalaureate degree for admission, although some permit admission upon completion of three years of college work.

Students who plan to take a bachelor's degree before entering law school may follow any field of specialization in the College of Business. Within the College of Business are faculty members who are lawyers and who serve as advisors for students desiring a pre law background.

Certificate in Quality Analysis. See page 192 for the requirements of this certificate

RESEARCH CENTERS

The College of Business houses nine research centers. These centers provide information and assistance to the business community on a wide variety of subjects. Operating under the umbrella of the L. William Seidman Research Institute, these centers are

1. the Arizona Real Estate Center;
2. the Center for Advanced Purchasing Studies;
3. the Center for Business Research;
4. the Center for Financial Systems Research;
5. the Division of Information Management and Systems Technology;
6. the Economic Outlook Center;
7. the First Interstate Center for Services Marketing;
8. the Joan and David Lincoln Center for Ethics; and
9. the National Science Foundation Center.

The college is the site of the National Science Foundation's Industry/University Cooperative Research Center for Health Management. The center is a collaborative effort with the Western Network for Education in Health Administration. Center university partners are Arizona State University, the University of British Columbia, the University of California at Berkeley, the University of California at Los Angeles, the

University of Colorado at Denver, University of Southern California, the University of Washington, San Diego State University, Northwestern University, Ohio State University, and the University of Michigan.

The industry sponsors are Franciscan Health Group West in Tacoma, Washington; Samaritan Foundation in Phoenix; Hospital of the Good Samaritan in Los Angeles; Intermountain Health Care in Salt Lake City; Mercy Health Services in Farmington Hills, Michigan, Sisters of Charity Health Care Systems in Cincinnati, Ohio; Sisters of Providence in Seattle; St Joseph Health Systems in Orange, California; Tucson Medical Center in Tucson, and Virginia Mason Medical Center in Seattle.

School of Accountancy

Philip M.J. Reckers
Director
(BA 267A) 602/965-3631

PROFESSORS

BOATSMAN, BOYD, FLAHERTY, HARRIED, JOHNSON, KAPLAN, MCKENZIE PANY, RECKERS, RENEAU, SCHULTZ, SHRIVER, R SMITH, TIDWELL, WILKINSON, WYNDELTS

ASSOCIATE PROFESSORS
CHRISTIAN GOLEN KNEER, MOECKEL O DELL, PE, REGIER

ASSISTANT PROFESSORS
GRASSO, GUPTA, K SMITH

SENIOR LECTURER
MAGILL

LECTURER
JONES

PROFESSORS EMERITI
FRITZMEYER HUIZINGH, HUNTINGTON, IMDEKE SANDERS

The major in Accountancy includes the essential academic preparation for

1. those wishing to prepare for professional careers in public accounting;
2. those seeking positions as controllers, heads of accounting divisions, cost accountants or internal auditors;
3. those wishing to serve in accounting positions in federal, state, and local governments; and

4. those planning to operate their own businesses.

The major in Accountancy consists of the following 24 semester hours.

	<i>Semester Hours</i>
ACC 330 Accounting Information Systems	4
ACC 340 External Reporting I	4
ACC 350 Internal Reporting	4
ACC 430 Taxes and Business Decisions	4
ACC 440 External Reporting II	4
ACC 450 Principles of Auditing	4

As part of the requirements, all Accountancy majors must complete the following courses:

	<i>Semester Hours</i>
ACC 250 Introductory Accounting Lab	1
COM 100 Introduction to Human Communication	3
or COM 230 Small Group Communication (3)	
COM 259 Communication in Business and the Professions	3
ENG 301 Writing for the Professions	3
PHI 103 Principles of Sound Reasoning	3
PHI 306 Applied Ethics	3

Admission. To be considered for admission to the Accountancy major, a student must (1) meet the College of Business admission requirements and (2) have received a grade of "B" or better in both ACC 230 and 240 or their equivalents

Academic Progress. In addition to college and university requirements, Accountancy majors must receive grades of "C" or better in the required upper division Accounting courses. If an Accountancy major receives a grade below "C" in any required upper division accounting course, this course must be repeated before any other upper division accounting course can be taken. If a second grade below "C" is received in either an upper division accounting course already taken or in a different upper division accounting course, the student is no longer eligible to take additional upper division accounting courses.

Major Proficiency Requirements. Students must receive grades of "C" or better in upper division courses for the major.

ACCOUNTANCY

ACC 230 Uses of Accounting Information I. (3) F, S, SS

Introduction to the uses of accounting information focusing on the evolution of the business cycle and how accounting information is used for internal and external purposes. Prerequisite: sophomore standing.

240 Uses of Accounting Information II. (3) F, S, SS

Introduction to the uses of accounting information focusing on the evolution of the business cycle and how accounting information is used for internal and external purposes. Prerequisites: ACC 230; sophomore standing.

250 Introductory Accounting Lab. (1) F, S, SS

Procedural details of accounting for the accumulation of information and generation of reports for internal and external users. Lab. Prerequisites: ACC 230; sophomore standing.

315 Financial Accounting and Reporting. (3) F, S

Accounting theory and practice related to uses of financial statements by external decision makers. Prerequisites: ACC 240; non-Accountancy major.

316 Management Uses of Accounting. (3) F, S

Uses of accounting information for managerial decision-making, budgeting, and control. Prerequisites: ACC 240; non-Accountancy major.

330 Accounting Information Systems. (4) F, S, SS

Knowledge related to accounting information systems, emphasizing managerial decision-making and support, transaction processing, controls, computer technology, and systems development. 3 hours lecture, 3 hours lab. Prerequisites: CIS 200; professional program business student majoring in Accountancy.

340 External Reporting I. (4) F, S, SS

Financial accounting theory and practice related to external reporting. 3 hours lecture, 3 hours lab. Prerequisites: ACC 250, 330 (grade of "C" or higher); professional program business student majoring in Accountancy.

350 Internal Reporting. (4) F, S, SS

Internal reporting systems for planning, control, and decision making. 3 hours lecture, 3 hours lab. Prerequisites: ACC 250, 330 (grade of "C" or higher); OPM 301; professional program business student majoring in Accountancy.

430 Taxes and Business Decisions. (4) F, S, SS

Federal income taxation of sole proprietors, partnerships, corporations, fiduciaries, and individuals with an emphasis on tax consequences of business and investment decisions. 3 hours lecture, 3 hours lab. Prerequisites: ACC 340 (grade of "C" or higher); LES 305; professional program business student majoring in Accountancy.

432 Problems in Managerial Accounting. (3) N

Cases and computer applications in decision-making, planning and control, and capital budgeting. Prerequisites: ACC 331 (grade of "C" or higher); professional program business student majoring in Accountancy.

440 External Reporting II. (4) F, S, SS

Continuation of ACC 340 External Reporting I with emphasis on the recognition, research, and resolution of financial reporting issues. 3 hours lecture, 3 hours lab. Prerequisites: ACC 340 with a grade of "C" or higher; professional program business student majoring in Accountancy.

450 Principles of Auditing. (4) F, S

Standards and procedures in auditing. Planning, evidence gathering and accumulation, and reporting. Ethical and legal considerations. 3 hours lecture, 3 hours lab. Prerequisites: ACC 440 (grade of "C" or higher); PHI 306; professional program business student majoring in Accountancy.

452 Advanced Taxation. (3) F, S

Advanced problems in business and fiduciary income tax, estate and gift tax, planning, and research. Prerequisites: ACC 351 (grade of "C" or higher); professional program business student majoring in Accountancy.

467 Management Advisory Services. (3) N

Concepts and methods of providing advisory services with respect to accounting information systems and financial analysis. Administration of consulting practices. Prerequisites: ACC 347 (grade of "C" or higher); professional program business student majoring in Accountancy.

475 Accounting in Public-Sector Organizations. (3) N

Principles of accounting and reporting, and budgeting and financial control systems applied in governmental units and other non-business organizations. Prerequisites: ACC 316 or 331 (grade of "C" or higher); professional program business student majoring in Accountancy.

483 Advanced Accounting. (3) F, S

Accounting theory related to business combinations, consolidated financial statements, foreign operations, partnerships, and non-business organizations. Prerequisites: ACC 322 (grade of "C" or higher); professional program business student majoring in Accountancy.

495 Contemporary Accounting Theory. (3) F, S

Theory of financial accounting and reporting requirements for profit-oriented enterprises. Prerequisites: ACC 483 (grade of "C" or higher); professional program business student majoring in Accountancy.

502 Financial Accounting. (3) F, S

Financial accounting concepts and procedures for external reporting. Prerequisites: calculus; computer literacy; graduate degree program student.

503 Managerial Accounting. (3) F, S

Managerial accounting concepts and procedures for internal reporting. Prerequisites: ACC 502; ECN 502; QBA 502.

511 Taxes and Business Strategy. (3) F

Economic implications of selected management decisions involving application of federal income tax laws. Recognition of tax hazards and tax savings. Prerequisite: ACC 502 or equivalent.

515 Professional Practice Seminar. (3) F, S

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

521 Tax Research. (3) F, S

Tax research source materials and techniques. Application to business and investment decisions. Prerequisite: ACC 351.

533 EDP Auditing. (3) S

Analysis of EDP audit techniques and evaluation methods. Emphasis on current topics such as distributed processing and microcomputers. Prerequisite: ACC 481.

541 Managerial Accounting Controls. (3) F

Impact of internal reporting systems on organizational decisions and human behavior. Design, implementation, and evaluation problems. Prerequisite: ACC 331 or 503.

551 Advanced Accounting Theory. (3) N

Accounting measurement theories, income determination, and financial reporting alternatives.

557 Microcomputers in Accounting Information Systems. (3) A

Development of conceptual understanding of microcomputer technology and business applications from strategic planning and managerial control perspectives. Prerequisite: ACC 330.

567 Financial Models in Accounting Systems. (3) S

Development and application of financial models by accountants. Analysis of decision support systems as financial modeling environments. Prerequisite: ACC 330.

571 Taxation of Corporations and Shareholders. (3) F, S

Tax aspects of the formation, operation, reorganization, and liquidation of corporations and the impact on shareholders. Prerequisite: ACC 351.

573 Taxation of Partners and Partnerships. (3) A

Tax aspects of the definition, formation, operation, liquidation, and termination of a partnership. Tax planning is emphasized. Prerequisite: ACC 351.

575 Estate and Gift Taxation. (3) A

Tax treatment of wealth transfers at death and during life time, with emphasis on tax planning. Prerequisite: ACC 351.

577 Taxation of Real Estate Transactions. (3) A

Income tax aspects of acquisition, operation, and disposal of real estate; syndications, installment sales, exchanges, dealer-investor issues, alternative financing, and planning. Prerequisite: ACC 521 or instructor approval.

579 Multinational Taxation. (3) N

Taxation of multinational businesses, foreign individuals subject to U.S. income tax, and U.S. citizens with foreign residency.

582 Auditing Theory and Practice. (3) N

Function and responsibility of the auditor in modern society. Advanced topics in auditing theory and methods. Contemporary issues in auditing. Prerequisite: ACC 481.

586 Problems in Financial Accounting. (3) F

Accounting theory and practice for external reporting. Prerequisite: ACC 503.

587 Computerized Accounting Systems. (3) F

Design and evaluation of computer-based accounting information system. Development of computer-based financial models for planning and control. Prerequisite: ACC 347.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Business Administration

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PROFESSORS

GUNTERMANN, HENDRICK,
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ASSOCIATE PROFESSORS

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CARTER, DAN EL, DAVIS, DUNDAS,
GARCIA, LEONARD, LOCK, LYNCH,
MURRANKA, MYLER, PEARSON

ASSISTANT PROFESSORS

ELLRAM, FERRIN, REISS

SENIOR LECTURER

FLYNN

REGENTS' PROFESSOR EMERITUS

FARRIS

PROFESSORS EMERITI

BATY, BOGGS, FEARON,
HENNINGTON, JACKS, LEWIS,
REUTER, A. SMITH, C. SMITH,
TATE WIGGINS

The Department of Business Administration offers courses in four separate areas: legal and ethical studies, management communication, purchasing and logistics management, and real estate.

Legal and Ethical Studies

The legal and ethical studies faculty offer the undergraduate and the Master of Business Administration core requirements in legal and ethical studies. In addition, the faculty offer specialized courses in law and ethics relating to health care, insurance, real estate, and professional sports.

Management Communication

The management communication faculty serve the College of Business by teaching the Bachelor of Science core requirement BUS 301 Fundamentals of Management Communication. In addition, the faculty teach BUS 502 Managerial Communication, a core course in the Master of Business Administration degree, as well as other management communication courses.

Real Estate

The Real Estate program is designed for students with a professional interest in real estate. Academic preparation can lead to careers in land development, investment analysis and counseling, appraisal, property management, sales, and finance.

The Real Estate major consists of a minimum of 18 semester hours with at least 15 hours in real estate courses. LES 411 and REA 300 must be completed before taking other real estate courses. REA 251 is not open to Real Estate majors.

The following 12 hours must be included:

		<i>Semester Hours</i>
LES 411	Real Estate Law	3
REA 300	Real Estate Analysis	3
REA 331	Real Estate Finance	3
REA 401	Real Estate Appraisal	3

To complete the major, the student must select one additional upper division course approved by the Department of Business Administration faculty and one of the following:

		<i>Semester Hours</i>
REA 441	Real Estate Land Development	3
REA 456	Real Estate Investments	3
REA 461	Current Real Estate Topics	3

Purchasing and Logistics Management

The major in Purchasing and Logistics Management includes the functions of planning, organizing, and controlling the flow of purchased materials into and out of the organization. Attention is given to analyzing and selecting vendors, price determination, value analysis, and disposal of scrap and surplus materials. Emphasis is also on the efficient use of transportation services by business management within a framework of logistics systems, government transportation policy relative to freight and passengers transportation, and the management of transportation shipper and carrier organizations. Graduates are employed by industrial firms, carriers, and governmental agencies.

The major in Purchasing and Logistics Management consists of the following 18 semester hours:

		<i>Semester Hours</i>
PLM 345	Traffic and Logistics Management	3
PLM 355	Purchasing and Supplier Management	3
PLM 432	Materials Management	3
PLM 455	Purchasing Research and Negotiation	3
PLM 463	International Transportation and Logistics	3
PLM 479	Purchasing and Logistics Strategy	3

Major Proficiency Requirements.

Students must receive grades of "C" or better in upper division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

LEGAL AND ETHICAL STUDIES

LES 305 Legal, Ethical, and Regulatory Issues in Business. (3) F, S

Legal theories, ethical issues, and regulatory climate affecting business policies and decisions

306 Business Law. (3) A

Legal and ethical aspects of contracts, sales, commercial paper, secured transactions, documents of title, letters of credit, and bank deposits and collections

307 Business Law. (3) A

Legal and ethical aspects of agency, partnerships, corporations, bankruptcy, antitrust, securities, and other regulations of businesses

308 Business and Legal Issues in Professional Sports. (3) N

The economic structure of professional sports and application of contract, antitrust, arbitration, and labor laws in the industry.

411 Real Estate Law. (3) A

Legal and ethical aspects of land ownership, interests, transfer, finance development and regulations of the real estate industry.

412 Insurance Law. (3) N

Legal concepts and doctrines applicable to the field of insurance. Prerequisite: professional program business student

579 Legal, Political, and Ethical Issues for Business. (3) N

Study of legal, ethical, and political components of business decisions; self-regulation and social responsibility as regulatory and political strategies. Prerequisites: ACC 503, FN 502, MGT 502, MKT 502

Omnibus Courses: See page 44 for omnibus courses that may be offered

BUSINESS ADMINISTRATION

BUS 233 Business Communication. (3) N
Written and oral reporting. Organization analysis and presentation of business information using electronic and other media. Prerequisites: ENG 102, sophomore standing.

301 Fundamentals of Management Communication. (3) F, S, SS
Intrapersonal, interpersonal, and administrative communication within management contexts. Prerequisites: CIS 200, ENG 102 with a grade of "C" or higher. *General Studies: L1.*

431 Business Report Writing. (3) N
Organization and preparation of reports incorporating electronic databases, word processing, and graphics. Prerequisite: BUS 301

451 Business Research Methods. (3) N
Methods of collecting information pertinent to business problems involving design, collection, analysis, interpretation, and presentation of primary and secondary data

502 Managerial Communication. (3) F, S, SS

Analysis of various business problems, situations, and development of appropriate communication strategies. Prerequisite: MGT 502.

504 Professional Report Writing. (3) A
Preparation and presentation of professional reports

507 Business Research Methods. (3) N
Techniques for gathering information for business decisions on making. Selection, design, and completion of a business oriented research project

591 Seminar. (3) N
Selected management communication topics

594 Study Conference or Workshop. (3) N
700 Research Methods. (3) N

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PURCHASING AND LOGISTICS MANAGEMENT

PLM 301 Purchasing/Materials and Logistics Management. (3) F, S, SS
Examines the purchasing, materials and logistics management areas. Techniques for acquiring, storing, processing, and moving material inventory are presented. Prerequisite: professional business program

345 Traffic and Logistics Management. (3) A
Managing logistics activities with emphasis on integrating transportation needs with inventory, warehousing, facility location, customer service, packaging, and materials handling. Prerequisites: OPM 301, professional program business student

355 Purchasing and Supplier Management. (3) A
Management of the purchasing function including organization, procedures, supplier selection, quality inventory decisions and price determination. Prerequisites: OPM 301; professional program business student

405 Urban Transportation. (3) N
Economic, social, political, and business aspects of passenger transportation. Public policy and government aid to urban transportation development. Prerequisite: upper division standing or instructor approval

432 Materials Management. (3) A
Study of managing the productive flow of materials in organizations, including MRP, JIT, quality, facility planning, and job design. Prerequisites: OPM 301, professional program business student

440 Productivity and Quality Management. (3) A
Productivity concepts at the national, organizational, and individual levels. Quality management and its relationship to productivity in all organizations. Prerequisite: professional program business student

455 Purchasing Research and Negotiation. (3) A
Current philosophy, methods, and techniques used to conduct both strategic and operations purchasing research and negotiation. Includes negotiation simulations. Prerequisites: OPM 301, PLM 355 grade of "C" or higher, 432, professional program business student

460 Carrier Management. (3) N
Analysis of carrier economics, regulation, management, and rate-making practice, evaluation of public policy issues related to carrier transportation. Prerequisite: upper division standing or instructor approval

463 International Transportation and Logistics. (3) A
Logistics activities in international business with special emphasis on transportation, global sourcing, customs issues, and facility location in international environment. Prerequisite: PLM 345 or instructor approval

479 Purchasing and Logistics Strategy. (3) A
Synthesis of purchasing, production, transportation to provide a systems perspective of materials management. Development of strategies. Prerequisites: PLM 345, 355 (grade of "C" or higher), 432; professional program business student.

532 Materials and Purchasing Management. (3) A
Analysis of the economic flow of materials and the economic environment in which the materials acquisition and allocation functions operate

541 Global Sourcing and Logistics Management. (3) S
Concepts, strategies, and techniques required to increase organizational effectiveness in global environment. Ways in which sourcing and logistics can contribute. Prerequisite: PLM 532 or instructor approval

545 Business Logistics. (3) S
Systems management concepts approach to logistics requirements of the business enterprise; analysis of goods and information flows and coordination activities. Seminar

591 Seminar. (3) N
Topics such as the following are offered:
(a) Purchasing
(b) Logistics and Transportation

791 Doctoral Seminar. (3) A
Topics may be selected from the following:
(a) Logistics, Transportation, and Physical Distribution Management.
(b) Purchasing and Materials Management.

Omnibus Courses: See page 44 for omnibus courses that may be offered

REAL ESTATE

REA 251 Real Estate Principles. (3) N
Regulation, practices, legal aspects, and professional opportunities of the real estate industry. Cannot be applied to Real Estate major.

300 Real Estate Analysis. (3) A
Application of economic theory and analytical techniques to real estate markets. Topics include law, finance, appraisal, market analysis, investments, development. Prerequisite: professional program business student

331 Real Estate Finance. (3) A
Legal, market, and institutional factors related to financing proposed and existing properties. Emphasis on current financing techniques and quantitative methods. Prerequisites: FIN 300; professional program business student

401 Real Estate Appraisal. (3) A
Factors affecting the value of real estate. Theory and practice of appraisal and preparation of the appraisal report. Appraisal techniques. Prerequisites: REA 300; professional program business student

402 Income Property Appraisal. (3) N
Valuation of net income streams for various types of income producing properties. Prerequisite: REA 401, professional program business students

441 Real Estate Land Development. (3) A
Neighborhood and city growth. Municipal planning and zoning. Development of residential, commercial, industrial, and special purpose properties. Prerequisites: REA 300; professional program business student.

456 Real Estate Investments. (3) A
Analysis of investment decisions for various property types. Cash flow and rate of return analysis. Prerequisites: FIN 300; professional program business student.

461 Current Real Estate Topics. (3) N
Current real estate topics of interest are discussed and analyzed. Prerequisites: REA 300, professional program business student

591 Seminar in Selected Real Estate Topics. (3) N

- Topics may be selected from the following:
- (a) Real Estate Market Analysis.
Analytical techniques used in performing market research to assess the feasibility of proposed residential, retail, office, and other developments
 - (b) Real Estate Finance and Investments.
Basic techniques for analyzing the financial feasibility of real estate investments. Includes cash flow yield and risk analysis, taxation, form of ownership, and management.
 - (c) Real Estate Development.
Development process covering feasibility selection, planning, design, financing, and construction. Relationship of and use controls and regulations to the private sector.
 - (d) Real Estate Research.
Reviews current research in areas such as market studies, mortgage securitization, valuation, development, investments, and government regulation.

Omnibus Courses: See page 44 for omnibus courses that may be offered

Decision and Information Systems

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PROFESSORS

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ASSOCIATE PROFESSORS

BROOKS, CALLARMAN,
CARROLL, GOUL, KEEFER,
KEIM O'LEARY, ROY, ST. LOUIS,
D SMITH-DANIELS,
V SMITH-DANIELS
VERDINI WILSON

ASSISTANT PROFESSORS

CHING, DIABY, KIANG, KULKARNI,
REISER, SIFERD

PROFESSORS EMERITI

HUSTON, McCREADY

The major in Computer Information Systems prepares students for professional careers involving the analysis, configuration, programming, and data base aspects of the design and implementation of computerized business information systems. The course work prepares the student for a career in business computer information systems and for admission to graduate programs in computer information systems or management information systems.

The major in Computer Information Systems consists of a minimum of 18 semester hours. The following 15 hours must be included:

	<i>Semester Hours</i>
CIS 235 Computer Information Systems I.....	3
CIS 330 Data and File Structures.....	3
CIS 335 Computer Information Systems II.....	3
CIS 420 Business Database Concepts.....	3
CIS 440 Systems Analysis and Design.....	3

To complete the major, the student selects three or more hours of upper division credit approved in advance by the student's faculty advisor.

All Computer Information Systems majors must complete CSE 100 Introduction to Computer Science I or equivalent, which may be counted in the business core in place of CIS 200.

Admission. To be admitted to the Computer Information Systems major, a student must have completed the following courses with a minimum GPA in these courses of 2.50: CSE 100; MAT 119, 210 (or higher level); QBA 221.

Major Proficiency Requirements. Students must receive grades of "C" or better in upper division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

Certificate in Quality Analysis

The program of study leading to the Certificate in Quality Analysis prepares students to perform technical analyses associated with quality measurement and improvement of manufacturing and service processes. Graduates with the ability to implement these analyses are in high demand in the marketplace. This program is not a substitute for the listed areas of business specialization; rather, the courses required for the certificate add quantitative strength and implementation skills for quality tools to the student's chosen field of specialization.

Students are required to complete the Bachelor of Science degree from any of the major fields in business at ASU and to complete a minimum of 15 semester hours of approved course work, including the following nine hours:

	<i>Semester Hours</i>
QBA 321 Applied Quality Analysis I ...	3
QBA 421 Applied Quality Analysis II	3
QBA 450 Operations and Process Analysis.....	3

To complete the certificate, the student selects at least six additional hours of course work related to quality analysis approved in advance by the advisor for the certificate program.

The student must also complete the following courses with a minimum GPA of 2.50: CIS 200, MAT 119, 210 (or 270), QBA 221; and the 15 hours of course work selected for the certificate.

CSE 100 may be counted in the business core in place of CIS 200.

Courses taken as part of an approved program of study for the certificate do not count against the college restriction on business free electives.

COMPUTER INFORMATION SYSTEMS

CIS 200 Computers in Business. (3) F, S
Introduction to business information systems and the use of business application software
Prerequisite: MAT 117 or higher *General Studies N3*

235 Computer Information Systems I. (3) F, S
Development of information systems using file-oriented languages like COBOL introduction to business information technologies and system analysis Prerequisite: CSE 100, MAT 119 or 210 or 270; QBA 221

300 Computers in Business II. (3) N
Introduction to information systems in business. Use of computers for business problem solving Prerequisites: CIS 200 F N 300; professional program business student

307 Systems Modeling. (3) N
Procedures for investigating and analyzing decisions on systems Use of special languages as tools of analysis and simulation Prerequisites: CSE 100, MAT 119 210 or 270; professional program business student

330 Data and File Structures. (3) F, S
Algorithms data and file structures for business information systems using a high level programming language such as C. Prerequisite: C S 235.

335 Computer Information Systems II. (3) F S
Advanced business applications using a high level language such as COBOL Business application systems and recent information technology developments Prerequisites: ACC 240, CIS 235

420 Business Database Concepts. (3) F S
Relational, hierarchical, and network database management systems such as IMS, IDMS, and INGRES Emphasis on relational concepts and query languages Prerequisite: C S 330 Pre or corequisite: C S 335

430 Advanced Topics in Information Systems. (3) N
Advanced topics such as data communications distributed systems, decision support systems, and artificial intelligence Prerequisites: professional program business student, instructor approval

440 Systems Analysis and Design. (3) F, S
Development of business application systems using structured and object-oriented analysis and design Use and evaluation of CASE or other tools. Prerequisite: CIS 420.

502 Management Information and Decision Support Systems. (3) F S
Fundamentals of computer based management information and decision support systems Prerequisite: completion of a first year MBA courses QBA 502

505 Technical Foundations of Data Management. (3) A
Data and file structures for business data management; information processing using techniques supported by languages such as C Prerequisites: C S 335 and a computational programming language or instructor approval

506 Business Database Systems. (3) A Hierarchical, network relational and other recent data models for database systems. Processing issues such as concurrency control query optimization, and distributed processing. Prerequisites: CIS 505 or equivalent. MAT 210

510 Systems Models and Simulation. (3) N Design of computer-based decision systems. Simulation as a research and decision-making tool. Prerequisites: MAT 210, QBA 502, a computer programming language

512 Decision Support Systems. (3) A Definition, description, construction and evaluation of computer-based decision systems. Prerequisites: CIS 502 or 505 or QBA 505, MAT 210.

515 Management Information Systems. (3) A Systems theory concepts applied to the collection, retention, and dissemination of information for management decision making. Prerequisite: CIS 335 or 502

520 Systems Design and Evaluation. (3) A Methodologies of systems analysis and design. Issues include project management interface, organizational requirements, constraints, documentation, implementation control and performance evaluation. Prerequisite: CIS 505 or equivalent

525 Artificial Intelligence in Business. (3) A Development and application of artificial intelligence approaches to business problems solving. Prerequisite: CIS 505 or equivalent

530 Information Systems Development. (3) A Object-oriented and interprocess communication and control concepts for information systems applications based on languages such as C++ and platforms such as networked Unix. Prerequisite: CIS 505

535 Distributed Information Systems. (3) A Introduction to distributed systems and their impact on information systems in business. Prerequisite: ACC 587 or CIS 505

591 Seminar in Selected CIS Topics. (3) A Topics such as the following will be offered:
(a) Advanced Data and Knowledge Base Systems
(b) Distributed Artificial Intelligence
(c) Integrated Modeling Environments
(d) Organizational Support Systems

Omnibus Courses: See page 44 for omnibus courses that may be offered

QUANTITATIVE BUSINESS ANALYSIS

QBA 221 Statistical Analysis. (3) F, S Methods of statistical description. Application of probability theory and statistical inference in business. Prerequisites: MAT 119, 210. *General studies: N2*

321 Applied Quality Analysis I. (3) N Applications of statistical quality control employed in empirical studies related to quality analysis. Applications focus on service processes. Prerequisite: QBA 221

391 Management Science. (3) A Study of mathematical models and solution techniques which can be used to aid decision makers. Prerequisites: MAT 119, 210, 242, QBA 221; professional program business student. *General studies: N2*

410 Applied Business Forecasting. (3) N Application of forecasting techniques in business and institutional environments. Prerequisite: QBA 321.

421 Applied Quality Analysis II. (3) N Applications of statistical quality control employed in manufacturing and experimental research. Applications focus on design and improvement of processes. Prerequisite: QBA 321

450 Operations and Process Analysis. (3) N Implementation of quantitative techniques for the analysis of quality problems related to operations and process analysis. Prerequisites: OPM 301, QBA 221

502 Managerial Decision Analysis. (3) F, S Fundamentals of quantitative analysis to aid management decision making under uncertainty. Prerequisites: MAT 210; computer literacy; graduate degree program student

505 Management Science. (3) A Quantitative approaches to decision making including linear programming and simulation with an emphasis on business applications. Prerequisites: MAT 210, QBA 502.

510 Managerial Statistics. (3) A Statistical methods used in decision making including analysis of variance and simple and multiple regression. Prerequisites: MAT 210; QBA 502 or an introductory statistics course

511 Sampling Techniques in Business. (3) N Planning execution and analysis of surveys in business research. Prerequisite: QBA 502.

525 Applied Regression Models. (3) A Simple linear regression, multiple regression, and indicator variables and logistic regression. Emphasis on business and economic applications. Prerequisites: MAT 210; QBA 510

527 Categorical Data Analysis. (3) N Discrete data analysis in business research. Multidimensional contingency tables and other discrete models. Prerequisite: QBA 525.

528 Exploratory Data Analysis. (3) N Introduces student to principles and methods of exploratory data analysis. Prerequisite: QBA 502.

530 Experimental Design. (3) A Experimental designs used in business research. Balanced and unbalanced factorial designs, repeated measures designs and multivariate analysis of variance. Prerequisites: QBA 525 or equivalent

535 Multivariate Methods. (3) A Advanced statistical methods used in business research. Multivariate analysis of association and interdependence. Prerequisite: QBA 525

540 Forecasting. (3) N Foundation of statistical forecasts and forecast intervals. Application of classical and computer-assisted forecasting methods to business forecasting problems. Prerequisites: MAT 210, QBA 502

550 Intermediate Decision Analysis. (3) A Quantitative decision analysis methods for business decisions making under uncertainty, including decision diagrams, subjective probabilities and preference assessment. Prerequisites: MAT 210, QBA 502

552 Statistical Decision Theory. (3) N Statistical decision methods for business decisions making under uncertainty, including Bayesian inference, optimal statistical decisions, and value of information assessment. Prerequisites: MAT 210; QBA 510 or 550.

560 Probabilistic Models. (3) N Development and application of probabilistic models for quantitative business analysis. Prerequisites: MAT 210, QBA 502

561 Mathematical Programming. (3) N Techniques for solving mathematical programming models of business problems. Prerequisites: MAT 210, 242

562 Network Flow Models. (3) N Introduction to network structure, applications, and algorithms, development of data structures for network algorithms applied to business problems. Prerequisites: QBA 561 or MAT 242 and QBA 505

564 Nonlinear Optimization. (3) N Basic properties of solutions and algorithms for constrained and unconstrained minimization: basic descent methods, and barrier methods. Prerequisites: QBA 561 or MAT 242 and QBA 505

Omnibus Courses: See page 44 for omnibus courses that may be offered

OPERATIONS AND PRODUCTION MANAGEMENT

OPM 301 Operations and Logistics Management. (3) F, S Identification and integration of major components of operations and logistics management and their impact on organizational productivity and performance

502 Operations and Logistics Management. (3) F, S Conceptual foundations for the total operations and logistics functions for a types of organizations. Application of analytical methods to product problems. Prerequisites: ECN 502, QBA 502

540 Quality and Productivity Management. (3) A Organizational factors influencing quality and productivity in the production of goods and services. Quality and productivity strategies, improvement programs and measurement systems. Prerequisite: OPM 502 or instructor approval

581 Production and Inventory Management. (3) A Planning and control of production and inventories in manufacturing and service systems. Includes strategic implications, decision-making models, and applications. Prerequisite: OPM 502 or instructor approval

582 Capacity Management and Scheduling. (3) A Capacity and scheduling decisions entering the acquisition and location of a firm's resources, including work force, equipment and facilities. Prerequisites: OPM 581; QBA 561

585 Facilities Design and Management of Technology. (3) A Decisions regarding management of facilities and technology for manufacturing and service firms. Facility location, layout, process design and selection. Prerequisites: OPM 581; QBA 561

587 Project Management. (3) A
Planning, scheduling and controlling of projects in R & D, manufacturing, construction and services. Project selection, financial considerations and resource management. Prerequisite: QBA 502

791 Seminar. (3) A
Topics such as the following are offered:
(a) Doctoral Seminar in Production/Operations Management
(b) Doctoral Seminar in Logistics Systems

Omnibus Courses: See page 44 for omnibus courses that may be offered

Economics

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PROFESSORS

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McPETERS, MELVIN, MÉNDEZ,
ORMISTON, SCHLAGENHAUF

ASSOCIATE PROFESSORS

DeSERPA, SMITH, WINKELMAN

ASSISTANT PROFESSORS

AHN, SCHLEE

LECTURER

ROBERTS

PROFESSORS EMERITI

COCHRAN, JACKSON,
LOWE, PLANTZ

The study of economics affords an opportunity for the student to acquire a general knowledge of the methods by which goods and services are allocated and incomes are generated and why prices, employment, money, and financial markets behave as they do. Some knowledge of economics is crucial not only for those intending to participate in the business world, but for those intending to pursue graduate educations in law or other business fields or to work in the world of journalism and communications.

Economists obtain positions at universities and in government, financial institutions, brokerage houses, private nonfinancial corporations, and international organizations such as International Monetary Fund and the World

Bank and as financial journalists and as marketing and management specialists in domestic and international firms.

Economics majors are required to earn a minimum grade of "C" in MAT 210 Brief Calculus before taking upper division courses in economics. While MAT 210 meets the minimum mathematics requirement to major in Economics, all Economics majors who anticipate going on to graduate school in economics or in business or to law school are encouraged to take MAT 270 Calculus with Analytic Geometry I, for four semester hours, in sections taught via the "reform calculus" method. The relevant section line numbers are available from the Department of Mathematics. Majors are encouraged to pursue further course work in mathematics. MAT 270 may be taken in lieu of MAT 210 in the science and mathematics area of the requirements described in the *Advising Guide*.

The major in Economics consists of 18 semester hours of upper-division courses in economics. The following six hours must be included:

	<i>Semester Hours</i>
ECN 313 Intermediate Macroeconomic Theory	3
ECN 314 Intermediate Microeconomic Theory	3

ECN 313 and 314 should be taken before other upper division courses in economics. Students must earn a minimum grade of "C" in ECN 313 and 314. Concurrent enrollment in ECN 313 and 314 is permitted. Concurrent enrollment in ECN 313 or 314 and other upper division courses in economics is subject to the approval of the faculty advisor.

Major Proficiency Requirements.

Students must receive grades of "C" or better in upper division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper division course in the major already taken or in a different upper division course in the major, the student is no longer eligible to take additional upper division courses in the major.

ECONOMICS

ECN 111 Macroeconomic Principles. (3) F, S, SS

Basic macroeconomic analysis. Economic institutions and factors determining income levels, price levels, and employment levels. *General studies: SB*

112 Microeconomic Principles. (3) F, S

Basic microeconomic analysis. Theory of exchange and production, including the theory of the firm. *General studies: SB*

304 Current Issues in Economics and Politics. (3) A

Application of basic economic principles to contemporary issues such as crime, the environment, discrimination, health care, and the national debt. Not for Economics majors. Lecture, student projects, discussion. Prerequisites: ECN 111 or 112. 2.0 ASU GPA; junior standing

306 Survey of International Economics. (3) A

Survey of international trade issues, commercial policy, trade theory, customs unions, and international monetary topics. Not for Economics majors. Lecture, discussion. Cross-listed as IBS 306. Prerequisites: ECN 111 or 112, 2.0 ASU GPA, junior or standing

313 Intermediate Macroeconomic Theory. (3) F, S

Determinants of aggregate levels of employment, output, and income of an economy. Prerequisites: ECN 111, 112; MAT 210 (grade of "C" or higher). *General studies: SB*

314 Intermediate Microeconomic Theory. (3) F, S

Role of the price system in organizing economic activity under varying degrees of competition. Prerequisites: ECN 111, 112; MAT 210 (grade of "C" or higher). *General studies: SB*

315 Money and Banking. (3) SS

Functions of money. Monetary systems, credit functions, banking practices, and central banking policy. This course cannot be applied to the Economics major. Prerequisite: ECN 111.

331 Comparative Economic Systems. (3) N

A thematic institution, past and present, for organizing the social division of labor. Property rights, information and incentives in industrial societies. Prerequisite: ECN 111 or 112. *General studies: SB, G*

360 Economic Development. (3) N

Theories of economic growth and development. Role of capital formation, technological innovation, population, and resource development in economic growth. Prerequisite: ECN 111 or 112. *General studies: SB, G*

365 Economics of Russia and Eastern Europe. (3) A

Origins and analysis of contemporary institutions. Comparative development and differentiation in the 20th century. Prerequisite: ECN 111 or 112. *General studies: SB, G*

394 Special Topics. (3) SS

Current topics of interest in economics, e.g., managerial economics and macroeconomic policy issues. Prerequisite: ECN 111 or 112.

404 History of Economic Thought. (3) N
Development of economic doctrines: theories of mercantilism, physiocracy, classicalism, neoclassicism, Marxism, and contemporary economic systems. Prerequisite: ECN 314 or instructor approval. *General studies: SB.*

421 Labor Economics. (3) A
Origins of labor movement; analysis of labor unions; labor markets; collective bargaining, and current policy issues. Prerequisite: ECN 314 or instructor approval. *General studies: SB.*

436 International Trade Theory. (3) A
The comparative-advantage doctrine, including practices under varying commercial policy approaches. The economic impact of international disequilibrium. Prerequisite: ECN 314 or instructor approval. *General studies: SB, G.*

438 International Monetary Economics. (3) A
History, theory, and policy of international monetary economics: Balance of payments and exchange rates. International financial markets including Eurocurrency markets. Prerequisite: ECN 313 or instructor approval. *General studies: SB, G.*

441 Public Finance. (3) A
Public goods, externalities, voting methods, public expenditures, taxation, and budget formation with emphasis on the federal government. Prerequisite: ECN 314 or instructor approval. *General studies: SB.*

450 Law and Economics. (3) A
Economics of the legal system: analysis of property, contracts, torts, commercial law, and other topics. Discusses on analyses. Prerequisite: ECN 314.

453 Government and Business. (3) A
Development of public policies toward business. Antitrust activity. Economic effects of government policies. Prerequisite: ECN 314 or instructor approval.

480 Introduction to Econometrics. (3) A
Elements of regression analysis: estimation on hypothesis tests, prediction. Emphasis on use of econometric results in assessment of economic theories. Prerequisite: instructor approval. *General studies: N2.*

484 Economics Internship. (3) F, S, SS
Academic credit for professional work organized through the Internship Program. Prerequisites: ECN 313, 314. Outstanding academic record.

485 Mathematical Economics. (3) A
Integration of economic analysis and mathematical methods into a comprehensive body of knowledge within contemporary economic theory. Prerequisite: instructor approval. *General studies: N2.*

494 Special Topics. (3) N
Current topics of interest in economics, managerial economics, and microeconomic policy issues. Prerequisites: ECN 313 and 314 or instructor approval.

498 Pro-Seminar. (3) A
Chosen from selected topics: e.g., money, development, urban economics, economic regulation, and area studies. Prerequisites: ECN 313 and 314 or instructor approval.

502 Managerial Economics. (3) F, S
Application of economic analysis to managerial decisions on making, areas of demand, production, cost, and pricing. Evaluation of competitive strategies. Prerequisites: calculus, computer literacy; graduate degree program student.

504 Development of Economic Analysis. (3) A
Historical development of economic theory. Emphasis on the development of economic analysis from preclassical economics through Keynes.

509 Macroeconomic Theory and Applications. (3) N
Theory of income, output, employment, and price level. Influence on business and economic environment. Prerequisite: ECN 111.

510 Microeconomic Theory and Applications. (3) A
Theory of exchange, production, and pricing in a market economy. Influence on business and economic environment. Prerequisite: ECN 112.

511 Macroeconomic Analysis I. (3) A
The nation's income, output, employment, and general price level. Examination of current theoretical and empirical research and policy problems. Prerequisite: ECN 313.

512 Microeconomic Analysis I. (3) A
Theory of exchange, production, resource use, and pricing in capitalistic and mixed systems. Prerequisite: ECN 314.

513 Macroeconomic Analysis II. (3) A
Advanced topics in macroeconomics. Emphasis on applied macroeconomic models. Prerequisite: ECN 511.

514 Microeconomic Analysis II. (3) A
Advanced topics in microeconomics. Emphasis on general equilibrium, welfare economics, and production and capital theory. Prerequisite: ECN 512.

516 Monetary Theory. (3) N
Traditional and post-Keynesian monetary theory, interest rate determination, the demand and supply of money. Prerequisite: ECN 511.

517 Monetary Policy. (3) N
Determinants of the money supply and interest rate levels. Federal Reserve policy and its effectiveness. Prerequisite: ECN 516.

521 Labor Economics I. (3) N
Development of basic theoretical models for analyzing labor market issues. Prerequisite: ECN 512.

522 Labor Economics II. (3) N
Extensions/criticisms of labor market theories. Applications to a variety of policy issues. Prerequisite: ECN 521.

531 Economic Systems and Organizations. (3) N
Philosophical foundations of major economic systems and of properties of principal system models. Comparison of a tentative institutions and system components of contemporary economies. Prerequisites: ECN 511, 512.

536 International Trade Theory. (3) A
Theories of comparative advantage and the empirical verification. Theory and political economy of commercial policy. Resource transfers and the role of the multinational corporation. Prerequisites: ECN 511, 512.

538 International Monetary Theory and Policy. (3) A
The foreign exchange market; balance of payments and international financial institutions and arrangements; theory and applications. Prerequisites: ECN 511, 512.

543 Public Sector Economics. (3) N
Economics of collective action, public spending, and taxation. Impact of central government activity on resource allocation and income distribution. Prerequisite: ECN 512.

553 Industrial Organization. (3) N
Analysis of structure, conduct, and performance in industrial markets and recent developments. Antitrust policies. Prerequisite: ECN 512.

561 Economics of Developing Nations. (3) N
Economic problems, issues, and policy decisions facing the lesser-developed nations of the world. Prerequisites: ECN 511, 512.

572 Regional Economics. (3) N
Introduction to export base, input-output, linear programming, simulation, and econometric modeling as tools of regional analysis. Prerequisite: ECN 512.

580 Econometrics I. (3) A
Application of mathematical and statistical techniques to problems of economic theory. Problems in the formulation of econometric models. Prerequisite: 6 hours of statistics.

581 Econometrics II. (3) A
Advanced topics in econometrics. Emphasis on extending the simple linear model and on simultaneous relationships. Prerequisite: ECN 580.

584 Economics Internship. (1-3) SS
Academic credit for professional work organized through the Internship Program. Prerequisites: ECN 511, 512.

594 Conference and Workshop in Economics. (1-2) F, S
Working papers by department faculty and outside speakers are presented and discussed. Economics ABDs will also present their theses' proposals. Prerequisite: instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Finance

Herbert M. Kaufman
Chair
(BAC 519) 602/965-3131

PROFESSORS

JOEHNK, KAUFMAN, POE,
SMITH, SUSHKA

ASSOCIATE PROFESSORS

BOOTH, CESTA, HOFFMEISTER,
MARTIN, WILT

ASSISTANT PROFESSORS

BESSEMBINDER, CHAN,
GALLINGER, HERTZEL

PROFESSORS EMERITI

ANDERSON, DAUTEN, NELSON,
OLNEY, STEVENSON, TENNEY

The study of finance prepares students to understand the financial implications inherent in virtually all business decisions. Students majoring in Finance are prepared for entry-level careers in corporate management, depository institutions, investment management, and financial services. The

finance curriculum emphasizes financial markets, evaluation of investments, and efficient allocation of resources.

The major in Finance consists of 18 semester hours. The following courses must be included in the major:

			<i>Semester Hours</i>
FIN 331	Financial Markets and Institutions		3
FIN 361	Managerial Finance		3
FIN 421	Security Analysis and Portfolio Management		3
	Two additional 400 level FIN courses		6
	One additional upper division course		3

All students must complete ACC 315 Financial Accounting and Reporting before taking 400 level FIN courses. In addition, ACC 316 Management Uses of Accounting must be taken.

Students have the option of including one of the ACC courses as part of the major or as free electives. If the ACC courses are chosen as free electives, the upper division courses used to complete the major must be approved in advance by the Department of Finance

Major Proficiency Requirements.

Students must receive grades of "C" or better in upper division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper division course in the major already taken or in a different upper division course in the major, the student is no longer eligible to take additional upper division courses in that major.

FINANCE

FIN 251 Principles of Personal Investments. (3) N

Investment concepts for individual investors, fundamentals of investment techniques and principles of sound investment. For nonmajors. Course may be used on year for elective credit by College of Business students

300 Fundamentals of Finance. (3) F, S, SS
Theory and problems in financial management of business enterprises. Prerequisites: ACC 240; ECN 112 QBA 221

331 Financial Markets and Institutions. (3) F, S

Analysis of financial markets and intermediaries. Theory of financial intermediation, interest rate theory, money and capital market instruments and government regulation. Prerequisite: FIN 300

361 Managerial Finance. (3) F, S

Theories and problems in resource allocation, cost of capital, CAPM and capital budgeting, asset valuation, capital structure, and financing policy. Prerequisite: FIN 300.

421 Security Analysis and Portfolio Management. (3) F, S

Security analysis theory and practice. Selection and management of financial asset portfolios. Securities markets and portfolio risk return analysis. Prerequisites: ACC 315 or 321, FIN 331, 361; professional program business student

427 Speculative Securities. (3) A

Study of stock options, index options, convertible securities, financial futures, warrants, subscription rights, and arbitrage pricing theory. Prerequisites: FIN 421, professional program business student

431 Management of Financial Institutions. (3) A

Asset liability and capital management in financial institutions. Influence of market factors and regulatory agencies. Emphasis on commercial banks. Prerequisites: ACC 315 or 321, FIN 331; professional program business student

451 Working Capital Management. (3) N

Analysis of short-term profitability and liquidity. Emphasis on managing cash, accounts receivable, inventory, and current liabilities. Prerequisites: ACC 315 or 321; FIN 300; professional program business student

461 Financial Cases and Modeling. (3) A

Case-oriented capstone course in managerial finance. Contemporary issues of quarterly management, capital budgeting, capital structure, and financial strategy. Prerequisites: ACC 315 or 321, FIN 361; professional program business student

471 Risk Financing. (3) N

Identification, measurement, and treatment of risk financing. Control, retention, and transfer as alternative approaches to the risk of loss. Prerequisites: FIN 300; professional program business student

481 Theory of Finance. (3) N

Advanced course in financial theory for honors students and selected senior Finance majors. Honors student or senior Finance major with minimum GPA of 3.40.

502 Managerial Finance. (3) A

Theory and practice of financial decisions in making, negotiating, risk analysis, valuation, capital budgeting, cost of capital, and working capital management. Prerequisites: ACC 502, ECN 502, QBA 502

521 Investment Management. (3) A

Valuation of equities, fixed incomes, and options/futures in an individual security and portfolio context; mathematical asset allocation approaches. Not open to students with credit in FIN 421. Prerequisite: FIN 502.

531 Capital Markets and Institutions. (3) A

Recent theoretical and operational developments in economic sectors affecting capital markets and institutions. Not open to students with credit in FIN 431. Prerequisite: FIN 502

561 Financial Management Cases. (3) N

Case-oriented course in applications of finance theory to management issues. Acquisition allocation, and management of funds within the business enterprise. Working capital management, capital budgeting, capital structure, and financial strategy. Not open to students with credit in FIN 461. Prerequisite: FIN 502

581 Theory of Financial Decisions. (3) A

Theories and applications of managerial finance and investments. Capital budgeting, capital structure, dividend theory, and valuation. Prerequisite: FIN 502

781 Theory of Finance. (3) A

Central paradigms of finance theory. Individual and societal allocation of scarce resources through a pricing system with valuation of risky assets. Prerequisites: FIN 502, 521, 531

791 Doctoral Seminar in Finance. (3) A

- Investments
Investments and market theory, efficient markets hypothesis, option and commodity markets. Prerequisite: FIN 581.
- Financial Institutions and Markets.
Economic and monetary theory applied to financial markets and institutions. Impact of financial structure on market performance and efficiency. Prerequisite: FIN 581.
- Financial Management.
Financial theory pertaining to capital structure, dividend policy, valuation, cost of capital, and capital budgeting. Prerequisite: FIN 581.

Omnibus Courses: See page 44 for omnibus courses that may be offered

INSURANCE

INS 251 Principles of Insurance. (3) N

Coverages available, buying methods, regulation, claims, insurance institutions, and career opportunities

321 Life and Health Insurance. (3) N

Types and uses of life and health policies, industry organization, regulation, underwriting, and other company operations. Prerequisite: professional program business student.

331 Property Insurance Principles and Coverage. (3) N

Principles of property and liability insurance, industry organization, types and forms of coverages, and commercial coverage fundamentals. Prerequisites: INS 251 or instructor approval, professional program business student

461 Estate Planning. (3) N

Use of life insurance with wills, trusts and buy-sell agreements, and tax aspects. Needs approach to estate planning. Prerequisite: professional program business student

Omnibus Courses: See page 44 for omnibus courses that may be offered

School of Health Administration and Policy

(BA 397) 602/965-7778

PROFESSORS

FORSYTH, JOHNSON, KIRKMAN-LIFF,
KRONENFELD, SCHNELLER,
WILLIAMS ZUCKERMAN

ASSISTANT PROFESSOR
JONES

PROFESSOR EMERITUS
EVELAND

The Graduate Program in Health Services Administration

The School of Health Administration and Policy offers the Master of Health Services Administration (M.H.S.A.) Students enrolled in the school may earn the concurrent M.H.S.A./M.B.A. degrees. The school also collaborates with the College of Law to allow students to earn concurrently the M.H.S.A. J.D. degrees and the College of Nursing to allow students to earn concurrently the M.H.S.A. degree and the M.S. degree in Nursing with a concentration in nursing administration. The program also offers a concentration in health services research in the Ph.D. in Business Administration.

The M.H.S.A. program is designed to prepare students for entry level management positions in health services delivery, planning/policy, and consulting organizations. Although most program graduates have aspired to and successfully found employment in hospitals, the curriculum and research efforts within the school do not focus on one categorical setting. Students are able to study the characteristics of vertically integrated systems and may choose from courses focused on ambulatory settings, long-term care, and other components of the continually evolving health care system. Since so many of the features of the environment of health services are subject to periodic change (e.g., reimbursement and information systems), substantial emphasis

is on building the basic skills and analytic perspectives necessary to encounter and react to change through innovation and action.

The program has a special commitment to provide students with an understanding of the competitive nature of the health care system. Since so many of the features of the environment of health services are subject to periodic change, substantial emphasis is placed on building basic skills to understand and scan environments and to encounter and react to change through innovative action. Program students are educated to think independently and to recognize the strengths and weaknesses of group processes in decision making.

The mission of the M.H.S.A. program is to develop in its students a pattern for skill acquisition, ideology, and style that is necessary for entry into the job market and for pursuing careers as chief executive officers in target organizations. To accomplish this mission, the curriculum provides

1. the skills of understanding, analysis, and application that are essential to effective health care administration;
2. internship, residency, and project experiences that bridge the gap between theory and practice; and
3. opportunities to interact with practitioners, both in the classroom and in structured field experiences.

HEALTH SERVICES ADMINISTRATION

HSA 473 Comparative Health Systems. (3) F
Comparison of health care financing and delivery in industrialized countries covers insurance, hospital management and physical payment. Lecture/discussion. Cross-listed as HSA 573.

494 Special Topics in Health Administration. (3) A
Seminar topics including comparative health care systems, ambulatory care administration, behavioral health, long-term care, and health economics. Prerequisite: instructor approval.

502 Health Care Organization. (3) F
Concepts, structures, functions, and values which characterize contemporary health care systems in the United States.

505 Community Health Care Perspectives. (3) S
Epidemiological, sociological, and political perspectives and techniques for analyzing health care problems and responding to health care needs in communities. Prerequisite: HSA 502

512 Health Care Economics. (3) S
Economics of production and distribution of health care services with special emphasis on the impact of regulation, competition, and economic incentives. Prerequisite: HSA 502.

520 Health Care Organizational Structure and Policy. (3) F
Functional relationships among management elements of health care institutions with major focus on hospital governance and productivity. Prerequisite: HSA 502.

522 Health Care Management Systems. (3) F
Systems concepts, quantitative methods, and information systems applied to management problems in health institutions and community health planning. Prerequisites: HSA 505, QBA 502.

532 Financial Management of Health Services. (3) F
Acquisition, allocation and management of financial resources within the health care enterprise. Budgeting, cost analysis, financial planning and internal controls. Prerequisites: ACC 503, FIN 502; HSA 502.

542 Health Care Jurisprudence. (3) S
Legal aspects of health care delivery for hospital and health services administration. Legal responsibilities of the hospital administrator and staff. Prerequisites: HSA 505, 520.

571 Ambulatory Care Management. (3) A
The evolution, planning and management of multispecialty group practices, health maintenance organizations, and other alternative delivery systems. Prerequisite: HSA 502.

573 Comparative Health Systems. (3) F
Comparison of health care financing and delivery in industrialized countries; covers insurance, hospital management and physical payment. Lecture/discussion. Cross-listed as HSA 473.

589 Integrative Seminar. (3) S
Capstone assessment of current policies, problems, and controversies across the broad spectrum of health services administration. Prerequisites: HSA 505, 520, 522, 532.

591 Seminar. (3) A
Seminar topics such as the following may be offered:
(a) Comparative Health Care Systems
(b) Cost Containment and Quality Assurance
(c) Behavioral Health
(d) Long Term Care
(e) Health Care Economics
(f) Health Care Labor Law
(g) Topics in Health Services Research
(h) Managing Physicians
(i) Multihospital Systems

593 Applied Project. (3) F S SS
Optional on-site experience in advanced development of managerial skills in health services administration and policy. Minimum of 10 weeks. Prerequisites: 18 hours of credit toward program of study; director approval.
Omnibus Courses: See page 44 for omnibus courses that may be offered.

International Business Studies

Certificate in International Business Studies

The program of study leading to the Certificate in International Business Studies is designed to prepare students for positions with multinational firms, banks, government agencies, and international organizations. This program is not a substitute for the listed areas of business specialization; rather, the courses required for the certificate add an international dimension to the student's chosen major.

Requirements for the certificate are designed to provide an understanding of international business environments, principles and operations, to provide an awareness of global social processes and a sensitivity to foreign cultures, and to develop competence in a foreign language. These objectives are met in the following ways:

1. International business principles and operations. At least 15 semester hours of approved courses in international business are required. Students must take either IBS 300 Principles of International Business or ECN 306 Survey of International Economics and the international course in their major. Other international business courses available as electives are:

	<i>Semester Hours</i>
ECN 331 Comparative Economic Systems	3
ECN 360 Economic Development	3
ECN 365 Economics of Russia and Eastern Europe	3
ECN 436 International Trade Theory	3
ECN 438 International Monetary Economics	3
ECN 494 ST: Multinational Firm in the World Economy	3
IBS 400 Cultural Factors in International Business	3
MGT 459 International Management	3
MGT 494 ST: International Management	3
MKT 435 International Marketing	3
MKT 494 ST: International Marketing	3
PLM 463 International Transportation and Logistics	3

2. Global and Area Studies. This requirement can be satisfied either by means of course work or through participation in approved College of Business exchange programs with foreign schools of business, or by some combination of the two. The course work option requires at least 15 semester hours of approved electives in international and area studies. A minimum of six semester hours must be in courses that provide a cross-cultural perspective from the global point of view of one or more disciplines. A minimum of nine semester hours must be in courses that provide an understanding of one region of the world.

Students who participate for two semesters in an approved College of Business exchange program with a foreign business school are deemed to have fulfilled the global and area studies requirements of the Certificate in International Business upon the successful completion of this exchange program. Students who participate in such an exchange program for one semester are deemed to have satisfied the required nine hours of area studies courses, and students who participate in such an exchange program in the summer need only complete six hours of area studies courses to meet the requirements of the certificate for area studies courses.

3. Evidence of competence in a foreign language equivalent to one year of college study is required.

Since the careful planning and selection of courses are necessary to meet the requirements for the certificate without exceeding the minimum number of hours required for graduation and to take advantage of opportunities for participation in exchanges with foreign schools of business, interested students are urged to consult with an international business faculty advisor as early as possible.

INTERNATIONAL BUSINESS STUDIES

IBS 300 Principles of International Business. (3) A
 Multidisciplinary analysis of international economic and financial environment. Operations of multinational firms and their interaction with home and host societies. Prerequisite: ECN 112. *General studies: G*

306 Survey of International Economics. (3) A
 Survey of international trade issues, commercial policy, trade theory, customs unions and international monetary topics. Not for Economics majors. Lecture, discussion. Cross-listed as ECN 306. Prerequisites: ECN 111 or 112. 2.0 ASU GPA; junior standing.

400 Cultural Factors in International Business. (3) S
 Anthropological perspectives on international business relations, applied principles of cross-cultural communication and management regional approaches to culture and business. Cross-listed as ASB 400.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Management

Luis R. Gomez-Mejia
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PROFESSORS

BOHLANDER, GOMEZ-MEJIA,
 PASTOR, PENLEY REIF

ASSOCIATE PROFESSORS

BASSFORD, BRENNENSTUHL, CARDY,
 COOK, HOM, KEATS, KELLER,
 KINCKI, MANZ, MOORHEAD
 OLIVAS, ROBERSON, VAN HOOK

ASSISTANT PROFESSORS

BLANCERO, GOODING, JACOBSON,
 REGER, W SEMAN

SENIOR LECTURERS

KREITNER LEA

PROFESSORS EMERITI

COCHRAN, DAVIS GROSSMAN,
 HEERINSKEEP,
 SCHABACKER, WHITE

Management includes the functions of planning, organizing, staffing, motivating, and controlling in the business setting; yet management is more than mere administration. Good managers make things happen through their actions within an organization and through responsible contributions to society. Good managers also understand the implications of their actions in an international environment. The Department of Management offers international business seminars for its students, and it provides students opportunities to specialize their studies in management systems or human resources management.

Management Systems

The purpose of management is to maximize desirable organizational outputs and minimize undesirable organizational outputs, given realistic constraints. Many tools and systems are used to achieve these ends. These tools and systems are the focus of the management systems track. The following courses must be taken to complete this track:

	<i>Semester Hours</i>
MGT 311 Personnel Management	3
MGT 352 Human Behavior in Organizations	3
Three of the following five courses:	
MGT 433 Management Decision Analysis	3
MGT 434 Social Responsibility of Management	3
MGT 440 Entrepreneurship	3
MGT 459 International Management	3
MGT 468 Management Systems	3

In addition, students must take one MGT elective subject to approval by a management advisor.

All Management majors are required to take six hours of upper-division general studies approved by a management advisor.

Human Resource Management

Effective organizational management depends upon creating an internal organization that is designed to accomplish the organizational mission. The human resource management track introduces the student to issues surrounding the human component of organizations. The curriculum encompasses planning, staffing, motivating, training and development, compensation, performance appraisal, labor relations, and labor law. The courses are designed to provide knowledge and skills that will promote achievement of human resource goals. The following courses must be taken to complete the human resource management track:

	<i>Semester Hours</i>
MGT 311 Personnel Management	3
MGT 352 Human Behavior in Organizations	3
MGT 413 Wage and Salary Management	3
MGT 423 Industrial Relations and Collective Bargaining	3

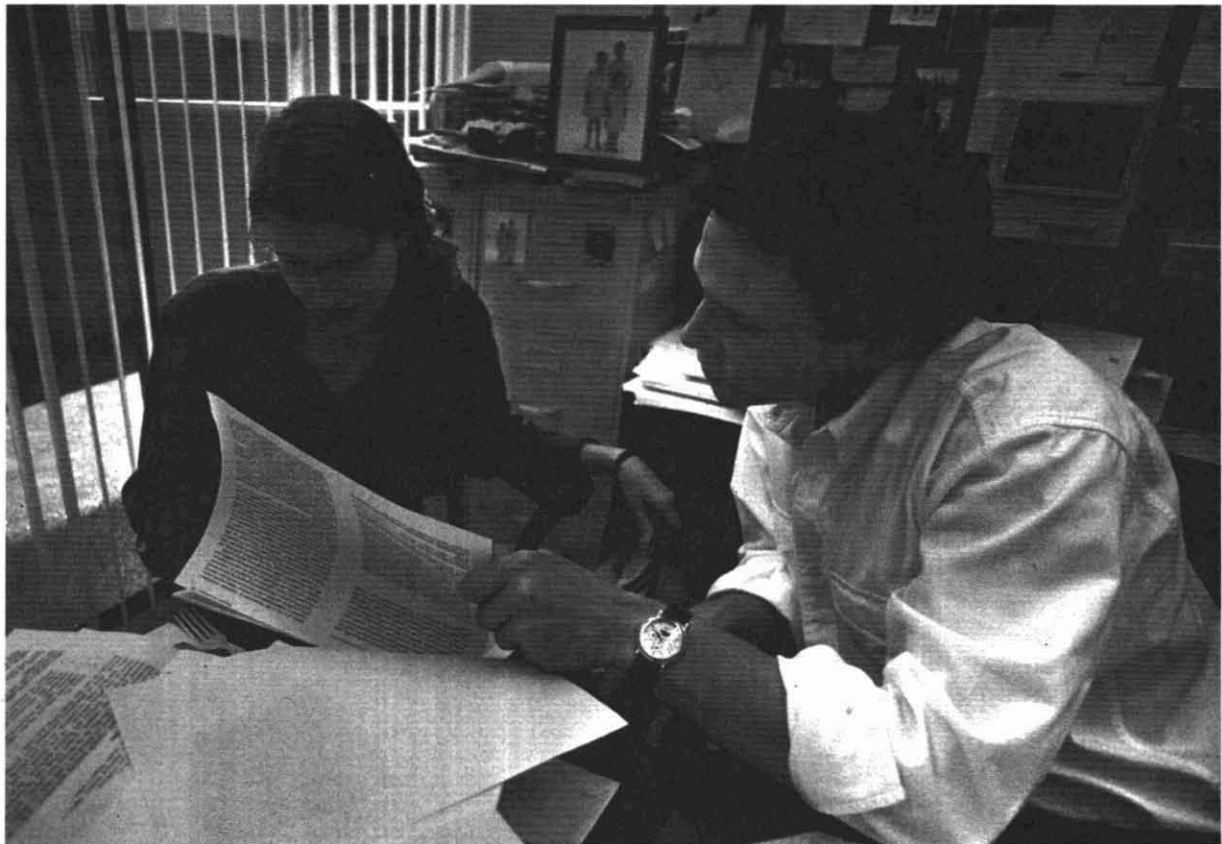
In addition, students must take two MGT electives in human resource management subject to approval by a management advisor.

All Management majors are required to take six hours of upper-division general studies approved by a management advisor.

Major Proficiency Requirements. Students must receive grades of "C" or better in upper-division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper-division course in the major already taken or in a different upper-division course in the major, the student is no longer eligible to take additional upper-division courses in that major.

MANAGEMENT

- MGT 301 Management and Organization Behavior.** (3) F, S, SS
Administrative, organizational, and behavioral theories and functions of management, contributing to the effective and efficient accomplishment of organizational objectives. Prerequisites: 1 psychology (social and behavioral) course and 1 sociology course.
- 311 Personnel Management.** (3) F, S, SS
Manpower planning, staffing, training and development, compensation, appraisal, and labor relations. Prerequisite: MGT 301.



352 Human Behavior in Organizations. (3) F S SS

Human aspects of business as distinguished from economic and technical aspects and how they influence efficiency morale and management practice Prerequisite: MGT 301

413 Wage and Salary Management. (3) A
Installation and administration of a complete wage and salary program includes objectives policies organization control job evaluation, and wage surveys. Prerequisites: MGT 311 professional program business student

422 Training and Development. (3) N
Learning theory orientation and basic level training, management development resource materials and methods Prerequisites: MGT 311, professional program business student

423 Industrial Relations and Collective Bargaining. (3) F S
Processes and procedures of collective bargaining. Scope and negotiation of union contracts.

424 Employee Selection and Appraisal. (3) F S

Concepts and methods of personnel selection and performance appraisal. Includes job analysis measurement and evaluation. Experienced exercises emphasized Prerequisite: MGT 311

433 Management Decision Analysis. (3) F S

Decision-making concepts and methods in the private and public sectors and their application to organizational problems Understanding of individual and group decision making Prerequisites: MGT 301 professional program business student

434 Social Responsibility of Management. (3) F S

Relationship of business to the social system and its environment. Criteria for appraisal management decisions Managers as change agents. Prerequisites: MGT 301 professional program business student

440 Entrepreneurship. (3) A

Opportunities risks, and problems associated with small business development and operation

441 Venture Design and Development. (3) N

Analysis, design, and development of a business plan for a new venture Prerequisite: ACC 240

442 Small Business Management. (3) N

Students, acting as management consultants apply business principles and make recommendations to small businesses while learning to manage small firms Prerequisite: business core except MGT 463

447 Management and the Impact of Technology. (3) N

The impact of technology on strategic planning and human resources management in business organizations

448 Management and the Impact of Technology: Research. (3) N

Development of research strategies and cases for studying the impact of technology on management theory and practice in business organizations Prerequisite: MGT 447

452 Organizational Behavior Applications. (3) A

The complex set of behavioral forces and relationships that influence organizational effectiveness. Intervention strategies and application to skills Prerequisites: MGT 352; professional program business student

459 International Management. (3) A

Concepts and practices of multinational and foreign firms Objectives strategies policies, and organizational structures for operation in various environments Prerequisite: MGT 301.

463 Strategic Management. (3) F, S SS

Strategic formulation and administration of the total organization including integrative analysis and strategic planning To be taken last semester of senior or year Prerequisites: completion of 108 hours, including a other business administration core requirements professional program business student *General studies: L2*

468 Management Systems. (3) F S

Systems theory and practice applied to organization process and research Organizations seen as open systems interacting with changing environments Prerequisite: MGT 301.

494 Special Topics. (3) N

Chosen from topics in human resources, strategic management, and international management including seminars in international management in Asia or Europe.

502 Organization Theory and Behavior. (3) F S

Important concepts and applications in management including motivation leadership group dynamics organization design, decision-making communication, and organization change Prerequisites: calculus computer literacy graduate degree program student

503 Complex Organizations. (3) N

Concepts and applications in macro organization theory Topics include organization structure strategic choice culture boundary spanning, effectiveness and different perspectives of interorganization relations

504 Competitive Strategy. (3) N

Industry, competitor and firm strategic positioning analysis a mediated gaining sustainable competitive advantage Lecture discusses Prerequisites: ECN 502, F N 502 MGT 502 MKT 502

520 Problems in Personnel Management. (3) A

Selecting developing maintaining and utilizing a competent labor force. Case studies of personnel problems Preparation of a written personnel program

522 Labor Relations and Public Policy. (3) A

State and federal legislation on recent decisions of courts and labor boards Legal rights and duties of employers unions and the public

559 International Comparative Management. (3) A

Analysis of comparative management practices problems and issues Management strategies for the multinational organization impact of national and cultural environments

589 Strategic Management. (3) F S

Formulation of strategy and policy in the organization emphasizing the integration of decisions in the functional areas Prerequisites: ACC 503 BUS 502 C S 502 ECN 502 F N 502, MGT 502 MKT 502 OPM 502, QBA 502, completion of at least 36 hours of program of study credits

591 Seminar. (3) N

Topics such as the following will be offered:
a) Competitive Strategy
b) Ethics
c) Human Resources Systems
d) Management Planning and Control

598 Special Topics. (3) N

Graduate special topics chosen from human resources, strategic management and international management including special topics in international management in Asia or Europe

791 Seminar: Doctoral Seminar in Management. (3) A

Topics such as the following will be offered:
a) Compensation
b) Human Resource Management
c) Organization Behavior
d) Organization Theory
e) Research Design and Methodology
f) Strategic Management

Omnibus Courses: See page 44 for omnibus courses that may be offered

Marketing

Michael P. Mokwa

Chair

(BAC 462) 602/965-3621

PROFESSORS

BROWN CROSBY GWINNER HUTT,
JACKSON, LASTOVCKA, MOKWA,
OSTROM, REINGEN, SCHLACTER

ASSOCIATE PROFESSORS

BELTRAMI, BITNER,
BLASKO, GOURLEY, KUMAR,
STEPHENS, WARD

ASSISTANT PROFESSORS

R KLEINE, S KLEINE
SINHA, WALKER

SENIOR LECTURER

SPIERS

PROFESSORS EMERITI

BESSOM, OVERMAN, ROWE,
SCHMIDT, ZACHER

Study in the field of marketing involves analysis of how businesses plan, organize, administer, and control their resources to achieve marketing objectives. Focus is placed on market forces, growth and the survival of firms in competitive markets, and on the marketing strategy and tactics of the firm. Through the proper selection of courses, a student may prepare for a career in

1. advertising;
2. general marketing management;
3. industrial marketing,

4. international marketing;
5. market research and planning;
6. promotion management;
7. retail merchandising and management;
8. selling and sales management, or
9. services marketing

The major in Marketing consists of 18 semester hours. The following 12 hours must be included:

	<i>Semester Hours</i>
MKT 302 Fundamentals of Marketing Management	3
MKT 304 Consumer Behavior	3
MKT 351 Marketing Intelligence	3
MKT 460 Strategic Marketing	3

To complete the major, students, in consultation with their faculty advisors, select six additional hours from among the following list of courses:

	<i>Semester Hours</i>
ADV 301 Advertising Principles	3
ADV 311 Advertising Creative Strategy	3
ADV 371 Advertising Media	3
ADV 461 Advertising Management	3
MKT 310 Principles of Selling	3
MKT 325 Public Relations in Business	3
MKT 411 Sales Management	3
MKT 412 Promotion Management	3
MKT 424 Retail Management	3
MKT 430 Marketing for Service Industries	3
MKT 434 Industrial Marketing	3
MKT 435 International Marketing	3
MKT 444 Marketing Channels	3
MKT 484 Internship	3

In addition, all Marketing majors are required to take six hours from a list of communications, behavioral science, and global awareness courses approved by the Department of Marketing. The list of approved courses is contained in the *Marketing Field of Specialization Student Curriculum Guide*, a copy of which can be obtained from the department office.

Major Proficiency Requirements. Students must receive grades of "C" or better in upper division courses for the major. If a student receives a grade below "C" in any course in the major, this course must be repeated. If a second grade below "C" is received in either an upper division course in the major already taken or in a different upper division course in the major, the student is no longer eligible to take additional upper division courses in the major.

ADVERTISING

- ADV 301 Advertising Principles.** (3) F, S, SS
Advertising as a communications tool in marketing and business management. Survey of market segmentation, creative strategy, media and effectiveness measures. Prerequisite: MKT 300
- 311 Advertising Creative Strategy.** (3) A
Application of communications theory to advertising. Evaluation of strategies and executions. Creation of a portfolio containing print and broadcast advertisements. Prerequisites: ADV 301; non-business majors must obtain department approval
- 371 Advertising Media.** (3) A
Media strategy as an extension of marketing strategy: conceptual aspects of media planning, quantitative and qualitative analysis of media. Prerequisites: ADV 301; non-business majors must obtain departmental approval
- 461 Advertising Management.** (3) N
A capstone course in advertising dealing with the management of advertising from both the client and agency perspectives. Prerequisites: ADV 301 and MKT 302 (with grades of "C" or better)
- Omnibus Courses:** See page 44 for omnibus courses that may be offered

MARKETING

- MKT 300 Principles of Marketing.** (3) F, S, SS
Role and process of marketing within the society, economy, and business organization. Prerequisite: ECN 112
- 302 Fundamentals of Marketing Management.** (3) F, S, SS
Marketing planning, implementation and control by organizations with special emphasis on identifying market opportunities and developing marketing programs. Prerequisite: MKT 300
- 304 Consumer Behavior.** (3) F, S, SS
Application of behavioral concepts in the analysis of consumer behavior and the use of behavioral analysis in marketing strategy formulation. Prerequisite: MKT 300.
- 310 Principles of Selling.** (3) A
Basic principles underlying the selling process and the practical application in the sale of industrial goods, consumer goods, and intangibles. Prerequisite: MKT 300
- 325 Public Relations in Business.** (3) N
Role of public relations in business, government, and social institutions, emphasizing policy formulation from a managerial perspective. Prerequisite: MKT 300
- 351 Marketing Intelligence.** (3) F, S, SS
Integrated treatment of the traditional approaches to marketing research and analysis of environmental factors affecting marketing decisions in the firm. Prerequisites: MKT 302 and QBA 221 (with grades of "C" or higher)
- 411 Sales Management.** (3) A
Application of management concepts to the administration of the sales operation. Prerequisite: MKT 302
- 412 Promotion Management.** (3) A
Integration of the promotional activities of the firm including advertising, personal selling, public relations, and sales promotion. Prerequisite: MKT 302

- 424 Retail Management.** (3) A
Role of retailing in marketing. Problems and functions of retail managers within various retail institutions. Prerequisite: MKT 300.
- 430 Marketing For Service Industries.** (3) F, S
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
- 434 Industrial Marketing.** (3) A
Strategies for marketing products and services to industrial, commercial, and governmental markets. Changing industry and market structures. Prerequisite: MKT 302 or instructor approval.
- 435 International Marketing.** (3) N
Analysis of marketing strategies developed by international firms to enter foreign markets and to adapt to changing international environments. Prerequisites: MKT 302 or instructor approval; professional program business student
- 444 Marketing Channels.** (3) N
Distribution channels used by firms engaged in marketing and manufacturing. Strategies for marketing-channel management. Relationship among marketing intermediaries. Prerequisites: MKT 302; professional program business student
- 460 Strategic Marketing.** (3) F, S, SS
Policy formulation and decision making by the marketing executive. Integration of marketing programs and consideration of contemporary marketing issues. Prerequisites: MKT 302, 304, 351 (with grades of "C" or higher), professional program business student
- 502 Marketing Management.** (3) F, S
Managing the marketing function: market and environmental analysis, marketing planning, strategy, and control concepts. Development and management of marketing programs. Prerequisite: ECN 502
- 520 Strategic Perspectives of Buyer Behavior.** (3) N
Concepts and theories from the behavioral sciences as they relate to marketing strategy formulation. Prerequisite: MKT 502 or equivalent or instructor approval.
- 522 Marketing Information.** (3) A
Marketing research, marketing information systems, and modern statistical techniques in marketing decision making. Prerequisite: MKT 502.
- 524 Services Marketing.** (3) F, S
Strategies for marketing services emphasizing the distinctive challenges and approaches that make marketing of services different from marketing manufactured goods. Prerequisite: MKT 502 or equivalent.
- 563 Marketing Strategy.** (3) A
Planning and control concepts and methods for developing and evaluating strategic policy from a marketing perspective. Prerequisite: MKT 502
- 591 Seminar.** (3) A
Topics such as the following will be offered:
(a) Product Strategy
(b) Channel Strategy
(c) Promotion Strategy
(d) Marketing in International Operations
(e) Advertising Strategy
- Omnibus Courses:** See page 44 for omnibus courses that may be offered.

College of Education

Leonard A. Valverde, Ph.D.
Dean

PURPOSE

For students, choosing a professional college is a major decision. It represents the choice of a profession within which a career will be built. The College of Education provides a stimulating, challenging forum wherein scholars and practitioners interact in the discovery and mastery of the science and art of educational endeavors. This balanced approach, in which research and practice are viewed as essential and complementary, enables the college to produce superior educators.

The purposes of the faculty of the College of Education are as follows.

1. to engage in the scholarly, scientific, and professional study of education,
2. to prepare competent professionals who will serve in a variety of critical educational roles;
3. to develop productive scholars who will make significant contributions to the educational literature and to the quality of educational practice, and
4. to serve the education profession at the local, national, and international levels.

In accord with these purposes, the College of Education is committed to producing quality scholarship and research and to excellence in teaching.

ORGANIZATION

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

Division of Curriculum and Instruction Program Areas

Adult Education
Early Childhood Education
Educational Media and Computers
Elementary Education
Multicultural Education
Reading and Library Science
Secondary Education
Special Education

Division of Educational Leadership and Policy Studies Program Areas

Educational Administration and Supervision
Educational Policy Studies
Higher Education

Division of Psychology in Education Program Areas

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

Services to students and the community are provided through the following centers and offices:

The *Center for Bilingual/Bicultural Education* conducts interdisciplinary research on classroom interaction, language development, and cognitive development. The focus of these research efforts is bilingual and bicultural students in Arizona.

The *Center for Indian Education* serves as a service agency to Indian communities, school districts, and Indian students attending ASU. The center also conducts research on Indian education in Arizona and other states with American Indian populations.

The *Office of Student Affairs* assists individuals interested in teacher preparation programs through advisement, admission, and retention activities, and certification assistance. Other services include program of study validation, petition review, student communications, and high school and community college articulation/relations.

The *Office of Professional Field Experiences* places all teacher preparation students in public schools and similar institutions for internships and student teaching, monitors students' progress in their field experiences, sponsors courses for cooperating teachers, and conducts research on student performance in the field.

The *Office of Educational Services* counsels students regarding College of Education scholarships and provides recruitment and support services for minority students wishing to enter the Professional Teacher Preparation Program (PTPP).

The *Center for Academic Precocity* provides academic services to intellectually advanced students in grades pre-K through 11. These services include individual assessment, talent identification, and a variety of courses.

The *Counselor Training Center* provides counseling for ASU students, staff, and the community at large in personal and career development, stress management, and marriage and family

College of Education Degrees, Majors, and Concentrations

Major	Degree	Administered by
Baccalaureate Degrees		
Early Childhood Education	B.A.E.	Division of Curriculum and Instruction
Elementary Education	B.A.E.	Division of Curriculum and Instruction
Concentration: bilingual education/English as a second language		
Secondary Education	B.A.E.	Division of Curriculum and Instruction
Academic specializations: biological sciences; business, office, and distributive education; chemistry; Chinese; communication; economics; English: family resources and human development (home economics); French; geography; German; history; humanities; Japanese, journalism; mathematics; mathematics/chemistry; mathematics physics, physical education; physics; physics/chemistry; political science; Russian; social studies; Spanish		
Selected Studies in Education	B.A.E.	College of Education
Special Education	B.A.E.	Division of Curriculum and Instruction
Graduate Degrees		
Counseling	M.C.	Division of Psychology in Education
Counseling Psychology	Ph.D.	Division of Psychology in Education
Counselor Education	M.Ed.	Division of Psychology in Education
Concentration: counseling and student personnel		
Counselor Education	Ed.D. ¹	Division of Psychology in Education
Curriculum and Instruction	Ph.D. ²	Interdisciplinary Committee on Curriculum and Instruction
Concentrations: curriculum studies, early childhood education, educational media and computers, elementary education, English education, exercise and wellness education, music education, physical education, reading education, science education, special education		
Educational Administration and Supervision	M.A., M.Ed., Ed.D.	Division of Educational Leadership and Policy Studies
Educational Leadership and Policy Studies	Ph.D.	Division of Educational Leadership and Policy Studies
Educational Media and Computers	M.Ed.	Division of Curriculum and Instruction
Concentration: business education		
Educational Psychology	M.A., M.Ed.	Division of Psychology in Education
Educational Psychology	Ph.D.	Division of Psychology in Education
Concentrations: lifespan developmental psychology, measurement, statistics, and methodological studies; school psychology		
Elementary Education	M.A., M.Ed., Ed.D.	Division of Curriculum and Instruction
Concentrations: bilingual education, child development, communication arts, curriculum, early childhood education, Indian education, mathematics, multicultural education, reading, science, social studies		
Elementary Education	Ph.D. ¹	Division of Curriculum and Instruction
Higher and Adult Education	M.Ed., Ed.D.	Division of Educational Leadership and Policy Studies
Concentrations: adult education ¹ , higher education		
Learning and Instructional Technology	M.A., M.Ed., Ed.D.	Division of Psychology in Education
Learning and Instructional Technology	Ph.D.	Division of Psychology in Education
Concentrations: instructional technology, learning		

¹ Applications are not being accepted.

² This program is administered jointly by the College of Education and the Graduate College. See the "Graduate College" section of this catalog.

Major	Degree	Administered by
School Library Science	M.A. ¹ , M Ed ¹	Division of Curriculum and Instruction
Secondary Education	M.A.	Division of Curriculum and Instruction
Secondary Education Concentrations: bilingual education, English as a second language, Indian education, subject matter fields	M.Ed.	Division of Curriculum and Instruction
Secondary Education Concentrations: art education, business education, curriculum and instruction, mathematics education, music education, physical education, science education	Ed.D.	Division of Curriculum and Instruction
Social and Philosophical Foundations of Education	M.A.	Division of Educational Leadership and Policy Studies
Special Education	M.A., Ph.D. ¹	Division of Curriculum and Instruction
Special Education Concentrations: gifted, mildly handicapped, multicultural exceptional, severely multiply handicapped	M.Ed.	Division of Curriculum and Instruction

¹ Applications are not being accepted.

² This program is administered jointly by the College of Education and the Graduate College. See the "Graduate College" section of this catalog.

issues. Counseling is conducted by graduate students in counseling and counseling psychology under the supervision of certified psychologists.

The *Reading Tutoring Program* assesses causes of reading problems and offers one to one tutoring or small group instruction by experienced teachers in public schools to students referred by parents and recommended by school districts.

Other units within the college offering specialized research and educational services include the Math Clinic, College of Education Preschool, Arizona Educational Information System, Technology Based Learning and Research, and the Mountain States Multifunctional Resource Center.

Teacher Education

Preparation for teacher certification is available to both the undergraduate pursuing a first degree and the individual with a college degree in a non education field.

The teaching majors of Art, Choral Music, Dance, Instrumental Music, and Theatre with a bachelor's degree are available through the College of Fine Arts. See pages 295-322 for more information.

Undergraduate programs leading to the Bachelor of Arts in Education degree are described in the text that follows. Descriptions of graduate degree programs can be found in the *Graduate Catalog*.

Bachelor of Arts in Education

Candidates for the Bachelor of Arts in Education degree must complete the Professional Teacher Preparation Program (PTPP) offered by the College of Education. Graduates of this program are able to demonstrate proficiency in specified knowledge areas or skills, including the following:

1. principles and application of effective instruction;
2. classroom organization and management;
3. content or subject matter;
4. specific curriculum and teaching strategies;
5. interrelationship of culture and schooling in a multicultural society;
6. human development;
7. communication skills;
8. theories of learning and motivation.
9. assessment and evaluation; and
10. computer literacy.

Each student in the PTPP selects one of three major areas that provide specialized instruction and preparation. These majors are

1. Elementary Education,
2. Secondary Education; and
3. Special Education.

Students in Elementary Education have these options:

1. to complete a general program in Elementary Education, grades K-8;
2. to specialize in early childhood education; or
3. to complete an endorsement in either bilingual education or English as a second language.

Students in Secondary Education may be certified in a specific academic specialization. Students in art, music, or physical education complete a K-12 endorsement in their field. Special Education majors may be certified for grades K-12 in mental retardation, emotionally handicapped, or learning disabilities.

PTPP Areas and Options or Endorsements

Early Childhood Education
Elementary Education
bilingual education
English as a second language
Secondary Education
certification in specific academic specializations
K-12 endorsements in art, music, or physical education
Special Education
emotionally handicapped
learning disabilities
mental retardation

All PTPP students complete a common core of courses as well as courses specific to the area or option selected. Early Childhood Education and Elementary Education prepare students for certification in grades K–8. Students who select these majors develop the knowledge and skills needed to teach children from a variety of language, cultural, and developmental backgrounds. The Early Childhood Education major prepares students to work in infant programs, preschools, and grades K–3. The Elementary Education bilingual education/English as a second language (ESL) concentration prepares students to work in bilingual ESL settings in grades K–8. The Special Education major prepares students for certification in grades K–12 in one of the areas listed above. Students completing any of the above majors must also complete the human development requirements and an academic specialization.

Secondary Education prepares students for certification in specific academic subjects in grades 7–12. Students with teaching majors in the College of Fine Arts earn the appropriate bachelor's degree from that college.

Courses for the academic specialization are determined by the faculty in the academic discipline. Therefore, students with majors in Secondary Education and the College of Fine Arts have two academic advisors: one in the college and department of the academic specialization and one in the Office of Student Affairs in the College of Education. For more information, refer to the following section titled, "Academic Specialization," page 206.

ADVISEMENT

All students pursuing teaching certificates should seek early advisement from the Office of Student Affairs in the College of Education. Careful planning and early advisement in developing an approved program of study are essential if teacher candidates are to complete certification and graduation requirements within the typical 126 semester hour undergraduate degree program.

Mandatory Advising. Transfer students are required to meet with an academic advisor prior to registering for their first semester classes. Freshmen must meet with an advisor before registering for each of their first two semesters.

ADMISSION

Preprofessional Admission

Students admitted to ASU during their freshman and sophomore years may also be admitted to the College of Education with preprofessional status. Preprofessional students should seek advisement within the College of Education through its Office of Student Affairs, EDB 7. *Admission to ASU with preprofessional status in the College of Education does not guarantee admission to the Professional Teacher Preparation Program (PTPP). Admission to the PTPP is a separate process.*

Professional Program Admission

Students are eligible for consideration for admission to the Professional Teacher Preparation Program if they meet the following criteria:

1. admission to ASU as a classified student;
2. a minimum GPA of 2.50;
3. completion of at least 56 semester hours by the time of PTPP admission;
4. submission of scores from either the ACT or PPST (a minimum score is not required. An applicant may be referred for additional skill development while matriculating through the program of study.);
5. completion of ENG 101 and 102 and general studies L1 and N1 requirements with a grade of "C" or better; and
6. a special application with additional supporting materials.

Admission is competitive and not guaranteed to all who satisfy the minimum admission criteria.

Some academic units have additional requirements. *Students seeking admission to K–12 or secondary education programs* should consult the Office of Student Affairs (602/965-3877) to determine if there are additional admission requirements for their teaching fields.

PTPP application deadlines are February 1 for fall admission, October 1 for spring admission. Applicants should contact the Office of Student Affairs for an application.

Because PPST scores must be included for an application to be complete, applicants should plan to take the PPST *well in advance* of application

deadlines. In most cases, the PPST can be taken as early as the end of the freshman year.

Admission to the PTPP is selective and based on available resources. Not all students who meet minimum requirements are admitted to the program.

Transfer Students

To be considered for admission to the PTPP, transfer students must first be formally admitted to ASU (see pages 34–35). Transfer students must also meet all PTPP admission requirements and should contact the Office of Student Affairs within the College of Education for admission procedures and advisement. The university Undergraduate Admissions office should receive the application for admission to ASU, transcripts, applicable test scores, and other required information at least three months before the PTPP application deadline date for the desired PTPP admission semester.

Students completing their first two years of course work at a community college or at a four-year institution in Arizona other than ASU should consult ASU academic advisors during those two years for advice in planning a sequence of general studies courses that will meet ASU general studies requirements.

Program of Study

A program of study (POS) must be filed during the first semester of enrollment in the Professional Teacher Preparation Program. Students completing 87 hours (the university limit for registering without a POS) who have not been admitted to the PTPP are provided a registration waiver by the College of Education. See page 72 for university requirements.

Program Requirements

The College of Education offers the Bachelor of Arts in Education (B.A.E.) degree. Progress toward the degree involves meeting university, college, and division requirements. The degree program also includes courses and academic content required for teacher certification by the State of Arizona. Students seeking certification in one of the fine arts complete degree requirements in the College of Fine Arts and specified courses through the PTPP.

COURSE WORK REQUIREMENTS

A minimum of 126 semester hours are required for the B.A.E. degree. Four categories of courses are required of PTPP students:

1. general studies;
2. academic specialization;
3. human development (elementary and special education certification candidates only); and
4. Professional Teacher Preparation Program.

General Studies Requirements

All students enrolled in a baccalaureate degree program must successfully complete a minimum of 35 semester hours of specifically identified general studies courses as outlined in the ASU *General Catalog*. The required distribution of general studies courses among the core and awareness areas is outlined in this catalog on pages 50-71. Preprofessional students should complete as many of the general studies courses as possible before admission to the PTPP.

Academic Specialization

Courses in the academic specialization give students a greater depth of knowledge in one academic area. Elementary and Special Education majors complete 18 hours in a single academic

subject. A Secondary Education major completes 36-60 hours, depending upon the area, in the subject in which the student wishes to be certified; fine arts may require more. Teacher candidates should confer with the Office of Student Affairs regarding acceptable academic specializations. Refer to the pages shown below for descriptions of the individual academic specializations:

Academic Specialization	Page(s)
art education ¹	300-301
biological sciences	96
business education	See advisor
chemistry	101
Chinese	123
communication	340
dance education ¹	308
economics	See advisor
English	104
family resources and human development	110
French	123
geography	113
German	123
history	118
humanities	121-122
Japanese	123
journalism	343
mathematics	132
mathematics/chemistry	132
mathematics/physics	132
music ²	311
physical education	107
physics	142
physics/chemistry	142
political science	145
Russian	123
social studies	93, 153
Spanish	123
theatre education ¹	319

¹ Art education, dance education, and theatre education concentrations are under corresponding B.F.A. majors.

² Students major in either Choral-General Music or Instrumental Music under the B.M. degree.

Human Development

The elementary and special education certification programs require students to complete 15 credits selected from specific human development courses pertinent to the teaching area. Teacher candidates should confer with an academic advisor in the Office of Student Affairs regarding course selection. The human development content

and credit for Secondary Education majors are incorporated into the PTPP courses. No additional credits are required in human development for Secondary Education majors.

Professional Teacher Preparation Program

The PTPP is a four-semester sequential program consisting of 35-44 credits. Ranging from seven to 14 credits per semester, the courses for one semester must be completed before enrolling in the next semester. In other words, courses for one semester may not be taken at the same time as those scheduled for another semester. In addition to the PTPP courses, students continue completing general studies requirements and human development and academic specialization requirements through the third semester of the program.

Four-Semester Requirements Professional Teacher Preparation Program

Elementary Education (K-8) Major

		Semester Hours
Semester I (7)		
DCI 396	Field Experience	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development	3
SPF 301	Culture and Schooling	2
Semester II (7)		
DCI 303	Classroom Organization and Management	2
DCI 397	Field Experience	0
EDP 302	Assessment and Evaluation in Education	1
EED 400	Principles of Effective Instruction in Elementary Education	3
EMC 300	Computers in Education	1
Semester III (14)		
EED 401	Teaching Science and Social Studies to Children	4
EED 402	Teaching Strategies in Mathematics	2
EED 404	Language Arts	2
EED 496	Field Experience	0
RDG 401	The Teaching of Reading	3
RDG 402	Reading Practicum	3
Semester IV (14)		
EED 478	Student Teaching in the Elementary School	12
SPF 401	Theory and Practice in Education	2



Elementary Education (K–8) Major with a Concentration in Bilingual Education/English as a Second Language

		<i>Semester Hours</i>
Semester I (7)		
DCI 396	Field Experience	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development	3
SPF 301	Culture and Schooling	2
Semester II (7)		
BLE 400	Principles of Instruction in Language Minority Education	3
DCI 303	Classroom Organization and Management	2
DCI 397	Field Experience	0
EDP 302	Assessment and Evaluation in Education	1
EMC 300	Computers in Education	1
Semester III (14)		
BLE 401	Teaching Science and Social Studies to Children	4
BLE 402	Teaching Strategies in Mathematics	2
BLE 405	Teaching Reading in BLE/ESL	3
BLE 406	Reading Practicum	3
BLE 407	Language Arts	2
BLE 496	Field Experience	0
Semester IV (14)		
BLE 478	Student Teaching in the Elementary School	12
SPF 401	Theory and Practice in Education	2

Early Childhood Education with K–8 Teacher Certification

		<i>Semester Hours</i>
Semester I (7)		
DCI 396	Field Experience	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development	3
SPF 301	Culture and Schooling	2
Semester II (9)		
DCI 303	Classroom Organization and Management	2
DCI 397	Field Experience	0
ECD 308	Foundations of Early Childhood Education	3
ECD 404	Language Arts	2
EDP 302	Assessment and Evaluation in Education	1
EMC 300	Computers in Education	1
Semester III (12)		
ECD 401	Instructional Strategies: Social Studies and Creative Arts	3
ECD 402	Instructional Strategies: Math and Science	3
ECD 496	Field Experience	0
RDG 401	The Teaching of Reading	3
RDG 402	Reading Practicum	3

Semester IV (14)		
EED 478	Student Teaching in the Elementary School	12
SPF 401	Theory and Practice in Education	2

Secondary Education (7–12) Major

		<i>Semester Hours</i>
Semester I (7)		
DCI 396	Field Experience	0
EDP 301	Learning and Motivation in Education	2
EDP 303	Human Development	3
SPF 301	Culture and Schooling	2
Semester II (8)		
DCI 397	Field Experience	0
EDP 302	Assessment and Evaluation in Education	1
EMC 300	Computers in Education	1
RDG 301	Reading in the Content Areas	3
SED 400	Principles of Effective Instruction in Secondary Education	3
Semester III (6)		
SED 403	Principles, Curricula, and Methods	3
SED 496	Field Experience	0
Methods course in academic specialization		
		3
Semester IV (14)		
SED 478	Student Teaching in the Secondary Schools	12
SPF 401	Theory and Practice in Education	2

Special Education (K–12) Major

		<i>Semester Hours</i>
Semester I (12)		
DCI 396	Field Experience	0
EDP 303	Human Development	3
EED 404	Language Arts	2
EMC 300	Computers in Education	1
RDG 401	The Teaching of Reading	3
RDG 402	Reading Practicum	3
Semester II (8)		
EED 402	Teaching Strategies in Mathematics	2
SPE 412	Evaluating Exceptional Children	3
SPE 413	Methods in Language, Reading, and Arithmetic for Exceptional Children	3
SPE 496	Field Experience	0
Semester III (12)		
EED 320	Teaching Science to Children	3
SPE 411	Parent Involvement and Regulatory Issues	3
SPE 414	Methods and Strategies in Behavior Management	3
SPE 415	Social Behavior Problems of Exceptional Children	3
SPE 496	Field Experience	0

Semester IV (12)		
SPE 478	Student Teaching in Special Education	12
(one certification area)		

Field-Experience Requirements

In addition to course work, students admitted to the PTPP are required to participate in directed field experiences during each of the four semesters of the program. The field experiences progress from short-term observation and participation to long-term supervised practice teaching. *Students should expect these field experiences to be above and beyond the class times listed in the Schedule of Classes for each semester.* Such field experiences typically take place in public schools throughout the greater Phoenix area. Regular attendance is required during all field experiences. Students should plan extra travel time and expect to confer with placement teachers and field facilitators before or after scheduled field experiences. To meet field experience requirements, students must plan to have their own transportation and be available during regular school hours.

Student Teaching. The culminating field experience, called *student teaching*, occurs in the fourth semester of the PTPP and is a full-day, full-semester obligation. *Student teaching is only possible during fall and spring semesters.*

Admission to Student Teaching (Semester IV). To be admitted to student teaching, a student must have attained a high level of professional standards in previous field experience assignments and meet the following requirements:

1. be in good standing in the PTPP:
 - a. have earned a minimum “C” or “Y” grade in each PTPP course;
 - b. have a minimum PTPP GPA of 2.50;
 - c. have a minimum ASU GPA of 2.50; and
 - d. have maintained a high standard of professional conduct;
2. have no incompletes in PTPP courses;
3. complete all PTPP courses, with the exception of SPF 401;
4. have an approved program of study on file;

5. have no more than two courses to complete in general studies; and
6. complete the application procedure and approval to student teach from the Office of Professional Field Experiences at least 10 weeks before the beginning of the student teaching term.

Secondary Education majors must have no more than two required courses remaining in the academic specialization and receive the approval of the specialization advisor

Student teachers must adhere to the calendar, regulations, and philosophy of the schools in which they are placed. Beginning and ending dates for student teaching are determined by the Office of Professional Field Experiences in cooperation with the placement schools. Because student teaching is on a full day schedule, 8:00 a.m. to 4:00 p.m. Monday through Friday for 15 consecutive weeks, student teachers are strongly encouraged to avoid extra activities and course work that would interfere with the heavy demands placed upon them while student teaching.

GRADUATION REQUIREMENTS

Candidates for the degree of Bachelor of Arts in Education are required to complete an approved program of at least 126 semester hours. The College of Education expects its degree candidates to meet individual course assessment standards, field experience observation criteria, courses required for teacher certification, and other proficiency standards and performance criteria required to demonstrate knowledge and skill in the areas listed under the Bachelor of Arts in Education description on page 204 of this catalog.

ACADEMIC STANDARDS

Retention and Disqualification

Students admitted to the College of Education on *preprofessional status* are subject to the general standards of academic good standing of the university. *However, students who maintain standards of academic good standing during their freshman and sophomore years do not necessarily qualify for admission to any teacher preparation program offered by the College of Education*

Students admitted to the PTPP within the College of Education must maintain academic standards and dem

onstrate requisite qualifications for successful teaching, including sound physical and mental health, interpersonal skills, basic communication skills, a positive attitude, appropriate professional conduct, and satisfactory performance in field experiences. Because PTPP standards are higher than those for the university, a student who is suspended from the PTP Program may still be eligible to enroll in other non PTPP courses.

To be considered in good standing, students must maintain an overall cumulative GPA or a GPA in PTPP course work of 2.50 or higher with at least a grade of "C" in each PTPP course. Any first or second semester PTPP student who fails to satisfy these requirements may be placed on academic probation or suspended from enrollment in the next semester of the PTPP program. By the end of the third semester, PTPP students must meet the requirements for student teaching described earlier.

Students on academic probation or suspension from the university and/or PTPP must seek advice from the Office of Student Affairs before registering for additional course work. A complete copy of the retention policy for the PTPP is available from the Office of Student Affairs in EDB 7.

Probation and suspension status for academic reasons begins on the first day of classes of the semester after the probation or suspension action. Students placed on probation for any reason are subject to disqualification by the College of Education at the end of the following semester if the conditions imposed for reinstatement are not met. The status of a student placed on probation or suspension for any reason is reviewed at the end of the following semester.

Students demonstrating behaviors or characteristics that make it questionable whether they can succeed in the teaching profession are reviewed by the director of the Office of Professional Field Experiences and the director of the Division of Curriculum and Instruction. If necessary, a review panel composed of faculty members who have had direct involvement with the student is convened. Following this review, the student may be referred to the Division of Curriculum and Instruction Standards and Appeals Committee. The committee's review may result in a de

cision to disqualify the student or the specification of conditions under which continued participation is permitted, i.e., probation.

Students who wish to appeal decisions of the Standards and Appeals Committee of the Division of Curriculum and Instruction may do so in writing to the dean of the college or the University Undergraduate Standards Committee. Any exceptions to the retention and disqualification policies and procedures must be approved by the Standards and Appeals Committee of the Division of Curriculum and Instruction and the dean of the College of Education.

Postbaccalaureate Initial Teacher Certification (ITC) Programs

Postbaccalaureate programs that lead to initial teaching certification are designed for those who hold a bachelor's degree in an area other than education. The college offers postbaccalaureate programs in early childhood education, elementary education, secondary education, and special education. Special education students must qualify for and be concurrently admitted to a master's degree program in special education. Information on postbaccalaureate programs is available through the Office of Student Affairs (OSA), EDB 7. The OSA provides academic advisement and information regarding requirements, procedures, and deadline dates.

A student who wishes to be considered for entry must meet the College of Education admission requirements for postbaccalaureate programs:

1. an earned bachelor's degree from an accredited institution;
2. a cumulative GPA of 2.50 or better for the last 60 semester hours of credit earned; and
3. submission of a completed application form and supporting materials by the appropriate deadline dates during the semester before admission.

Admission to postbaccalaureate programs is selective and based on available resources. *Not all students who meet the minimum requirements are admitted to the program*

A student who also wishes to pursue a master's degree should contact the program coordinator in the intended area of study. The master's degree student must meet the admission requirements of both the College of Education

and the Graduate College. No more than nine semester hours of graduate credit earned before formal admission to the Graduate College can be included in a candidate's master's degree program of study.

Student Teaching

Students in the Postbaccalaureate Initial Teacher Certification Program must file student teaching applications early in the semester before the student teaching term. Application deadlines are October 15 for spring semester and February 15 for fall semester. To be accepted for student teaching, students must

1. attain a cumulative GPA of 2.50 or higher in required professional education course work;
2. complete all required professional education course work other than one preapproved course that can be taken concurrently with student teaching; secondary education students must also receive approval from their academic specialization advisors);
3. remove all academic deficiencies such as grades of "D," "E," or "F" before placement; and
4. attain a final approval from the Office of Professional Field Experiences. This review considers performance in field settings and academic achievement.

Certification for Teaching

The curricula for both the undergraduate and postbaccalaureate teacher education programs meet the requirements for teacher certification in the State of Arizona.

In addition to the course requirements specified in this catalog, there are other requirements for teacher certification mandated by the State of Arizona including the U.S. Constitution and Arizona Constitution requirement. Some teaching areas have specific math, science, and fine arts requirements.

Because these requirements vary over program areas and may be changed at any time, students are encouraged to maintain close contact with the Office of Student Affairs regarding the most current state certification requirements.

The College of Education is approved by the Arizona Department of Education for the preparation of el-

ementary, secondary, and special education teachers. Students who complete an approved program of study and meet all graduation requirements of the university and the college are recommended for certification to the Arizona Department of Education. The Office of Student Affairs (EDB 7) maintains information about current certification requirements in Arizona and other states.

The College of Education also offers courses for certified teachers leading to special endorsements by the Arizona Department of Education. Of special interest are endorsements in the areas of bilingual education (BLE), early childhood education, English as a second language (ESL), middle school education, and reading. The bilingual education endorsement is required of all teachers specifically responsible for providing bilingual instruction. The English as a second language endorsement is required of all teachers specifically responsible for providing ESL instruction. Students should contact the Office of Student Affairs for information and advisement regarding teaching concentrations or special teaching endorsements.

Selected Studies in Education

An undergraduate student who is interested in a career in education other than public school teaching can elect to develop an individualized degree program. A student who wants to develop a program of selected studies must fulfill College of Education admission requirements and should contact the Office of Student Affairs for program advisement. A program of study must be filed during the first semester of a student's program and be approved by the Standards and Appeals Committee of the Division of Curriculum and Instruction. The Selected Studies major is not designed to lead to teacher certification.

Correspondence Course Work for Credit

It is the general policy of the College of Education not to accept course credit for courses in education taken through correspondence. Exceptions to this policy may be approved if the correspondence course work has been approved in advance of enrollment in the course by the student's advisor, respective program coordinator, and division

director. In all such cases, an appropriate rationale must be submitted with the request to enroll.

College of Education Graduate Program Core Courses

All 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 an understanding of the educational system is deepened.

Candidates for M.Ed. and M.C. degrees must complete courses COE 501, 504, and 505 for a total of nine semester hours. Doctoral candidates must complete COE 502, 503, 504, and 505 for a total of 12 semester hours. The core courses are offered each semester and during the summer session. Students are urged to take the core courses early in the program since these courses form the foundation on which many subsequent courses are built.

The core courses follow.

COLLEGE OF EDUCATION

COE 501 Introduction to Research and Evaluation in Education. (3) F, S, SS
Overview of educational inquiry from controlled quantitative to qualitative naturalistic. Emphasis on conducting and critically interpreting published research.

502 Introduction to Quantitative Methods. (3) F, S, SS
Topics in statistical analysis, measurement, and research design. Experimental data analysis, estimation theory, and statistical inference. Use of computers for data analysis. Cross-listed as EDP 502.

503 Introduction to Qualitative Research. (3) F, S, SS
Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory, and hermeneutics) and quantitative versus qualitative social sciences methods of inquiry. Cross-listed as EDP 503.

504 Learning and Instruction. (3) F, S, SS
Introduction to psychology of learning and instruction. Includes the foundations of learning theories and their application to educational practice. Cross-listed as EDP 504.

505 American Education System. (3) F, S, SS
Political, social, historical, and philosophical analyses of American education at all levels. Examination of primary sources, evaluations, and case studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Division of Curriculum and Instruction

Sheryl L. Santos
Interim Director
(ED 409) 602/965-1644

PROFESSORS

BERLINER B TTER, CHRISTIE,
EDELSKY, EDWARDS, FAAS,
GRYDER, HIGGINS, MOYER, PRIETO,
RAY, RUTHERFORD,
SATTEETHWA TE, SEARFOSS,
VALVERDE, WALLEN,
ZIM LES, ZUCKER

ASSOCIATE PROFESSORS

ANDERSON, ARIAS, BAKER,
BARONE, BENAVIDES, BLANCHARD,
COHEN, COHN EEDS, FALTIS
FINER, FLORES GOMEZ, GUZZETT,
HATFIELD, HUDELSON, KLEIN,
KNAUPP McCOY, MCGOWAN
Mc SAAC NELSON, PETERSON,
PIBURN RADER, ROBERTS,
SANTOS STAHL, STALEY, SURBECK,
SWISHER, THOMAS VALLEJO
WILSON, WISEMAN

ASSISTANT PROFESSORS

BLUMENFELD-JONES, DI GANGI,
K NARD, SERNA

PROFESSORS EMERITI

ABRAHAM, ARMSTRONG, AXFORD,
BATCHELOR BELGARDE, J.E BELL
J.W BELL, M. BELL, BOYD, BROOK
CHASEY, CHRISTINE, COOK,
CROUCH DOYLE DUDEK, FRASIER
FULLERTON GILL, GRIFFITH,
HAGGERSON, HARDT, HOOVER,
JACOBS, JEL NEK, JONES, KAMINS
KIESOW K NGSBURY, KOZACIK,
LAMM, LEE, MALONE, MANERA,
McGRATH, MITCHELL MOORE,
O BEIRNE, O'BRIEN, OLMSTED,
PODLICH, R CE, SCHALL
SHOFSTALL, SILVAROLI, STEERE
SULLIVAN, SUNDWALL,
VEATCH, WAMACKS

Program Areas

Adult Education*
Early Childhood Education
Educational Media and Computers
Elementary Education
Multicultural Education
Reading and Library Science*
Secondary Education
Special Education

* Applications are not being accepted in
Adult Education or Library Science

Degrees: B A.E., M.A , M Ed., Ed.D.,
Ph.D.

The Division of Curriculum and Instruction offers undergraduate and graduate academic programs. The undergraduate programs are designed to prepare persons to teach effectively in early childhood, elementary, secondary, and special education settings. Concentrations available at the undergraduate level include bilingual education, English as a second language (ESL), Indian education, and multicultural education. Programs in special education lead to Arizona teacher certification in the mentally handicapped, emotionally handicapped, learning disabilities, and early childhood education for the handicapped areas. Programs of study leading to special endorsements by the Arizona Department of Education are early childhood education, bilingual education (BLE), English as a second language (ESL), middle school education, and reading.

Postbaccalaureate programs leading to teaching certification are available in early childhood, elementary, secondary, and special education areas. The graduate programs in this division are designed to prepare persons for roles such as master teachers, educational leaders, researchers, media and computer specialists.

Faculty within the division are engaged in research and professional training projects. Graduate students have opportunities to participate in varied teaching, research, and professional training (on- and off campus) activities.

CURRICULUM AND INSTRUCTION

DCI 302 Principles and Applications of Effective Instruction. (3) F, S

Principles of teaching identified by research on teaching effectiveness. Application of principles to classroom practice. For majors only. Prerequisite: EDP 303

303 Classroom Organization and Management. (2) F, S

Develop understanding and application of classroom organization and management principles, strategies, and procedures. For majors only. Prerequisites: EDP 301, 303; SPF 301

396 Field Experience I. (0) F, S

First semester PTPP. Observation and imitated participation in a school setting. Focus on observation of development, learning management, instruction, assessment, and motivation. 4 clock hours required per week. Corequisite: semester I of the PTPP.

397 Field Experience II. (0) F

Second semester PTPP. Observation and imitated participation in a school setting. Focus on observation of development, learning, management, instruction, assessment, and motivation. 6 clock hours required per week. Corequisite: semester I of the PTPP.

701 Curriculum Theory and Practice. (3) F, S

Curriculum theory and practice as a field of study. Its current orientations and applications. Modes of inquiry, and community of scholars and practitioners. Seminar. Corequisite: Master's level curriculum course.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Adult Education Program Area

ADULT EDUCATION

AED 510 Introduction to Adult Education. (3) N

Historical development, core content, and principal areas of adult education.

511 Program Development in Adult Education. (3) N

An andragogical approach to planning programs for adults. Emphasis on agencies.

512 Characteristics of Adult Learners. (3) N

Characteristics of the adult learner throughout the life span.

566 International Adult Education. (3) A

Review and comparison of adult education programs and facilities in selected countries.

Omnibus Courses:

See page 44 for omnibus courses that may be offered.

Early Childhood Education Program Area

EARLY CHILDHOOD EDUCATION

ECD 308 Foundations of Early Childhood Education. (3) F, S

The foundational basis of the early childhood field, including historical roots, current theories, professional options, and policy developments at national, state, and local levels.

310 Educational Environments: Infants/Toddlers. (3) F, S, S

Organizing, planning, and implementing developmentally appropriate educational practices to provide optimal learning environments for infants and toddlers in group settings.

311 Social Studies in Early Childhood Education. (3) F

Development of democratic living in all areas of the curriculum. Objectives, problem solving, selection of content, scope and sequence, construction of instructional materials and resources. Experiences with children.

312 Educational Environments: Preschool-Kindergarten. (3) F, S

Considers aspects of curriculum philosophy, principles, practices, problems, and evaluation in the integrated-experience program.

314 The Developing Child. (3) F S SS
Provides a base for understanding and working with young children. Examines all aspects of development of children, birth through age eight, with implications for teachers and parents.

322 Communication Arts in Early Childhood Education. (3) F
Factors affecting language development. Setting conditions for learning in listening, speaking, reading, and writing. Prerequisite: ENG 213 or equivalent.

378 Practicum in Early Childhood Development. (3) F, S
Provides a field-based experience in selected early childhood settings (outside the public schools prior to student teaching). Prerequisite: ECD 314.

401 Instructional Strategies: Social Studies and Creative Arts. (3) F S
Presents materials, techniques, and resources for a balanced program of social studies and aesthetic expression appropriate for children in preschool through 3rd grade, with emphasis on the integrated curriculum. Corequisites: ECD 402, 496; RDG 401, 402.

402 Instructional Strategies: Math and Science. (3) F, S
Emphasizes developmentally appropriate educational strategies and instructional techniques in teaching mathematics and science to children (preschool through 3rd grade) within an integrated curriculum approach. Prerequisites: B O 100; MAT 114 or 117 or equivalent, MTE 180 or equivalent. PHS 110 or equivalent. Corequisite: ECD 401, 496; RDG 401, 402.

404 Language Arts. (2) F S
Presents theory on the social nature of oral and written language and congruent classroom practices. Prerequisites: DC 396, EDP 301, 303; SPF 301. Corequisites: DCI 303, 397; EDP 302. EMC 300.

411 Early Childhood Education: Programs and Materials. (3) F, S SS
Principles, experiments, research studies and recent trends as factors related to the education of children through age eight. Prerequisite: ECD 312 or equivalent.

496 Field Experience. (0) F S
Application of course content in a preschool through 3rd grade setting. Emphasis on observation, focus on child-centered curriculum, planning and delivering instruction, and assessment. Corequisites: ECD 401, 402. RDG 401, 402.

521 Primary/Elementary Communication Arts in Bilingual Education. (3) SS
Examination of bilingual/biterate development of elementary school children, bringing together native and second language, oral language and literacy development findings with educational practices. Lecture, lab. Cross-listed as BLE 521. Prerequisite: BLE 511.

522 Developmental Social Experiences in Early Childhood Education. (3) F
Materials, techniques, aesthetic expression, creative activities, and values in the integrated curriculum. Prerequisite: ECD 311 or equivalent.

525 Communication Arts in Early Childhood Education. (3) S
Problems and trends of current programs and oral language development. Effort to bring together language acquisition findings with educational practices. Opportunity for self-directed learning/study. Prerequisite: ECD 322 or equivalent.

527 Mathematics in Early Childhood Education. (3) F
Theory and practice in the use of manipulative materials for teaching mathematics to preschool and primary grade children. Prerequisite: ECD 402 or EED 380 or 402 or equivalent.

544 Play Education. (3) S SS
Theories of play and the educational implications of each. Practical applications at the early childhood level.

555 Modern Practices in Early Childhood Education. (3) F SS
Trends and practices, instructional and resource materials and methods and techniques in early childhood education.

733 Social and Emotional Development. (3) A
Inquiry into the social and emotional development dynamics in children such as peer relationships, self-concept, and parenting processes with implications for teachers.

744 Evaluative Procedures: Young Children. (3) S
A critical examination and use of developmentally appropriate evaluative procedures for children from birth through age eight.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

506 Information Processing for Business and Vocational Teachers. (3) SS
Development of curriculum and strategies for teaching information processing; hardware software evaluation and equipment acquisition techniques in business and vocational education.

512 Technology in Business and Vocational Education. (3) SS
Emerging curricula and instructional technology in business and vocational education.

515 Distributive Education. (3) F
Planning, organizing, and implementing marketing and distributive education programs in secondary schools and community colleges.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

EDUCATIONAL MEDIA AND COMPUTERS

EMC 300 Computers in Education. (1) F, S
An introduction to word processing, databases, spreadsheets, teacher utility programs and evaluation of educational software. Required for Education majors.

321 Computer Literacy. (3) F S SS
Survey of the role of computers in business and education. Emphasis on word processing, database, and spreadsheets. *General studies: N3.*

323 Computer Applications. (3) F, S
Introduction to computer applications such as HyperCard, Telecommunications, Authoring Languages, and Expert Systems. Lecture, lab. *General studies: N3.*

455 Animation and Special Effects. (3) F
An examination of the art, science, and impact of an animation and other special effects used in film.

502 Current Issues and Problems in Media/Computer Education. (3) F
Critical analysis of current practices in instructional media/computer.

505 Amiga Technology. (3) F
The Amiga computer as a multimedia system. Graphics and animation with Deluxe Paint V and authoring with Amigavision. Lecture, lab.

506 Amiga Animation. (3) F
The Amiga computer as an animation system. Creating an animation using a wide range of 2-D and 3-D technologies. Lecture, lab. Prerequisite: EMC 505.

507 Computers in Educational Administration. (3) F S
Survey of computer use and applications in educational administration. Lecture, lab. Cross-listed as EDA 507.

511 Computer Applications in Education. (3) F, SS
Use and evaluation of computers for word processing, information management, graphics, and authoring instruction in educational settings.

513 Introduction to Multimedia. (3) F
Introduction to multimedia, emphasizing applications for business, industry, and public and higher education.

521 Instructional Media Design. (3) F, S
Preparing specifications for instructional television, film, slide/tape programs and computer-based instruction.

Educational Media and Computers Program Area

BUSINESS EDUCATION

BUE 480 Teaching Business Subjects. (3) S
Organization and presentation of appropriate content for business subjects in the secondary school.

501 Principles of Business Education. (3) F
History, philosophy, principles and objectives of business and distributive education.

502 Organization and Management of Co-operative Programs. (3) F
Work-study programs for business occupations in high schools and community colleges.

503 Competency-Based Business and Vocational Education. (3) S
Development and administration of competency-based individualized programs in business and vocational education.

505 Current Literature in Business and Vocational Education. (3) S
Critical analyses, generalizations, and trends in business and vocational education.

522 Evaluating Computer Materials. (3) S, SS

Select on utilization, design, and evaluation of instructional computer materials

523 Telecommunication for Instruction. (3) F

Instructional uses of satellite teleconference, and electronic networks for distance learning

524 Imaging Technology. (3) F

Use of optical scanning and digital data manipulation of photographs for use in educational presentations and publications

525 Presentation Graphics. (3) S

Design, production and display of computer graphics for group presentations Prerequisite: EMC 521 or instructor approval

527 Instructional Television. (3) F

Design and production of instructional programs for television. Lecture, lab Prerequisite: EMC 521 or instructor approval

528 Advanced Photographic Media Production. (3) S

Design and production of multimedia instructional programs Emphasis on slide tape format Lecture, lab. Prerequisite: EMC 521 or instructor approval

530 Development of Computer-Based Instruction. (3) S

The systematic design development and formative evaluation of computer based instruction Prerequisite: EMC 511 or instructor approval

531 Hypermedia. (3) F

The application of HyperCard and other support software in the design and production of instructional computer-based materials for business industry and public and higher education Lecture lab

532 Desktop Publishing. (3) F, S, SS

Design and production of educational materials using computer based word processing, graphics, and page layout programs Lecture lab

535 Interactive Video. (3) S

The use of various authoring systems and support programs to assist in the design and production of regular and repurposed interactive video. Lecture lab

584 Educational Media Internship. (1-6) F, S, SS

Prerequisites: EMC 521; LNT 502 instructor approval

637 Computers in Elementary School Curriculum. (3) SS

Experiences with educational uses of computers, computer awareness family/societal impact classroom applications/software and curriculum development

701 Advanced Technologies in Education. (3) S

Examining the role and impact of artificial intelligence, expert systems, and related advanced technologies in education

702 Research in Technology-Based Education. (3) F

Critical exposure to theories research, and methods in technology based education.

Omnibus Courses: See page 44 for omnibus courses that may be offered

Elementary Education Program Area

ELEMENTARY EDUCATION

EED 320 Teaching Science to Children. (3) F, S, SS

Develops students' personal philosophies of the nature of elementary school science; why teach science and how children learn science Knowledge and skills in planning instruction using instructional models integrating the curriculum employing current science programs and materials and evaluating children's learning Prerequisite: A basic biology and physical science course. Limited to students admitted to the postbaccalaureate certification program

333 Communication Arts in the Elementary School. (3) F, S, SS

Factors affecting language growth Setting conditions for teaching oral and written language. Limited to students admitted to the postbaccalaureate certification program

344 Elementary School Organization and Management. (3) F, S, SS

Overall program of the elementary school Practical approaches to discipline and to planning organizing and managing the classroom Limited to student admitted to the postbaccalaureate certification program

355 Social Studies in the Elementary School. (3) F, S, SS

Methods and materials for teaching Social Studies in the elementary grades limited to students admitted to the postbaccalaureate certification program

366 Observation and Participation. (1-3) F, S, SS

Students observe and work directly with elementary children in a classroom situation includes a critical evaluation Limited to students admitted to the postbaccalaureate certification program

380 The Teaching of Mathematics in the Elementary School. (3) F, S, SS

A beginning course in methods and materials used Laboratory experiences and computer applications with curriculum materials Classroom observation required Limited to students admitted to the postbaccalaureate certification program Prerequisite: MTE 180 or equivalent

400 Principles of Effective Instruction in Elementary Education. (3) F, S, SS

Principles and models of teaching defined by research on instructional effectiveness Application of principles to classroom practice in elementary schools Prerequisite: PTPP admission

401 Teaching Science and Social Studies to Children. (4) F, S

Examines core functions processes concepts, materials goals, objectives, scope and sequence, unit and lesson planning and models of instruction Corequisites: EED 402 404, 496 RDG 401 402

402 Teaching Strategies in Mathematics. (2) F, S

Strategies and methodologies of teaching elementary mathematics integrating modern technologies problem solving, manipulative current research and learning theories Prerequisite: MAT 114 or 117 or equivalent MTE 180 or equivalent Corequisites: EED 401 404 496, RDG 401, 402 or SPE 412 413 496

404 Language Arts. (2) F, S

Presents theory on the social nature of oral and written language and congruent classroom practices. Corequisites: EED 401 402 496 RDG 401 402

478 Student Teaching in the Elementary School. (3-15) F, S

Supervised teaching in the area of specialization A synthesized experience in curriculum, instruction, and classroom management Prerequisites: 2.50 GPA; completion of professional course sequence approval of Professional Field Experiences

496 Field Experience. (0) F, S

Application of course content in a (K-8) school classroom Emphasis on observation of pupil management planning and delivery of instruction and assessment Corequisites: EED 401, 402, 404 RDG 401, 402.

511 Principles of Curriculum Development. (3) F, S, SS

Contemporary curriculum theories Curriculum as an interrelated entity. Principles of conception and effecting change.

526 Communication Arts in the Elementary School. (3) S, SS

A critical examination of school language arts teaching, focusing on theoretical assumptions regarding oral and written language development

528 Social Studies in the Elementary School. (3) F, S, SS

Problems and trends of current programs Development of a balanced and articulated program of social studies Prerequisite: EED 355 or equivalent

529 Science in the Elementary School. (3) S

Problems and trends of current programs. Development of a balanced and articulated science program Prerequisite: EED 320 or equivalent

530 Outdoor Education. (3) SS

Use of various outdoor settings as laboratories for classroom related experience study, observational inquiry research, and recreation.

537 Mathematics in the Elementary School. (3) F, S, SS

Contemporary mathematics teaching Content materials and approaches to instruction Prerequisite: EED 380 or 402 or equivalent

578 Student Teaching in the Elementary School. (9-15) F, S

Supervised teaching for postbaccalaureate students synthesized experience in curriculum instruction, and classroom management Prerequisites: completion of 21 hours of denoted course work from an approved program of study a GPA of 2.50 (postbaccalaureate degree) or 3.00 (postbaccalaureate degree) approval of Professional Field Experience

581 Diagnostic Practices in Mathematics. (3) F, S

Specific skills in diagnosing/treating children's learning difficulties in mathematics. Includes practical experiences both on and off campus, identify strengths/weaknesses and in total remediation. Prerequisite: EED 380 or 402 or instructor approval.

585 Contemporary Issues in Elementary Education. (3) S, SS

A seminar which develops an understanding of a broad range of contemporary issues. Assists in establishing an informed professional view. Prerequisite: EED 511 or equivalent.

670 Qualitative Research in Elementary Education. (3) S

Survey of ethnographic and naturalistic studies of teacher microethnographic and sociolinguistic studies of classroom interaction ethnographies of elementary schooling. Prerequisite: COE 503.

720 Language in Education. (3) A

Sociolinguistic seminar on language issues in education, including language acquisition, classroom interaction, language attitudes, relation to language, and class-gender ethnicity.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Multicultural Education Program Area

BILINGUAL EDUCATION

BLE 400 Principles of Instruction in Language Minority Education. (3) F, S
History, theory, and practice of educating bilingual and ESL students. Addresses second language acquisition, program models, methodology, policy research, and linguistic diversity. Lecture/discussion. Prerequisite: PTPP admission.

401 Teaching Science and Social Studies to Children. (4) F, S

Introduction of teaching strategies to be utilized in working in bilingual/ESL classroom settings. Corequisites: BLE 402, 405, 406, 407, 496.

402 Teaching Strategies in Mathematics. (2) F, S

Introduction and implementation on concepts for teaching mathematics to minority language populations. Prerequisites: MAT 114 or 117 or equivalent. MTE 180 or equivalent. Corequisites: BLE 401, 405, 406, 407, 496.

405 Teaching Reading in BLE/ESL. (3) F, S

Teaching reading in BLE/ESL settings. An integrated classroom curriculum and literature-based instruction will be emphasized. Strategies for teaching decoding (phonics), vocabulary, comprehensions, study skills, and area reading are also included. Prerequisite: ENG 213 or equivalent. Corequisite: BLE 406.

406 Reading Practicum. (3) F, S

Supervised school-based experience in teaching reading to bilingual/ESL students. Prerequisite: ENG 213 or equivalent. Corequisite: BLE 405.

407 Language Arts. (2) F, S

Theory of the social nature of oral and written language and congruent classroom practices for students preparing to teach bilingual and ESL students. Corequisites: BLE 401, 402, 405, 406, 496.

478 Student Teaching in the Elementary School. (3–15) F, S

Supervised teaching in the area of specialization. A synthesized experience in curriculum instruction and classroom management in a bilingual education/ESL setting. Prerequisites: 2.50 GPA, completion of professional course sequence; approval of Office of Professional Field Experiences.

496 Field Experience. (0) F, S

Application of course content in a bilingual ESL school setting. Emphasis on observation, pupil management, planning and delivering instruction, and assessment. Corequisites: BLE 401, 402, 405, 406, 407.

511 Introduction to Language Minority Education. (3) A

Historical, philosophical, theoretical, and pedagogical foundations of language minority education in the United States.

514 Bilingual/Multicultural Aspects of Special Education. 3 S

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

515 Instructional Methods for Bilingual Students. (3) F, S

An introduction to general dual language teaching approaches. Focuses on the effective teaching of limited English proficient populations. Prerequisite: BLE 511.

516 Teaching Strategies for Native American ESL Programs. (3) A

Includes instructional activity development, cultural characteristics, and infusion of culturally relevant content in ESL programs. Instruction. Prerequisite: BLE 511.

520 ESL For Children. (3) S

Examines approaches to second language development for children congruent with recent research in second language acquisition in children. Prerequisite: BLE 511.

521 Primary/Elementary Communication Arts in Bilingual Education. (3) S

Examination of bilingual biterate development of elementary school children bringing together native and second language, oral language, and literacy development findings with educational practices. Cross-listed as ECD 521. Prerequisite: BLE 511.

522 Literacy/Biliteracy Development. 3 S

Examines approaches to first and second language reading and writing for bilingual second language learners from a whole language perspective. (Spanish-English emphasis). Prerequisite: BLE 511.

528 Social Studies for Bilingual/ESL Teachers. (3) S

Provides language and instructional methodology relevant to bilingual multicultural students in social studies content delivered in Spanish and English. Prerequisite: BLE 511.

533 Reading-Teaching Bilingual Students. (3) F, S

Acquaints teachers with a socio-psycholinguistic perspective on first and second language reading and with strategies for reading development (Spanish/English emphasis). Prerequisite: BLE 511.

535 Sociolinguistic Issues in Bilingual Education. (3) F

Survey of major theoretical issues e.g. language situations, communicative competence, language attitudes, interacting language social processes and bilingual education. Prerequisite: BLE 511.

541 Nature of Bilingualism/Second Language Acquisition. (3) A

Bilingual and second language acquisition with emphasis on children and adolescents. Cognitive social and cultural aspects will be stressed. Prerequisite: BLE 511.

543 Bilingual Education Models. (3) A

Bilingual education programs in other countries analysis of political, social, economic and educational implications, practice in planning bilingual education curricula. See also offerings under MCE, SED, SPE, and SPF. Prerequisite: BLE 511.

561 Parent Involvement in Language Minority Education Programs. (3) F, S

Examines issues, approaches and strategies for improving parental and community involvement in the schooling of language minority children and youth. Prerequisite: BLE 511.

580 Practicum. (1–6) F, S

Provides for practical application in school settings of principles of bilingual education or English as a Second Language. Specific permissions required.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

INDIAN EDUCATION

IED 411 Foundations of Indian Education. (3) F, S

Historical development of Indian affairs and Indian education, including contemporary educational issues, traditional concepts of education, and Indian cultures.

422 Methods of Teaching Indian Students. (3) F

Philosophies, methodologies and materials used in Indian education. Examination of local and tribal classroom materials. Experimentation with new teaching concepts. Prerequisite: ED 411.

424 Curriculum and Practices for Indian Education. (3) S

Curricular philosophies and research in Indian education. Techniques for curriculum development, change and improvement. Prerequisite: ED 411.

433 Counseling the Indian Student. (3) A

Techniques and methods used in counseling with emphasis on understanding and cultural values. Experimentation with new counseling concepts. Prerequisite: IED 411.

490 Problems of Teachers of Indian Students. (3) S

Current issues, trends and problems encountered by teachers. Viable solutions discussed. Research reviewed and evaluated. Prerequisite: ED 411.

500 PS: Administration and Management of Indian Education Programs. (3) A

Examination of administrative and programmatic practices related to the schooling of American Indian populations.

502 PS: Development of Indian Cultural and Language Materials. (3) A

Provides a cultural/language approach to curriculum development. Examination of instructional materials used in American Indian bilingual education programs.

630 Research in Reading. (3) F

For advanced graduate students interested in applied research problems, literature of reading instruction, and major issues related to reading research. Prerequisite: instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Secondary Education Program Area

HUMANITIES EDUCATION

HUE 101 Ideas and Values in the Humanities. (4) F, S

Interrelation of architecture, literature, music philosophy religion, theatre, and other performing arts in the modern world. 2 hour lectures, 2 hour discussion meetings per week. *General studies HU*

102 Ideas and Values in the Humanities. (4) F, S

See HUE 101. *General studies HU*

118 Encountering the Arts. (3) F, S
Introductory course emphasizing personal contacts with the fine and performing arts. Attendance of a wide range of events, with analysis and evaluation.

130 Introduction to Popular Culture. (3) F, S

Reflections of American values in 20th-century popular arts: Music, print, art, television, radio, movies, and the aesthetics of popular culture. *General studies HU*

401 Humanities in World Cultures. (3–6) N
A humanities study program of foreign travel. Fine and performing arts of the various world cultures. May be repeated for credit. Prerequisite: instructor approval.

480 Methods of Teaching the Humanities. (3) N

Methods of instruction organization, discussion and presentation of the courses in the interdisciplinary humanities. Prerequisites: HUE 101 and 102 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

SECONDARY EDUCATION

SED 400 Principles of Effective Instruction in Secondary Education. (3) F, S, SS

Different modes of education are examined. Appropriate teaching practices for each mode are developed and applied to secondary school classrooms. Lecture, discussion. Prerequisite: PTPP admission.

403 Principles, Curricula, and Methods. (3) F, S, SS

Advanced level of development of knowledge and skills of instructional planning and methods of teaching and evaluating in the secondary school. Observation/participation required. Corequisite: SED 496.

478 Student Teaching in the Secondary Schools. (3–12) F, S

The practice of teaching. The relationship of theory and practice in teaching. Prerequisites: SED 403, special methods; approval of Office of Professional Field Experiences.

480 Special Methods of Teaching Social Studies. (3) F, S

Interdisciplinary approaches; production and collection of materials.

496 Field Experience. (0) F, S

Application of course content in a secondary school setting. Emphasis on observation, pupil management planning and delivering instruction and assessment. Corequisite: SED 403.

501 Introduction to Effective Instruction. (6) F, S, SS

Introductory course for postbaccalaureate certification program in secondary education. Emphasis upon developing basic classroom management instruction, and evaluation. Includes a field assignment of at least 120 hours. Prerequisite: admission to postbaccalaureate certification program.

522 Secondary School Curriculum Development. (3) F, S, SS

Social processes: issues, principles, patterns and procedures in curriculum development.

533 Improving Instruction in Secondary Schools. (3) F, S, SS

Analyses of procedures, methods, techniques, and experiments in teaching in secondary schools. Prerequisites: SED 478, 578.

577 Issues and Trends in Secondary Education. (3) N

Analyses of current and professional reports, problems and issues in American secondary education. Prerequisites: SED 478, 578.

578 Student Teaching in the Secondary Schools. (3–12) F, S

The practice of teaching. The relationship of theory and practice in teaching. Postbaccalaureate students only. Prerequisites: completion of approved postbaccalaureate program; minimum 2.50 GPA; approval of Office of Professional Field Experiences.

588 Human Relations in the Secondary Schools. (3) A

Problems in human relations inherent in the interaction of pupils, teachers, administrators, nonprofessional staff, and laymen. Prerequisites: SED 478, 578.

711 Secondary Curriculum Development. (3) S, SS

Theories and processes of developing curriculum: evaluation of research. Prerequisites: SED 478, 522 (or equivalent), 578.

722 Improvement of Instruction in the Secondary School. (3) F

Evaluation of the research; issues and theories related to the improvement of instruction. Prerequisite: SED 533.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Special Education Program Area

SPECIAL EDUCATION

SPE 311 Orientation to Education of Exceptional Children. (3) F, S, SS

Includes gifted, mildly handicapped, severely handicapped, and the bilingual/multicultural exceptional child. *General studies: SB.*

312 Mental Retardation. (3) F, S, SS

Characteristics and assessment specific to mental retardation. Terminology, development, educational programming, and therapeutic procedures will be emphasized. Prerequisite: SPE 311.

314 Introduction to Bilingual/Multicultural Special Education. (3) F, S, SS

Theoretical background and practical application of general issues regarding the education of bilingual/multicultural handicapped children. Prerequisite: SPE 311.

336 Behavioral and Emotional Problems in Children. (3) F, S, SS

Characteristics and assessment specific to emotional and behavioral disturbed children. Terminology, development, and educational programming emphasized. Prerequisite: SPE 311.

361 Introduction to Learning Disabilities. (3) F, S, SS

Characteristics and assessment specific to learning disabilities. Terminology, development and educational programming emphasized. Prerequisite: SPE 311.

411 Parent Involvement and Regulatory Issues. (3) F, S

Emphasis on parent and school relations through effective communication and state and federal regulations impacting services for the handicapped. Prerequisites: SPE 311; major on y.

412 Evaluating Exceptional Children. (3) F, S

Normative and criterion-referenced diagnostic techniques, including formative evaluation. Emphasis upon application. Daily practicum required. Prerequisites: DC 396, EDP 303, EED 404, EMC 300, RDG 401 and 404; SPE 311. Corequisites: EED 402, SPE 413, 496.

413 Methods in Language, Reading, and Arithmetic for Exceptional Children. (3) F, S

Methods, techniques and materials for use in prescriptive teaching. Daily practicum required. Prerequisites: DC 396, EDP 303, EED 404, EMC 300, RDG 401, 404. SPE 311. Corequisites: EED 402; SPE 412, 496.

414 Methods and Strategies in Behavior Management. (3) F, S

The organization and delivery of instruction, including formative evaluation techniques. Techniques of behavior management. Daily practicum required. Prerequisites: RDG 401, 402; SPE 412, 413. Corequisites: SPE 415, 496.

415 Social Behavior Problems of Exceptional Children. (3) F S

Analysis and intervention on into social behavior problems of exceptional populations. Daily practicum required. Prerequisites: RDG 401, 402. SPE 412, 413. Corequisites: SPE 414, 496.

455 Early Childhood and the Handicapped. (3) F

Early childhood education as it applies to the handicapped child.

478 Student Teaching in Special Education (3–15) F S

"Y" grade on y. Prerequisites: approval of special education program coordinator. Completion of specified prerequisites in special education.

496 Field Experience. (0) F S

Application of course content in a special education setting. Emphasis on observation, pupil management, planning and delivering instruction, and assessment. Corequisites: SPE 411 (or 413), 412, 414, 415.

511 The Exceptional Child. (3) F S, SS

Educational needs of exceptional children and adults. Not recommended for students who have completed SPE 311.

512 Individuals with Mental Retardation. (3) F SS

Etology, 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.

513 Teaching Students with Mental Retardation. (3) N

Specific methods, materials and curriculum for students with mild or moderate retardation. Prerequisite: SPE 312 or 512.

514 Bilingual/Multicultural Aspects of Special Education. (3) S

Theories and issues related to the education of bilingual and culturally diverse exceptional children.

515 Methods for the Remediation of Learning Problems of Exceptional Children. (3) S SS

Methods and materials for remediation of the basic academic problems of exceptional children. Prerequisite: SPE 511, a methods course in the teaching of reading and mathematics.

522 Academic Assessment of Exceptional Children. (3) F

Normative and criterion-referenced assessment of learning problems in exceptional children. Formative evaluation included. Practicum required. Lecture/practicum. Prerequisites: SPE 311 or 511, elementary methods courses; program approval.

523 Prescriptive Teaching with Exceptional Children. (3) F

Language, reading and arithmetic methods, techniques and materials used in individualized instruction. Practicum required. Lecture/practicum. Prerequisites: elementary methods courses. SPE 311 (or 511), 522 or concurrent and program approval.)

524 Effective Classroom Behavior Management. (3) S

Organization and delivery of instruction including formative evaluation and techniques of academic behavior management for exceptional children. Practicum required. Lecture/practicum. Prerequisites: SPE 311 (or 511), 522, 523 and program approval.

525 Social Behavior Interventions. (3) S

Analysis and intervention on into social behavior problems of exceptional students. Focus on strategies to change maladaptive social behavior. Practicum required. Prerequisites: SPE 311 or 511 or 522 or 523, program approval.

531 Behavior Management Approaches with Exceptional Children. (3) F SS

Behavior management approaches for classroom behavior of exceptional children. Prerequisite: SPE 511 or equivalent.

536 Characteristics of Children with Behavioral Disorders. (3) F SS

Variables contributing to behavior patterns of behaviorally disordered children.

538 Methods of Teaching Students with Behavioral Disorders. (3) N

Development of methods for managing the academic and social behavior of behaviorally disordered children and youth in educational settings. Prerequisite: SPE 336 or 536.

551 Teaching Young Children with Special Needs. (3) S

Methods, materials and curriculum for preschool and primary-aged children with special needs. Prerequisites: SPE 455 and 511 or equivalents.

552 Management of Individuals with Severe Handicaps. (3) S

Instruction and management of school-aged and adult individuals with severe physical, or multiple handicaps. Prerequisites: SPE 511 or equivalent, instructor approval.

553 Developmental/Functional Assessment. (3) F

Teacher-focused developmental functional assessment of preschool and severely physically and multiply handicapped individuals. Field experience required. Prerequisites: SPE 511 and 512 and 574 or equivalents.

554 The Parent/School Partnership. (3) S

Includes knowledge and procedures for involvement and training of parents and caregivers of preschool and severely handicapped individuals. Field experience required. Prerequisites: SPE 455 and 511 or equivalents.

561 Characteristics/Diagnosis of Learning Disabilities. (3) F SS

Theories related to learning disabilities, including identification and characteristics.

562 Methods of Teaching Students with Learning Disabilities. (3) N

Various methods and intervention strategies for remediation of learning disabilities of children and youth. Prerequisite: SPE 361 or 561.

574 Educational Evaluation of Exceptional Children. (3) F SS

Design and statistical considerations of normative and criterion-referenced tests. Collection, recording, and analysis of data from formative evaluation. Prerequisites: SPE 511 or equivalent, a methods course in the teaching of reading and mathematics.

575 Current Issues in the Education of Exceptional Children. (3) F SS

Mainstreaming, noncategorical financing, ega-dagnostic labeling, segregation, and other critical and controversial issues related to the education of exceptional children.

577 Mainstreaming Methods. (3) S

Successful mainstreaming methods, practical problem-solving sessions related to teacher's classroom needs and individual contracts focusing on mainstreaming issues are addressed. General educators encouraged.

578 Student Teaching in Special Education. (9–15) F, S

"Y" grade on y. Prerequisites: completion of specified courses; approval by the special education program coordinator.

579 Supported Employment for Individuals with Severe Handicaps. (3) F

Emphasis on transition from school to integrated community and work settings for the severely and profoundly handicapped. Practicum required. Lecture/practicum. Prerequisites: SPE 552 and courses on severely handicapped.

582 Classroom Research with Exceptional Children. (3) S

Introduction to interpreting research. Specific research techniques with primary emphasis on classroom research. Including applied behavior analysis.

585 Creativity: Research and Development. (3) S

Nature of creativity explored in terms of philosophical underpinnings, empirical evidence, human development, self-actualization and the ecology surrounding the creative event.

586 Advising the Gifted Child. (3) A

Focus on educational planning and guidance, social and emotional development and family problem-solving regarding needs of gifted children.

587 Controversies in Educating the Gifted. (3) F

In-depth analysis of major controversies in educating the gifted, including nature/nurture, the role of mental tests and sex differences.

588 The Gifted Child. (3) F SS

Gifted children's characteristics, identification, needs, school and home environments, definitions and misunderstandings. Research by Pressey, Stanley Terman, and others.

589 Methods in Teaching the Gifted. (3) S, SS

Methods in teaching elementary and secondary school gifted children including individualized and computer-assisted instruction, team teaching. Prerequisite: SPE 588.

774 Characteristics and Causation of Exceptionality. (3) F

In-depth analysis of literature pertaining to causes of exceptionality and learning, education, personality-social and cognitive characteristics. Lecture/discussion.

775 Evaluation and Intervention in Special Education. (3) S

In-depth analysis of research and literature on evaluation procedures and intervention approaches for exceptional individuals at all age levels. Lecture/discussion.

781 Research and Evaluation in Special Education. (3) S

Issues and problems in conducting research and/or evaluation on programs involving exceptional children.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Division of Educational Leadership and Policy Studies

K. Forbis Jordan
Interim Director
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ASHE BELOK, DEMEKE DRAKE
 HUFF, MENKE, SHAFER, M. STOUT
 WARREN, WOCHNER WOOTON

Program Areas

Educational Administration and Supervision
 Education Policy Studies
 Higher Education

Degrees: M.A., M.Ed., Ed.D., Ph.D.

Programs of the Division of Educational Leadership and Policy Studies are designed to develop leaders, researchers, and policy analysts for careers in schools, colleges, and private and government agencies. Graduates are able to examine educational institutions, theories, and practices within broad economic, historical, political, and social contexts in this country and abroad.

Three basic emphases exist within the division's programs. One strand focuses on the administration and policies of educational institutions and practices from preschool through secondary education. The second strand focuses on the administration and policies of post secondary education. The third strand emphasizes inquiry into the processes by which educational policy is formulated and evaluation of policy decisions. Each strand brings together the methods and perspectives of the social sciences and the social and philosophical foundations of education.

Faculty within the division are involved in both empirical and theoretical research. Qualitative and quantitative methods 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.

The division is a member of the University Council for Educational Administration.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

EDA 501 Competency/Performance in Educational Administration. (3) F, SS

The nature of educational administration and the concept of competency as it applies to educational administration.

507 Computers in Educational Administration. (3) F, S

Survey of computer use and applications in educational administration. Lecture, lab. Cross listed as EMC 507.

510 Introduction to Organization and Administration of American Public Schools. (3) F, S

Organizational structure and administration of public education are explored through the application of legal and ethical concepts and relevant information of the social sciences. Cross listed as SPF 510.

511 School Law. (3) S

Constitutional, statutory, and case law that relates to a school personnel, pupils, the school district and other governmental units. Contracts, dismissal, tenure, retirement, pupil injuries, liability of personnel and district, school district boundary changes and bonding.

521 Evaluation of Teaching Performance. (3) F

In-depth analysis of legal basis of teacher appraisal, teacher competency measurement of teacher performance, and application of performance appraisal systems. Prerequisite: COE 504.

524 Theory and Application of Educational Administration. (3) F, SS

History and development of public school administration in the United States; current organizational patterns for public education at local, intermediate, state and national levels; current theoretical positions in educational administration.

525 Human Relations and Societal Factors in Education. (3) N

Interrelationships between problems of educational administration and interdisciplinary social sciences. Communication skills, morale, authority and perception. Concepts from political science, economics, and social psychology useful to the administrator.

526 Instructional Supervision. (3) F, S, SS

Administering curriculum improvement, in-service education, evaluating, and improving teaching competence. Administrative instructional responsibilities.

527 Managerial Functions in School Administration. (3) N

Relates to the work of the central district office staff and the school principal. Use of human resources, educational planning and organization and management of time.

538 Administration of the Community School. (3) N

Philosophy, history, organization, and operation of the community centered school. Introduction of the community education concept into a school system and making it operational.

544 Public School Finance. (3) F

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.

548 Community Relations in Education. (3) N

Administrative factors of primary importance in developing community involvement in public schools. Emphasis on theory and skills of school system and individual communication.

555 Educational Facility Planning. (3) N

School building needs, educational planning for facilities, responsibilities of architects, duties of contractors, and equipment and furnishing of school buildings.

571 School Business Management. (3) F, S, SS

Purchasing, budgeting, accounting, payroll management, auditing, financial reporting, insurance, and administration of non-teaching personnel and services.

573 School Personnel Administration. (3) S

Organization for personnel services; development of policy to govern selection or placement, remuneration, transfers, separations and development of morale among instructional and non-instructional personnel.

576 The School Principalship. (3) F

Problem and laboratory approaches used to provide application of administrative activities of elementary and secondary schools. Prerequisites: EDA 501, 526.

634 Instructional Leadership. (3) N

Current practices and processes used by instructional leaders who plan, organize and coordinate the professional activities of elementary and secondary schools. Prerequisite: EDA 526.

675 Politics of Education. (3) S

Social science theory and research are used to consider the political context of educational policy making. Prerequisite: COE 505.

676 The School Superintendency. (3) S

Critical examination of the school superintendency and the primary functions of this educational position. The duties, responsibilities, activities and problems of the school superintendent are included. The unique leadership role of the school superintendent is examined. Prerequisite: instructor approval.

679 Administration of Special Programs in Education. (1-3) N

For personnel administering special educational services; responsibilities of superintendents, principals, supervisors and directors for special education student personnel and advisory library science, and others.

711 Administrative Leadership. (3) F

Emphasis on research in leadership; application of research findings to administrative and supervisory functions in educational endeavors. Prerequisites: EDA 524, 30 semester hours in educational administration, admissions or doctorate program.

722 Administration of Instructional Improvement. (3) S

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.

733 Administrative Management. (3) S

Recent research relating to school management. School finance law, buildings transportation, food services and supply management. Prerequisites: EDA 527, 544, 571, 30 semester hours in educational administration, admission to doctoral program.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

EDUCATIONAL POLICY STUDIES

SPF 111 Exploration of Education. (3) F, S
Education as an instrument in the development of the individual and society, and its significance as an American institution.

301 Culture and Schooling. (2) F, S

For the professional teacher preparation program: an overview of the cultural, social, and political issues in which formal schooling takes place in the United States. For education majors only.

401 Theory and Practice in Education. (1) 2 F, S

For the professional teacher preparation program: The analysis and interpretation of classroom behavior from perspectives derived from philosophy, social science, and law. For education majors only.

457 Third-World Women. (3) F

Economic, sociopolitical, and demographic context for understanding the roles of third world women in health, family, work, education, and community. Cross-listed as NUR 457/WST 457. Prerequisite: 6 hours of social science credit or instructor approval. *General studies SB G*

510 Introduction to Organization and Administration of American Public Schools. (3) F, S

Organizational structure and administration of public education are explored through the application of legal and ethical concepts and relevant information of the social sciences. Cross-listed as EDA 510.

511 School and Society. (3) F, S, SS

Interrelationship of school and society and the role of education in social change.

515 Education of Women. (3) N

Analysis of roles and status of women, educational practices, and a thematic view.

520 Cultural Diversity in Education. (3) S
Philosophical and sociological investigation of cultural diversity in the United States and how it relates to education.

533 Comparative Education in the Western World. (3) N

Educational practices and traditions in the leading nations of Europe and the Soviet Union.

534 Education and Change: Developing Nations. (3) N

Education as economic and sociopolitical change agent in Africa, Asia, the Middle East, and Latin America.

543 Bilingual Education Models. (3) N

Bilingual education programs in other countries: analysis of political, social, economic and educational implications. Practice in planning bilingual education curricula.

544 Philosophical Foundations of Education. (3) F

Theories of education in ancient, medieval, and modern classical and contemporary philosophies.

566 History of Education. (3) S

Development of educational institutions and ideas in the Western World, from ancient times to the 20th century.

612 Evaluation Theory. (3) F

Explores the major theories of evaluation (inquiry leading to value judgments) in educational policy through examination of cases.

622 Theory of Educational Organizations. (3) F

An investigation of how educational organizations function and the implications of these views on role definition and performance of administrators as they design organizational processes.

711 Social and Historical Foundations of Education. (3) N

Problems of American education and the sociohistorical context.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

HIGHER EDUCATION**HED 510 Introduction to Higher Education.** (3) F

An overview of American higher education, including philosophical, political, and social aspects.

516 Management Concepts in Higher Education. (1) N

Introduction to concepts of management theory and practice.

533 The Community-Junior College. (3) F, S

History, functions, organization, and current issues. Meets Arizona community college course requirement for certification.

611 Curriculum and Instruction. (3) S

Curriculum development, instructional organization, and improvement of instruction in higher education. Prerequisite: HED 510.

644 Higher Education Finance and Budgeting. (3) S

Financial planning and budgeting in higher education institutions: issues related to financing public and private colleges and universities. Prerequisite: HED 510.

649 Law of Higher Education. (3) F

Analysis of legal issues related to higher education on examination of key court decisions. Prerequisite: HED 510.

689 Administration. (3) F

Theory and practice of administration in higher education institutions. Prerequisite: HED 510.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

**Division of Psychology
in Education**

Gail Hackett
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**REGENTS' PROFESSOR
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NICHOLS, NOBLE, SATTLER,
STAFFORD, VAN WAGENEN,
VERGIS, WRENN

Program Areas

Counseling Psychology
Counselor Education
Learning and Instructional Technology
Lifespan Development Psychology
Measurement, Statistics, and
Methodological Studies
School Psychology

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

The faculty in the Division of Psychology in Education offer graduate degrees in a number of program majors. Master's degrees are offered in Counseling Psychology, Counselor Education, Educational Psychology, and Learning and Instructional Technology. Doctoral degrees are offered in the program majors of Counselor Education (applications for the doctorate in Counselor Education are no longer being accepted), Counseling Psychology (a program accredited by the American Psy

chological Association), Educational Psychology, and Learning and Instructional Technology. In the Ph.D. program in Educational Psychology, the following concentrations are available: school psychology (a program accredited by the American Psychological Association); measurement, statistics, and methodological studies; and life span developmental psychology.

Students applying to the graduate programs in Counseling Psychology or Educational Psychology are required to submit scores on the Graduate Record Examination (GRE) The Miller Analogies Test may be substituted for the GRE in the concentrations of counselor education and educational technology. All degree programs require the successful completion of comprehensive examinations.

Additional information on graduate programs may be obtained directly from the division office. Persons requesting information should specify the program of interest.

COUNSELING PSYCHOLOGY

CPY 613 Child Counseling. (3) N
Applications of counseling theory in working with children in child and elementary schools Integrated practicum available with permission of instructor Prerequisite: CED 577 or equivalent

622 Group Counseling. (3) F, S
Theories and methodologies used in group counseling Prerequisites: CED 567 and 577 or equivalents

634 Organizational Development and Planned Change. (3) N
Organizational and individual dynamics including theory, analysis, techniques and consultation intervention strategies used in organizational development Field consultation projects. Prerequisites: CED 567 and 577 or equivalents.

644 Psychology of Careers. (3) S
Advanced career counseling including theory research and practice. Prerequisite: CED 577 or equivalent.

645 Professional Issues and Ethics. (3) F, S
Ethical, legal, and professional issues of concern to practitioners and researchers functioning in a variety of settings Prerequisites: CED 512 and 523 or equivalents

666 Comparative Theories of Personality. (3) F
Comparative analysis of personality theories in relation to counseling practices Prerequisite: CED 577 or equivalent

667 Patterns of Behavior Disorders. (3) A
Etymology and treatment of a variety of psychological problems particularly those represented in DSM-IV-R. Prerequisite: CED 577 or equivalent

670 Behavioral Counseling. (3) N
Theory, procedures, and applications of behavior modification and therapy in working with children, parents, and adult clients in school, clinic and institutional settings. Didactic instruction and analysis of individual and group problems and directed experiences Prerequisite: CED 577 or equivalent

671 Multicultural Counseling. (3) N
Provides awareness of the influence of sociocultural variables on human development and explores implications for counseling minority populations Prerequisite: CED 577 or equivalent

672 Human Diversity: Social Psychological Perspectives. (3) A
Implications for psychological practice of social, psychological and biological factors in the development of behavioral differences

674 Counseling Women. (3) F
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.

675 Counseling Interventions in Stress Management. (3) N
Theory, procedures, and application of stress management techniques including feedback meditation, relaxation, autogenic therapy visualization, and imagery Prerequisites: CED 577 or equivalent; instructor approval

677 Advanced Counseling. (3) N
Advanced topics in counseling theory research, and practice Prerequisite: CED 577 or equivalent

679 History and Systems of Psychology. (3) A
Examination of the development and differentiation of the discipline of psychology from its origins in philosophy to the present

701 Science and Practice of Counseling Psychology. (3) F
Directed experiences involving the integration of theory research, and practice in counseling psychology Prerequisite: instructor approval

702 Research Methods in Counseling Psychology. (3) A
The application of experimental and/or quasi-experimental methods to theory construction and treatment evaluation in counseling psychology Prerequisite: COE 502 or equivalent

Omnibus Courses: See page 44 for omnibus courses that may be offered

COUNSELOR EDUCATION

CED 512 Introduction to the Helping Relationship. (3) F, S, SS
Introduction to the skills used in the helping professions and an examination of the settings in which they occur.

522 Personality Development. (3) F, S, SS
Interaction of affective and cognitive factors in personality development at different age levels. Various personality theories examined

523 Psychological Tests. (3) F, S, SS
Standardized tests in the study of the individual with emphasis on test score interpretation in counseling

534 Occupations and Careers. (3) F, S, SS
The world of work, career development education and training for occupational entry and mobility

545 Analysis of the Individual. (3) F, S, SS
Theory and methods commonly used in studying the individual Observational methods, diagnostic interviews, structured, and semistructured methods for assessing personality. Prerequisite: CED 523.

567 Group Procedures. (3) F, S, SS
Social psychological factors determining interaction, effectiveness and morale in small groups Techniques of observational assessment and leadership.

577 Counseling. (3) F, S, SS
Principles and application of counseling with particular emphasis on counseling theories Prerequisites: CED 512, 534, 545 admission to M.C. or school counseling or certification program

655 Student Development Programs in Higher Education. (3) A
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

656 The American College Student. (3) A
Selected theories of human development with application to academic/sociopsychological learning tasks of postsecondary environments influences, including faculty expectations and campus subcultures

672 Marriage and Family Counseling I. (3) F
Introduction to marriage and family counseling theories. Emphasis is on a systems-community interaction model using co-counseling

673 Marriage and Family Counseling II. (3) S
Advanced analysis and application of systems community counseling Focus on marital and sexual counseling Practicum recommended

681 Supervised Practice. (3) F, S
Supervised experiences in schools or community agencies Prerequisite: instructor approval

Omnibus Courses: See page 44 for omnibus courses that may be offered.

EDUCATIONAL PSYCHOLOGY

EDP 301 Learning and Motivation in Education. (2) F, S
Using a case format, learning and motivation principles are applied to education contexts. Education majors only

302 Assessment and Evaluation in Education. (1) F, S
Using a case format, assessment and evaluation principles are applied to education contexts Education majors only.

303 Human Development. (3) F, S
Selected aspects of child and adolescent development Emphasis on possibilities for influence by teachers and parents For majors only Prerequisite: COE 232 or equivalent *General studies: L2*

310 Educational Psychology. (1-6) F, S, SS
Human behavior in educational situations presented through instructional modules Students may enroll for credit to a total of 6 hours *General studies: SB*

313 Childhood and Adolescence. (3) F, S, SS

Principles underlying total development of pre- and early adolescent children. Emphasizes on physical, intellectual, social, and emotional development with practical implications for teachers grades 5–9. Prerequisite: EDP 303 or admission to College of Education postbaccalaureate program

354 Introduction to Statistical Data Analysis in Education. (3) F, S, SS

The role of statistics in research. Tabular and graphic data presentation. Frequency distributions. Descriptive indexes and introduction to statistical inference. Prerequisite: MAT 117 *General Studies, N2*

502 Introduction to Quantitative Methods. (3) F, S, SS

Topics in statistics: analysis, measurement and research design. Exploratory data analysis. Estimation theory and statistical inference. Use of computers for data analysis. Cross-listed as COE 502

503 Introduction to Qualitative Research. (3) F, S, SS

Terminology, historical development, approaches (including ethnography, ethnomethodology, critical theory, grounded theory and hermeneutics), and qualitative versus quantitative social sciences methods of inquiry. Cross-listed as COE 503.

504 Learning and Instruction. (3) F, S, SS

Introduction to psychology of learning and instruction. Includes the foundations of learning theories and the application to educational practice. Cross-listed as COE 504

510 Essentials of Classroom Learning. (3) F, S, SS

Theoretical and empirical foundations of learning in the classroom. Critical exposure to research and method in instructional psychology. Cross-listed as LNT 510

513 Child Development. (3) F, S, SS

Examination of problems and achievements experienced by children growing up in a technological society. Emphasizes on discovering the child's perspective

514 Psychology of the Adolescent. (3) F, S, SS

Cognitive, physical, and social development of adolescents in contemporary society. Impact of family, school, and workplace on adolescent development. Prerequisite: EDP 310 or PGS 100 or equivalent

530 Theoretical Issues and Research in Human Development. (3) F

Psychological theories, research, and methods relevant to human development, emphasizing the relations between early development and later performance

532 Psychology of Exceptionality. (3) S

General psychology and theory and experimental research relevant to exceptionalities, emphasizing implications for educational programs that recognize unique learner characteristics. Fieldwork

534 Principles of Behavior Modification. (3) F

Principles of conditioning as applied to behavior modification, current research on the experimental analysis of behavior in educational psychology

540 Theoretical Views of Learning. (3) F, S

Classical and cognitive theories of learning plus recent orientations. Illustrative experiments and rational foundations. Implications for educational practice. Cross-listed as LNT 540

542 The Psychology of Learning and Instruction. (3) S

Critical review and evaluation of research on learning variables relevant to acquisition and retention of instructional materials. Lab. Cross-listed as LNT 542

543 Psychological Research on Life-Span Development. (3) S

Critical review and evaluation of contemporary research on cognitive and affective development across the life span. Prerequisite: EDP 530 or equivalent

544 Psychology of Reading. (3) N

Alternate analyses of the reading process. Designs and procedures for investigating instructional and non-instructional variables related to reading achievement

550 Introduction to Measurement in Education. (3) F, S

Nature and types of educational measures. Critiquing and selecting appropriate measuring devices. Constructing measuring devices. Social controversies about tests

551 Expository Writing and Research Heuristics. (3) F

Weekly writing practice making use of heuristic concepts and expository principles. The construction of rationales for research problems. Logic and coherence in rhetoric. Writing style appropriate to exposition

552 Basic Statistical Analysis in Education. (3) F, S, SS

Nature of educational data and statistical analysis. Frequency distributions and descriptive indexes. Introduction to hypothesis testing, ANOVA and regression.

554 Intermediate Statistical Data Analysis in Education. (3) F, S, SS

Multivariate regression, ANOVA by multiple regression, repeated measures and other designs, covariance analysis and introduction to MANOVA. Prerequisite: COE 502 or EDP 552 or passing grade on a qualifying exam

556 Data Processing Techniques in Measurement and Research. (3) S

Advancement of statistical design and measurement skills through development of data-processing techniques and usage of special programs and data-processing programs. Prerequisite: EDP 554

560 Individual Intellectual Assessment. (16) F, S

Experience in administering and interpreting individual tests. Theoretical basis for ability testing. Ethical considerations, and diagnostic use of test results. Initial enrollment 3-hour minimum. Lab experience. Prerequisites: EDP 454 and admission to a program in professional psychology or instructor approval.

562 School Psychology: Theory and Practice. (3) F

Development and present status of school psychology, including an overview of assessment and intervention strategies and professional issues

563 Interventions in School Psychology. (3) F

Examination of case-based consultation and consultation research relevant to school psychology practice. Field experience. Prerequisite: school psychology program or instructor approval

566 Diagnosis of Learning Difficulties. (3) S

Clinical diagnosis of learning difficulties, emphasizing specific academic problems. Use and interpretation of diagnostic instruments in practice. School situations. Prerequisites: EDP 560 and 562 or equivalent; instructor approval

567 School Psychological Services to Minority Students. (3) S

Historical perspectives and major issues in psychology and academic assessment and interventions with minority school children

568 Organizational Development: School Psychological Perspectives. (3) F

Applications of organizational development strategies and techniques facilitating the positive impact of schools on students' learning and social functioning.

651 Methods and Practices of Qualitative Research. (3) S

Advanced course for students familiar with theory and extant work. Topics include data collection, analysis, reporting, and an extensive fieldwork project. Prerequisite: COE 503

652 Multivariate Procedures in Data Analysis I. (3) F

Multivariate analysis of variance and covariance, multivariate multiple comparison procedures, power analysis and effect size, discriminant analysis and repeated measures analysis. Prerequisite: EDP 554 or passing score on qualifying exam

654 Multivariate Procedures in Data Analysis II. (3) S

Multivariate multiple regression, canonical correlation, factor analysis, categorical data analysis, and linear models, and structural equation models. Prerequisite: EDP 554 or passing score on qualifying exam

Omnibus Courses: See page 44 for omnibus courses that may be offered

LEARNING AND INSTRUCTIONAL TECHNOLOGY**LNT 501 Foundations of Educational Technology.** (3) F, S

Introduction to instructional development. An examination of accomplishments and problems in the field

502 Design and Development of Instruction. (3) F, S

Design, development and format evaluation of objectives-based instructional materials

503 Research Techniques for Instructional Development. (3) F

Procedures for analyzing the effects of a tentative instructional practice

504 Educational Evaluation. (3) S

Evaluation of procedures in instruction and training

510 Essentials of Classroom Learning. (3) F, S, SS

Theoretical and empirical foundations of learning in the classroom. Critical exposure to research and method in instructional psychology. Cross-listed as EDP 510

540 Theoretical Views of Learning. (3) F, S
 Classical and cognitive theories of learning, plus recent orientations. Illustrative experimental and rational foundations; implications for educational practice. Cross-listed as EDP 540.

542 The Psychology of Learning and Instruction. (3) S
 Critical review and evaluation of research on learning variables relevant to acquisition and retention of instructional materials. Lab. Cross-listed as EDP 542.

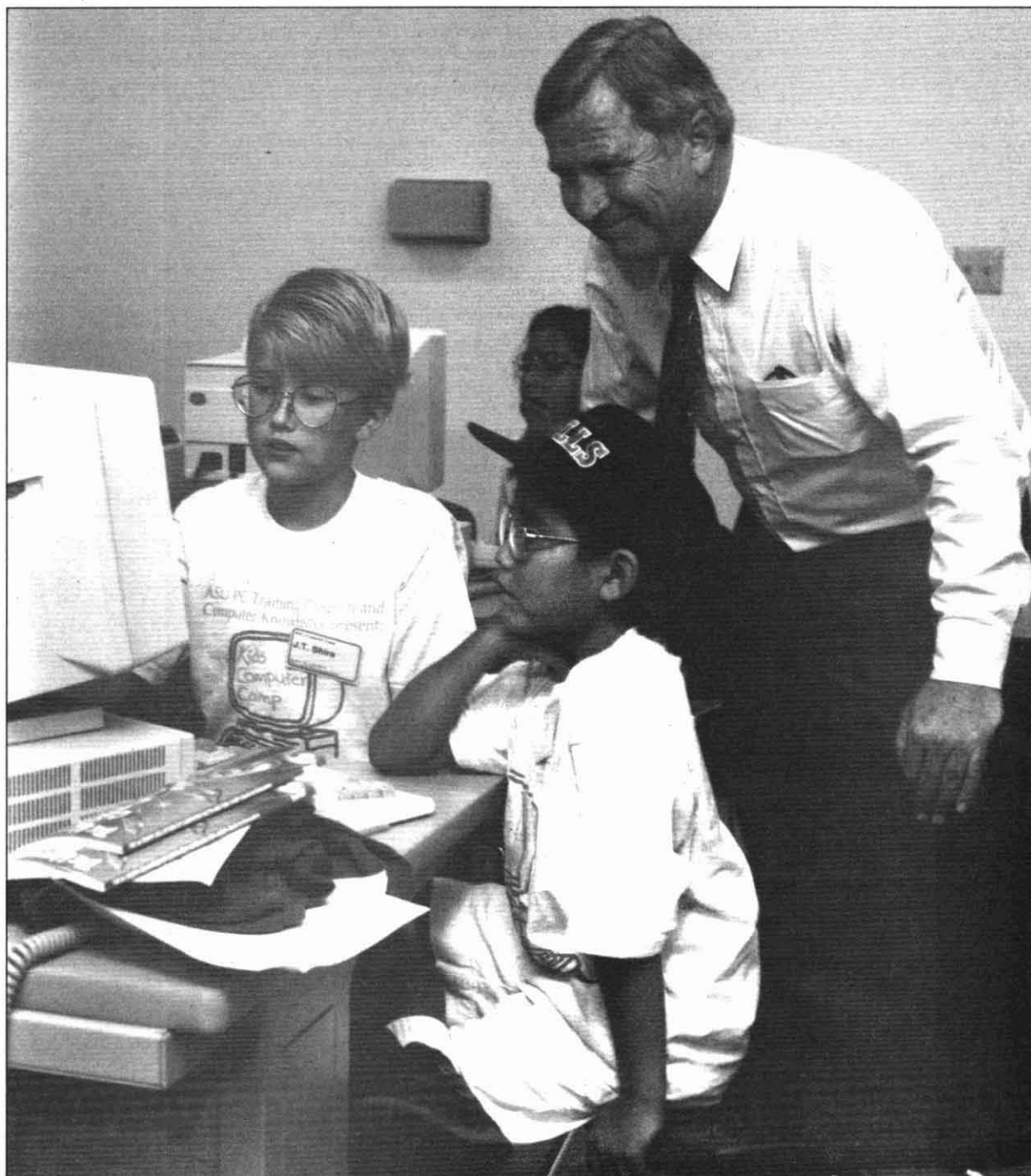
545 Cognition and Instruction. (3) F
 Current developments in research relating cognitive models to the instructional process. Seminar. Prerequisites: EDP 552; LNT 540.

584 Educational Technology Internship. (1-6) F, S, SS
 Prerequisites: LNT 501, 502; instructor approval. Pre- or corequisite: EMC 521.

780 Advanced Instructional Development. (1-3) S
 Conducting and documenting selected instructional development activities. Prerequisites: LNT 502; instructor approval.

792 Advanced Instructional Research. (3) F
 Design and execution of instructional research on selected topics. Prerequisites: LNT 503; instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.



College of Engineering and Applied Sciences

David C. Chang, Ph.D.
Dean

PURPOSE

The purpose of the College of Engineering and Applied Sciences is to provide a university education of such fundamental background and scope that a student may achieve competency in engineering, agribusiness and environmental resources, technology, computer science, or construction. Every effort is made to carry on well rounded, well integrated programs that not only give the student proficiency for a professional career but also develop character, judgment, ideals, breadth of view, and appropriate cultural attitudes. Students are taught to recognize that their professional efforts will cause change and that they must accept responsibility for the social consequences of those efforts.

ORGANIZATION

The College of Engineering and Applied Sciences is composed of the following units:

School of Agribusiness and Environmental Resources

Del E. Webb School of Construction

School of Engineering

Department of Chemical, Bio and Materials Engineering

Department of Civil Engineering

Department of Computer Science and Engineering

Department of Electrical Engineering

Department of Industrial and Management Systems Engineering

Department of Mechanical and Aerospace Engineering

School of Technology

Department of Aeronautical Technology

Department of Electronics and Computer Technology

Department of Manufacturing and Industrial Technology

The Office of the Dean administers programs in engineering special and interdisciplinary studies

Research Centers. The college is committed to becoming one of national prominence in research. In addition, it is the policy of the college to encourage exceptional upper division undergraduate students and graduate students to participate with faculty in research ac-

tivity. Most faculty are conducting research on government or industry sponsored projects. Research activities include aerodynamics, agribusiness, arid land agriculture, bioengineering, biomedical, biotechnology, CAD/CAM, computer design, computer science and applications, computer integrated manufacturing, environmental, materials science, microelectronics manufacturing, natural resource management, nuclear radiation, power systems, rotor dynamics, semiconductor materials and devices, signal processing, solar energy, solid state electronic devices, structural dynamics, structures, telecommunications, thermosciences, transportation systems, and turbine design. These activities are carried out under the academic divisions or departments listed in the following catalog material and also through the interdisciplinary research centers listed below:

Aerospace Research Center

Center for Advanced Transportation Systems Research

Center for Agribusiness Policy Studies

Center for Energy Systems Research

Center for Solid State Electronics Research

Computer Integrated Manufacturing Systems Research Center

Systems Science and Engineering Research Center

Telecommunications Research Center

Center for Professional Development. The Center for Professional Development in the College of Engineering and Applied Sciences establishes a cooperative focus with the college's academic departments and research centers to provide a wide variety of technical conferences, institutes, seminars, short courses, research briefings, and televised and satellite transmitted programs to enable engineers, scientists, and technical managers locally, nationally, and internationally to continue their lifelong learning in a constantly changing technical world.

Programs may be conducted on campus in the center's conference room, at various off-campus locations, or at company sites upon request

For more information, contact the Center for Professional Development, located in ECG 148, at 602/965 1740.

ADMISSION

Students who wish to be admitted to freshman standing in the College of Engineering and Applied Sciences should present certain secondary units that are specified in the requirements of each of the four schools. Students who have omissions or deficiencies in secondary school subject matter preparation may be required to complete additional university course work that may not be applied toward their degrees.

Students who are not admissible to programs in this college and who enroll in another college at ASU may not register for any 300 or 400 level courses in this college unless such courses are required in their degree programs and the students have the proper course prerequisites.

Entrance requirements of this college may differ from those of other ASU academic units. Students may be admitted under one of two different classifications, professional or preprofessional.

Professional Status. For admission to professional status, Arizona residents must meet one of the requirements as listed in the "Professional Status Requirements for Residents" table.

For admission to professional status, a nonresident must meet one of the requirements as listed in the "Professional Status Requirements for Nonresidents" table. In addition, an international student must satisfy minimum TOEFL score requirements as shown in the table.

Students admitted to the university by the General Education Development (GED) are required to take either the ACT or the SAT in order to be admitted to professional status.

Preprofessional Status. A student not admissible to professional status within the college but otherwise regularly admissible to ASU as stated on page 31, "Undergraduate Admission," may be admitted as a preprofessional student to any one of the departments or schools of the college. International students whose TOEFL scores do not meet the minimum required as shown in the tables below also may be admitted to preprofessional status. A student admitted into this classification follows the freshman sophomore sequence of courses as required by the chosen major. Courses are selected with the assistance of an academic advisor. After completing a minimum of 30 semester

hours of required or approved elective courses with a cumulative GPA equivalent to that required of transfer students and corresponding to the chosen major, students may apply for admission to professional status. International students must also submit a TOEFL score equivalent to that required for admission to professional status (refer to the tables below). Preprofessional students are not permitted to register for 300 and 400 level courses in the College of Engineering and Applied Sciences until their status is changed to the professional classification.

Readmission. Students applying for readmission to professional status for any program in this college must have a cumulative GPA for all college course work equal to that of the transfer admission requirements shown below. A student who does not meet these requirements may request admission to preprofessional status, subject to the restrictions shown above.

Transfer into and within the College. Students transferring into or between schools or departments within the college or from other colleges within the university must meet both the cumulative GPA requirement and the catalog requirements of the new school or department in effect at the time of transfer. Students who are transferring from an Arizona community college and have been in continuous residence may continue under the catalog in effect at the time of entering the community college.

Transfer Students. A student who contemplates transferring into this college from another institution, whether a community college or four year institution, should study carefully the sections under this college pertaining to the particular program and consult an advisor in this college before enrolling in the other institution. These steps assure a smooth transition at the time of transfer. Transfer students may request admission to either preprofessional or professional status in any of the programs offered by this college.

The minimum requirements for admission of resident, nonresident, and international transfer students to the professional program are listed in the "Professional Status Requirements for

Professional Status Requirements for Residents

School	High School Rank	Minimum Scores	
		ACT	SAT
Agribusiness and Environmental Resources	Upper 50%	22	930
Construction	Upper 50%	23	1050
Engineering	Upper 25%	23	1050
Technology	Upper 50%	22	930

Professional Status Requirements for Nonresidents

School	High School Rank	Minimum Scores		
		ACT	SAT	TOEFL*
Agribusiness and Environmental Resources	Upper 25%	24	1010	500
Construction	Upper 25%	24	1050	550
Engineering	Upper 25%	24	1050	550
Technology	Upper 25%	24	1010	500

* For international students see page 35

Professional Status Requirements for Transfer Students

School	Transfer GPA ¹		TOEFL ²
	Resident	Nonresident	
Agribusiness and Environmental Resources	2.00	2.50	500
Construction	2.25	2.50	550
Engineering	2.50	2.50	550
Technology	2.25	2.50	500

¹ The cumulative GPA is calculated using all credits from ASU and from other colleges and universities.

² For international students see page 35

Transfer Students" table. The departments and schools may impose additional admission and graduation requirements to those minimums specified by the college.

Credit is granted for transferred courses deemed equivalent to corresponding courses in the selected program of study, subject to grade and senior residence requirements. No grades lower than "C" are accepted as transfer credit to meet the graduation requirements of this college. Credits transferred from a community college or two year institution are applied only as lower-division credits. Prospective Arizona community college transfer students should consult their advisors and refer to the annual *Arizona Higher Education Course Equivalency Guide* for a listing of the acceptable courses transferable to the various college degree programs.

It should be noted that some courses taken in other colleges of this university or other universities may be acceptable for general university credit but may not be acceptable toward the degree requirements of this college. De termination of those particular courses acceptable to a specific degree program is made within the appropriate department or school with the approval of the dean.

Cooperative Education. The co op program is a study work plan of education that alternates periods of academic study with periods of employment in business, industry, and government directly related to a student's major. Students who choose this program ideally complete 12 months of employment

and graduate with both the academic background and practical experience gained from working with professionals in a chosen field.

A student in the college is eligible to apply upon completion of 45 or more hours of classes in the selected major. Certain positions may require completion of specific courses of study. Transfer students are required to complete at least one semester at ASU before beginning work. All student applicants must have a GPA of at least 2.50 and the approval of an advisor.

To maintain continuous student status in the university, each co op student must be enrolled in ASE 399 Cooperative Work Experience for one semester hour during each work session. For more information, contact the director of Student Academic Services at 602/965 5150 (ECG 115) or the Career Services office at 602/965 2350 (SSV C359).

ADVISEMENT

For assistance and counseling in planning a program of study, each student in this college is assigned a faculty advisor who is familiar with the chosen field of specialization and who must be consulted before registering each semester. The student should inform the advisor of any outside work or activity so that course loads may be adjusted accordingly.

Most students attending college find it necessary to obtain part time employment; consequently, it is suggested that a careful balance of work and class requirements be considered in order to avoid academic problems.

Students enrolled in this college may register for a maximum of 19 semester hours. Any student wanting to register for more than the maximum must petition the CEAS Standards Committee and must have an approval on file before registering for the overload.

Minority Engineering Program. The Minority Engineering Program staff is available to assist prospective, newly admitted, and continuing students with academic and professional development through a variety of support services. In addition, advisement is provided in the procurement of financial aid, scholarships, and employment.

DEGREES

Majors. Programs leading to the B.S. and B.S.E. degrees are offered by the College of Engineering and Applied Sciences, with majors in the subjects shown in the "College of Engineering and Applied Sciences Degrees, Majors, and Concentrations" table, pages 225-227. Each major is administered by the academic unit indicated.

Integrated B.S.E.-M.S. Program. To provide greater program flexibility, qualified students of the School of Engineering may undertake a program with an integrated fourth and fifth year sequence of study in one of several fields of specialization in engineering. This program provides an opportunity to meet the increasing demands of the profession for graduates who can begin their engineering careers at an advanced level.

Students admitted to this program are assigned a faculty committee that supervises a program of study in which there is a progression in the course work and in which earlier work is given application in the later engineering courses for both the bachelor's and master's degrees. Entry into the integrated program requires an application submitted to the dean through the faculty advisor and the department chair. Applications are reviewed by a school committee that recommends the appropriate action to the dean. The application may be submitted in the fifth semester.

**College of Engineering and Applied Sciences
Degrees, Majors, and Concentrations**

Major	Degree	Administered by
Baccalaureate Degrees		
School of Agribusiness and Environmental Resources		
Agribusiness Concentrations: agribusiness, computer analysis, pre-veterinary medicine	B.S.	School of Agribusiness and Environmental Resources
Environmental Resources in Agriculture Concentration: natural resource management	B.S.	School of Agribusiness and Environmental Resources
Del E. Webb School of Construction		
Construction Options: general building construction, heavy construction, military construction, specialty construction	B.S.	Del E. Webb School of Construction
School of Engineering		
Aerospace Engineering Emphases: aerodynamics, aerospace materials, aerospace structures, computer methods, design, mechanical, propulsion, system dynamics and control	B.S.E.	Department of Mechanical and Aerospace Engineering
Bioengineering Emphases: biochemical engineering, bioelectrical engineering, biomaterials engineering, biomechanical engineering, bionuclear engineering, biosystems engineering, molecular and cellular bioengineering, pre medical engineering	B.S.E.	Department of Chemical, Bio and Materials Engineering
Chemical Engineering Emphases: biochemical, biomedical, environmental, materials, pre medical, process engineering, semiconductor processing	B.S.E.	Department of Chemical, Bio and Materials Engineering
Civil Engineering Emphases: construction, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, water resources engineering	B.S.E.	Department of Civil Engineering
Computer Science	B.S.	Department of Computer Science and Engineering
Computer Systems Engineering	B.S.E.	Department of Computer Science and Engineering
Electrical Engineering	B.S.E.	Department of Electrical Engineering
Engineering Interdisciplinary Studies Option: geological engineering	B.S.	School of Engineering
Engineering Special Studies Options: engineering mechanics, manufacturing engineering, pre medical engineering	B.S.E.	School of Engineering
Industrial Engineering	B.S.E.	Department of Industrial and Management Systems Engineering
Materials Science and Engineering Emphases: chemical processing and energy systems, electronic materials, manufacturing and materials processing, mechanical metallurgy, physical metallurgy, polymers and composites	B.S.E.	Department of Chemical, Bio and Materials Engineering

* This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

Major	Degree	Administered by
Mechanical Engineering Emphases: aerospace, biomechanical; computer methods; control and dynamic systems; design; energy systems; engineering mechanics; manufacturing; stress analysis, failure prevention, and materials; thermosciences	B.S.E.	Department of Mechanical and Aerospace Engineering
School of Technology Aeronautical Engineering Technology Option: aeronautical technology	B.S.	Department of Aeronautical Technology
Aeronautical Management Technology Options: <i>ab initio</i> airline pilot flight management, airway science aircraft systems management, airway science management	B.S.	Department of Aeronautical Technology
Electronics Engineering Technology Options: computer systems, electronic systems, microelectronics, telecommunications	B.S.	Department of Electronics and Computer Technology
Industrial Technology Emphases: graphic communications, industrial management, interactive computer graphics	B.S.	Department of Manufacturing and Industrial Technology
Manufacturing Engineering Technology Emphases: computer integrated manufacturing engineering technology, manufacturing engineering technology, mechanical engineering technology, robotic and automation engineering technology, welding engineering technology	B.S.	Department of Manufacturing and Industrial Technology
Graduate Degrees		
School of Agribusiness and Environmental Resources		
Agribusiness Concentrations. agribusiness management and marketing, food quality assurance	M.S.	School of Agribusiness and Environmental Resources
Environmental Resources in Agriculture	M.S.	School of Agribusiness and Environmental Resources
Del E. Webb School of Construction		
Construction Concentrations: construction science, facilities, management	M.S.	Del E. Webb School of Construction
School of Engineering		
Aerospace Engineering	M.S., M.S.E., Ph.D.	Department of Mechanical and Aerospace Engineering
Bioengineering	M.S., Ph.D.	Department of Chemical, Bio and Materials Engineering
Chemical Engineering Concentrations. biomedical and clinical engineering, chemical process engineering, chemical reactor engineering, energy and materials conversion, environmental control, solid state processing, transport phenomena	M.S., M.S.E., Ph.D.	Department of Chemical, Bio and Materials Engineering
Civil Engineering Concentrations: environmental/sanitary, geotechnical/soil mechanics, structures, transportation, water resources/hydraulics	M.S., M.S.E., Ph.D.	Department of Civil Engineering

* This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

Major	Degree	Administered by
Computer Science	M.C.S., M.S., Ph.D.	Department of Computer Science and Engineering
Electrical Engineering	M.S., M.S.E., Ph.D.	Department of Electrical Engineering
Engineering Science	M.S., M.S.E., Ph.D.	School of Engineering
Industrial Engineering Concentrations: computer aided processes, computer integrated manufacturing, human factors, information systems, operations research, organization control, quality control/reliability	M.S., M.S.E., Ph.D.	Department of Industrial and Management Systems Engineering
Mechanical Engineering	M.S., M.S.E., Ph.D.	Department of Mechanical and Aerospace Engineering
Science and Engineering of Materials	Ph.D.*	Committee on the Science and Engineering of Materials
School of Technology		
Technology	M.Tech.	
Concentrations: aeronautical engineering technology, aeronautical management technology Concentration: electronics engineering technology		Department of Aeronautical Technology Department of Electronics and Computer Technology
Concentrations: graphic communications technology, industrial management and supervision, manufacturing engineering technology, mechanical engineering technology, welding engineering technology		Department of Manufacturing and Industrial Technology

* This program is administered by the Graduate College. See the "Graduate College" section of this catalog.

Graduate Degrees

Deficiencies for admission to the graduate degree programs are specified at the time of admission. The Graduate Record Examination (GRE)—the verbal, quantitative, and analytical components—is recommended but not required unless specified by the respective academic unit. TOEFL scores must be submitted by foreign student applicants before admission is considered. The minimum required score is determined by each academic unit.

Master of Computer Science Degree (M.C.S.)

The M.C.S. program provides a professionally oriented, graduate-level education in computer science and engineering. All of the Graduate College entrance requirements and departmental academic performance and preparation requirements must be satisfied for admission. The applicant must have a

baccalaureate degree in computer science, computer engineering, or a closely related field. The M.C.S. program requires a minimum of 30 semester hours of approved graduate level course work. At the end of the program of study, the student must pass a final comprehensive examination over the graduate course work taken for the degree and over the appropriate under graduate prerequisites. Details of the content and format of the examination are available from the department.

Master of Science Degree (M.S.)

Agribusiness and Environmental Resources. This program provides competent students with opportunities to complete advanced studies with emphasis on research. Areas of study in Agribusiness may be management, marketing, finance, international agriculture, and food industry. Areas of study in Environmental Resources in Agriculture may be natural resource

management and range ecology. Admission requires completion of 18 semester hours in agribusiness and environmental resources or closely related course work. Scores from the GRE or Miller Analogies Test (MAT) are required. The Graduate Management Admission Test (GMAT) is accepted for agribusiness students only. A minimum of 30 semester hours of approved graduate course work is required, including a thesis. An oral examination in defense of the thesis is required.

Computer Science. This graduate program provides opportunities for qualified students holding a baccalaureate degree in computer science or related fields to complete advanced studies with emphasis on research. A minimum of 30 semester hours of approved course work is required, including a thesis. An oral examination in defense of the thesis is required.

Construction. This graduate program provides opportunities for qualified students holding a baccalaureate degree in construction, engineering, architecture, or a related discipline to complete advanced studies with emphasis on management and research. The construction science concentration allows candidates whose primary interest is field engineering or supervision of heavy and industrial construction projects to pursue a more technically oriented course of study. The construction management concentration allows candidates pursuing upper-level management positions in various sectors of the construction industry to improve their competency in project, program, and company management areas. The facilities management concentration supports the needs of the student whose aim is to pursue careers in the maintenance, operation, renovation, or decommissioning of existing facilities.

Engineering Science. These research oriented graduate degree programs provide opportunities to highly competent students to major in aerospace, chemical, civil, electrical, industrial, or mechanical engineering, bioengineering, or engineering science. Options in aerospace engineering, biotechnology, engineering mechanics, engineering science, and materials science and engineering are available under the Engineering Science major. M.S.E. and Ph.D. degree programs are also available in these options.

The M.S. degree program (including all options) is administered through the office of the college associate dean for academic affairs. Admission normally requires an appropriate undergraduate engineering degree and satisfaction of all Graduate College admission requirements and special department requirements. A minimum of 30 semester hours of approved graduate course work is required, which must include a thesis and an oral examination at the completion of the program. Students writing a thesis must enroll in a combination of both 592 Research and 599 Thesis, totaling six semester hours.

Master of Science in Engineering Degree (M.S.E.)

These professionally oriented graduate degree programs are intended as a preparation for a career in professional practice. Two options are available within the Master of Science in Engi-

neering degree programs. Option 1 (thesis option) is designed primarily for full time students. A thesis (engineering report or research paper) is required of students following this option. Option 2 (no thesis, no report option) is designed primarily for students who hold full time jobs and must attend university classes on a part time basis or for full time students who do not have an approved thesis topic. Both options require a minimum of 30 semester hours of approved graduate level course work. For entry the student must satisfy all Graduate College admission requirements and special department requirements and must have a baccalaureate degree in engineering or another closely related degree program.

Master of Technology Degree (M.Tech.)

This degree program is designed for flexibility, permitting the student to select a combination of courses in technology and supporting areas to meet individual career goals. Selected areas of concentration are designed to provide graduates with technical and professional skills for use in preparation for and advancement in leadership positions found in industry and education. The Master of Technology is offered by the Departments of Aeronautical Technology, Electronics and Computer Technology, and Manufacturing and Industrial Technology. Admission requires an appropriate baccalaureate degree with a minimum of 30 semester hours in technology or equivalent. A minimum of 32 semester hours of approved course work is required, including a practicum or applied project. An oral examination in defense of the practicum or applied project is required.

Doctor of Philosophy Degree

The Ph.D. degree is awarded in engineering or Computer Science upon the satisfactory completion of an approved program of graduate study, research, and dissertation. For specific reference to this degree, see the "Graduate College" section of this catalog or the *Graduate Catalog*.

DEGREE REQUIREMENTS

For detailed information on the degree requirements of a major in the College of Engineering and Applied Sciences, refer to that department's or school's individual description on the ensuing pages.

English Proficiency Requirement.

As a minimum, completion of both ENG 101 and 102 or ENG 105 with a grade of "C" or better is required for graduation from ASU in any baccalaureate program (see page 40); but any student whose written or spoken English in any course is unsatisfactory may be required by the appropriate director or department chair to take additional course work. See "First Year Composition Requirement," page 71.

Pass/Fail Grades. Students enrolled in the College of Engineering and Applied Sciences do not receive degree credit for pass/fail courses taken at this institution. In addition, no course in this college is offered for pass/fail credit. Students requesting credit for pass/fail courses taken at another institution must file a Petition for Adjustment to Curriculum Requirements. Each request is judged on its particular merits.

Entry into Upper-Division Courses.

Before enrolling in courses at the 300 level and above, a student in good academic standing must secure the approval of his or her advisor. A student who is not in good academic standing must secure the approval of his or her advisor and director or department chair. Students whose grades in 300 level courses are unsatisfactory may be required to retake one or more courses for which credit has previously been granted.

The departments and schools have certain additional requirements that must be met in addition to the above college requirements and students should consult them for details.

Course Work Currency. Courses taken more than five years before admission to degree programs in this college are not normally accepted for transfer credit at the option of the department in which the applicant wishes to enroll. Courses completed within the five years preceding admission are judged as to their applicability to the student's curriculum.

GENERAL STUDIES REQUIREMENTS

Higher education should provide the student not only with competency in the chosen subject field, but also with experiences that facilitate the student's growth in ability to perceive significant relationships, to make intelligent value judgments, to express ideas with ease,

clarity, and good taste, and to develop the qualities of character and personal integrity requisite for a successful career. The development of moral, ethical, and social concepts and a sound professional attitude is required. It is expected that the attainment of an interest and pleasure in the above pursuits will inspire continued study. Courses are selected with the aid of an advisor to provide planned sequences and to place emphasis on the interrelationships that exist among fields of knowledge.

Specific attention should be directed to the university general studies requirements shown on pages 50–52. Additional requirements and recommended course selections are shown in appropriate catalog sections for the schools and departments of this college.

School of Engineering majors have some restrictions on the selections of course work used to fulfill the general studies requirements in humanities and fine arts (HU), social and behavioral sciences (SB), and lower division literacy and critical inquiry (LI). Please refer to pages 239–240 for details.

General studies courses are regularly reviewed. To determine whether a course meets one or more general studies course credit requirements, see the listing of courses by core and awareness area, pages 53–71. General studies courses are also identified within the course description according to the “Key to General Studies Credit Abbreviations,” page 52.

GRADUATION REQUIREMENTS

Graduation requirements in this college are listed under the description of each school or major.

ACADEMIC STANDARDS

Retention. A student is expected to make satisfactory progress toward completion of degree requirements in order to continue enrollment in the College of Engineering and Applied Sciences. Any one of the following conditions is considered unsatisfactory progress and results in the student being placed on probationary status:

1. an ASU cumulative GPA less than 2.00;
2. a semester or summer session with a GPA less than or equal to 1.50; or
3. two successive semesters with GPAs less than 2.00

Students not meeting department standards are placed on probation at the department’s discretion.

Students on probation are subject to disqualification if (1) they do not attain a semester GPA of 2.25 (2.50 for pre-professional students in the School of Engineering) and their cumulative GPA is below 2.00 at the end of the probationary semester or (2) they are placed on probation for two consecutive semesters.

Courses completed during the summer sessions may not be used to re-evaluate a student’s fall semester probationary status.

Students on academic probation are not allowed to register for more than 13 semester hours of course work. Probationary students may not register for the next semester without a special permit from an advisor in Student Academic Services. Special permits are not given until grades are recorded by the registrar for the current semester.

Disqualification. During a semester on academic probation, a student who fails to meet the retention standards specified above is disqualified. Students may request a review of their disqualification status by contacting the associate director of Student Academic Services in ECG 115. Any disqualified student who is accepted by another college at ASU may not register for courses in this college unless the courses are required for the new major. Disqualified students who do register for courses in this college may be withdrawn from these courses any time during that semester. Furthermore, students at the university who have been disqualified academically by this college are not eligible to enroll in summer session courses in this college until the disqualification period has expired and they have been reinstated.

Reinstatement. The College of Engineering and Applied Sciences does not accept an application for reinstatement until the disqualified student has remained out of this college for at least a 12-month period. Merely having remained in a disqualified status for the above period of time does not, in itself, constitute a basis for reinstatement. Proof of ability to do satisfactory college work in the chosen discipline is required, for example, completing pertinent courses in the discipline at a com-

munity college with better than average grades.

STUDENT RESPONSIBILITIES

Course Prerequisites. It is expected that students consult the *Schedule of Classes* and the catalog with regard to course prerequisites. Students who register for courses without the designated prerequisites may be withdrawn without the student’s consent at any time before the final examination. Such withdrawal may be effected by the instructor, the chair of the department offering the course, the director of Student Academic Services, or the dean of the college. In such cases, there is no monetary reimbursement to the student. However, such withdrawal is considered to be unrestricted as described on page 46 and does not count against the number of restricted withdrawals allowed.

SPECIAL PROGRAMS

Student Academic Services. The dean’s office of the College of Engineering and Applied Sciences maintains a special office staffed to assist students in various matters. This office coordinates the work of the College Admissions and Standards Committee and administers the probation, disqualification, and readmission processes for students who are academically deficient.

Academic Honors. Students completing baccalaureate degree requirements receive the appropriate honors designations on their diplomas consistent with the requirements specified by the university.

Students in the College of Engineering and Applied Sciences are encouraged to seek information concerning entry into those honor societies for which they may qualify. Membership in such organizations enhances the student’s professional stature. The following honor societies are active within the college:

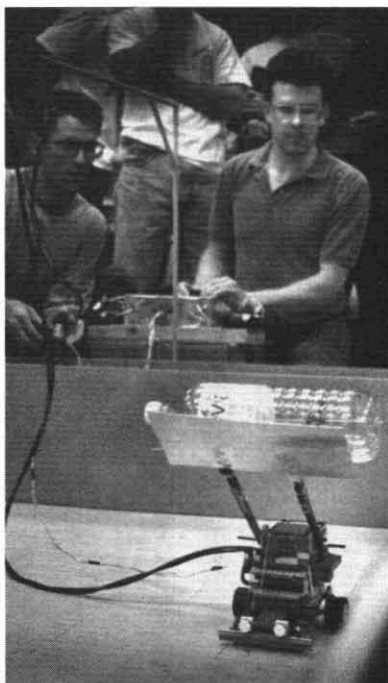
1. Alpha Pi Mu Industrial Engineering Honor Society;
2. Alpha Zeta Agriculture Honor Society;
3. Chi Epsilon—Civil Engineering Honor Society;
4. Eta Kappa Nu Electrical Engineering Honor Society;

5. Pi Tau Sigma—Mechanical Engineering Honor Society;
6. Sigma Lambda Chi—Construction Honor Society;
7. Tau Alpha Pi—National Honor Society, Engineering Technologies;
8. Tau Beta Pi—National Engineering Honor Society; and
9. Upsilon Pi Epsilon—National Computer Science Honor Society.

Information on any of these organizations may be obtained from the respective department or school offices.

University Honors College. The College of Engineering and Applied Sciences participates with the University Honors College, which affords superior undergraduates opportunities for enhanced educational experiences. Participating students can major in any academic program. A description of the requirements and the opportunities offered by the University Honors College can be found on pages 79–81 of this catalog.

Scholarships. Academic scholarships for continuing students in this college may be applied for by contacting the Student Academic Services office or the various department or school offices. Other scholarships may be available through the university Student Financial Assistance Office.



ASU 3+2 Programs. Students desiring to earn a baccalaureate degree from Grand Canyon University (Phoenix, Arizona) in Mathematics, Chemistry, Construction, or Physics or from Southwestern University (Georgetown, Texas) in Physical Science and a baccalaureate degree in one of the engineering majors or the Construction major from ASU can take advantage of a 3+2 program approved by these institutions. Such students complete the first three years of study at their respective college or university and the last two years of study at ASU. At the end of the fourth or fifth year, assuming all degree requirements have been met, the baccalaureate degree is awarded by the student's respective college or university and the appropriate engineering or construction baccalaureate degree is awarded by ASU.

A similar 3+2 program is available to qualified students from Long Island University/C.W. Post Campus, College of Arts and Sciences, who wish to earn both a Bachelor of Science degree from C.W. Post in Mathematics or Physics and a Bachelor of Science in Engineering degree from ASU in Civil, Chemical, Electrical, Industrial, or Mechanical Engineering.

More information can be obtained by writing to one of the following offices:

OFFICE OF THE ADMINISTRATIVE
VICE PRESIDENT
GRAND CANYON UNIVERSITY
3300 W CAMELBACK RD
PHOENIX AZ 85017-1097

PROVOST AND DEAN OF THE BROWN
COLLEGE OF ARTS AND SCIENCES
SOUTHWESTERN UNIVERSITY
GEORGETOWN TX 78626

DEAN, COLLEGE OF ARTS AND
SCIENCES
C.W. POST CAMPUS
LONG ISLAND UNIVERSITY
BROOKVILLE NY 11548

OFFICE OF THE DEAN
COLLEGE OF ENGINEERING AND
APPLIED SCIENCES
ARIZONA STATE UNIVERSITY
Box 875506
TEMPE AZ 85287-5506

The Del E. Webb School of Construction also has 2+2 agreements with several selected out-of-state colleges and universities. For a listing and additional information, call 602/965-3615, or write

DIRECTOR, DEL E. WEBB SCHOOL OF
CONSTRUCTION
ARIZONA STATE UNIVERSITY
Box 870204
TEMPE AZ 85287-0204

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC programs are required to take from 12 to 20 hours in the Department of Aerospace Studies or Department of Military Science. To preclude excessive overloads, these students should plan on at least one additional semester to complete degree requirements. Because of accreditation requirements, aerospace studies (AES) or military science (MIS) courses are not acceptable for engineering or engineering technology degree credit as either social and behavioral science or humanities and fine arts under general studies. ROTC students must also meet all other degree requirements of this college.

A military construction option is available in the Del E. Webb School of Construction. See page 239 for details.

GENERAL INFORMATION

Definition of Terms. The terms used in this college to describe offerings are defined below for purposes of clarity.

Program of Study. This broad term describes the complete array of courses included in the study leading to a degree. Examples: agribusiness and environmental resources, construction, engineering, and technology.

Major. This term describes a specialized group of courses contained within the program of study. Example: program of study—engineering; major—Civil Engineering. Example: program of study—technology; major—Industrial Technology.

Area of Emphasis (Technical Electives), Option, or Concentration. Each of these terms describes a selection of courses within a major or among one or more majors. The number of technical electives varies from curriculum to curriculum. In a number of the majors, the technical electives must be chosen from preselected groups. For this reason the choice of specific technical electives for an area of emphasis should be done with the advice and counsel of an advisor. Example: major—Mechanical Engineering; area of emphasis—thermosciences.

School of Agribusiness and Environmental Resources

Eric P. Thor
Director
 (AG 281) 602/965-3585

PROFESSORS

BRADY BROCK, CHALQUEST
 EDWARDS GORDON, KAGAN
 ST LES, THOR

ASSOCIATE PROFESSORS

CONKLIN, W MILLER RACCACH,
 SEPERICH, WHYSONG

ASSISTANT PROFESSOR

GREEN

PROFESSORS EMERITI

BARRETT LYTLE, MADDY
 V. MILLER, MOODY RASMUSSEN,
 R CHARDSON ROBINSON, TAYSOM

PURPOSE

The School of Agribusiness and Environmental Resources provides academic programs directed toward agribusiness and the environmental aspects of agriculture. Agribusiness is a dynamic industry that provides employment to about 23% of the U.S. labor force. Environmental resources emphasizes both the conservation of wild land resources for the needs of future generations and their use to meet present day needs. Courses in the School of Agribusiness and Environmental Resources are designed to prepare students for the wide range of job opportunities that exist in the agricultural industries and governmental agencies. The academic programs are especially designed to meet the needs of the urban student who has had little or no previous agriculture experience. An interest in plants, animals, or foods can be the starting point for career development in agricultural industries or natural resource management. The undergraduate programs also provide the necessary training for students preparing to enter graduate degree programs.

ORGANIZATION

The academic programs are organized into two separate majors. (1) Agribusiness and (2) Environmental Resources in Agriculture. Options for specialization within these majors are

Agribusiness and Environmental Resources in Agriculture Concentrations and Options

Major	Concentration	Option
Agribusiness	Agribusiness	Food industry General agribusiness International agribusiness
Environmental Resources in Agriculture	Computer analysis Pre veterinary medicine Natural resource management	Range ecology Wildlife habitat management

shown in the "Agribusiness and Environmental Resources in Agriculture Concentrations and Options" table.

Center for Agribusiness Policy Studies

The Center for Agribusiness Policy Studies carries out research and development relating to agribusiness, rural development, multiple use of scarce resources, and public policy. The center addresses regional, national, and international development in the context of global and competitive markets for agricultural products and inputs. Of particular interest is the development of private sector strategies and public policy alternatives that go beyond traditional government subsidy programs to find innovative, market oriented ways to enhance competitiveness in international markets, increase rural incomes and create new jobs. A related center concern is the development of "win win" strategies for environmental management and the multiple use of scarce natural resources by competing interest groups. The goal of such policy development is to resolve or manage conflict regionally, nationally, or globally and to promote long term, sustainable agriculture in terms of regional economic growth. Of particular interest to the center are innovative rural credit programs for developing nations, strategic marketing to identify profitable "niche" markets and further processing to create jobs and add value to agricultural products. For more information, contact the director of the Center for Agribusiness Policy Studies at 602/965 3585 (AG 281).

DEGREES

Bachelor of Science (B.S.). The School of Agribusiness and Environmental Resources offers the Bachelor of

Science degree in Agribusiness and in Environmental Resources in Agriculture.

Master of Science (M.S.). The School of Agribusiness and Environmental Resources offers the Master of Science degree in Agribusiness and in Environmental Resources in Agriculture. The program includes research and the preparation of a thesis. A minimum of 30 semester hours of graduate level course work is required for the degree. Additional details for this degree are given in the *Graduate Catalog*.

ADMISSION

See pages 30-35, 47-48, 224-225, and 230 for information regarding requirements for admission, transfer, retention, disqualification, and reinstatement.

In addition, students who are beginning their initial college work in the School of Agribusiness and Environmental Resources should present secondary school units in accordance with the minimum university requirements. There are no secondary school agricultural course requirements.

GRADUATION REQUIREMENTS

The completion of a minimum of 126 semester hours including university general studies, the school and major cores, and option courses leads to the B.S. degree. An overall GPA of 2.00 is required. Of the semester hours required for graduation, 40% (a minimum of 50 semester hours) must be upper division. Also see special graduation requirements under the pre veterinary medicine concentration described on page 235.

MAJORS

The Agribusiness major is an applied, industry oriented curriculum. The study of animals, plants, and their utilization in the food and fiber system forms the base of the program. Students learn to analyze firms involved in input supply activities, commodity processing, food manufacturing, and food distribution. Students also study government agricultural programs and national policy activities that affect agribusiness. Because of the U.S. role in supplying commodity and food products to the world markets, international aspects of agribusiness development and trade are emphasized.

The natural resource management concentration within the Environmental Resources in Agriculture major emphasizes the study of wildland ecosystem management. Application of the systems approach in a wide variety of resource management situations is emphasized. Students pursue an ecological emphasis in the range ecology option or the wildlife habitat management option. In both cases, students are trained to apply ecological principles to management of wildlands. Students with particular interest in vegetation, water, and soil resources should pursue the range ecology option. Students with a particular interest in animal resources should pursue the wildlife habitat option.

The baccalaureate degree requirements in Agribusiness and Environmental Resources in Agriculture include the general studies, the School of Agribusiness and Environmental Resources core, a proficiency core, the major core, and the option courses and elective courses to complete the graduation requirement of 126 semester hours. Before entering the junior year, each student, with the aid of an advisor, is expected to select a concentration and an option.

DEGREE REQUIREMENTS

All students pursuing a B.S. degree in the School of Agribusiness and Environmental Resources must satisfy English proficiency and general studies requirements as follows:

	<i>Semester Hours</i>
English Proficiency	
ENG 101, 102 First Year Composition ¹ or ENG 105 Advanced First Year Composition (3)	6

General Studies

<i>Literacy and Critical Inquiry</i> ²	
L1 course	3
L2 course	3
<i>Numeracy</i> ¹	
Numeracy courses	6
<i>Humanities and Fine Arts and Social and Behavioral Sciences</i> ²	
(15 semester hours minimum)	
At least one course must be upper division, two courses must be from the same department, and two departments or more must be represented in the total selection	
HU courses	6-9
SB courses	6-9
<i>Natural Sciences</i> ¹	
S1/S2 courses	8
Total general studies	35

NOTE: Six semester hours taken in two of the three awareness areas² are required in the final list of courses offered in the student's graduation program of study. If desired, these courses can be included in the HU and SB course selections.

¹ See the school academic advisor for approved courses.

² See pages 53-71 for the acceptable courses in these categories.

Agribusiness and Environmental Resources in Agriculture Core

All students pursuing a B.S. degree in the school must complete the following general core courses:

	<i>Semester Hours</i>
AGB 300 Livestock Management	3
AGB 302 Introduction to Agribusiness	3
AGB 310 Crop Management	3
ERA 346 Natural Resource Conservation	3
Total	12

The following proficiency core courses are required of all students except those in the computer analysis and pre-veterinary medicine concentrations:

	<i>Semester Hours</i>
BIO 181, 182 General Biology	8
or AGB 150 Animal Science (3) and ERA 130 Environmental Resources Science and Humans (4)	
CHM 101 Introductory Chemistry or CHM 113 General Chemistry (4) and CHM 115 General Chemistry with Qualitative Analysis (5)	4

ECN 111 Macroeconomic Principles ¹	3
ERA 350 Applied Quantitative Methods ¹	3
MAT 117 College Algebra ¹ or MAT 210 Brief Calculus (3)	3
Computer course ²	3
Total	23-29

¹ These courses satisfy part of the general studies requirements.

² A list of acceptable courses is available in the School of Agribusiness and Environmental Resources Office.

AGRIBUSINESS

The Agribusiness major offers several concentrations and options. It combines business and technical agriculture as they relate to the management, marketing, and financial objectives of agribusiness firms. Topics of interest include the supplying of input resources and services to agricultural producers, the management of crop and livestock enterprises, the processing of raw agricultural products and the management and quality assurance of food manufacturing. Food distribution is examined from the points of view of food wholesalers and retailers as well as food service firms, which include restaurants and specialized food firms. The study of agribusiness also includes analysis of the critical roles of government in regulating certain aspects of agribusiness and promoting international trade in agribusiness products.

Agribusiness. The agribusiness concentration contains the general agribusiness, international agribusiness, and food industry options.

General agribusiness integrates the knowledge and skills needed to manage people, products, and services in agribusiness enterprises. Agribusiness management combines the agricultural sciences, behavioral science, and common sense. Functional, institutional, and behavioral aspects of marketing are examined while studying the flows of products and services through the various market channels for agricultural inputs, commodities, and food. Emphasis is placed on up-to-date management/marketing methods that allow graduates to meet challenges in the food and fiber industries. Graduates are qualified to make significant contributions in a broad range of career opportunities that

exist in agribusiness. Many start career paths that lead to upper level agribusiness management/marketing positions.

International agribusiness relates worldwide agricultural resources to the requirements and potentials of the various nations. Particular emphasis is given to economic development and to the international trade of food and fiber products. Special courses are offered to form a unique curriculum that is designed to train either the U.S. or foreign student to work in the enhancement of agricultural programs of foreign countries. Provided is a basic knowledge of U.S. agricultural techniques that is extended to the global aspects of agriculture. Graduates in this area are particularly qualified to aid in the development of the world's agricultural potential to provide food to meet the expanding populations. Jobs exist in commercial industries and in government agencies national, international, and foreign. A language capability in addition to English is recommended.

Food industry focuses on the scientific and technical competence required for employment in this field. Strong emphasis is given to basics such as food chemistry, food processing, and food safety. This unique program offers employment opportunities for graduates in food industries, regulatory agencies, and consumer organizations.

Students selecting the agribusiness concentration are required to take the following courses:

	<i>Semester Hours</i>
ACC 230 Introductory Accounting I or AGB 390 Agribusiness Accounting (3)	3
AGB 312 Agribusiness Marketing	3
AGB 332 Agribusiness Finance	3
AGB 342 Agribusiness Management I	4
AGB 364 Agribusiness Technology	3
AGB 412 Agricultural Commodities	3
AGB 443 Agribusiness Management II	3
AGB 444 Agribusiness Analysis	3
AGB 455 Agricultural Marketing Channels	3
AGB 458 International Agribusiness	3
AGB 474 Agribusiness Policy and Government Regulations	3
AGB 490 Recent Advances in Agribusiness	1
ECN 112 Microeconomic Principles	3
Total	38

Typical Curriculum for the Agribusiness Concentration

First Year

	<i>Semester Hours</i>
AGB 150 Animal Science	3
CHM 101 Introductory Chemistry	4
ENG 101, 102 First Year Composition	6
ERA 130 Environmental Resources Science and Humans	4
MAT 117 College Algebra	3
General elective courses	5
SB courses*	6
Total	31

Second Year

ACC 230 Introductory Accounting I or AGB 390 Agribusiness Accounting (3)	3
AGB 302 Introduction to Agribusiness	3
ECN 111 Macroeconomic Principles	3
ECN 112 Microeconomic Principles	3
Agribusiness electives courses	9
General elective courses	6
HU courses*	6
Total	33

Third Year

AGB 300 Livestock Management	3
AGB 310 Crop Management	3
AGB 312 Agribusiness Marketing	3
AGB 332 Agribusiness Finance	3
AGB 342 Agribusiness Management I	4
AGB 364 Agribusiness Technology	3
ERA 346 Natural Resource Conservation	3
ERA 350 Applied Quantitative Methods	3
Option courses	6
Total	31

Fourth Year

AGB 412 Agricultural Commodities	3
AGB 443 Agribusiness Management II	3
AGB 444 Agribusiness Analysis	3
AGB 455 Agricultural Marketing Channels	3
AGB 458 International Agribusiness	3
AGB 474 Agribusiness Policy and Government Regulations	3
AGB 490 Recent Advances in Agribusiness	1
General elective courses	3
Option courses	9
Total	31

* See pages 53-71 for the requirements and the approved list

Computer Analysis. This concentration gives students the necessary background to move into a wide variety of

career opportunities involving the use of computers in the agribusiness industries. A basic core of agricultural science courses is combined with a proficiency core of agribusiness marketing, management, finance, and critical computer science courses. A graduate of this program is prepared to handle the problems agribusiness firms and organizations face in applying the latest computer technology to operations.

Students choosing the computer analysis concentration are required to take the following proficiency core courses:

	<i>Semester Hours</i>
AGB 312 Agribusiness Marketing	3
AGB 332 Agribusiness Finance	3
AGB 342 Agribusiness Management I	4
BIO 181, 182 General Biology	8
CSE 100 Introduction to Computer Science I	3
CSE 101 Introduction to Computer Science II	3
CSE 120 Digital Design Fundamentals	3
CSE 201 Application Languages Programming Laboratory	1
CSE 310 Data Structures	3
CSE 340 Structure of Programming Languages	3
ERA 350 Applied Quantitative Methods	3
MAT 243 Discrete Mathematical Structures	3
MAT 271 Calculus with Analytic Geometry II or MAT 290 Calculus I (5)	4
MAT 272 Calculus with Analytic Geometry III or MAT 291 Calculus II (5)	4
MAT 342 Linear Algebra	3
Total	51

Typical Curriculum for the Computer Analysis Concentration

First Year

	<i>Semester Hours</i>
CSE 100 Introduction to Computer Science I	3
CSE 101 Introduction to Computer Science II	3
ENG 101, 102 First Year Composition	6
MAT 243 Discrete Mathematical Structures	3
MAT 270 Calculus with Analytic Geometry I	4
MAT 271 Calculus with Analytic Geometry II	4
HU courses*	6
SB courses*	3
Total	32

Second Year

AGB 302	Introduction to Agribusiness	3
BIO 181, 182	General Biology	8
CSE 120	Digital Design Fundamentals	3
CSE 201	Application Languages Programming Laboratory	1
CSE 310	Data Structures	3
MAT 272	Calculus with Analytic Geometry III	4
General elective courses		9
Total		31

Third Year

AGB 300	Livestock Management	3
AGB 310	Crop Management	3
AGB 312	Agribusiness Marketing	3
AGB 332	Agribusiness Finance	3
AGB 342	Agribusiness Management I	4
CSE 340	Structure of Programming Languages	3
ERA 350	Applied Quantitative Methods	3
MAT 342	Linear Algebra	3
SB courses*		6
Total		31

Fourth Year

ERA 346	Natural Resource Conservation	3
General elective courses		13
Supporting courses		16
Total		32

* See pages 53-71 for the requirements and the approved list.

Pre-veterinary Medicine. This concentration is primarily designed to meet the entrance requirements of professional veterinary medical schools in the United States and Canada. Selection of this area permits students to complete the pre-veterinary requirements for entrance to professional veterinary school. The curriculum permits the student to obtain some course work in agribusiness, especially as it relates to professional practice and industry. This background also provides an important alternative for the student who does not actually enter veterinary school. Completion of all requirements for a B.S. degree in Agribusiness at ASU is provided by completing additional credits, if desired. A pre-veterinary medicine student who has been accepted to a school of veterinary medicine and who also elects to earn a Bachelor of Science degree in the School of Agribusiness and Environmental Resources may do so by completing a minimum of 30 semester hours at ASU and by completing the

Agribusiness and Environmental Resources in Agriculture and general studies requirements. The student may then receive a written statement from the dean of the College of Engineering and Applied Sciences giving senior in absentia privileges. The student is eligible to receive the B.S. degree after the Office of the Registrar receives a recommendation from the dean of the professional school and a transcript of credit indicating the student has completed a total of 126 semester hours with a cumulative GPA of 2.00 or better.

Although this concentration is primarily intended for the student preparing to enter professional veterinary medicine as a career, it is also an excellent basis for future graduate degree programs or many of the scientifically related jobs in agribusiness and government.

Students selecting the pre-veterinary medicine concentration are required to take the following proficiency core courses:

		<i>Semester Hours</i>
BIO 181, 182	General Biology	8
CHM 113	General Chemistry	4
CHM 115	General Chemistry with Qualitative Analysis	5
CHM 231	Elementary Organic Chemistry or CHM 331 General Organic Chemistry, 335 General Organic Chemistry Laboratory, 332 General Organic Chemistry, and 336 General Organic Chemistry Laboratory (8)	4
ERA 350	Applied Quantitative Methods	3
MAT 117	College Algebra or MAT 210 Brief Calculus (3)	3
MIC 206	Microbiology Laboratory	1
MIC 220	Biology of Microorganisms	3
Total		35

Typical Curriculum for the Pre-Veterinary Medicine Concentration

First Year

		<i>Semester Hours</i>
CHM 113	General Chemistry	4
CHM 115	General Chemistry with Qualitative Analysis	5
ENG 101, 102	First Year Composition	6
MAT 117	College Algebra or MAT 210 Brief Calculus (3)	3
HU courses ¹		6
SB courses ¹		6
Total		30

Second Year

AGB 300	Livestock Management	3
AGB 353	Wildlife and Domestic Animal Nutrition	3
BIO 181, 182	General Biology	8
CHM 231	Elementary Organic Chemistry or CHM 331 General Organic Chemistry, 335 General Organic Chemistry Laboratory, 332 General Organic Chemistry, and 336 General Organic Chemistry Laboratory (8)	4
General elective courses		9
HU courses ¹		3
Total		30-34

Third Year

AGB 439	Veterinary Practices	3
BIO 340	General Genetics	4
CHM 361	Principles of Biochemistry	3
CHM 367	Elementary Biochemistry Laboratory	1
ERA 346	Natural Resource Conservation	3
ERA 350	Applied Quantitative Methods	3
MIC 206	Microbiology Laboratory	1
MIC 220	Biology of Microorganisms	3
PHY 111	General Physics	3
PHY 113	General Physics Laboratory	1
PHY 112	General Physics	3
PHY 114	General Physics Laboratory	1
General elective courses		4
Total		33

Fourth Year²

General elective courses		6
Supporting courses		15
Upper division courses		12
Total		33

¹ See pages 53-71 for the requirements and the approved list.

² Assuming the student has applied and has been accepted to a veterinary college during the beginning of the third year, the courses from the first year of the veterinary program are substituted for the classes of the fourth year for the B.S. degree.

ENVIRONMENTAL RESOURCES IN AGRICULTURE

The primary emphasis of the Environmental Resources in Agriculture major is natural resource management and conservation. Particular attention is given to the study of ecosystem characteristics as they relate to man's use of renewable resources. Applications of ecological principles to resource management are considered using examples

drawn from Arizona's forest, range, and agricultural ecosystems. Employment opportunities in environmental resource management, range ecology, land reclamation, soil conservation, and agribusiness exist with both private firms and government resource management agencies.

Natural Resource Management. This concentration includes the range ecology and wildlife habitat management options

Range ecology emphasizes the study of renewable rangeland resources based on a strong background of agricultural and biological sciences. The specific areas of plant, animal, and soil sciences with strong supporting courses in ecology constitute primary training in this option. Students may choose careers as professional range or soil conservationists for federal and state agencies or in private industry. Range and soil conservationists both perform work concerned with inventorying, analyzing, improving, protecting, and managing the natural resources of rangelands and related wildlands.

Wildlife habitat management emphasizes the interaction of renewable resources with the wildlife populations that inhabit them. Primary training is in the areas of ecology, plant, and soil science, with strong supporting courses in wildlife. Students completing this option may choose careers as professional wildlife habitat managers for federal and state agencies or in the private sector.

Students selecting the natural resource management concentration are required to take the following courses:

	<i>Semester Hours</i>
BIO 320 Fundamentals of Ecology	3
BOT 370 The Flora of Arizona	4
ENG 301 Writing for the Professions	3
ERA 325 Soils	3
ERA 326 Soils Laboratory	1
ERA 333 Water Resources Management	3
ERA 360 Range Ecosystem Management	4
ERA 402 Range Habitat Inventory	4
ERA 407 Range Plants and Habitats	4
ERA 420 Range Habitat Improvements	3
ERA 475 Wildlife and Range Animal Management	3
ERA 490 Recent Advances in Environmental Resources	1
Total	36

Typical Curriculum for Environmental Resources in Agriculture First Year

	<i>Semester Hours</i>
BIO 181, 182 General Biology	8
CHM 101 Introductory Chemistry	4
ENG 101, 102 First Year Composition	6
MAT 210 Brief Calculus	3
Computer course ¹	3
General elective courses	7
Total	31

Second Year

BOT 370 The Flora of Arizona	4
ERA 325 Soils	3
ERA 326 Soils Laboratory	1
HU courses ²	8
Option requirements ³	7
SB courses ²	8
Total	31

Third Year

AGB 300 Livestock Management	3
AGB 302 Introduction to Agribusiness	3
AGB 310 Crop Management	3
ERA 346 Natural Resource Conservation	3
ERA 350 Applied Quantitative Methods	3
ERA 360 Range Ecosystem Management	4
Option requirements ³	14
Total	33

Fourth Year

ERA 490 Recent Advances in Environmental Resources	1
General elective courses	4
Option requirements ³	26
Total	31

¹ A list of acceptable courses is available in School of Agribusiness and Environmental Resources Office
² See pages 53-71 for the requirements and the approved list
³ Option requirements as listed for individual programs.

AGRIBUSINESS

AGB 101 Food Chain. (2) F Dependence of the quality, quantity, and cost of national food supplies on technology, marketing, and world agricultural policies. *General studies G*
150 Animal Science. (3) F Comparative growth development, and propagation of farm animals Lecture lab

160 Veterinary Medicine Today. (3) F Introduction to the role of the veterinarian as related to the fields of food supply and veterinary medicine

300 Livestock Management. (3) F Methods of managing livestock enterprises economics, loss prevention, and marketing Prerequisites: BO 181 182

302 Introduction to Agribusiness. (3) F Impact of national policy and world agriculture on the cost, quantity, and quality of the U.S. food resources

305 Cultural Diversity in Agribusiness. (3) F, S A critical look at how different cultural traditions as practiced in the Southwest have impacted and continue to shape regional agricultural economies Prerequisites: ENG 101 102.

310 Crop Management. (3) S Crop production, management principles, and the application to crop growth and development. Prerequisites: BO 181 182

312 Agribusiness Marketing. (3) F Marketing arrangements for agricultural products. Prerequisite: AGB 342

332 Agribusiness Finance. (3) S Agribusiness investment management and financial institutions that serve agriculture. Prerequisites: AGB 342 ECN 111.

335 Establishing an Agribusiness. (3) F Establishing entrepreneurship in agriculture including legal status financing, planning, marketing and management Prerequisite: junior standing.

342 Agribusiness Management I. (4) S Principles of management, including planning, organizing, integrating, measuring and developing people in agribusiness organizations Lecture computer lab

353 Wildlife and Domestic Animal Nutrition. (3) S Feedstuffs, feeding standards and their application in meeting nutritional needs of animals producing food and fiber

364 Agribusiness Technology. (3) S Biotechnology and other technologies of the three sectors of agribusiness, including input, production and commodity food processing and distribution. Prerequisites: BO 181 and 182 or instructor approval

368 Food Processing. (3) F An introduction to processed food quality assurance statistical sampling and inspection procedures. Prerequisites: AGB 364; ERA 350

369 Food Analysis. (3) F Processing control and scientific instrumentation used in food quality assurance laboratories Lecture, lab. Prerequisites: CHM 225, 226

370 Companion Animals to Man. (3) N Selection, breeding, health, and care of pets. Includes their social and economic impact on urban living

390 Agribusiness Accounting. (3) N Introduction to managerial accounting for agribusiness using computerized accounting systems for the development of financial data required for management decision making Prerequisite: computer literacy

402 Agricultural Cooperatives. (3) N
Organization, operation and management of agricultural cooperatives.

404 Sales and Merchandising in Agribusiness. (3) N
The principles and techniques of selling and commodity merchandising in the agricultural industries. Lecture, lab

412 Agricultural Commodities. (3) F
Trading on futures markets. Emphasis on the hedging practices with grains and meats. Prerequisite: AGB 312 or 1 marketing or finance course

413 Financial Commodities. (3) S
Trading on futures markets. Emphasis on the hedging practices with financial and currency instruments. Prerequisite: AGB 332 or FIN 300.

414 Advanced Commodity Trading. (3) N
Advanced analysis of trading techniques, with emphasis on hedging in the futures markets. Prerequisite: AGB 412 or 413

423 Food and Industrial Microbiology. (4) F
Food and industrial related microorganisms deterioration and preservation of industrial commodities. Lecture, lab. Prerequisite: M C 205 or 206 or instructor approval.

424 Food and Industrial Fermentations. (4) S
Management, manipulation and metabolic activities of industrial microbial cultures and their processes. Lecture, lab. Prerequisite: AGB 423 or instructor approval.

425 Food Safety. (3) S
Control, prevention and prediction of microbial and chemical foodborne diseases. Prerequisite: AGB 423 or instructor approval

426 Food Chemistry. (4) S
The biochemical and chemical interactions that occur in raw and processed foods. Lecture, lab. Prerequisites: CHM 115 231.

428 Comparative Nutrition. (3) N
Effects of nutrition on animal systems and metabolic functions. Prerequisite: CHM 231

433 Diseases of Domestic Animals. (3) N
Control and prevention of infectious and non-infectious diseases of domestic animals. Prerequisite: MIC 206 or 220

435 Animal Physiology I. (4) F
Control and function of the nervous, muscular, cardiovascular, respiratory and renal systems of domestic animals. Lecture, lab. Cross listed as BME 435. Prerequisites: B O 181 CHM 113.

439 Veterinary Practices. (3) F, S
Observation of and participation in veterinary medicine and surgery supervised by local veterinarians. Prerequisite: advanced pre-veterinary student

440 Food Marketing. (3) S
Food processing, packaging, distribution, market research, new food research and development, and social implications. Prerequisite: AGB 312

443 Agribusiness Management II. (3) F
Principles of human resource management with emphasis on the special problems of agribusiness systems. Prerequisite: AGB 342

444 Agribusiness Analysis. (3) S
Analysis of agribusiness firm decisions in the ecological, economic, social, and political environments. Special emphasis on ethical issues surrounding food production and consumption. Prerequisites: AGB 312 and 332 or equivalents. *General studies L2.*

450 International Agricultural Development. (3) F
Transition of developing countries from subsistence to modern agriculture. Technology transfer and food improvement programs are emphasized. Prerequisite: AGB 312

452 World Food Dynamics. (3) N
Transition and development of raw agricultural commodities into nutritional food products. Emphasis given to food expansion in developing countries. Prerequisite: AGB 302

453 World Agricultural Resources. (3) S
World production and consumption of agricultural products, international relationships, and agencies concerned with world agricultural development problems. Prerequisite: AGB 302. *General studies G*

454 International Agricultural Trade. (3) N
Dimensions, locations, mix, methods and changes of international trade in agricultural products. Prerequisite: AGB 312

455 Agricultural Marketing Channels. (3) S
Operational stages of agricultural commodities in normal distribution systems and implementation of marketing strategies. Prerequisite: AGB 312

458 International Agribusiness. (3) N
Identification and analysis of methods, problems, and future of international agribusiness operations. Emphasizes special problems associated with international agribusiness systems. Prerequisite: AGB 312.

460 Agribusiness Management Systems. (4) S
The development and use of decision support systems for agribusiness management and marketing. Lecture, lab. Prerequisites: AGB 332 342; ERA 350.

474 Agribusiness Policy and Government Regulations. (3) F
The development and implementation of government food, drug, pesticide and farm policies and regulations that affect the management of agribusiness. Prerequisites: AGB 312, 342 412.

490 Recent Advances in Agribusiness. (1) F, S
Reports and discussions of current topics and problems associated with agribusiness. May be repeated for credit

505 Commodity Analysis. (3) N
Analysis of commodity markets. Prerequisite: 1 year of economics or marketing

508 Advanced Agribusiness Marketing. (3) F
Theory and analysis of marketing farm commodities, risks, and the effect of future trading on cash prices.

509 Advanced Agribusiness Marketing Channels. (3) S
Analysis of agribusiness marketing channels. Formulation of marketing strategies.

510 Advanced Agribusiness Management I. (4) F
Managing and financing agribusiness emphasizing environmental and economic sustainability in a global economy undergoing rapid change. Prerequisite: AGB 342.

511 Advanced Agribusiness Management II. (3) S
Analysis of organization behavior, change, and resource requirements within agribusiness systems. Prerequisite: AGB 342

512 Food Industry Management. (3) S
Operations and management of food-processing factories, food distribution centers, and retail food handling firms

516 International Agricultural Techniques. (3) N
Coordination of production and marketing techniques to consumption objectives with agricultural products in foreign countries

518 World Agricultural Development. (3) N
Factors that influence production, processing, and marketing of agricultural products in developing countries

520 Advanced Agribusiness Analysis I. (4) S
Vertical integration and differentiation in food and agricultural industries. Lecture, recitation. Prerequisites: AGB 508 and 510 and 532 or equivalents

521 Agribusiness Coordination. (4) N
Organizational alternatives for agribusiness with emphasis on cooperatives and trading companies. Lecture, recitation. Prerequisites: AGB 508 and 510 and 532 or equivalents.

525 Advanced Agribusiness Management Systems. (3) N
Development and use of decision support systems for agribusiness management decision making. Prerequisites: AGB 510 532

527 Agribusiness Research Methods. (3) N
The use of model building, hypothesis testing, and empirical analysis in solving agribusiness problems

530 Advanced Agribusiness Policy. (3) N
Policy-making history, structure and process. Prerequisite: AGB 508.

532 Advanced Agribusiness Finance. (3) F
Financial management of agribusiness firms; agribusiness financial analysis, investment analysis, agricultural risk management and introduction to agricultural financial instruments. Prerequisites: computer literacy and 1 finance course or instructor approval.

535 Advanced Food Science. (3) N
Chemical and physical nature of processed foods. Emphasis on food product development. Prerequisite: AGB 364

Omnibus Courses: See page 44 for omnibus courses that may be offered

ENVIRONMENTAL RESOURCES IN AGRICULTURE

ERA 130 Environmental Resources Science and Humans. (4) F, S
Physical and biological laws underlying the production of natural resources including air, water, soil, plants, and animals as influenced by humans. Lecture, lab.

325 Soils. (3) F
Fundamental properties of soils and their relation to plant growth and the nutrition of man and animals. Relation of soils to environmental quality. Prerequisite: CHM 101 or 113 or equivalent

326 Soils Laboratory. (1) F
Selected exercises to broaden the background and understanding of basic soil principles. Lab. Corequisite: ERA 325.

332 Agricultural Chemicals. (3) N
Composition, properties, and use of agricultural commercial fertilizers and pesticides and their effects on soil, air, and water quality

333 Water Resources Management. (3) S Sources—their development, and conservation and regulations for agricultural, natural resources and urban uses. Prerequisite: CHM 101 or 113

346 Natural Resource Conservation. (3) S A global perspective on the conservation of wildland and agricultural resources. Development/resource conservation interrelationships. *General studies: G*

350 Applied Quantitative Methods. (3) F Statistical methods with applications in natural resource management and the agricultural sciences. Use of digital computer. Prerequisite: MAT 117 or equivalent. *General studies: N2.*

360 Range Ecosystem Management. (4) F Interrelationships between vegetation, soils, and grazing animals. Evaluation of grazing animal impact (vestock and wildlife). Multiple use of range and resources. Lecture/recreation. Prerequisites: BIO 320 and ERA 346 or equivalents

365 Watershed Management. (3) N Hydrologic, physical, biological, and ecological principles applied to watershed management impact of ecosystem manipulations on water yield and quality. 1 weekend field trip. Prerequisite: ERA 325-346

370 Forest Ecosystem Management. (3) N Silvicultural principles underlying the practice of forestry. Forest site evaluations, manipulation of stands to direct success on, forest measurements and multiple use of forests. Lecture, lab. Prerequisites: BIO 320 ERA 346-350.

402 Range Habitat Inventory. (4) S Vegetation sampling and inventory as related to animal habitat relationships. Lecture, lab. 1 weekend field trip. Prerequisites: ERA 350, 360

407 Range Plants and Habitats. (4) F The distribution, ecological characteristics, identification of key plants, and uses of habitats on western rangelands. Laboratory emphasis on grass identification. Lecture/lab. Prerequisite: BOT 370 or equivalent

410 Wildlife Habitat Relations. (3) N Interactions among animal populations and the habitat. Systems simulation of population dynamics as influenced by competition and management strategies. Lecture. 1 weekend field trip. Prerequisite: ERA 360

420 Range Habitat Improvements. (3) S Current practices in brush and weed control, revegetation, burning water developments, fencing and grazing as tools for range improvement. Lecture. 1 weekend field trip. Prerequisite: ERA 360

425 Soil Classification and Management. (3) N Principles of soil genesis, morphology, and classification. Management and conservation practices will be presented. Prerequisite: ERA 325

433 Riparian Ecosystem Management. (3) N Examination of the functions and components that make up riparian ecosystems and the management of these ecosystems. Lecture, field trip. Prerequisite: ERA 325 or instructor approval

446 Soil Fertility. (3) S Ability of soils to retain and supply plant nutrients. Reactions of fertilizers in soils. Prerequisites: ERA 325, 326

448 Soil Ecology. (3) N Soils viewed in an ecosystem context so plant relationships, nutrient budgets and abiotic factors that influence soil processes. Prerequisites: BIO 320 and ERA 325 and 326 or instructor approval

452 Soil, Water, and Irrigation. (3) N Water measurement, conveyance and conservation, with emphasis on crop production and soil plant water relations. Prerequisite: ERA 325

460 Applied Systems Ecology. (3) N The systems approach applied to analysis and management of natural resource ecosystems. Use of simulation models. Prerequisites: ERA 350 or equivalent, 1 course in ecology.

470 Land Reclamation. (3) N Problems of reestablishing vegetation on disturbed sites. Special revegetation techniques, surface modifications and government regulations. 1 weekend field trip. Prerequisites: ERA 407 and 420 and 446 and 448 or instructor approval

475 Wildlife and Range Animal Management. (3) N Principles and techniques for management of domestic and nondomestic animals using range and ecosystems. Emphasis on practical applications of management. Weekend field trips. Prerequisite: instructor approval

480 Natural Resource Planning. (3) S Planning for management and conservation of wildland ecosystems. Ecological, economic, and social constraints on long-term sustainable resource development. Computer tools for resource planning. Lecture. 1 weekend field trip. Prerequisites: ERA 402 or equivalent, senior standing

490 Recent Advances in Environmental Resources. (1) N Current literature and significant developments involving environmental resources. May be repeated for credit

540 Plant Responses to Environmental Stresses. (3) N

Reaction of plants to environmental stresses, herbivores, pesticides, mechanical treatments, aerapollutants, and soil amendments. 1 weekend field trip. Prerequisites: BOT 360 and ERA 420 or instructor approval

548 Plants, Soils, and Environmental Quality. (3) N

Effects of air quality on plants and soils and the role in removing contaminants from the atmosphere. Prerequisite: ERA 325

550 Vegetation Dynamics. (3) N Succession concept and its use in site evaluation. Habitat type concept. Herbivores as an ecological process. Prerequisite: BOT 420 or instructor approval

560 Systems Ecology. (3) N Quantitative description and mathematical modeling of ecosystem structure and function. Techniques for model construction and simulation. Lecture, lab. Prerequisites: ERA 350 or equivalent, computer programming, 6 hours in ecological studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Del E. Webb School of Construction

William W. Badger

Director

(COB 268) 602/965-3615

PROFESSORS

BADGER, MULLIGAN

ASSOCIATE PROFESSORS

BASHFORD, MAYO, WEBER

VISITING ASSOCIATE PROFESSOR

ATWOOD

VISITING ASSISTANT PROFESSORS

KASHIWAGI, ROBSON

FACULTY ASSOCIATES

AULERICH, SNEED

PROFESSORS EMERITI

BURTON, HASTINGS, MICHELS,

PETERMAN, WARD WOODING

PURPOSE

Construction careers are so broadly diversified that no single curriculum prepares the student for universal entry into all fields. As an example, heavy construction contractors usually place more emphasis on technical and engineering science skills than do residential contractors/developers, who usually prefer a greater depth of knowledge in management and construction. To ensure a balanced understanding of the technical, professional, and philosophical standards that distinguish modern day constructors, advisory groups representing leading associations of contractors and builders provide counsel in curriculum development. Construction has a common core of engineering science, management, and behavioral courses on which students may build defined options to suit individual backgrounds, aptitudes, and objectives. These options are not absolute but generally match major divisions of the construction industry.

DEGREES

Bachelor of Science (B.S.) Degree.

The Del E. Webb School of Construction offers the Bachelor of Science degree with a major in Construction. Four options are available: general building, heavy construction, military construction, and specialty construction.

Each option is arranged to accent requisite technical skills and to develop management, leadership, and competitive qualities in the student. Prescribed are a combination of general studies, technical courses basic to engineering and construction, and a broad range of applied management subjects fundamental to the business of construction contracting. The military construction option complements the heavy construction option but permits the use of 18 semester hours of ROTC credits for appropriate technical electives and management-type courses.

Master of Science (M.S.) Degree. The Del E. Webb School of Construction also offers the Master of Science degree with a major in Construction. Additional details for this degree are found in the *Graduate Catalog*.

ADMISSION

See pages 31-35 and 48-49 for information regarding requirements for admission, transfer, retention, qualification, and reinstatement. A preprofessional category is available for applicants deficient in regular admission requirements. Vocational and craft oriented courses taught at the community colleges are not accepted for credit toward a bachelor's degree in Construction.

Professional Accreditation and Affiliations. The Del E. Webb School of Construction is a member of the Associated Schools of Construction, an organization dedicated to the development and advancement of construction education. The construction program is accredited by the American Council for Construction Education (ACCE).

SPECIAL PROGRAMS

ASU 2+2 Program. The Del E. Webb School of Construction maintains a cooperative agreement with most community colleges within Arizona and also with selected out-of-state colleges and universities to structure courses that are directly transferable into the construction program at ASU.

ASU 3+2 Program. The Del E. Webb School of Construction also participates in the ASU 3+2 program with Grand Canyon University and Southwestern University. See page 230 for details.

Student Organizations. The school has a chapter of Sigma Lambda Chi (SLC), a national honor society that recognizes high academic achievement in accepted construction programs. The school is also host to the Associated General Contractors of America (AGC) student chapter.

Scholarships. Apart from those given by the university, a number of scholarships from the construction industry are awarded to students registered in the construction program. The scholarships are awarded on the basis of academic achievement and participation in activities of the construction program.

DEGREE REQUIREMENTS

Students complete the following basic requirements before registering for advanced courses: (1) all first semester, first year courses and the university English requirement (see page 40) must be completed by the time the student has accumulated 48 semester hours of program requirements, and (2) all second semester, first-year courses must be completed by the time the student has completed 64 semester hours of program requirements. Transfer students are given a one semester waiver.

Any student not making satisfactory progress is permitted to register for only those courses required to correct any deficiencies.

Students in all options are required to complete a construction core of science-based engineering, construction, and management courses. Since the semester hours vary for some alternative courses in the core, any difference in credits is made up in the selected fields of specialization to achieve a minimum of 132 semester hours.

English Proficiency		<i>Semester Hours</i>
(6 semester hours minimum)		
ENG 101, 102	First Year Composition ¹	6
	or ENG 105 Advanced First-Year Composition (3)	

General Studies Requirements		
(36 semester hours minimum)		
<i>Literacy and Critical Inquiry</i> ²		
(6 semester hours minimum)		
COM 225	Public Speaking ¹	3
ETC 400	Technical Communications ¹	3

Numeracy		
(6 semester hours minimum)		
ECE 106	Introduction to Computer Aided Engineering ¹	3
MAT 270	Calculus with Analytic Geometry I ¹	4
	or MAT 260 and 261	

Humanities and Fine Arts and Social and Behavioral Sciences²
(15 semester hours minimum)
At least one course must be of upper division level, two courses must be from the same department, and two or more departments must be represented in the total selection.

HU course(s)	3-6	
CON 101	Construction and Culture: A Built Environment	3
	Social and behavioral sciences	0-3
ECN 111	Macroeconomic Principles ¹	3
ECN 112	Microeconomic Principles ¹	3

Natural Sciences		
(8 semester hours minimum)		
PHY 111	General Physics ¹	3
PHY 112	General Physics ¹	3
PHY 113	General Physics Laboratory ¹	1
PHY 114	General Physics Laboratory ¹	1

Total general studies

NOTE: Six semester hours in two of the three awareness areas² are required in the final list of courses offered in the student's graduation program of study. If desired, these hours can be included in the HU/SB course selections.

¹ Required for graduation.
² See pages 53-71 for the requirements and the approved list.

Construction Core Requirements Common to All Options

		<i>Semester Hours</i>
ACC 230	Uses of Accounting Information I	3
CEE 310	Testing of Materials for Construction	3
CEE 450	Soil Mechanics in Construction	3
CON 221	Applied Engineering Mechanics: Statics	3
CON 243	Heavy Construction Equipment, Methods, and Materials	3
CON 244	Construction Graphics	2
CON 251	Microcomputer Applications for Constructors	3
CON 252	Building Construction Methods, Materials, and Equipment	3
CON 273	Electrical Construction Fundamentals	3

CON 323	Strength of Materials	3
CON 341	Surveying	3
CON 345	Mechanical Systems	3
CON 371	Construction Management and Safety	3
CON 383	Construction Estimating	3
CON 389	Construction Cost Accounting and Control	3
CON 424	Structural Design	3
CON 463	Foundations and Concrete Structures	3
CON 495	Construction Planning and Scheduling	3
CON 496	Construction Contract Administration	3
ECE 105	Introduction to Languages of Engineering	3
STP 226	Elements of Statistics	3
Science elective		4
Total common to all options		66

Secondary Core for General Building, Heavy, and Specialty Construction Options

	<i>Semester Hours</i>
CEE 340	Hydraulics and Hydrology 3
CON 453	Construction Labor Management 3
LES 306	Business Law 3
Technical elective	3
Total secondary core required 12	

Secondary Core for the Military Option

	<i>Semester Hours</i>
CON 344	Route Surveying 3
CON 486	Heavy Construction Estimating 3
Total secondary core required 6	

Advisor approved alternates/transfer credits for courses listed above may vary from the total required semester hours indicated. Such variances do not reduce the minimum of 132 semester hours required for the degree.

The course work for the first two years is the same for the general, heavy, and speciality options. The specific lower-division requirements are shown below:

	<i>Semester Hours</i>
First Semester	
CON 101	Construction and Culture: A Built Environment 3
ECN 111	Macroeconomic Principles 3
ENG 101	First Year Composition 3
MAT 270	Calculus with Analytical Geometry 4
PHY 111	General Physics 3
PHY 113	General Physics Laboratory 1
Total 17	

Second Semester

ECE 105	Introduction to Languages of Engineering	3
ECN 112	Microeconomic Principles	3
ENG 102	First Year Composition	3
PHY 112	General Physics	3
PHY 114	General Physics Laboratory	1
HU elective		3
Total 16		

Third Semester

CON 221	Applied Engineering Mechanics: Statics	3
CON 243	Heavy Construction Equipment, Methods, and Materials	3
ECE 106	Introduction to Computer Aided Engineering	3
STP 226	Elements of Statistics	3
Basic science elective		4
Total 16		

Fourth Semester

ACC 230	Uses of Accounting Information I	3
CON 244	Construction Graphics	2
CON 251	Microcomputer Applications for Constructors	3
CON 252	Building Construction Methods, Materials, and Equipment	3
CON 273	Electrical Construction Fundamentals	3
CON 323	Strength of Materials	3
Total 17		

Option in General Building Construction

The general building option provides a foundation for students who wish to pursue careers as estimators, project managers, project engineers, and, eventually, owners of firms engaged in the construction of residential, commercial, and institutional structures. Educational focus is on building systems required for the mass development and production of large scale projects. General building construction is addressed as an integrated process from conception through delivery of completed facilities to users.

	<i>Semester Hours</i>
Requirements	
CON 472	Development Feasibility Reports 3
CON 483	Advanced Building Estimating 3
LES 411	Real Estate Law 3
REA 251	Real Estate Principles 3
Total 12	

Option in Heavy Construction

The heavy construction option prepares students for careers related to the public works discipline. Typical projects in which they are involved are highways, railroads, airports, power plants, rapid transit systems, process plants, harbor and waterfront facilities, pipelines, dams, tunnels, bridges, canals, sewerage and water works, and mass earthwork

	<i>Semester Hours</i>
Requirements	
CON 344	Route Surveying 3
CON 482	Cost Engineering 3
CON 486	Heavy Construction Estimating 3
LES 307	Business Law 3
Total 12	

Option in Military Construction

The military construction option is open only to students in the four year ROTC program leading to a commission in the U.S. Army. The option prepares students for careers in either the military or engineering/highway construction field.

	<i>Semester Hours</i>
Requirements	
Approved military science courses	18
Total	18

Option in Specialty Construction

The specialty construction option prepares students for careers with specialty constructors, such as mechanical and electrical construction firms. It emphasizes the construction process at the subcontractor level.

	<i>Semester Hours</i>
Requirements	
CON 455	Construction Office Methods 3
CON 468	Conceptual and Electrical Estimating 3
CON 482	Cost Engineering 3
Approved technical elective	3
Total 12	

CONSTRUCTION

CON 101 Construction and Culture: A Built Environment. (3) F, S

An analysis of the cultural context of construction, emphasizing its centrality in the evolution and expansion of built environments as expressions of ethical and historical value systems. Lecture speakers field trips *General studies, HU G*

221 Applied Engineering Mechanics: Statics. (3) F, S, SS

Vectors, forces and moments, force systems equilibrium analysis of basic structures and structural components friction centroids, and moments of inertia. Cross listed as ETC 211. Prerequisites: MAT 261 or equivalent, PHY 111, 113

243 Heavy Construction Equipment, Methods, and Materials. (3) F, S

Emphasis on "Horizontal" construction. Feet operations, maintenance programs, methods, and procedures to construct tunnels, roads, dams, and the excavation of buildings. Lab, field trips.

244 Construction Graphics. (2) F, S

Sketching and architectural drafting of building materials and systems. Computer graphic applications for construction. Lecture, lab, field trips. Prerequisite: ECE 106 or equivalent.

251 Microcomputer Applications for Constructors. (3) F, S

Application of the microcomputer as a problem-solving tool for the constructor. Characteristics of microcomputer hardware and operating systems. Use of spreadsheets, statistical packages, database management, and software. Prerequisite: ECE 106.

252 Building Construction Methods, Materials, and Equipment. (3) F, S

Emphasis on "Vertical" construction. Methods, materials, codes, and equipment used in building construction corresponding to the 16 division "Master Format." Lecture, lab.

273 Electrical Construction Fundamentals. (3) F, S

Circuits and machinery. Power transmission and distribution, with emphasis on secondary distribution systems. Measurements and instrumentation. Field trips. Prerequisites: MAT 270 or equivalent. PHY 112, 114.

323 Strength of Materials. (3) F, S

Analysis of strength and rigidity of structural members in resisting applied forces. Stress, strain, shear, moment, deflections, combined stresses, connections, and moment distribution. Both US and SI units of measurement. Prerequisite: CON 221.

341 Surveying. (3) F, S

Theory and field work in construction and surveys. Lecture, lab. Prerequisite: MAT 118.

344 Route Surveying. (3) S

Simple, compound, and transition curves including reconnaissance, preliminary and actual surveys. Calculation of earthwork. Dimensional control for construction projects. Lecture, lab. Prerequisites: CON 243, 341.

345 Mechanical Systems. (3) F, S

Design parameters and equipment related to heating and cooling systems for mechanical construction. Computer-aided calculations. Lecture, field trips. Prerequisites: CON 252; PHY 111, 113.

371 Construction Management and Safety. (3) F, S

Organization and management theory applied to the construction process. Leadership functions. Safety procedures and equipment. OSHA requirement for construction. Prerequisite: CON 252.

383 Construction Estimating. (3) F, S

Methods and techniques used in estimating construction costs. Standard approach to quantity surveys emphasized. Practice in takeoffs, costing, and final bid preparation on microcomputer usage for semester project. Lecture, project workshop. Prerequisites: CON 243, 244, 251, 252; Construction major or instructor approval.

389 Construction Cost Accounting and Control. (3) F, S

Nature of construction cost. Depreciation and tax theory and variable equipment costs. Cash flow theory. Investment models, profitability and analysis. Computer applications. Funding sources and arrangements. Builder's insurance. Prerequisites: ACC 230, CON 251. *General studies: N3*

424 Structural Design. (3) F, S

Economic use of steel, reinforced concrete and wood in building and engineered structures. Design of beams, columns, and connections. Elastic and ultimate strength design. Student design projects. Field trips. Prerequisite: CON 323.

453 Construction Labor Management. (3) F, S

Labor and management history, union, and open shop organization of building and construction workers; applicable laws and government regulations; goals, economic power, jurisdictional disputes, and grievance procedures. Lecture, lab. Prerequisites: CON 371; ECN 112. *General studies: H*

455 Construction Office Methods. (3) S

Administrative systems and procedures for the construction company office including methods improvement and work simplification of office layout, business forms and design, and office manuals. Prerequisite: CON 389.

463 Foundations and Concrete Structures. (3) F, S

Subsurface construction on theory and practice for foundations of buildings and engineered facilities. Concrete form design for foundations and structural frames. Underpinning, piling, dry and wet excavating, dewatering, coffer dams, and caissons. Lecture, recitation, field trips. Prerequisites: CEE 450; CON 424.

468 Conceptual and Electrical Estimating. (3) F

System of estimating construction costs before design has been initiated. Cost estimating for large projects. Analysis and organization of electrical estimate. Prerequisite: CON 383.

472 Development Feasibility Reports. (3) S

Integration of economic, social, theory, development cost data, market research data, and financial analysis into a feasibility report. Computer orientation. Prerequisites: CON 389; ECN 112, REA 251 or equivalent. *General studies: L2*

477 Residential Construction. (3) F

Study of design concerns, construction materials, and contract administration problems related to residential construction. Owner and contractor relationship. Field trips. Prerequisite: CON 252 or instructor approval.

482 Cost Engineering. (3) F, S

Application of engineering principles to project costs. System analysis of estimating design, construction and operating functions to optimize the life-cycle cost. Prerequisites: CON 389, 483 (or 486).

483 Advanced Building Estimating. (3) F, S

Concepts of pricing and markup, development of historic costs, life cycle costing, change order and conceptual estimating, and emphasizing microcomputer methods. Prerequisite: CON 383.

486 Heavy Construction Estimating. (3) F
Methods analysis and cost estimation for construction of highways, bridges, tunnels, dams and other engineering works. Field trips. Prerequisite: CON 383. Pre- or corequisite: CON 344.

495 Construction Planning and Scheduling. (3) F, S

Various network methods of project scheduling such as AOA, AON, PERT, bar-charting, network balance and VPM techniques. Microcomputers used for scheduling, resource allocation, and time/cost analysis. Prerequisites: CON 383; STP 226. Pre- or corequisite: CON 389 or instructor approval. *General studies: N3*

496 Construction Contract Administration. (3) F, S

Review construction contracts. Survey the administrative procedures of the general and subcontractors. Study documentation, claims, arbitration, litigation, bonding, insurance and indemnification. Discuss ethical practices, licensing, and codes. Lecture, field trips. Prerequisites: CON 371 and senior standing. Pre- or corequisite: ETC 400.

531 Economics of the Construction Industries. (3) F

The economic environment of construction with emphasis on unique aspects, critical review of economic literature dealing with the construction industries. Prerequisite: CON 496 or instructor approval.

533 Strategies of Estimating and Bidding. (3) F

Course will explore advanced concepts of the estimating process, such as modeling and statistical analysis, to improve bid accuracies. Prerequisite: CON 483 or 486, or instructor approval.

540 Construction Productivity. (3) F

Productivity concepts. Data collection. Analysis of productivity data and factors affecting productivity. Means for improving product on and study of productivity improvement programs. Pre- or corequisite: CON 495.

545 Construction Project Management. (3) F, S, SS

Theory and practice of construction project management. Roles of designer, owner, general contractor and construction manager. Lecture, field trips. Pre- or corequisite: CON 495.

548 Managing the Construction Enterprise for Survival. (3) F

Provides a thorough understanding of the business risks in the construction industry and processes for avoiding them.

551 Facilities Management. (3) S

Analysis of the facilities management organization and implementation of human resources, business management, building design and construction, work management and physical plant operations.

577 Construction Systems Engineering. (3) F

Systems theory as applied to the construction process. Alternatives for structuring information flows and the control of projects. Prerequisite: EE 476 or equivalent.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

School of Engineering

(ECG 100) 602/965-1726

PURPOSE

A large percentage of all engineering degree holders are found in leadership positions in a wide variety of industrial settings. Although an education in engineering is generally considered to be one of the best of technical educations, it also provides an opportunity for the development of many additional activities, aptitudes and interests, including moral, ethical, and professional concepts. In this era of rapid technological change, an engineering education serves our society well as a truly liberal education. Society's needs in the decades ahead call for engineering contributions on a scale not previously experienced. The well being of our civilization as we know it may well depend upon how effectively this resource is developed.

Students studying engineering at ASU are expected to acquire a thorough understanding of the fundamentals of mathematics and the sciences and their applications to the various engineering fields. The program is designed to develop a balance between science and engineering and an understanding of the economic and social consequences of engineering activity. The goals include the promotion of the general welfare of the engineering profession.

The courses offered are designed to meet the needs of the following students:

1. those who wish to obtain a degree in engineering and who plan careers in which science, mathematics, and analytical methods are of special value;
2. those who wish to do graduate work in engineering;
3. those who wish to have one or two years of training in mathematics, applied science and engineering in preparation for a technical career;
4. those who desire pre-engineering for the purpose of deciding which program to undertake or those who desire to transfer to another college or university; and

5. those who wish to take certain electives in engineering while pursuing another program in the university.

ADMISSION

See pages 30-35, 47-48, 224-225, and 230 for information regarding requirements for admission, transfer, retention, disqualification, and reinstatement.

College students who are beginning their initial college work in the School of Engineering should present certain secondary school units in addition to the minimum university requirements. A total of three units is required in mathematics. College algebra, geometry, and trigonometry must be included. The laboratory sciences chosen must include at least one unit in physics and one unit in chemistry. Calculus, biology, and computer programming are recommended.

Students who have omissions or deficiencies in subject matter preparation may be required to complete additional university credit course work that may not be applied toward an engineering degree. One or more of the courses CHM 113 General Chemistry, CSE 181 Applied Problem Solving with BASIC, ENG 101 First Year Composition*, MAT 118 Precalculus Algebra and Trigonometry, and PHY 105 Basic Physics are taken to satisfy omissions or deficiencies.

DEGREES AND MAJORS

The Bachelor of Science (B.S.) and Bachelor of Science in Engineering (B.S.E.) degrees are composed of three parts: University General Studies, an engineering core, and a major. This combination is illustrated in the charts shown on pages 242-243.

The general studies courses satisfy a university requirement and include literacy and critical inquiry, humanities and fine arts, social and behavioral sciences, numeracy and natural sciences (see pages 49-51). In addition, there are requirements in the areas of cultural diversity in the United States, historical, and global awareness. These courses constitute approximately 28% of the degree program.

* See statement on English examinations under "Placement Examinations for Proficiency," page 40.

The engineering core is a specific and organized body of knowledge that serves as a foundation to engineering and for further specialized studies in a particular engineering major. These courses constitute approximately 33% of the degree program.

The courses included in the engineering core are taught in such a manner that they serve as basic background material: (1) for all engineering students who will be taking subsequent work in the same and related subject areas and (2) for those students who may not desire to pursue additional studies in a particular subject area. Thus, subjects within the engineering core are taught with an integrity and quality appropriate relevant to the particular discipline but always with an attitude and concern for both engineering in general and for the particular major(s).

The majors available are of two types: (1) those associated with a particular department within the School of Engineering (for example, Electrical Engineering and Civil Engineering) and (2) those offered as special and interdisciplinary studies (for example, manufacturing engineering and pre-medical engineering). In general, all curricula are extensions beyond the engineering core and cover a wide variety of subject areas within each field. About one fourth of the major credits are reserved for the student's use as an area of emphasis. These credits are traditionally referred to as *technical electives*.

Majors and areas of emphasis are offered by the six engineering departments: Chemical, Bio and Materials Engineering; Civil Engineering; Computer Science and Engineering; Electrical Engineering; Industrial and Management Systems Engineering; and Mechanical and Aerospace Engineering. The majors of the Engineering Special Studies and Engineering Interdisciplinary Studies are administered by the Office of the Dean and are designed for those students whose educational objectives require more intensity of concentration or flexibility than is possible in the traditional departmental fields (see pages 277-280).

The first two years of study are concerned primarily with the general studies and the engineering core, with more time being spent on general studies.

The final two years of study are concerned with the engineering core and the major, with a considerable part of the time being spent on the major. This arrangement can be illustrated by the chart below.

The sequential arrangement of all course work for the B.S. and B.S.E. degrees into the three categories shown below is especially helpful to the beginning student. The semester-by-semester selection of courses varies from one field to another. An example of a typical freshman engineering schedule is shown below.

Typical Freshman Year

	<i>Semester Hours</i>
First Semester	
CHM 114 General Chemistry for Engineers ¹	4
or CHM 116 General Chemistry (4)	
ECE 105 Introduction to Languages of Engineering ²	3
MAT 290 Calculus I ³	5
HU or SB elective ⁴	6
or ENG 101 First-Year Composition (3) ⁵	
Total	18
Second Semester	
ECE 106 Introduction to Computer-Aided Engineering	3
ENG 102 First-Year Composition	3
or ENG 105 Advanced First-Year Composition (3) ⁵	
MAT 291 Calculus II ³	5
PHY 121 University Physics I: Mechanics ⁶	3
PHY 122 University Physics Laboratory I	1
HU or SB elective ⁴	3
Total	18

¹ Chemical Engineering, Bioengineering, Materials Science and Engineering, and Pre-medical engineering students take CHM 113 and 116.
² Students with no computer background should enroll in CSE 181 Applied Problem Solving with BASIC before enrolling in ECE 105.

³ MAT 270, 271, and 272 may be taken in lieu of MAT 290 and 291 (only 10 hours may be used to satisfy graduation requirements).
⁴ See pages 53-71.
⁵ Students not eligible for ENG 105 should complete ENG 101 in the first semester.
⁶ Students who have not completed one unit of physics in high school should complete PHY 105 in the preceding semester.

Well-prepared students usually can complete the program of study leading to an undergraduate degree in engineering in four years or less by attending summer sessions. Many students, however, may find it advantageous or necessary to devote more than four years to the undergraduate program by pursuing, in any semester, fewer studies than are regularly prescribed. Where omissions or deficiencies exist, e.g., in chemistry, computer programming, English, mathematics, and physics, the student must complete more than the minimum of 133 semester hours. Therefore, in cases of inadequate secondary preparation, poor health, or financial necessity requiring much time for outside work, the undergraduate program should be extended to five or more years.

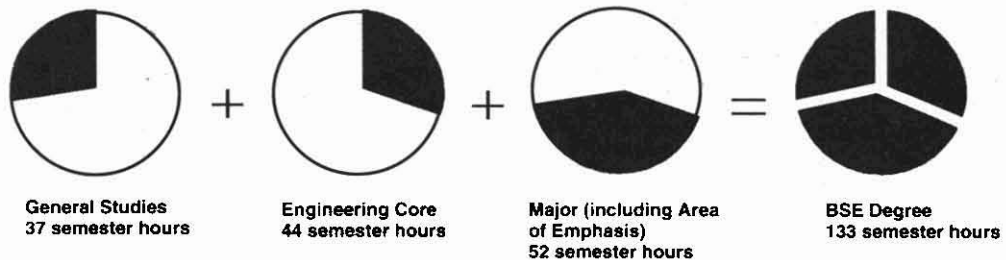
DEGREE REQUIREMENTS

The degree programs in engineering at ASU are intended to develop habits of quantitative thought having equal utility for both the practice of engineering and other professional fields. It is the intent of the faculty that all students be prepared in the following areas:

1. *Competency in oral and written English.* This is considered to be essential for the engineering graduate. Although the requirement of specific course work may serve as a foundation for such competency, the development of communication skills should be demonstrated by student work in engineering

courses. As a minimum and in addition to the 133 semester hour course requirements, all students must satisfy the university First-Year Composition requirements (see page 71).

2. *General studies.* This is to ensure that the engineering student acquires a satisfactory level of basic knowledge in the humanities and fine arts, social and behavioral sciences, literacy and critical inquiry, numeracy and natural sciences. These subjects are so selected as to give the engineer an increased awareness of social responsibilities, to provide an understanding of related factors in the decision-making process, and to provide a foundation for the study of engineering. *School of Engineering students must use caution in selecting their lower-division literacy and critical inquiry course (LI) because of accreditation requirements. The course selected should be one that is listed in the General Studies Courses table on pages 53-71 as satisfying both "LI" and "HU" or "LI" and "SB."* Otherwise, the student must complete a total of 16 semester hours of humanities and social and behavioral sciences, instead of 15 semester hours, to satisfy the baccalaureate degree requirements in engineering. *Because of accreditation requirements, aerospace studies (AES) and military science (MIS) courses are not acceptable for engineering degree credit as either humanities and fine arts or as a social and behavioral science.*
3. *Fundamental studies.* Studies in engineering and related subjects further develop the foundation for engineering and provide the base for specialized studies in a particular engineering discipline.



4. *Major studies.* These courses provide a depth of understanding for a more definitive body of knowledge appropriate to a particular aspect of societal concern. These studies include technical elective course work in an area of emphasis that may be selected by the student with the assistance of an advisor.

Also refer to the individual engineering department material for any additional specific departmental requirements.

The specific course requirements for the three parts of the B.S. and B.S.E. degrees are listed below

B.S. and B.S.E. Degree Requirements

	<i>Semester Hours</i>
English Proficiency	
ENG 101, 102 First Year Composition 6	6
or ENG 105 Advanced First Year Composition 3)	

General Studies

<i>Literacy and Critical Inquiry</i> ¹ (Six semester hours minimum)	
ECE 400 Engineering Communications* 3	3
One L1 and HU or L1 and SB course ¹	3

Numeracy

(Six semester hours minimum)	
ECE 106 Introduction to Computer Aided Engineering ² 3	3
MAT 290 Calculus I ² 5	5
or MAT 270 Calculus with Analytic Geometry I (4)	

Humanities and Fine Arts and Social and Behavioral Sciences¹

(16 semester hours minimum)
At least one course must be of upper division level; two courses must be from the same department; and two or more departments must be represented in total selection. If L1 course is also an HU or SB course, then 15 semester hours minimum are required

ECN 111 Macroeconomic Principles ² 3	3
or ECN 112 Microeconomic Principles (3)	
HU course(s) ³ 6-10	6-10
SB course(s) ³ 3-7	3-7
<i>Natural Sciences</i> (Eight semester hours minimum)	
PHY 121 University Physics I Mechanics ² 3	3
PHY 122 University Physics Laboratory I ² 1	1
PHY 131 University Physics II: Electricity and Magnetism ² 3	3
PHY 132 University Physics Laboratory II ² 1	1
Total general studies 37	37

NOTE: Six semester hours taken in two of the three awareness areas¹ are required in the final list of courses in the student's graduation program of study. These courses can be included in the HU and SB course selections.

- ¹ Refer to pages 53-71 for the specific requirements and the approved list.
- ² Required for graduation.
- ³ Aerospace studies (AES) and military science (MIS) courses are not acceptable for engineering degree credit

	<i>Semester Hours</i>
Engineering Core	
CHM 114 General Chemistry for Engineers 4	4
or CHM 116 General Chemistry 4)	
ECE 105 Introduction to Languages of Engineering 3	3
ECE 210 Engineering Mechanics I: Statics 3	3
or PHY 321 Newtonian Mechanics (3) ¹	
ECE 301 Electrical Networks I 4	4
MAT 274 Elementary Differential Equations 3	3
MAT 291 Calculus II 5	5
or MAT 271 (4) and MAT 272 (4)	
Approved mathematics content electives ² 4	4
Basic science elective ² 3	3

Minimum five of the following six courses are required ² 15	15
ECE 312 Engineering Mechanics II Dynamics (3) or PHY 322 Analytical Mechanics (3) ¹	
ECE 313 Introduction to Deformable Solids (3)	
ECE 333 Electrical Instrumentation (3) or ECE 334 Electronic Devices and Instrumentation (4)	
ECE 340 Thermodynamics (3) or CHM 441 General Physical Chemistry (3)	
ECE 350 Structure and Properties of Materials (3) or CHM 442 General Physical Chemistry (3) or ECE 351 Engineering Materials (3) or ECE 352 Properties of Electronic Materials (3)	

Microcomputer/Microprocessor elective (3) Select one ² :	
BME 470 Microcomputer Applications in Bioengineering (3)	
CEE 400 Microcomputer Applications in Civil Engineering (3)	
CHE 461 Process Control (3)	
CSE/EEE 225 Assembly Language Programming (Motorola) (3)	
CSE/EEE 226 Assembly Language Programming (Intel) (3)	
IEE 463 Computer Aided Manufacturing and Control (3)	
MAE 305 Measurements and Microcomputers (4)	
Total required minimum engineering core 44	44

¹ Subject to department approval. If PHY 321 is selected, PHY 322 must also be completed

² Courses to be selected are subject to department approval. See department requirements.

FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR
GENERAL STUDIES			
ENGINEERING CORE			
		MAJOR	OPTION

A summary of the degree requirements is as follows:

	<i>Semester Hours</i>
General studies	37
Engineering core	44
Major (including area of emphasis)	52
The requirements for each of the majors offered are described on the following pages.	
Total degree requirements	133
Plus university First-Year Composition requirements.	

GRADUATION REQUIREMENTS

To qualify for graduation from the School of Engineering, a student must have a minimum cumulative GPA of 2.00 in addition to having a GPA of at least 2.00 for the 52 semester hours of required courses in the major field.

PROFESSIONAL ACCREDITATION

The undergraduate programs in Aerospace Engineering, Bioengineering, Chemical Engineering, Civil Engineering, Computer Systems Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, Engineering Special Studies, and Engineering Interdisciplinary Studies are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The Bachelor of Science program in Computer Science is accredited by the Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board (CSAB).



ANALYSIS AND SYSTEMS

ASE 100 College Adjustment and Survival. (2) F, S

Exploration of career goals and majors. Emphasis on organization and development of study skills, including time management, stress management, and use of the library.

399 Cooperative Work Experience. (1) F, S, SS

Usually involves two six-month work periods with industrial firms or government agencies alternated with full-time semester and summer sessions studies. Not open to students from other colleges on campus. May be repeated for credit. Prerequisites: at least 45 hours completed in major area with minimum 2.50 GPA; instructor approval.

485 Engineering Statistics. (3) F, S, SS Statistical methods applied to engineering problems. Estimation, tests of hypotheses, regression, correlation, analysis of variance, and nonparametric statistics. Prerequisite: ECE 383. *General studies:* N2.

490 Project in Design and Development. (2-3) F, S, SS

Individual project in creative design and synthesis. Course may be repeated. Prerequisite: senior standing.

496 Professional Seminar. (0) F, S

Topics of interest to students in the engineering special and interdisciplinary studies.

500 Research Methods: Engineering Statistics. (3) F, S, SS

Statistical methods applied to engineering problems. Estimation, tests of hypotheses, regression, correlation, and analysis of variance and nonparametric statistics. Open only to students without previous credit in ASE 485. Prerequisite: ECE 383 or 500.

582 Linear Algebra in Engineering. (3) F Development and solution of systems of linear algebraic equations. Applications from mechanical, structural, and electrical fields of engineering. Prerequisite: MAT 242 or equivalent.

586 Partial Differential Equations in Engineering. (3) S

Development and solution of partial differential equations in engineering. Applications in solid mechanics, vibrations, and heat transfer. Prerequisites: ECE 386; MAT 242, 274.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

ENGINEERING CORE

ECE 105 Introduction to Languages of Engineering. (3) F, S, SS

Computer programming using C, freehand drawing, visualization, and computer graphics. Lecture, recitation, lab. Prerequisites: CSE 181 or BASIC programming experience; algebra.

106 Introduction to Computer-Aided Engineering. (3) F, S

Computer-aided analysis and design, computer graphics, modeling, optimization, and graphic documentation. Lecture, recitation, lab. Prerequisites: ECE 105 and 1 year high school physics or corequisite of PHY 105 or 112 or 131. *General studies:* N3.

107 Freehand Drawing and Visualization. (1) F, S, SS

Representational drawing from direct observation to assist visualization, spatial awareness, and perception. Techniques include contour,

gesture, and value drawing. Media include pencil and computer graphics. 3 hours lab.

210 Engineering Mechanics I: Statics. (3) F, S, SS

Force systems, resultants, equilibrium, distributed forces, area moments, fluid statics, internal stresses, friction, energy criterion for equilibrium, and stability. Lecture, recitation. Prerequisites: ECE 106; MAT 271 or 291; PHY 121, 122.

301 Electrical Networks I. (4) F, S, SS

Introduction to electrical networks. Component models, transient, and steady-state analysis. Lecture, recitation, lab. Prerequisite: ECE 106. Pre- or corequisites: MAT 274; PHY 131, 132.

312 Engineering Mechanics II: Dynamics. (3) F, S, SS

Kinematics and kinetics of particles, translating and rotating coordinate systems, rigid body kinematics, dynamics of systems of particles and rigid bodies, and energy and momentum principles. Lecture, recitation. Prerequisites: ECE 210; MAT 274.

313 Introduction to Deformable Solids. (3) F, S, SS

Equilibrium, strain-displacement relations, and stress-strain-temperature relations. Applications to force transmission and deformations in axial, torsional, and bending of bars. Combined loadings. Lecture, recitation. Prerequisites: ECE 210; MAT 274.

333 Electrical Instrumentation. (3) F, S, SS

Survey of electronic devices and circuits as applied to instrumentation/measurements. Diodes/transistors/basic transistor amplifiers/op-amps/digital logic gates, electrical sensors/transducers as applied to electrical and electronic devices, circuits, and instruments. Lecture, lab. Prerequisite: ECE 301.

334 Electronic Devices and Instrumentation. (4) F, S, SS

Application of electric network theory to semiconductor discrete and integrated circuits. Electronic device and circuit applications, laboratory circuit design, testing, and verification. Lecture, recitation, lab. Prerequisite: ECE 301.

340 Thermodynamics. (3) F, S, SS

Work, heat, and energy transformations and relationships between properties; laws, concepts, and modes of analysis common to all applications of thermodynamics in engineering. Lecture, recitation. Pre- or corequisites: CHM 114 or 116; ECE 210; MAT 274; PHY 131.

350 Structure and Properties of Materials. (3) F, S, SS

Basic concepts of material structure and its relation to properties. Application to engineering problems. Prerequisites: CHM 114 or 116; PHY 121.

351 Engineering Materials. (3) F, S

Structure and behavior of civil engineering materials. Laboratory investigations and test criteria. Lecture, lab. Prerequisite: ECE 313.

352 Properties of Electronic Materials. (3) F, S, SS

Introduction of Schrodinger wave equation, treatment of potential barrier problems in wave mechanics, hydrogen atom and the periodic table, bonds of crystals, free electron model, the band theory of solids, semiconductors, introduction of semiconductor devices, superconductor dielectric, and magnetic properties of electronic materials. Prerequisites: ECE 333 or 334; MAT 274.

383 Probability and Statistics for Engineers. (2) F, S, SS

Probability, random variables, discrete and continuous distributions descriptive statistics, and sampling distributions Prerequisite: MAT 272 or MAT 291 *General studies: N2.*

384 Numerical Analysis for Engineers I. (2) F, S

Numerical solution of algebraic and transcendental equations and systems of linear equations. Numerical integration Curve fitting. Error bounds and error propagation Emphasis on use of digital computer. Prerequisites: ECE 105; MAT 272 or 291

385 Numerical Analysis for Engineers II. (2) S

Continuation of ECE 384. Numerical solution of partial differential equations and mixed equation systems Introduction to experimental design and optimization techniques Prerequisite: ECE 384

386 Partial Differential Equations for Engineers. (2) F, S

Boundary value problems, separation of variables, and Fourier series as applied to initial boundary value problems. Prerequisite: MAT 274.

400 Engineering Communications. (3) F, S, SS

Planning and preparing engineering publications and oral presentations, based on directed library research related to current engineering topics Prerequisite: senior or standing in an engineering field and completion of first year English requirements plus sophomore critical writing course *General studies L2*

500 Research Methods: Probability and Statistics for Engineers. (2) F, S, SS

Probability, random variables, discrete and continuous distributions descriptive statistics and sampling distributions Open only to students without previous credit for ECE 383. Prerequisite: MAT 272 or 291

Omnibus Courses: See page 44 for omnibus courses that may be offered

**SOCIETY, VALUES,
AND TECHNOLOGY****STE 201 Introduction to Bioengineering.** (3) F

Impact of bioengineering on society. Developing an awareness of the contributions of bioengineering to society and biological problems Cross listed as BME 201. Prerequisite: ENG 102 or 105.

202 Global Awareness within Engineering Design. (3) F

Strategies for integrating long term environmental, economic, and ethical considerations into engineering design Biomedical environmental, technological, and materials engineering case studies Lecture critical discussion course Cross listed as BME 202. Prerequisites: ECE 106; ECN 111 or 112 ENG 102 *General studies L1*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

**Chemical, Bio and
Materials Engineering**

James W. Mayer
Interim Chair

(ECG 202) 602/965-3313

Historically, materials have had a tremendous impact on the advancement of civilization, as reflected in the words "stone," "bronze," "iron," and "paper" attached to the various ages in the development of society. Until recently an arbitrary distinction was made between chemically reactive materials and relatively inert solid phase materials. As our technological know how advances, we recognize that the fundamental principles, the molecular level mechanisms, and the processing techniques are very similar regardless of the state, phase, or shape of the materials. Understanding of these principles and their application to real systems is the key to future progress as specially designed materials are sought for the solution of complex technological problems. Therefore, it is logical that the educational program of future scientists and engineers dealing with the engineered materials be comprehensive, covering all aspects of the materials world.

Similarly, the human body and other living systems process materials by analogous steps as do the chemical industries. These living systems are small, sophisticated integrated plants utilizing pumps, aerators, separators, and reactors involving fluid flow, thermodynamics, heat and mass transfer, and other familiar principles. Therefore, it is appropriate that chemical, bio, and materials engineers work together in both education and research.

Students aspiring to be engineers in either the chemical, bio-, or materials engineering areas must prepare to solve a wide variety of problems utilizing chemistry, physics, mathematics, life sciences, and engineering sciences. As professionals in industry, they apply these fundamentals to creatively develop, economically design, and productively operate systems, constituent equipment, and specialized analytical facilities.

The department offers three B.S.E. degrees, in Chemical Engineering, in Bioengineering, and in Materials Science and Engineering. A B.S.E. degree

program in pre medical engineering is also available at ASU; it is described separately on pages 279-280

**CHEMICAL ENGINEERING—
B.S.E.****PROFESSORS**

BERMAN, CALE, GUILBEAU, HENRY,
KUESTER, SATER, ZW EBEL

ASSOCIATE PROFESSORS

BECKMAN, BELLAMY, BURROWS,
RAUPP, RIVERA, TORREST

ASSISTANT PROFESSOR

GARCIA

PROFESSORS EMERITI

DORSON, REISER

Chemical engineers are generally concerned with chemical change. They design and operate processes that accommodate such changes, including the chemical activation of materials. Typically this involves complex multicomponent systems wherein the interactions between species have to be considered and analyzed. The new challenge in chemical engineering is to apply the principles of mass transfer, solution thermodynamics, reaction kinetics, and separation techniques to technological endeavors such as integrated circuit design, solid state surface treatments, and materials processing.

Consequently, in addition to the chemical and petroleum industries, chemical engineers find challenging opportunities in the plastics, solid-state, electronics, computer, metals, space, food, drug, and health care industries, where they practice in a wide variety of occupations, such as environmental control, surface treatments, energy and materials transformations, biomedical applications, fermentation, protein recovery, extractive metallurgy, and separations. While a large percentage of the industrial positions are filled by graduates with bachelor's degrees, there are lucrative and creative opportunities in research and development for those who acquire postgraduate education.

Subspecializations have developed within the profession. However, the same broad body of knowledge is generally expected of all chemical engineers for maximum flexibility in industrial positions. The preparation for chemical engineering is accomplished by a blend of classroom instruction and laboratory experience.

DEGREE REQUIREMENTS

The course work for the undergraduate degree can be classified into the following categories (in semester hours):

General studies 39

Sixteen hours of HU and SB type courses must be included see page 240, general studies, for special requirements) since CHE 351 and 352 must be taken to satisfy L1 elective.

Engineering core 44

CHE 461; CHM 116, 331, 441, 442, ECE 105, 210, 301, 313, 333, 384, 385; MAT 274, 291 (or 271 and 272)

Major 50

CHE 311, 312, 331, 332, 333, 342, 432, 442, 451, 462; CHM 113, 332, 335; 12 hours technical electives

In the above engineering core listing, ECE 394 ST: Conservation Principles, ST: Properties That Matter, ST: Systems, and ST: Differential Conservation may be substituted for CHM 441 and ECE 210, 301, 313, and 333. In the above list of courses, additional hours of approved technical elective courses may be substituted for CHE 311, 312 and 331 and CHM 442.

The technical elective courses must be selected from upper division courses with an advisor's approval and must include the following: two three semester hour chemistry courses; a three-semester hour natural science or materials course; and a three semester hour chemical engineering course.

To fulfill accreditation requirements and to prepare adequately for the advanced chemistry courses, Chemical Engineering majors are required to take the CHM 113 and 116 introductory chemistry sequence (CHM 117 and 118 are acceptable substitutes). Other freshman chemistry courses are *not acceptable*, and transfer students who have taken another chemistry course may be required to enroll in CHM 113 and 116.

Students are required to enroll in CHE 496 Professional Seminar during at least one semester of each academic year in attendance. A total of five semesters of seminar credit is necessary to meet degree requirements.

The Department of Chemical, Bio and Materials Engineering also offers graduate programs leading to the M.S.E., M.S., and Ph.D. degrees. These programs provide a blend of classroom instruction and research. A wide variety of topical and relevant research projects are available for thesis topics. Students interested in these pro-

grams should contact the department for up-to date descriptive literature.

Chemical Engineering Areas of Emphasis

Students who wish to specialize may develop an area of interest through the use of technical electives and selective substitutions for required courses. Substitutions must be approved by the advisor and the Department Standards Committee and must be consistent with ABET accreditation criteria. No substitution of CHE 462 is allowed. The following are possible elective areas of emphasis with suggested courses. A student may choose electives within the general department guidelines and does not have to select one of the areas listed.

Biochemical. Students wishing to prepare for a career in biotechnology, pharmaceuticals, fermentation, food processing, and other areas within biochemical engineering should select from:

Chemistry elective: CHM 361, 461.
Technical electives: AGB 425, 426; CHE 475, 476, 477

Biomedical. Students who are interested in biomedical engineering but wish to maintain a strong, broad chemical engineering base should select from:

Chemistry elective: CHM 361, 461
Technical electives: BME 318, 414, 416, 435, CHE 411, 412, 413.

Environmental. Students interested in the management of hazardous wastes and air and water pollution should select from:

Chemistry elective: CHM 361, 461, 481.
Technical electives: CEE 362, 561, 563, 564; CHE 494, 533, 552, 553; EEE 461.

Materials. Students interested in the development and production of new materials such as ceramics, polymers, semiconductors, composites, superconductors, and alloys should select from:

Chemistry elective: CHM 438, 453, 471.
Technical electives: BME 318; ECE 350, 352; MSE 431, 470, 471, 472.

Pre medical. Students planning to attend medical school should select courses from those listed under the biomedical emphasis. In addition, BIO 181 and 182 must be taken to satisfy medical-school requirements but are not counted toward the Chemical Engineering bachelor's degree.

Process Engineering. The engineering core and required chemical engineering courses serve as a suitable background for students intending to enter the traditional petrochemical and chemical process industries. Students can build on this background by selecting courses with the approval of their advisor. Examples:

Energy conversion and conservation: CHE 552, 553, 554, 556, MAE 436, 437, 438.

Plant administration and management: CHE 528, 553; IEE 300, 431.

Simulation, control, and design: CHE 527, 528, 556, 562, 563

Semiconductor Processing. Students who are interested in the development and manufacturing of semiconductor and other electronic devices should select from:

Chemistry elective: CHM 471.
Technical electives: ECE 352; EEE 435, 436; MSE 472

Chemical Engineering Program of Study Typical Four-Year Sequence

First Year

First Semester	Semester Hours
CHE 496 Professional Seminar	0
CHM 113 General Chemistry	4
ECE 105 Introduction to Languages of Engineering	3
ENG 101 First Year Composition	3
MAT 290 Calculus I	5
HU or SB elective*	3
Total	18

Second Semester

CHE 496 Professional Seminar	0
CHM 116 General Chemistry	4
ECE 106 Introduction to Computer Aided Engineering	3
ENG 102 First Year Composition	3
MAT 291 Calculus II	5
PHY 121 University Physics I: Mechanics	3
PHY 122 University Physics Laboratory I	1
Total	19

Second Year

First Semester

CHE 311 Material Balances	3
CHE 496 Professional Seminar	0
CHM 331 General Organic Chemistry	3
CHM 335 General Organic Chemistry Laboratory	3
MAT 24 Elementary Differential Equations	3
PHY 131 University Physics II: Electricity and Magnetism	3
PHY 132 University Physics Laboratory II	1
Total	14

Second Semester

CHE 312	Introduction to Thermodynamics	3
CHE 331	Transport Phenomena I: Fluids	3
CHE 496	Professional Seminar	0
CHM 332	General Organic Chemistry	3
ECE 210	Engineering Mechanics I: Statics	3
ECE 384	Numerical Analysis for Engineers I	2
HU or SB elective*		3
Total		17

Third Year

First Semester

CHE 332	Transport Phenomena II: Energy Transfer	3
CHE 342	Applied Chemical Thermodynamics	4
CHE 351	Measurements Laboratory	2
CHE 496	Professional Seminar	0
CHM 441	General Physical Chemistry	3
ECE 385	Numerical Analysis for Engineers II	2
HU or SB elective*		4
Total		18

Second Semester

CHE 333	Transfer Phenomena III: Mass Transfer	3
CHE 352	Transport Laboratories	2
CHE 496	Professional Seminar	0
CHM 442	General Physical Chemistry	3
ECE 301	Electrical Networks I	3
ECE 313	Introduction to Deformable Solids	3
HU or SB elective*		3
Total		18

Fourth Year

First Semester

CHE 432	Principles of Chemical Engineering Design	3
CHE 442	Chemical Reactor Design	3
CHE 451	Chemical Engineering Laboratory	2
CHE 461	Process Control	3
CHE 496	Professional Seminar	0
Technical elective		6
Total		17

Second Semester

CHE 462	Process Design	3
CHE 496	Professional Seminar	0
ECE 333	Electrical Instrumentation	3
ECE 400	Engineering Communications	3
HU or SB elective*		3
Technical elective		6
Total		18

Degree requirements: 133 semester hours plus English proficiency.

* See pages 53-71 for requirements and approved list

BIOENGINEERING—B.S.E.

PROFESSORS

GUILBEAU, TOWE

ASSISTANT PROFESSORS

KIPKE, PIZZONI

SWEENEY, YAMAGUCHI

PROFESSOR EMERITUS

DORSON

Bioengineering (synonyms: biomedical engineering, medical engineering) is the discipline of engineering that applies principles and methods from engineering, the physical sciences, the life sciences, and the medical sciences to understand, define, and solve problems in medicine, physiology, and biology. Bioengineering bridges the engineering, physical, life, and medical sciences. More specifically, the bioengineering program at ASU educates engineering students to use engineering principles and technology to develop instrumentation, materials, diagnostic and therapeutic devices, artificial organs, and other equipment needed in medicine and biology and to discover new fundamental principles regarding the functioning and structure of living systems. The multidisciplinary approach to solving problems in medicine and biology has evolved from exchanges of information between specialists in the concerned areas.

Because a depth of knowledge from at least two diverse disciplines is required in the practice of bioengineering, students desiring a career in bioengineering should plan for advanced study beyond the bachelor's degree. The Bioengineering major at ASU is especially designed for students desiring graduate study in bioengineering, a career in the medical device industry, a career in biomedical research, a career in biotechnology research, or entry into a medical college.

Graduate degree programs in Bioengineering are offered at ASU at both the master's and doctoral levels. For more information concerning these degree programs, consult the *Graduate Catalog*.

Academic Requirements

In addition to the general studies requirement, CHM 116 General Chemistry and BIO 181 General Biology (basic science elective) must be selected in the engineering core. Also, in the engineering core, students must select ECE

313, 333, 340, and 350 and BME 470. The following courses are required in the undergraduate Bioengineering major. They have been selected to meet all university requirements and ABET accreditation requirements:

			<i>Semester Hours</i>
AGB/BME 475	Animal Physiology I	4	4
BIO 182	General Biology	4	4
BME 318	Biomaterials	3	3
BME 331	Transport Phenomena I: Fluids	3	3
BME 334	Heat and Mass Transfer	3	3
BME 411	Biomedical Engineering I (or BME 412 Biomedical Engineering II)	3	3
BME 413	Physiological Instrumentation	3	3
BME 417	Biomedical Engineering Design	3	3
BME 423	Physiological Instrumentation Laboratory	1	1
BME 490	Biomedical Engineering Projects	2	2
BME 496	Professional Seminar	0	0
CHM 113	General Chemistry	4	4
Technical electives		18	18
Total			51

Bioengineering Areas of Emphasis

Students interested in a career in bioengineering may elect to emphasize either biochemical, bioelectrical, biomaterials engineering, biomechanical, bionuclear, biosystems, molecular and cellular bioengineering, or pre-medical engineering. Although organic chemistry and biochemistry are not required in the bioelectrical, biomechanical, bionuclear, and biosystems engineering areas of emphasis, students selecting these areas are encouraged to include organic and biochemistry in their advanced degree programs of study.

Biochemical Engineering. This emphasis is designed to strengthen the student's knowledge of chemistry and transport phenomena and is particularly well suited for students interested in biotechnology. Technical electives must include CHM 331, 332, and 361 (or 461 or 462). The remaining technical electives must be upper-division engineering courses of suitable engineering science and design content.

Bioelectrical Engineering. This emphasis is designed to strengthen the student's knowledge of electrical systems, signal processing, and medical imaging. It emphasizes bioelectrical phenomena, medical instrumentation,

noninvasive imaging, and electrophysiology. ECE 334 is taken instead of ECE 333 in the engineering core. Technical electives must include BME 414, and EEE 302 and 303. Remaining technical electives are selected from BME 412, 419, and 520, and any 400-level EEE course with acceptable engineering science and design content.

Biomaterials Engineering. This area of emphasis integrates the student's knowledge of materials science and engineering with biomaterials science and engineering concepts for the design of materials intended to be used for the development of medical and diagnostic devices. It emphasizes structure-property relationships of engineering materials (metals, polymers, ceramics, and composites) and biological materials, biomaterial-host response phenomena, technical and regulatory aspects of biomaterials testing and evaluation and biotechnology applications in biomaterials engineering for the design and selection of soft and hard tissue biomaterials intended for clinical applications. Technical electives must include CHM 331, 332, and 361 and MSE 355 and 470. Remaining technical electives must be chosen from upper-division engineering or life or physical sciences courses having suitable science and design content and are subject to BME program approval.

Biomechanical Engineering. This emphasis is designed to strengthen the student's knowledge of mechanics, materials science, control theory and mechanical design. It emphasizes the design of orthopedic load bearing joint replacement devices, orthotic devices, and other mechanical devices important in the practice of medicine. It also provides the fundamentals for the study of neuromuscular control and the study of human motion. The following courses are required selections in the engineering core: ECE 384 (or MAT 242) and MAE 305. Technical electives may be selected from one of the following two groups:

- Biomechanics: BME 416; ECE 312; MAE 404 (or MSE 440), 422, 441.
- Biocontrols. BME 416, 419; ECE 312; MAE 317, 417 (or 447).
- Bionuclear Engineering** This emphasis is designed to strengthen the student's knowledge of radiation interac-

tions and shielding, health physics, radiation biology, radiation protection, and nuclear instrumentation. Technical electives include: BME 461, 465; PHY 361. Remaining technical electives are selected from BME 414 or any 400 level BME or EEE courses with acceptable engineering science and design content.

Biosystems Engineering. This emphasis is designed to strengthen the background of students interested in physiological systems analysis and design of artificial organs and medical devices that are based on chemical reactions and include momentum, heat, or mass transfer phenomena. Analyzing or designing flowing and reacting systems requires a background in transport phenomena, thermodynamics, and reaction engineering. Whether the system involves the microcirculation and physiological events or an artificial organ and extracorporeal circulation, there is a core of bioengineering sciences and design common to both applications. Technical electives must include: BME 419; CHE 342; ECE 312, 394 Conservation Principles.

Molecular and Cellular Bioengineering. This emphasis is designed to strengthen and integrate the student's knowledge of molecular and cellular biology, biochemistry, and biomaterials science and engineering for the design of biomolecular and cellular based hybrid medical and diagnostic devices. It is particularly suited for students interested in pursuing graduate studies in molecular and cellular bioengineering and health related biotechnology. Technical electives must include BIO 332 and CHM 331, 332, and 361. Other technical electives may be chosen from upper-division courses in engineering, life, and physical sciences with appropriate science and engineering design content and are subject to BME program approval.

Pre medical Engineering. This emphasis is designed to meet the needs of students desiring entry into a medical or dental school. The course sequence provides an excellent background for advanced study leading to a career in research in the medical or life sciences. Technical electives must include CHM 331, 332, 335, and 336. Remaining

technical electives must consist of BME prefix courses plus biology or biochemistry courses, which must meet engineering science and design content requirements.

**Bioengineering Program of Study
Typical Four-Year Sequence
First Year**

		<i>Semester Hours</i>
First Semester		
BME 496	Professional Seminar	0
CHM 113	General Chemistry	4
ECE 105	Introduction to Languages of Engineering	3
ECN 111	Macroeconomic Principles	3
ENG 101	First Year Composition	3
MAT 290	Calculus I	5
Total		18
Second Semester		
BME 496	Professional Seminar	0
CHM 116	General Chemistry	4
ECE 106	Introduction to Computer Aided Engineering	3
ENG 102	First Year Composition	3
MAT 291	Calculus II	5
PHY 121	University Physics I Mechanics	3
PHY 122	University Physics Laboratory I	1
Total		19

Second Year

First Semester		
BIO 181	General Biology	4
BME 496	Professional Seminar	0
MAT 274	Elementary Differential Equations	3
PHY 131	University Physics II: Elec tricity and Magnetism	3
PHY 132	University Physics Laboratory II	1
HU or SB elective ¹	. . . . .	3
L1 elective ^{1,2}	. . . . .	3
Total		17
Second Semester		
BIO 182	General Biology	4
BME 331	Transport Phenomena I: Fluids	3
BME 496	Professional Seminar	0
ECE 210	Engineering Mechanics I: Statics	3
ECE 301	Electrical Networks I	4
HU or SB elective ¹	. . . . .	3
Total		17

Third Year

First Semester		
BME 435	Animal Physiology I	4
BME 496	Professional Seminar	0
ECE 313	Introduction to Deformable Solids	3

ECE 340	Thermodynamics	3
	or CHM 441 General Physical Chemistry (3)	
ECE 350	Structure and Properties of Materials	3
ECE 384	Numerical Analysis for Engineers I	2
	or ECE 386 Partial Differen- tial Equations for Engineers (2) or MAT 242 Elementary Linear Algebra (2)	
	Technical elective	3
	Total	18
Second Semester		
BME 318	Biomaterials	3
BME 334	Heat and Mass Transfer	3
BME 496	Professional Seminar	0
ECE 333	Electrical Instrumentation	3
ECE 383	Probability and Statistics for Engineers	2
HU or SB elective ¹	. . . . .	3
	Total	14

Fourth Year

First Semester		
BME 411	Biomedical Engineering I	3
	or BME 412 Biomedical Engineering II (3)	
BME 413	Physiological Instrumentation	3
BME 423	Physiological Instrumenta- tion Laboratory	1
BME 490	Biomedical Engineering Projects	2
BME 496	Professional Seminar	0
HU or SB elective ¹	. . . . .	3
	Technical electives	6
	Total	18
Second Semester		
BME 417	Biomedical Engineering Design	3
BME 470	Microcomputer Applications	3
BME 496	Professional Seminar	0
ECE 400	Engineering Communi- cations	3
	Technical elective	9
	Total	18
	<i>Degree requirements: 133 semester hours plus English proficiency</i>	

¹ See pages 49-71 for the requirements and the approved list of courses

² See page 244 for special requirements and selection of an L1 elective.

MATERIALS SCIENCE AND ENGINEERING—B.S.E.

REGENTS' PROFESSOR
WAGNER

PROFESSORS
CARPENTER, JACOBSON, KRAUSE,
MAYER

ASSOCIATE PROFESSORS
DEY, HENDRICKSON

ASSISTANT PROFESSOR
ALFORD

PROFESSOR EMERITUS
STANLEY

Materials science is the engineering and scientific discipline that is concerned with the study of fundamental relationships between the structure of materials and their properties. The program provides students with the knowledge necessary to make decisions concerning the optimum utilization of existing materials or to develop and process new materials.

Essentially all major industries and many research laboratories are involved to some extent with the selection, utilization, and development of materials in designing and producing engineered systems. Students who major in Materials Science and Engineering find employment opportunities in a variety of industries and research facilities associated with aerospace, solid state electronics, energy conversion, transportation, manufacturing and chemical processing. The responsibilities of a materials scientist or materials engineer include research and development of materials to meet some new demand brought about by advancing technology, to select the best choice of existing materials for a specific application, or to devise novel ways to process materials to improve performance. Materials scientists also develop new techniques for processing materials to reduce costs of products or to create new products. Also, materials scientists are often responsible for analyzing data on field tested materials to determine the effects of the environment on materials performance.

The tools of a materials scientist include highly sophisticated analytical and processing equipment. Instruments such as ion implanters, molecular beam epitaxy systems, and chemical vapor deposition chambers have become indispensable in materials processing.

Since a considerable emphasis in materials science is placed on the microscopic world, instruments such as transmission and scanning electron microscopes, scanning tunneling microscopes, X-ray diffractometers, and Auger spectrometers are a necessary part of the field.

DEGREE REQUIREMENTS

The undergraduate curriculum requires that students take a series of interdisciplinary courses of fundamental importance to an understanding of all engineering materials. In addition, at the beginning of the third year, students are required to select a specialization in one of two areas: (1) materials processing and synthesis or (2) materials engineering. Students who elect to specialize in materials processing and synthesis select courses that emphasize thin film electronic materials while students who elect materials engineering select courses that emphasize the behavior of bulk solids.

The courses for the undergraduate degree can be classified into the following categories (in semester hours):

General studies 37

See page 244 for School of Engineering requirements.

Engineering core 44

CHM 116, 441; ECE 105, 210 (or PHY 321), 301, 313, 333 (or 312 or PHY 322), 350, 383 (or 384 or 386); IEE 463 or MAE 305, MAT 242, 274, 291 or 271 and 272); PHY 361

Major 52

CHM 113; MSE 353, 355, 430, 440, 450, 482, 490, 496

Three of the following four courses are required: MSE 420, 470, 471, and 472. In addition, course requirements for the two specialization areas are listed below.

Materials Processing and Synthesis. MSE 354, 453, and 454 and 11 hours of technical electives*.

Materials Engineering. MSE 420 lab, 431, 441, and 476, and 10 hours of technical electives*

* Technical electives must include eight hours of engineering design content.

Materials Science and Engineering Areas of Emphasis

Technical electives may be selected from one or more of the following areas. A student may, with prior approval of the department, select a general area or a set of courses that would

support a career objective not covered by the following categories.

Chemical Processing and Energy Systems. CHE 432, 442, 451; MAE 371, 372, 388, 430, 437, 438; MSE 530, 531, 533.

Electronic Materials. CHE 458, 548, 558; CHM 471; EEE 435, 539; MAE 437, 438, MSE 520, 521, 550, 562, 573; PHY 471, 481

Manufacturing and Materials Processing MAE 372, 403, 415, 422, 441, 442; MSE 441, 540, 549, 560.

Mechanical Metallurgy. MAE 305, 415, 422, 441, 442, 520, 522, 524, 527, 557; MSE 431, 441, 480, 520, 521, 540, 549, 550, 558, 560

Physical Metallurgy. CHM 471, MAE 372, 388, 422; MSE 431, 441, 480, 520, 521, 550, 558, 559, 560, 561, 573; PHY 361, 362, 471, 481.

Polymers and Composites. CHM 331, 332, 438, 471; MAE 372, 520, 527; MSE 570.

Materials Science and Engineering Program of Study

Typical Four-Year Sequence

First Year

	<i>Semester Hours</i>
First Semester	
CHM 113 General Chemistry ...	4
ECE 105 Introduction to Languages of Engineering	3
ENG 101 First Year Composition	3
MAT 270 Calculus with Analytic Geometry I	4
HU or SB elective ¹	3
Total	17

Second Semester	
CHM 116 General Chemistry	4
ECE 106 Introduction to Computer Aided Engineering	3
ENG 102 First Year Composition	3
MAT 271 Calculus with Analytic Geometry II	4
PHY 121 University Physics I, Mechanics	3
PHY 122 University Physics Laboratory I	1
Total	18

Second Year

First Semester	
ECE 211 Engineering Mechanics I: Statics or PHY 321 Newtonian Mechanics (3)	3
ECE 350 Structure and Properties of Materials	3
MAT 272 Calculus with Analytic Geometry III	4
MSE 496 Professional Seminar	0

PHY 131 University Physics II: Electricity and Magnetism	3
PHY 132 University Physics Laboratory II	1
HU or SB elective ¹	3
Total	17

Second Semester

ECE 301 Electrical Networks I	4
ECE 313 Introduction to Deformable Solids	3
MAT 242 Elementary Linear Algebra	2
MAT 274 Elementary Differential Equations	3
MSE 496 Professional Seminar	0
PHY 361 Introductory Modern Physics	3
L1 elective ¹	3
Total	18

Third Year

First Semester

CHM 441 General Physical Chemistry	3
ECE 312 Engineering Mechanics II Dynamics or ECE 333 Electrical Instrumentation (3) or PHY 322 Analytical Mechanics (3)	3
IEE 463 Computer Aided Manufacturing and Control or MAE 305 Measurements and Microcomputers 4)	3
MSE 353 Introduction to Materials Processing and Synthesis	3
MSE 355 Introduction to Materials Science and Engineering	3
MSE 496 Professional Seminar	0
HU or SB elective ¹	3
Total	18

Second Semester

ECE 383 Probability and Statistics for Engineers or ECE 384 Numerical Analysis for Engineers I (2) or ECE 386 Partial Differential Equations for Engineers (2)	2
MSE 354 Experiments in Materials Synthesis and Processing I or MSE 431 Corrosion and Corrosion Control (3)	2
MSE 420 Physical Metallurgy or MSE 472 Integrated Circuit Materials Analysis (3)	4
MSE 430 Thermodynamics of Materials	3
MSE 496 Professional Seminar	0
HU or SB elective ¹	3
Technical elective	3 or 4
Total	18

Fourth Year

First Semester

ECE 400 Engineering Communications	3
MSE 440 Mechanical Properties of Solids	3
MSE 450 X Ray and Electron Diffraction	3
MSE 470 Polymers and Composites or MSE 453 Experiments in Materials Synthesis and Processing II 2)	3
MSE 471 Introduction to Ceramics or MSE 453 Experiments in Materials Synthesis and Processing II 2)	3
MSE 496 Professional Seminar	0
HU or SB elective ¹	3
Total	18

Second Semester

MSE 454 Advanced Materials Processing and Synthesis or MSE 441 Analysis of Material Failures (3)	3
MSE 476 Nonmetallic Materials Laboratory ³	1
MSE 482 Materials Engineering Design	3
MSE 490 Capstone Design Project	3
MSE 496 Professional Seminar	0
Technical elective	7
Total	17

Degree requirements: 133 semester hours plus English proficiency.

¹ See pages 45-65 for the requirements and the approved list.

² See page 240 for special requirements and selection of an L1 elective.

³ Materials Engineering option only.

CHEMICAL ENGINEERING

CHE 311 Material Balances. (3) F, S Principles of physics and chemistry applied to the formulation of material balances Prerequisites CHM 116, ECE 106 MAT 271 or 291

312 Introduction to Thermodynamics. (3) F, S Energy balance calculations and introduction of thermodynamic principles Prerequisite CHE 311

331 Transport Phenomena I: Fluids. (3) F, S Transport phenomena, with emphasis on fluid systems Cross-listed as BME 331 Prerequisites CHE 311 (except BME majors) MAT 274; PHY 131

332 Transport Phenomena II: Energy Transfer. (3) F, S Continuation of transport principles, with emphasis on energy transport in stationary and fluid systems Prerequisites CHE 312, 331 Pre- or corequisite: ECE 385.

333 Transport Phenomena III: Mass Transfer. (3) F, S The application of transport phenomena to mass transfer The design of mass transfer equipment, including staged processes. Pre- or corequisites CHE 332 342