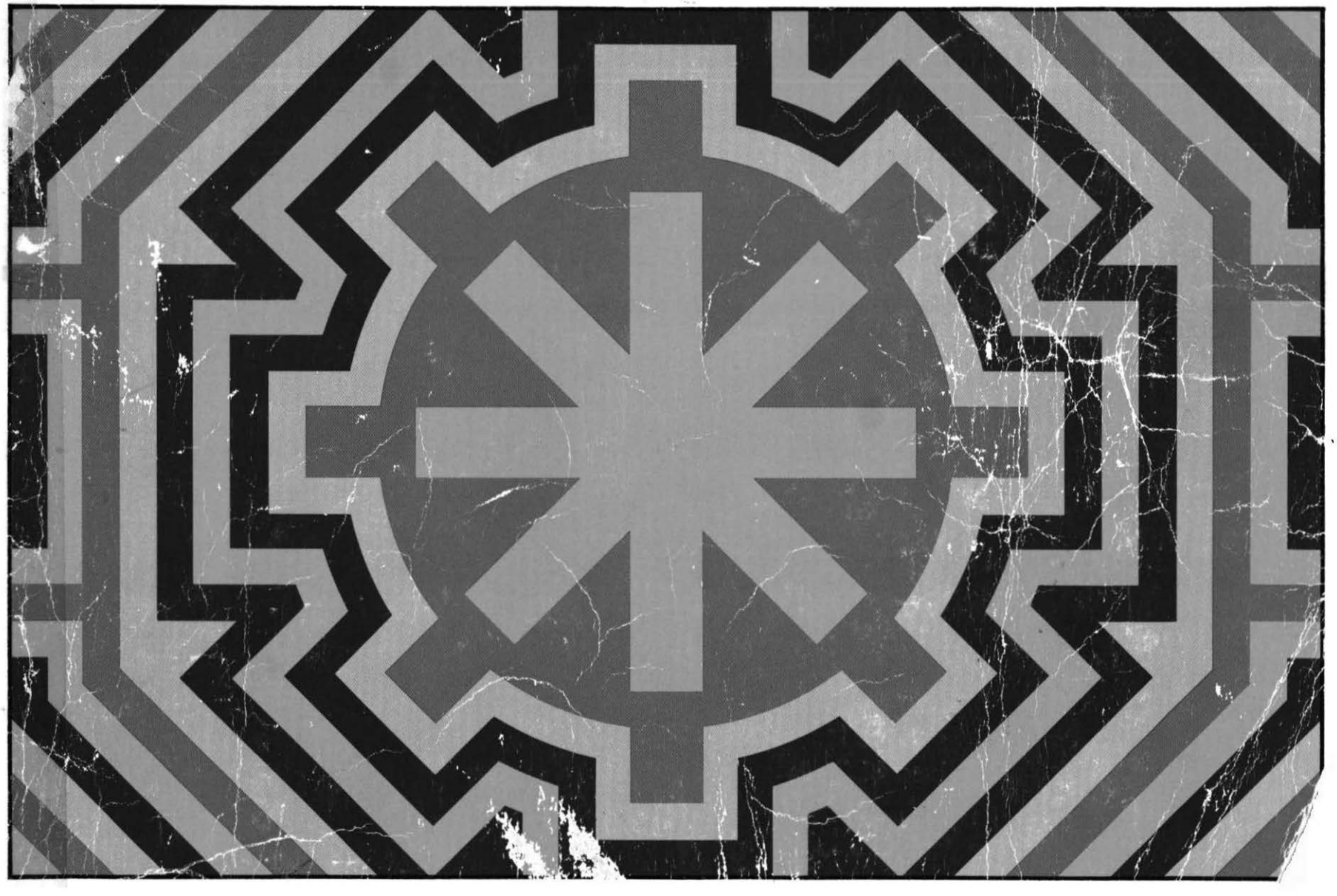
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Arizona State University General Catalog 1979-80 | 1980-81

Fall Spring Fall

ASU BULLETIN



Arizona State University

General Catalog 1979-80 | 1980-81



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COLLEGE OF ARCHITECTURE

Departments: Architecture, Design Sciences; Planning.

COLLEGE OF BUSINESS ADMINISTRATION

Departments: Accounting; Administrative Services; Economics; Finance; Management; Marketing; Quantitative Systems, Center for Health Services Administration

COLLEGE OF EDUCATION

Departments: Elementary Education; Secondary Education; Educational Administration and Supervision, Counselor Education, Center for Higher and Adult Education; Educational Psychology, Special Education, Educational Technology and Library Science.

COLLEGE OF ENGINEERING AND APPLIED SCIENCES

School of Engineering. Departments: Aerospace Engineering and Engineering Science; Chemical and Bio Engineering; Civil Engineering, Electrical and Computer Engineering, Industrial and Management Systems Engineering; Mechanical and Energy Systems Engineering

Divisions of Agriculture, Construction and Technology.

COLLEGE OF FINE ARTS

Departments: Art; Communication; Humanities and Religious Studies, Music; Theatre.

COLLEGE OF LAW

COLLEGE OF NURSING

CENTER OF CRIMINAL JUSTICE

GRADUATE COLLEGE

SCHOOL OF SOCIAL WORK

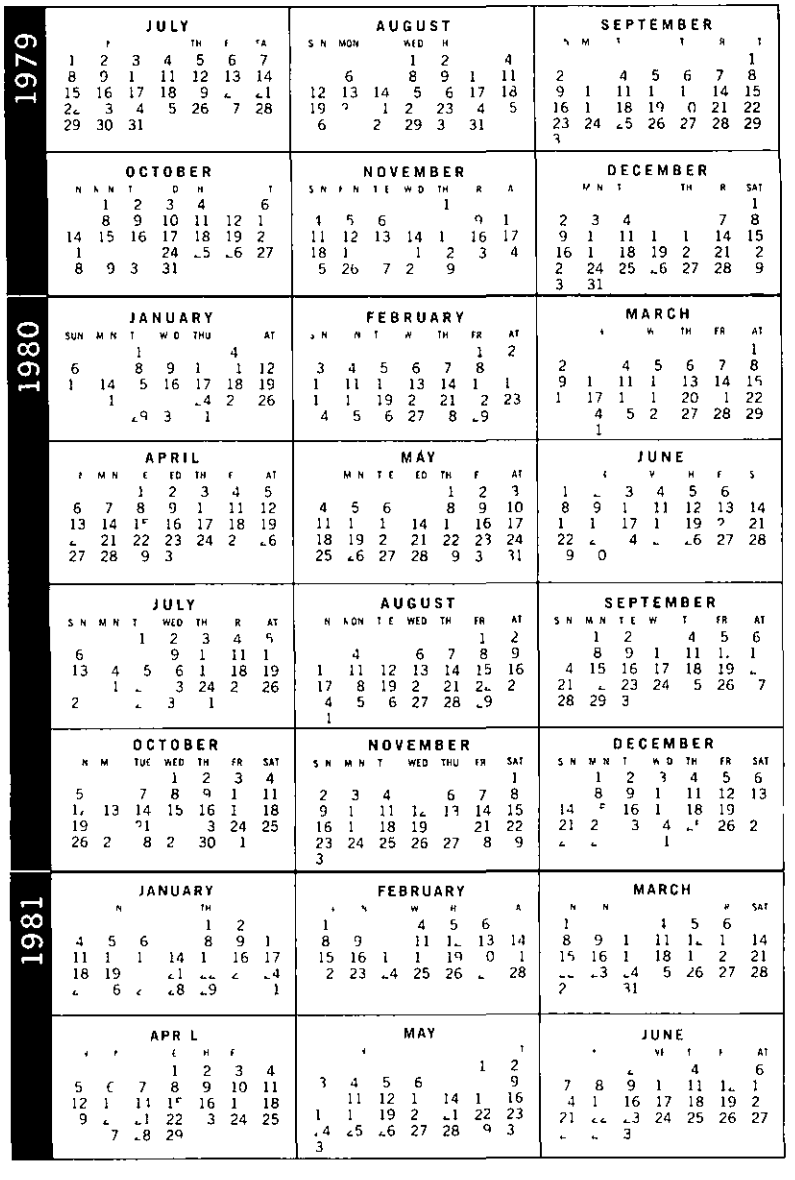
CONTINUING EDUCATION AND SUMMER SESSIONS

University Calendar

Fall Semester	1979	1980
Priority Date for Receipt of Undergraduate Admissions or Readmission Credentials	Aug. 3, F	Aug. 1, F
First Freshman Assembly	Aug. 20, M	Aug 18, M
Orientation and Advisement for New Students	Aug. 20 23, M-Th	Aug. 18-21, M-Th
Registration and Fee Payment	Aug. 22 23, W Th	Aug 20 21, W-Th
Instruction Begins	Aug. 27, M	Aug. 25, M
Late Registration and Drop Add	Aug. 29-30, W-Th	Aug. 27-28, W-Th
Labor Day Classes Excused	Sep. 3, M	Sep. 1, M
Last Day To Withdraw from a Course Without Academic Penalty	Oct. 5, F	Oct. 3, F
Mid Semester Scholarship Reports Due in Office of Registrar	Oct. 19, F	Oct 17, F
Candidates for Bachelor's Degree Must File Application for Graduation by	Oct. 19, F	Oct. 17, F
Veterans Day Classes Excused (1980)	Nov. 11, Su	Nov. 11, T
Thanksgiving Recess Classes Excused	Nov. 22 25, Th Su	Nov. 27 30, Th Su
Last Day To Withdraw from a Course Without Academic Penalty	Dec. 5, W	Dec. 4, Th
Instruction Ends	Dec 11, T	Dec. 10, W
Reading Day	Dec. 12, W	Dec. 11, Th
Final Examinations	Dec 13 14, 17 19, Th-F, M W	Dec 12, 15 18, F,M Th
Christmas and Mid Year Recess	Dec. 20 Jan 13, Th-Su	Dec. 19 Jan. 11, F-Su

Spring Semester	1980	1981
Priority Date for Receipt of Undergraduate Admissions or Readmission Credentials	Dec. 21, F	Dec. 19, F
Orientation and Advisement for New Students	Jan. 14 16, M W	Jan. 12 14, M W
Registration and Fee Payment	Jan. 15 16, T W	Jan. 13-14, T-W
Instruction Begins	Jan. 17, Th	Jan 15, Th
Late Registration and Drop Add	Jan 22 23, T W	Jan 20 21, T W
Candidates for Bachelor's Degree Must File Application for Graduation by	Feb. 13, W	Feb. 11, W
Washington's Birthday Classes Excused	Feb. 18, M	Feb. 16, M
Last Day To Withdraw from a Course Without Academic Penalty	Feb. 27, W	Feb. 25, W
Mid Semester Scholarship Reports Due in Office of Registrar	Mar. 7, F	Mar. 6, F
Spring Recess Classes Excused	Mar 8 16, Sa-Su	Mar. 7-15, Sa-Su
Last Day To Withdraw from a Course Without Academic Penalty	May 1, Th	Apr 30, Th
Instruction Ends	May 7, W	May 6, W
Reading Day	May 8, Th	May 7, Th
Final Examinations	May 9, 12-15, F,M Th	May 8, 11 14, F,M Th
Commencement	May 16, F	May 15, F

Summer Sessions	1980	1981
First Five-Week Registration	June 2, M	June 1, M
Instruction Begins	June 3, T	June 2, T
First Five-Week Session Ends	July 3, Th	July 3, F
Second Five Week Registration	July 7, M	July 6, M
Instruction Begins	July 8, T	July 7, T
Second Five Week Session Ends	Aug. 8, F	Aug. 7, F
Eight Week Registration	June 2, M	June 1, M
Instruction Begins	June 3, T	June 2, T
Eight Week Session Ends	July 25, F	July 24, F



Organization, History, General Information

Objectives

Arizona State University educates for leader ship and responsible citizenship. Increased competence, improved moral and ethical stan dards, expanded cultural horizons, and enhanced ability to seek answers to fundamen tal questions of human concern are the objectives of the University.

Organization

Arizona State University was established in 1885 as the Arizona Territorial Normal School It is governed, as are the University of Arizona (Tucson), and Northern Arizona University (Flagstaff), 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 non voting 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 Presi dent of the University, the chief executive officer and the regular means of communication between the Board of Regents and the institution The President is aided in the administrative work of the institution by the Provost, Vice Presidents, Deans, Directors, Departmental Chairs, Faculties, and other officers.

In the University's academic organization are the Colleges of Liberal Arts, Architecture, Business Administration, Education, Engineering and Applied Sciences, Fine Arts, Law and Nursing; the School of Social Work; Center of Criminal Justice; University Continuing Education and Summer Sessions, the Graduate College, and more than 50 units of instruction. These academic agencies develop and effectuate the teaching, research and service programs of the University, aided by the University libraries, museums, and other services.

The faculties and students of the University play an important role in educational policy, with a Faculty Senate, joint University committees and boards, and the Associated Students serving the needs of a large institution. A comprehensive system of joint faculty, student, alumni and staff committees provides an exchange of ideas and collaboration on the part of all members of the University

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 Thirteenth Legislative Assembly of Arizona Territory by John Samue Armstrong The Bill, strongly supported by Charles Trumbull Hayden of Tempe, passed the House on March 6, the Council on March 11 and was signed by Governor F A Tritle on March 12, 1885 thereby founding the institution today known as Arizona State University. Instruction was instituted on February 8, 1886, when 33 students met in a single room under the supervision of Principal Hiram Bradford Farmer.

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 areas, the school has carried forward this charter, accompanied by successive changes in scope, name and governance. On March 9, 1945, the three state institutions of higher learning came under the authority of one Board of Regents.

By vote of the people, on November 4, 1958, the name Arizona State University replaced the previous name, Arizona State College.

Accreditation and Affiliation

Arizona State University is accredited by the North Central Association of Colleges and Secondary Schools Professional programs in the various colleges, schools, divisions and departments are accredited by the following national bodies:

Architecture: National Architectural Accrediting Board, American Institute of Planners, FIDER Foundation of Interior Design Education and Research, American Society of Landscape Architects; **Nursing:** The National League of Nursing; **School of Social Work:** The Council on Social Work Education; **Education:** American Psychological Association, National Council for the Accreditation of Teacher Education, State Board of Education (Arizona);

Law: American Bar Association, Association of American Law Schools; **Center of Criminal Justice:** Academy of Criminal Justice Sciences, **Business Administration:** American Assembly of Collegiate Schools of Business, Accrediting Commission on Education for Health Services Administration; **Fine Arts:** National Association of Schools of Music, American Speech and Hearing Association, National Association of Schools of Art, Western Association of Art Departments and University Museums, Western Association of Art Museums;

Engineering and Applied Sciences: Engineer's Council for Professional Development, North Central Association for Teacher Education (through Secondary Education Department), Engineering Council for Professional Development; **Liberal Arts:** American Council on Education for Journalism, American Chemical Society, American Psychological Association, National Athletic Trainers Association.

ASU is a member of the National Association of State Universities and Land Grant Colleges, and is affiliated with the American Council on Education and other international, national and regional associations.

University Campus

Environment

Location. Arizona State University is located near the heart of metropolitan Phoenix, in the city of Tempe (population 100,000). Nearby are the municipalities comprising the fast growing Valley of the Sun Scottsdale, Mesa, Chandler, Glendale and other communities.

Historic and Scenic Features. Nearby are such landmarks as the Apache Trail, the man made lakes of the Salt River Project, Roosevelt and Coolidge Dams, and the Casa Grande National Monument. More distant are the internationally famous Grand Canyon of the Colorado, Glen Canyon Dam and Lake Powell, scenic Oak Creek Canyon, American Indian communities, and the Arizona Sonoran desert.

Grounds

Campus. Most of the major buildings on the 566 acre campus have been erected during the past 25 years. Broad lawns and sub tropical trees provide year round greenery.

University Field Laboratory. A 320 acre farm is located six miles southeast of the campus. It is used for experimental and practical work in various phases of agricultural science.

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

Conference Center at Castle Hot Springs. The Center, consisting of 165 acres northwest of Lake Pleasant, features lodging and meal accommodations for participants in University-sponsored conferences. The facility was deeded to the Arizona State University Foundation and is scheduled and administered through the Office of University Continuing Education

Metrocenter Facility. The University occupies a leased office facility and classrooms for northwest Phoenix in the Metrocenter shopping complex. In addition to providing classrooms for the west Phoenix and Glendale communities, it serves as an off-campus registration and information center for ASU

Information and Service Center. This Center, located in the Student Union Building at Glendale Community College, provides on-site service to community college students interested in transferring to ASU's main campus. The Center is staffed on a day and evening schedule, with a telephone answering service in effect at other hours.

English Skills Center. This leased Center at 25 West University Drive in Tempe provides classrooms and offices for the English Skills Program for non native speakers of English.

University Libraries and Collections

Year of construction in parentheses

Charles Trumbull Hayden Library (1966).

The University's main library houses 1,330,500 bound volumes and 907,000 units of microfilm in 225,000 square feet of enclosed space. The five story structure has seating for 1,400 persons, including 133 study carrels and 63 faculty studies. Among the special collections are the Arizona Collection, Curriculum Laboratory, the Papers of Carl Hayden, Barry Goldwater and John J Rhodes, the Solar Energy Society Collection, and the Jimmy Starr historical collection on American film.

Architecture Library. In addition to a major collection of books and periodicals, this library also contains the Paolo Soleri archives.

Arizona Historical Foundation Library. Under a cooperative agreement with ASU, the Foun dation's library of several thousand volumes is housed in the Charles Trumbull Hayden Li- brary

Law Library. A growing collection of some 145,000 volumes is located in the John S. Armstrong Law Building. The facility is de- signed to house 200,000 volumes.

Music Library. In addition to the collection of music scores, recordings and periodicals, the Music Library also contains the Pablo Casals International Cello Library, the Wayne King Collection, and the International Percussion Reference Library.

University Buildings

Memorial Union. The Memorial Union is a con munity center for all members of the Uni versity students, faculty, administration, staff, alumni, and their guests. The Union of fers a variety of services and facilities as well as a diverse program of cultural, educational, social and recreational activities. The building houses comfortable lounges, two ballrooms, a TV room, a movie house and an art gallery Diversified dining and meeting rooms are availab e for use by officially registered Uni versity organizations, departments, and colleges. Reservations for the use of these fa- cilities are made with the Memorial Union Reservation Office

On the main level of the Memorial Union s an a l University Information Desk, including lost and found, a notary public, lending li- brary, and campus courtesy phones Other services in the MU include the various food services, the MU Activities Center, the MU Recreation Center, the University Bookstore, University Housing Off ce, the MU Barber- shop, and the Associated Students Offices and Activities Center.

The MU Activities Center includes two photography labs, a music listening unit, pho tocopying machine, ditto and mimeograph service, free manual and electric typewriters, staplers, and other office supply materials. The Union program staff and student commit- tees who plan programs throughout the year are also located here Programs include "pop- ups" live, mid day entertainment, film fes tivals, seasonal events, art exhibits, nationally prominent and local speakers, and Leisure Learning courses in crafts, photography, and other interest areas. Students are involved in the planning and the implementation of these activities and the committee participation is voluntary and open to any student enrolled at ASU.

The Recreation Center is open for the en joyment of all members of the University. This fully equipped Center provides billiard tables, bowling lanes and a variety of table games at a low cost for leisure time activities and fully organized tournaments Campus tournaments in billiards, table tennis, chess, air-hockey, bridge and foosball are held during the fall semester The winners proceed to a regional tournament and, if successful, to the national level ASUMU bowling team try outs are held at the beginning of each semester, and the teams participate in state and national tourna- ments Sponsorship is provided by the Association of College Unions-International, and the MU Recreation Center is an active participant in this program. The MU Chess Club is very active, with memberships avail able in the Center and sets provided for the members' use. The Memorial Union Chess Association is an affiliate of the U.S. Chess Federation

Physical Education bowling classes are taught each semester on the Brunswick Astro- line lanes and faculty-staff and student leagues fill the evenings with open bowling during most of the regular hours.

Academic Services Building (1951). University Continuing Education and Summer Sessions, Personnel Department; Career Services; Com- puter Services facilities; News Bureau

Administration Building (1951). University administration and business offices.

Agriculture Building (1948) Division of Agri- culture; Center of Criminal Just ce.

Anthropology Building (1914). Department of Anthropology; museum in lobby.

Architecture Building (1970). College of Ar chitecture.

Architecture Annex (1965, 1976) College of Architecture, Solar Energy Research.

John S. Armstrong Law Building (1967). Col- lege of Law.

Art Building (1970). Department of Art

Art Warehouse (1978).

George M. Bateman Physical Sciences Center (1959, 1965, 1968, 1976). Departments of Chemistry, Geology, Physics; Center for Me- teorite Studies; Cancer Research Center. (See also Wexler Hall.)

Business Administration Building (1968 and 1970). College of Business Administration; Center for Executive Development.

Central Plant (1960). Central heating and cooling.

Ceramics Annex (1975). Art Department.

Classroom Office Building. (1979)

Danforth Meditation Chapel (1947). Ecumeni cal campus ministry offices and chapel

Education Complex: Hiram Bradford Farmer Education Building (1961); Ira D. Payne Hall (1969); Education Lecture Hall (1969) Col- lege of Education

Engineering Center (Wings A through F, 1957; Wing G, 1964). College of Engineering

and Applied Sciences; University Computer Center; Engineering Research Center

Environmental Center (1959, 1972). Lower Colorado River Research Laboratory and Climatology Laboratory.

Fine Arts Annex (1909). Studios and offices of the Art Department.

Forestry Services Laboratory (1964). Rocky Mountain Forest and Range Experiment Station of the U.S. Forest Service

Dixie Dees Gammage Hall (1941). College of Fine Arts; Institutional Studies; Nursing Continuing Education and College of Education offices.

Grady Gammage Memorial Auditorium (1964) (See Education Resources and Services below.)

Garage and Motor Pool (1972)

Charles Trumbull Hayden Library (1966) (See previous description.)

Home Economics Building (1951 and 1968). Department of Home Economics. Adjacent facility houses the Center for Family Studies

Frederick M. Irish "A" (1940). College of Business Administration and Department of Administrative Services.

Robert R. Krause Hall (1905). Department of Humanities and Religious Studies.

Language and Literature Building (1965 and 1971). Departments of English, Foreign Languages and Geography; Speech and Hearing Clinic.

Life Sciences Center (1959, 1963, 1971) Departments of Botany and Microbiology, and Zoology; Animal Resource Center.

Lyceum Theater (1939) University Theatre.

McAllister Office Complex (1975). Department of Art, Division of Technology offices; DWI Project, University Veterinarian; Russian and East European Studies, retirement publications office

A. J. Matthews Center (1930). University Art Collections; Vice President for Student Affairs; Student Services; **State Press** news and composing rooms.

Carrie Matthews Hall (1918). Bureau of Publications; Nursing faculty offices; Art photo labs.

Memorial Union (1956, 1970). (See previous description.)

Moeur Administration Building (1939) Registrar; Director of Admissions; Graduation Office; Orientation Office.

John R. Murdock Hall (1969) Lecture halls

Music Building (1971). Department of Music; Music Library; Music Theatre.

L. S. Neeb Hall (1969). Lecture hall

Nursing Building (1966). College of Nursing.

Old Main Building (1894). Departments of Aerospace Studies and Military Science.

William Guthrie Packard Stadium (1974). Baseball field.

Payne Laboratory School (1928). Departments of Communication, Theatre, and Art.

Physical Education Building East (1966). Women's athletics, Department of Health, Physical Education, Recreation and Dance.

Physical Education Building West (1952) Department of Health, Physical Education, Recreation and Dance; Parking, Tuition Status and other offices; Intramural Coordinator.

Physical Plant (1966). Physical Facilities; University Police; maintenance shops.

Psychology Building (1972). Department of Psychology.

Purchasing and General Stores (1951)

Social Sciences Building (1960). College of Liberal Arts; Departments of History, Political Science, Sociology; Centers of Asian Studies, American Studies, Latin American Studies, Public Affairs

Ritter Building (1976). Audiovisual Services, Central Mailing, Mail Service, University Printing Service, Psychological Testing Assessment.

Rural Road Offices (1975). Studios, offices and instructional laboratories for Art Department

Joe Selleh Field and Sun Angel Stadium (1967, 1976). Track and field facility.

Charles A. Stauffer Communication Arts Building (1973). Departments of Mass Communications, Communication and Theatre; KAET Channel 8 studios; Disabled Student Services.

Student Health Service (1969). Infirmary

Sun Devil Stadium (1958) Football stadium.

Swimming Pool (1957)

Technology Center (1964, 1967, 1978) Division of Technology.

Tontozona Outdoor Education Center (1974)

University Activity Center (1974). University convocation hall, Intercollegiate Athletics offices.

University Archives Building (1907). University Archivist.

West Hall (1936). School of Social Work

Charles Wexler Hall (1968) Departments of Mathematics and Philosophy. ("A Wing" of George Bateman Physical Sciences Center.)

Whiteman Tennis Center and Sun Devil Club Stadium (1976).

George W. Wilson Hall (1956). Graduate College; Graduate Admissions, University Counseling Services; Administrative Systems and Programming; University Research Grants and Contracts.

Residence Halls

M. O. Best (1956, 1967).

Charles Trumbull Hayden (1951).

Frederick M. Irish "B" (1940).

James H. McClintock "A" (1951), "B" (1956).

Manzanita (1967).

Mariposa (1969). Graduate student resident center; Alumni Center; Development Office.

Ocotillo Hall (1967).

Palo Verde East (1963).

Palo Verde Main (1958). Sorority housing.

Palo Verde West (1964).

Sahuaro (1958).

Adelphi Drive Housing (1954). Five units for small-group housing.

Alpha Drive Housing (1962). Ten units for small-group housing.



Education Resources and Services

Gammage Center for the Performing Arts is housed in Grady Gammage Memorial Auditorium, designed by Frank Lloyd Wright and named for the late President Gammage. This versatile auditorium seats 3,000 and has won wide acclaim for its design and acoustics. In addition to the great hall and related facilities (including the Aeolian-Skinner organ contributed by Hugh W. and Barbara V. Long, largest pipe organ in the state), the building contains classrooms and workshops for the College of Fine Arts.

University Art Collections. On display in Matthews Center, the collections include paintings in oil, watercolor and tempera, numerous works of sculpture and ceramics, and an extensive print collection. The Collection of American Art, founded by the late Oliver B. James, is permanently on display. Selections from the collections of Mr. and Mrs. Read Mullan, Mr. and Mrs. Orme Lewis, Lewis and Lenore Ruskin, Mrs. Henry Luce, Edward Jacobson, and Mr. and Mrs. Joseph Thomas are shown periodically. Special showings of significant traveling exhibitions are scheduled throughout the year.

Laura Boulton Collection of World Music and Musical Instruments. Housed in the Music Building, the collection includes aboriginal and folk music and instruments.

Computer Services. Accessible through several remote locations on campus, this facility serves the research, teaching, experimental and administrative data processing needs for the campus. All inquiries should be directed to the Office of the Assistant Vice President for Computer Services located in the Academic Services Building.

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 Public Broadcasting Service (PBS), and broadcasts daily from 7 a.m. to midnight. Program information is available from the KAET program manager.

Audiovisual Services. This University agency is responsible for selection, design, acquisition, production, storage, repair and circulation of instructional media and support equipment. Located in the Ritter Building, it consists of the film library, equipment circulation, photography service, closed circuit television, equipment repair and media production departments. A media production lab is open to the University community.

Undergraduate Program

Student Membership in the University

The major purposes of a University include the exchange of knowledge and the pursuit of wisdom, conducted in an environment which encourages reasoned discourse, intellectual honesty, openness to constructive change and respect for the rights of all individuals By accepting membership in this community, one neither surrenders rights nor escapes funda mental responsibilities as a citizen, but acquires rights as well as responsibilities to the total University community.

Attendance at the University 's a voluntary entrance into the academic community. The student voluntarily assumes obligations of per formance and behavior reasonably imposed by the institution, relevant to its lawful processes and functions

Under the Constitution and laws of the State of Arizona, jurisdiction and control over Arizona State University are vested in the Arizona Board of Regents Its agents the President, administration and faculty are granted broad legal authority to regulate stu dent life, subject to basic reasonable standards. In exercising this authority, the University is guided as well by considerations of educational policy.

In developing responsible student conduct, the University prefers counseling, guidance, admonition and example. However, when these means fail to resolve problems of student conduct and responsibility, charges may be heard by the University Trial Board, whose members are students and teaching faculty, to determine if there has been a violation of pre defined standards of conduct On the basis of its findings, among the sanctions that the Board may prescribe are the following: 1) warning, 2) admonition, 3) censure, 4) repri mand, 5) suspension of or forfeiture of campus privileges for a definite period of time, 6) pro-bation for a definite period of time, 7) suspension for a definite period of time, and 8) expulsion.

The student has the right to make timely appeal of the Board's decision upon the following grounds 1) prejudicial error committed during the hearing whereby the aggrieved was deprived of a fair trial, 2) noncumulative material and relevant evidence, new or newly discovered, which, with reasonable diligence, could not have been produced at the trial, 3) the decision or judgment is not supported nor justified by the evidence, 4) the penalty or sanction imposed was excessive, and 5) the penalty or sanction was insufficient. Pending final action on charges brought against a stu dent by the University, the status of a student is not altered; nor is the student's right to attend class suspended, except for reasons relating to the safety of students, faculty or University property

The immediate concern of the University is with student behavior on campus and at Uni versity sponsored events off campus

Misconduct for which students are subject to University discipline falls into the general areas of

1) Academic dishonesty cheating in examinations, laboratory work, written work (plagiarism), forging or altering University records that is, any attempt to gain credit for work not performed by the student,
2) Violation of University Regulations;
3) Individual and group offenses as defined in the *Code of Conduct.*

Details of expected student conduct and administrative procedures in handling disciplinary problems are further elaborated in the *Code of Conduct*

Family Educational Rights and Privacy Act of 1974

(Buckley Amendment)

Eligible students may inspect and review their education records. Certain records may remain confidential if the student waives the right of inspection Waivers signed may be revoked at any time by an eligible student The subsequent access applies only to those confidential statements and records placed in the file after the date of revocation.

Definitions

Eligible Student. For the purposes of this Act, an *eligible student* is defined as any individual formally admitted to and matriculated at Arizona State University or the parents of a *dependent* eligible student. Dependency is defined by Section 152 of the Internal Revenue Code of 1954. An individual who has made application to the University but has not been formally admitted shall *not* be included

Students must declare at registration their dependent status and individuals to whom information may be released

Education Records. Education records are records (1) directly related to a student, and (2) maintained by the University or by a party acting for the University. The term does not include those records specifically excluded by Section 99 3 of the Act

Directory Information. Directory information will include the student's name, local or campus address, local telephone number, home or off campus address, date and place of birth, citizenship, tuition and fee status, class 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. Students have the right to request that any of the above information not be disclosed.

Personally Identifiable. Data included are (a) the name of a student, the student's parent, or other family member, (b) the address of the student, (c) a personal identifier, such as the student's Social Security number or student number, (d) a list of personal characteristics or, (e) other information which would make the student's identity easily traceable

Record. Any information or data recorded in any medium, including, but not limited to. handwriting, print, tapes, film, microfilm, and microfiche

Location of Policy and Records

The following school officials maintain educational records pertaining to students. Registrar; Comptroller, Dean of the Graduate College; Directors of Admissions, Career Services, Financial Aids, Housing, Special Services, and University Testing Service; Deans of the Colleges; Chairs of the Departments and Academic Advisors, Dean of Students; International Student Adviser, NCAA Faculty Representative, Coordinators of Intramurals and Orientation The complete policy and a list of the records on file and their location are available at the Reserve Book Desk, Level I, Hayden Library.

Access to Records

All eligible students will have access to records as prescribed by the Act

Personally identifiable information may be disclosed to parents of those students who report *dependency status* at registration. Based on that report, the University either will or will not make records available to parents These forms will be retained by the Registrar's office.

Parents may challenge a student's report by producing the most current copy of their Internal Revenue Form 1040. If that form lists the student in question as a dependent, the parents will be required to sign an affidavit which affirms that the student is their dependent. The affidavit will be retained by the Registrar's Office Upon receipt of the affidavit, the University will make student records available to parents as specified under the Act.

Proof of Identification. Before access is allowed to educational records, the student must display some form of personal identification. At the minimum this identification should include a picture of the student.

Copies of Student-Related Records. One copy of student related materials to which a student has not waived rights of access may be provided to the student upon written request to the University official responsible for that record.

Undergraduate Admission

Arizona State University welcomes application for admission from all persons who feel they can qualify for admission and can benefit from the University's broad spectrum of educational programs and services.

Prospective students are encouraged to write to the Admissions Office for general information about the University, including application materials, or visit Room 136 of the Moeur Administration Building A tour of the campus may be arranged by appointment. Prospective students should write to the Admissions Office or call 602 965-7788. With advance notice, a meeting can be arranged with an academic advisor in the applicant's field of interest. Requests for specific information relating to academic programs or student services should be addressed to the appropriate department, division or college. (See page 5 for appropriate listings.)

University orientation programs for new students and parents are provided at numerous

times during the year including the beginning of each semester. Each orientation program includes advisement, placement testing, cam pus tours, chest X-rays, special events, and an introduction to University resources and pro cedures. Newly admitted students will be sent information preceding each available orientation program. Participation in orientation activities is not mandatory, but is highly recommended to better acquaint students to the academic and social environment of the University

The High School College Relations Office maintains close year round contact with administrators, counselors, and students in Arizona high schools and colleges to help inform prospective new freshman and transfer students of the educational programs and services offered by the University.

Admissions Procedures for New Freshman and Transfer Applicants

Persons interested in admission to an undergraduate program at Arizona State University need the following items on file in the Admissions Office 1) Application for Admission (including Domicile Affidavit); 2) official transcript(s); 3) American College Test (ACT) or Scholastic Aptitude Test (SAT) scores (as needed); and 4) the $10 application fee (for applicants residing out of the State of Arizona only). Early submission of materials is encouraged for early decision and participation in early orientation and registration. Priority deadlines are listed in the University Calendar (page 6). Applications received after those dates may not be honored for the semester desired A completed application for admission is valid only for the semester for which admission is requested.

Application. Prospective students must submit a completed and signed application on the official application form to the Admissions Office. All applicants for undergraduate admission residing out of the State of Arizona pay a nonrefundable application fee of $10 at the time application for admission is made.

Domicile Affidavit. The Domicile Affidavit also must be completed and returned to the Admissions Office in order to determine the applicant's fee and tuition status as in state or out of state. Failure to complete the Affidavit or to supply the information requested will result in the applicant's classification as out of-state for purposes of fee and tuition payment. Information on fee status may be found on pages 26 27 of this catalog Further inquiry may be made to the Fee Status Officer, 124 Physical Education Building West, or by calling 602 965 7712

Transcripts. Official transcripts of academic records from high school and all institutions of higher education previously attended must be *mailed* by the records office of the issuing institutions *directly* to the Admissions Office. Hand carried transcripts will not be accepted High school transcripts must show grade point average, rank in class, and date of graduation Applicants with 24 hours or less of transferable work must also submit official high school records.

All transcripts or credentials submitted from other institutions become the property of Arizona State University. Admission credentials and transcripts of applicants who do not enroll in the University will be retained for one year only.

Entrance Examinations. The American College Test or Scholastic Aptitude Test must be taken by all new freshman applicants on a national test date High school applicants should meet this requirement by taking the ACT or SAT in their junior or senior year. Applicants for transfer who have not completed at least 9 semester hours of acceptable credit with a grade point average of 2.00 on a 4 00 scale must submit ACT or SAT scores prior to admission. A report of the test scores must be sent to the Admissions Office 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, NJ 08540.

Health History Questionnaire. Each newly-admitted student is expected to complete the Arizona State University Health History Questionnaire and return it to the Student Health Service Applicants suffering from uncompensated psychiatric illness who may be a hazard to others may be denied admission All students must have a free chest X-ray taken at the Student Health Service prior to matriculation.

Undergraduate Admission Standards

Undergraduate admission standards are established by the Arizona Board of Regents. *Colleges, schools and departments within the University may establish more restrictive standards which should be noted in the respective college sections of this catalog*

Academic Admission Requirements for New Freshmen

Graduation from Secondary School. To be eligible for admission to Arizona State University, all applicants must have graduated from a secondary school with satisfactory scholarship as defined in "Scholarship Requirements" in the following section.

Scholarship Requirements. A first time freshman applicant for admission to Arizona State University may be admitted who:

1. Ranks in the upper 50% of the high school graduating class; *OR*
2. Obtains a minimum composite ACT score of 21 (in state applicants) or 23 (out-of state applicants);

3. Obtains a minimum composite SAT score of 930 (in state applicants) or 1010 (out-of state applicants).

If the specific freshman admission scholarship requirements are not met, the applicant may write a letter of appeal. At least one of the following criteria must be met

1. A high school grade point average minimum of 2 5 overall on a 4 0 scale;
2. An upward grade trend during high school career or an upward grade trend in the senior year,
3. Positive recommendations from secondary school administrators and or a positive recommendation from a university counselor based upon academic potential, work experience, leadership ability, or extracurricular activities,
4. An average score on the General Education Development test (GED) of at least 55 (GED applicants will also file records of high school work completed);
5. Demonstration of ability to complete freshman level academic courses by attaining a minimum grade point average of 2.0 on a 4 0 scale in academic courses in English, social science, mathematics, science, foreign languages or the humanities, as shown by at least 9 credit hours in a community college and or summer or evening sessions of a university

Classification of Secondary School Subjects.

Group I	English Courses with major emphasis upon grammar, composition, and literary analysis
Group II	Foreign Languages Classical or modern foreign language Two units or more are recommended
Group III	Mathematics. One unit of algebra and one unit of mathematics other than arithmetic, business mathematics, or general mathematics.
Group IV	Social Studies. History, civics, economics, sociology, geography, and government (including United States and Arizona Constitution)
Group V	Laboratory Sciences Courses in biology, chemistry, and physics, in which at least one regular laboratory period is scheduled each week.
Group VI	Fine Arts. Historical, theoretical and performance courses in art, music, speech and drama, and humanities.
Group VII	Agriculture, bookkeeping, general science, home economics, arithmetic, general mathematics, journalism, industrial arts, secretarial training, physical education, military science, and other subjects commonly offered for credit by secondary schools

Recommended Secondary School Subject Units. The following recommended pattern of subjects is that which, on the basis of experience, can be reasonably expected to provide satisfactory preparation for college when these subjects have been completed with better than average grades. *Academically talented students are strongly urged to take additional courses* from Groups I through V beyond those recommended. The definition of a unit is that used by the North Central Association of Colleges and Secondary Schools.

English (from Group I)	4
or English 3 and one Foreign Language 2 (from Groups I and II)	or 5
Mathematics (from Group III)	2
American History and Social Studies (from Group IV)	2
Laboratory Science (from Group V)	2
Electives (from Groups I through VII)	6
depending upon English option	or 5
	16 or more

The School of Engineering recommends 3½ units in mathematics, including advanced algebra, geometry and trigonometry. Calculus is recommended. The laboratory sciences chosen should include at last one unit in physics and one unit in chemistry One unit of biology is strongly recommended.

The College of Nursing recommends 2½ units of mathematics, including algebra, advanced algebra and one additional unit of mathematics Laboratory sciences should include one unit of biology and one unit of chemistry or their equivalent An additional unit of physics is recommended.

Conditional Admission Prior to Graduation from High School. Conditional admission may be granted to high school seniors who submit a six semester or seven semester transcript which shows academic quality and rank in class in keeping with admission standards, and who complete the steps in the undergraduate admission procedures. Regular admission will be confirmed when a verification of the high school graduation showing final grade point average, rank in class and date of graduation has been received in the mail by the Admissions Office directly from the high school. The conditional admission may be cancelled if the final verification shows that the applicant has not met the University requirements for admission.

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 For information on academic programs and opportunities for students

of exceptional ability, refer to the College of Liberal Arts section of this catalog (page 53)

Special Enrollment Permit for High-Ranking High School Seniors

("Able and Ambitious Program"). The high school senior with only a limited amount of work remaining for completion of high school graduation, who ranks in the top 10% of the class, may be granted a *special enrollment permit* as an unclassified student to enroll for *a maximum of six hours per semester* at the University. To qualify for the special enrollment permit, the following conditions must be met:

1. An application for the special enrollment permit must be submitted to the Admissions Office. Applicants sign an agreement as a part of the application for the special enrollment permit that they will continue in high school while enrolled in the limited program at Arizona State University and that they will graduate with their high school class.
2. An official transcript of the high school record showing senior standing and rank in class must be sent directly to the Admissions Office by the high school.
3. The principal or counselor of the high school must send a written recommendation to the Admissions Office authorizing the enrollment of the high school senior at Arizona State University at the same time the student is completing the high school program.

Admission of Unclassified Applicants—Undergraduate. Persons 19 years of age or over who wish to enroll for six semester hours or less per semester of undergraduate course work may register as unclassified students. Unclassified applicants are not required to file transcripts or domicile affidavits. They must, however, file an Unclassified Student Application for Admission form. Unclassified students are not candidates for any degree. Applicants disqualified or otherwise not eligible for regular admission may not attend as unclassified students.

Unclassified students who wish to work toward meeting requirements for a bachelor's degree must file an application for admission to a degree program with the Admissions Office and meet all admission requirements in effect at the time admission is sought as degree pursuing students. A maximum of 15 hours work completed as an unclassified student may be applied toward fulfilling degree requirements, provided the courses meet specific requirements within a degree program.

After students have been registered as regular degree pursuing students, they may not thereafter be permitted to register in an unclassified status.

Academic Admission Requirements for Transfer Applicants

Scholarship Requirements. Applicants for transfer admission must have a grade point average of 2.00 or higher on a 4.00 scale for all work attempted at previous institutions of higher education and be in good standing and eligible to return to those institutions. Applicants for transfer who have not completed at least 9 semester hours of acceptable credit must submit American College Test or Scholastic Aptitude Test scores prior to admission and meet the scholarship requirements outlined for new freshman applicants on page 15. Applicants who have 24 hours or less of transferable work must also submit official high school records.

Veterans Exception. By Arizona statute, in determining the admissibility to the University of a veteran, honorably discharged, who has served in the Armed Forces of the United States for a minimum of two years, who has previously enrolled at a university or community college in Arizona, no failing grades received by such veteran at an Arizona university or community college prior to military service may be considered. Military service records must be submitted, including form D D 214.

Acceptance of Transfer Credit. Transfer credit will be awarded for traditional course work successfully completed at institutions of higher education as determined by Arizona State University and the Arizona Board of Regents subject to the following exceptions: (1) Transfer credit is not granted for courses in which the lowest passing grades (D) were received. Grades and scholastic honor points earned at other colleges and universities, while part of the student's permanent record, are not included in the calculation of the student's cumulative grade point average at Arizona State University. (2) Successfully completed courses evaluated on a nontraditional grading system (e.g., pass/fail, credit/no-credit, etc.) will be accepted for transfer, however, some colleges at the University may not accept such credit toward fulfillment of graduation requirements or may have more restrictive requirements. (3) Credit originally granted for life experience normally cannot be transferred. *The applicability of credits toward degree requirements will be determined by the department, division, or college in which the student is enrolled.* Refer to appropriate college sections of this catalog.

Credits from Community Colleges. Credits transferred from community, junior, or two year colleges will be accepted as lower division credits up to a maximum of 64 semester hours.

Community college students planning to transfer to Arizona State University at the end of their first or second year should plan their community college courses to meet the re-

quirements of the curriculum selected. Students attending Arizona colleges or universities should consult through their academic advisor the "Arizona Higher Education Course Equivalency Guide" to determine the equivalency of courses between the institutions they are attending and Arizona State University

Students will be permitted to follow the degree requirements specified in the Arizona State University catalog in effect at the time they began their community college work providing their college attendance has been continuous.

Conditional Admission Prior to Receipt of Final Transcript. Students enrolled in other colleges or universities will be considered for conditional admission on the basis of having met all admission requirements, except for the final transcript of work in progress. The final transcript must be received in the Admissions Office directly from the records office of the issuing institution immediately upon completion of the work in progress. Hand-carried transcripts will not be accepted. Admission will *be confirmed only after receipt* of the final transcript showing the applicant has met the University requirements for admission. Any registration procedures previously undertaken will be cancelled, and any registration fees paid will be returned if the applicant does not qualify.

Appeal Procedure. Transfer students who wish to appeal the acceptance of transfer credit should appeal to the standards committee of the college at Arizona State University in which they are enrolled The decision of this committee with respect to acceptance of credits will be final.

Applicants for transfer admission who have failed to maintain an academic record which meets the scholarship requirements for admission to Arizona State University or who have been disqualified in the college or university previously attended because of scholarship, conduct, or other reasons, will be denied admission. Applicants who are denied admission may appeal to the University Undergraduate Admissions Board for reconsideration of their applications. The decision of that Board will be final.

Admission of Disabled Applicants. Qualified handicapped persons are encouraged to apply for admission to Arizona State University.

Pre-admission inquiry into the level of a disability may be made on a confidential basis in an effort to take remedial action, in meeting the individual applicant's needs. This is a voluntary action by the University. Refusal to provide such information will not subject the applicant to any adverse treatment, and it will only be used to help the Office for Disabled Student Services to provide support services.

If deemed necessary by a physician, disabled applicants must arrange for attendant care and other personal assistance, not directly related to classroom needs, prior to the start of classes. These provisions are solely the responsibility of the student, though this office will provide auxiliary aids specifically related to class activities.

It is urged that all prospective disabled students contact the Office for Disabled Student Services at Stauffer A-137, Phone: 965-6482.

Undergraduate Admission of International Applicants

For admission purposes, international applicants are defined as all persons who are not citizens of the United States of America.

All international applicants seeking admission to Arizona State University, in addition to meeting the standards for undergraduate admission, either as freshman or transfer applicants, must fulfill the following requirements:

1) Demonstrate proficiency in the English language. The University requires all international applicants whose native language is not English to take the Test of English as a Foreign Language (TOEFL). A minimum passing score of 500 is required for admission.

   The scores must be submitted directly to the Admissions Office from TOEFL, Box 899, Princeton, New Jersey 08540, or from official testing centers of accredited institutions of higher education as defined in the section titled "Acceptance of Transfer Credit" above.

   Proficiency may be demonstrated also by passing a full academic year of college work including, freshman English (i.e., the equivalent to ENG 101, 102) with a "C" grade or better at an accredited institution of higher education in the U S.A; or by meeting the admissions criteria set for graduates of American high schools after at least two years of full time study at a U.S. secondary school.

   Applicants who have completed the program in Arizona State University's English Skills Program may demonstrate proficiency in English by passing the battery of examinations required for issuance of the Advanced Proficiency Report in lieu of passing the TOEFL
2) Provide a personal data sheet certifying that they possess adequate financial resources to support themselves while in residence at the University. International applicants on scholarship must provide a letter of financial responsibility from the sponsoring agent or organization.
3) Meet all appropriate immigration standards and requirements.
4) Have all required admissions materials and credentials reach the Admissions Office at least two months prior to the beginning of

the semester for which application is being made.

International Student Information.

In addition, those students requiring student visas must meet the following requirements:

1) Upon admission to the University, international students are issued a Certificate of Eligibility (Form I-20 or DSP-66) which enables them to apply for the appropriate visa.
2) All international students are required to 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.
3) Upon arrival on campus, international students must report to the International Student Adviser.

English Skills Program. Arizona State University offers an intensive English training program for non-native speakers of English. Inquiries about the curriculum, fee schedule, etc., should be addressed to Dr. John Edwards, University Continuing Education Office, Arizona State University, Tempe, AZ 85281. Acceptance into the English Skills Program is separate from admission to the University.

Admission to Summer Sessions

Summer Sessions courses are equivalent in academic credit and performance standards to regular semester courses. Persons enrolling in them should meet the University's admissions and scholarship requirements. Students can enroll in Summer Sessions without formal admission or readmission to Arizona State University; therefore, attendance during Summer Sessions does not indicate admission or readmission to a degree program at the University. Admission and readmission procedures and standards are described in appropriate sections of this catalog. Only those high school seniors who meet the provisions outlined in the section, Special Enrollment Permit for High-Ranking High School Seniors (page 17), will be permitted to enroll in Summer Sessions.

Readmission to the University

An undergraduate student who has not attended Arizona State University for one semester (fall or spring) or more and desires to return to the University, must apply for readmission for the semester that the student intends to re-enroll. Official transcripts of all academic work taken since last attendance must be sent directly to Readmissions, Registrar's Office, Arizona State University, from the records office of the issuing institution. Failure to report intervening college or university attendance at the time of application is considered misrepresentation and falsification of University records and is cause for withholding of credit and further registration privileges. (See Records Hold, page 35).

An applicant for readmission, classified or unclassified, must meet the requirements for good standing (page 35). An applicant who has been denied readmission may appeal to the University Undergraduate Admissions Board.

An unclassified student who wishes to be admitted to a degree program must make application to the Undergraduate Admission Office, not readmission.

Conditional Readmission. Conditional readmission may be granted pending receipt of official transcripts of academic work in progress at another institution.

Final approval for readmission will not be given prior to the receipt of the pending transcript. If the condition for readmission is not cleared by mid-semester, the student is subject to withholding of credit and further registration privileges. (See Records Hold, page 35.)



Special Programs for Advanced Placement and Credit

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 credit with a score of 5, 4 or 3. No credit will be given for any examination with a score of 2 or 1. Sophomore standing in a discipline or area will be awarded with a score of 5.

When the scores are received by the University directly from CEEB, credit will be awarded as follows:

Exam	Score	Credit Hours
Art-Studio	5 or 4	6 (ART 141 and 142)
	3	3 (ART 141)
Art-History	5 or 4	6 (ARH 101 and 102)
	3	3 (ARH 101 or 102)
Biology	5 or 4	8 (BIO 101 and 102)
	3	4 (BIO 101)
Chemistry	5 or 4	7 (CHM 113 and 115)
	3	4 (CHM 113)
English	5 or 4	6 (ENG 101 and 102; exempt from ENG 104)
	3	Department will evaluate examination and recommend
Classics (Vergil, Lyric, Prose)	To be evaluated upon receipt	
French, German or Spanish—Language	5,4,3	8-14 (FRE, GER or SPA 201 and 202; additional credit to be recommended by the department)
French, German or Spanish—Literature	5,4 or 3	8-14 (FRE, GER or SPA 201 and 202; additional credit to be recommended by the department)
History-American or European	5 or 4	6 (HIS 103 and 104 or 101 and 102)
	3	Department will evaluate examination and recommend
Mathematics-Calculus AB	5 or 4	5 (MAT 120)
	3	5 (MAT 120)
Mathematics-Calculus BC	5 or 4	10 (MAT 120 and 121)
	3	5 (MAT 120)
Physics B	5 or 4	6 (PHY 111 and 112)
	3	3 (PHY 111)
Physics C	Same as for Physics B; or upon Departmental approval, credit may be granted for PHY 115 and 116 instead with a 5 or 4 score, or PHY 115 with a score of 3	



College-Level Examination Program (CLEP). Students who have taken a College-Level Examination of the College Entrance Examination Board may receive University credit. The following table of credit applies to all students enrolling in the University for the first time in August 1975 and any student enrolling thereafter. CLEP examination credit will *not* be given where (a) it duplicates credit previously earned by the student at the University or accepted by the University for work done elsewhere, or (b) it is more elementary than a course in which the student has already received credit. All examinations are given monthly by the University Testing Service.

General Examinations: To obtain credit or placement, students must receive a standard score of 500 or higher for the General Examinations. *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 60-semester-hours-of-credit limitation does not apply to subject examinations.

General Examinations	Credit Hours	Equivalency
English Composition	None	With essay exempts ENG 101 and 102 to enter ENG 104 but without essay see English Composition subject exam or English Placement Examination
Humanities	6	General Studies Credit
Mathematics	3	MAT 106
Natural Sciences	8	General Studies or Major Credit
Social Science History	6	Elective Credit

Subject Examinations	Credit Hours	Equivalency
Accounting	6	ACC 101 and 102
American Government	3	POS 300*
American History	6	HIS 103 and 104
American Literature	3	General Studies (Seniors may use for ENG 341 or 342)
Analysis and Interpretation of Literature	3	General Studies (no credit if English major)
Biology	4	General Studies or major elective
Clinical Chemistry	None**	Petition Botany Microbiology Dept. for transfer work in Arizona community college
College Algebra	3	MAT 117
College Algebra and Trigonometry	4	MAT 118
Computers and Data Processing	3	Elective Only
Intro Microeconomics	3	ECN 201 (Dept will accept credit
Intro. Microeconomics	3	ECN 202 for 201 or 202 not both No credit for advanced placement if major is Economics or any major in College of Business Administration
Educational Psychology	3	EDP 310*
English Composition	None	With essay exempts ENG 101 and 102 to enter ENG 104
English Literature	3	General Studies (Seniors may use ENG 221 or 222)
Freshman English	None	Recommend English Composition Subject Exam
Foreign Languages (College French, College Spanish)	0	Placement at Foreign Language level
FORTRAN IV	2	ECE 22 *or* ASE 226 *or* ASE 321
General Chemistry	7	CHM 113 and 115
General Psychology	3	PGS 100
Hematology	None**	Petition Botany Microbiology Department if transferring from Arizona community college
History of American Education	3	SPF 411*
Human Growth and Development	3	CDE 232
Immunology and Blood Banking	4	MIC 420*
Introduction to Business Management	None	No Credit
Introduction to Calculus	5	MAT 120
Introduction to Marketing	3	Elective (no credit if major is in College of Business Administration)
Introduction to Sociology	3	SOC 101
Introduction to Business Law	3	Elective
Microbiology	4	MIC 220 and 202
Money and Banking	3	Elective (no credit for advanced placement if major is Economics or any major in College of Business Administration)
Nursing Anatomy, Physiology, Microbiology, Behavioral Sciences for Nursing; Fundamentals of Nursing; Medical Surgical Nursing)		Not acceptable toward BS in Nursing
Statistics	3	MAT 226 *or* EDP 454*
Tests and Measurements	3	EDP 454*
Trigonometry	2	MAT 118
Western Civilization	6	HIS 101 and 102 Not HIS 100)

*Lower division credit **See note, petition needed.

All equivalency is subject to future review and possible catalog change

For further information regarding CLEP, contact the University Testing Service at Payne Education Hall 302, or call 602 965 3104

The ACT Proficiency Examination Program (PEP). Students who contemplate taking the new American College Test PEP examinations should be advised that no credit equivalency has been establ shed by Arizona State Univer sity.

Comprehensive Examinations

The purpose of the comprehensive examina tion is to give the student an opportunity to establish credit in a field in which the student has had adequate preparation or experience, but in which academic credit has not yet been earned

Only matriculated students may petition to establish credit by comprehensive examination.

Comprehensives serve as challenge examina tions and must be taken during the first two semesters in residence at Arizona State Uni versity. No comprehensive examination will be given to a student who has accumulated 100 or more semester hours of credit. A student pursuing a second baccalaureate degree may not receive credit by comprehensive examina tion, 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.

A student may establish a maximum of 30 hours of credit by comprehensive examinations and or correspondence courses

Examinations are applied for and administered by the departmental office in which the course is offered.

Applications will be accepted only for courses listed in the current University cata log, *and only for courses in which a comprehensive examination is regarded as a satisfactory measure of accomplishment*

A fee for such examination shall be charged (refer to section *Fees Deposits and Expenses).* An examination may cover only one course. For example, History 103 and 104, are two separate courses requiring different examinations. No examination will be prepared until the fee is paid.

The student will fill out the application giving the number, title, and the number of semester hours of credit for the course. The completed application must be approved by the student's advisor and filed with the department office in which the course is offered. The chair must grant approval to take the exami nation Ordinarily, an application will be approved for only one course at a time.

The number of hours of credit granted shall be the hours specified for the course in the current catalog.

All examinations shall be of a comprehen sive type. They shall be prepared and graded by the instructor of the course and chair of department or other experts appointed by the chair.

Letter grades of A, B, C, D and E will be used in grading examinations If the grade is A, B or C, a mark of Y will be entered on the student's permanent record If the grade on the examination is D or E, no entry will be made on the permanent record Entries on the permanent record of credit by examination shall be so indicated. The student will be noti fied of the result of the examination The student will **not** be given a second opportunity to establish credit by examination for the same course

Comprehensive examinations may not be taken in any course for which the student has received admission or transfer credit from any educational institution. Admission and transfer credit are established through the Admissions Office.

Comprehensive examinations may not be taken in the elementary level of a field in which the student has received credit for ad vanced work. This includes the prohibition of comprehensives in courses required as prereq uisites for a course in which the student has received credit.

Proficiency Examinations. A proficiency examination may be required for the waiver of a course requirement or for the validation of transfer credits in professional programs.

Information regarding policies and regulations governing the waiver of course requirement or validation of transfer of credits in professional programs may be obtained from the office of the dean of the college in which the student is registered

Placement Examinations for Proficiency

English. Entering Freshmen with an English ACT standard score of 25 or higher are auto matically eligible to take ENG 104, exempting ENG 101 and 102 Students scoring 23 or 24 are elig ble to take the English Exemption Examination for placement into ENG 101, 102 or 104. The English Exempt on Examina tion is given during orientation programs prior to the beginning of each regular semester and during the summer. Contact the Director of Freshman English for further information (See Admissions Procedures, page 15.)

Foreign Language. For information pertain ing to foreign language placement examinations, see page 81 (Foreign Languages) and pages 20 21 (advanced placement).

Mathematics. The Department of Mathe matics requires that all students take the Mathematics Placement Examination before registering for introductory mathematics courses. This examination is designed to determine the course level which will be of most benefit to the student. Examinations are given several times each semester and during the summer. For information concerning this examination, students should contact the Director of Mathematics Placement, Physical Science Center, A Wing.

Traveling Scholars Program: The Traveling Scholars Program is designed for students to take advantage of programs or special resources at one of the three state universities not available at their own institution. Any undergraduate student with a 2.5 GPA or graduate student with a 3.0 GPA enrolled 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 institution. Contact the University Registrar for additional information and the application form.

Correspondence and Continuing Education Courses. A maximum of 30 semester hours of credit earned in correspondence and or comprehensive examination may be applied toward the baccalaureate degree at Arizona State University. Credit earned in correspondence courses may not be applied toward advanced degrees (Refer to Correspondence Study, page 308.)

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 which 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; (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 no longer grants military science credit for active service or courses that were taken through the military.

Fees, Deposits and Other Charges

Registration and Tuition Fees

Full-time Students

Students registered for 7 or more hours are considered full time for fee purposes. Amounts listed are per academic semester. For further information on classification for fee status, see page 26 (Fee Status Classification, Procedures and Policies).

The following is a schedule of the total registration and tuition:

In State Fee Status

Undergraduate $275.00
Graduate $302.50

Out of State Fee Status

Undergraduate students registered for 12 hours and over pay a registration fee of $275.00 plus tuition of $775.00. Graduate students pay a registration fee of $302.50 plus tuition of $852.50. Students registered for 7 11 hours pay the applicable registration fee and a prorated tuition fee as follows:

	Undergraduate	Graduate
12 hours and over	$1050.00	$1155.00
11 hours	990.00	1084.00
10 hours	925.00	1013.00
9 hours	860.00	942.00
8 hours	795.00	871.00
7 hours	730.00	800.00

Part Time Students

Students registered for 6 hours or less ..... $30/hr. $33 hr.

NOTE: The Board of Regents has adopted a policy that tuition registration fees for all students be increased or decreased annually beginning in 1980-81, at a rate equal to the increase or decrease in the annual Consumer Price Index. Graduate students will pay a 10% surcharge.

Audit Registration not for credit

Fees for auditing classes are the same as fees paid for credit.

Summer, Continuing Education and Correspondence

Further information is included in this catalog's section, University Continuing Education and Summer Sessions.

Summer Sessions	$30.00 hour
Extension	30.00 hour
Correspondence	18.00 hour

Additional Fees

Fees listed are per academic semester and are in addition to the general University registration and tuition fees.

Private Music Instruction

½ hour of instruction per week	$40.00
1 hour of instruction per week	60.00
1 or more hours of instruction per week music majors only	60.00

Musical instrument rental charge

Charge for use of University owned musical instruments	10.00

Consult Music Department for specific information

Special Class Fees

Various University classes require payment of fees for special materials and rentals. These fees are listed in the schedule of classes for each semester.

A $5 towel and locker fee is required each semester by students using towels and locker facilities for Physical Education classes and Intramural Activities.

Late Registration

Regular Semester $10.00

A late registration fee is assessed when a

student registers after the regular start of classes.

Housing Charges (Per Academic Year)

Residence Halls with cafeteria services:

	Fall	Spring
Palo Verdes, Manzanita	$784	$523
Sahuaro	$764	$509
Mary Graduate Housing	$834	$556
	$1330	$886

(Options Available)

Amounts are based on fiscal 1978-79 rates for double occupancy with 15 meals a week. Single occupancy rooms may be requested as well as any 10 meal a week option. The Housing Office should be contacted on current price status and options.

Residence Halls without cafeteria services:

	Fall	Spring
Coed (no options available)	$430 $628	$286 $419
Irish	$310	$207
Hayden, McClintock A, Best A&B	$374	$249
Best C, McClintock B	$398	$265

Prices slightly higher for installment payment plan.

Meal Tickets:

The Memorial Union Club, as well as the Residence Hall Cafeterias, offer meals on a five day basis with additional serving for most meals at no extra cost. Several options are available. Also, weekend meal coupons may be purchased. Individual meals are available a la-carte at a higher rate.

All meal tickets for halls without cafeterias can be purchased from the University Cashier in the Administration Building.

Reservations:

Application forms for dormitories may be obtained by request from the Arizona State University Housing Office, Tempe, Arizona, 85281. Reservations may be obtained by filing an application together with a $50 deposit. For further information on Housing, refer to catalog section on Student Services Housing.

Other Fees and Charges

Admission Application $10.00

All out of state undergraduate applicants must pay a non-refundable fee when application for admission is made.

Transcripts ..... $ 1.00

Request for transcripts should be made two weeks in advance of time desired.

Copies for Educational records other than transcripts

Quantity of Pages	Charge
1 - 5	Free
6 - 10	$2

Additional pages will be made at an increase of $1 per 5 copies.

Graduation:

Undergraduate ..... $ 7.00
Graduate 10.00

Late Graduation:

Undergraduate $12.00
Graduate 15.00

If the graduation charge is not paid on or before the date specified in the section of the catalog headed Graduation Requirements, a late fee of $5.00 is added to the charge.

Graduation Reapplication

Undergraduate ..... $ 7.00
Graduate $10.00

Charge for reapplication when requirements were not met on original application are the same amount as the original application. This applies to both undergraduate and graduate students.

Course Withdrawal ..... $ 1.00

Charged following the last day of registration (per course withdrawn).

I.D. Replacement $5.00

Charge for replacement of a lost or mutilated activity card $10.00

Replacement because of wear or deterioration will be free of charge.

Returned Check Service ..... $ 5.00

Students who have checks returned to the University by the bank for any reason will be assessed a $5.00 service charge.

Cap and Gown Rental ..... approx. $ 7.50

Cap and gown for Commencement exercises are available at the University Bookstore and vary in price depending on the degree.

Comprehensive Examination ..... $ 7.50

Paid by all students seeking to establish credit by examination (per semester hour).

Lost Receipt and Registration Material $ 1.00

Parking ..... $ 5.00

A parking decal must be purchased for each motor vehicle used by a student or employee on the University campus. For further information refer to catalog subsection General Information Parking.

Deposits (refundable):

Housing $50.00
Science breakage, depending on course ..... $5.00 to $25.00

Refunds

Registration and Tuition Fees

Students withdrawing from school or individual classes will receive a refund based on a percentage of the total semester fee paid in accordance with the following schedule:

Before first day of semester	Deduct $10.00
1 thru 14 calendar days	80% refund
15 thru 21 calendar days	60% refund
22 thru 28 calendar days	40% refund
29 thru 35 calendar days	20% refund
After the 35th calendar day	No refund

Summer Session Refunds

Students withdrawing from any Summer Session or individual classes in a given session will receive a refund based on a percentage of

fees paid and in accordance with the following schedule:

Before first day of session	Deduct $5.00
1st and 2nd days of session	80% refund
3rd day of session	60% refund
4th day of session	40% refund
5th day of session	20% refund
After 5th day of session	No refund

Refunds will be based on the first five class days beginning with the first day of the Summer Session, not on the first five meetings of any given students' classes.

Percent of refund will be determined by date withdrawal is presented to the Business Office. If an application for change in fee status is pending through the Fee Status Classification Office, percent of refund may be determined by the date a notification to withdraw is filed with the Assistant Comptroller, Business Office, Administration 107. For further information, see page 26 (Fee Status Classification, Procedures and Policies).

In certain instances consideration is given when students must withdraw because of illness. For complete details contact the Registration section of the Business Office.

Additional Fee Refunds

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

Special Class Fees. Refunds, if any, will be determined by the department offering the course. Determination will be based on progress in the course and type of activity.

Late Registration. Not refundable.

Additional University Charges

Refund of these payments will be determined on the individual circumstances. Under ordinary conditions they are not refundable.

Housing Charges

Refunds to students departing from resident halls prior to end of the academic year are computed on the following basis:

Deposits. Housing deposits are refunded as prescribed by the housing contract that each student signs when they apply for residence hall accommodations. Students should refer to this document for specific information on refunds. When checkout occurs prior to the last two weeks of the Spring semester, students forfeit their $50 room deposit.

Rent. Students will be charged 10% of the total semester rate for each week or partial week of registered occupancy.

Board. Students will be charged for meals through the last day of the week in which formal check out occurs. Students departing during the last two weeks of the semester shall be charged the full semester rate for meals. No refund will be made for meals missed.

Check out is based on the date the Housing Department is notified on a check-out form, not the last day of occupancy.

All refunds will be made net of any amounts due the University. If the last day of the refund period falls on a weekend or holiday, the refund must be picked up during the regular office hours on the preceding day. For further information, see General Information, Forfeiture of Refunds, page 24.

General Information

Change in Fees

The Board of Regents reserves the right to change fees and charges without notice.

Payment of Fees

Registration and related fees are payable in full on the day of registration. (See Veteran's Deferred Payments)

Method of Payment

Payments to the University should be made by currency, traveler's check, bank money order, cashier's check or certified check. Personal or company checks in the exact amount of the charges will generally be accepted.

The University reserves the right to refuse any type of payment.

Veteran's Deferred Payment

As provided by the Veteran's Readjustment Assistance Act, veterans may apply for deferred payment of registration fees. A "Certificate of Eligibility" must be presented. Contact the Business Office in advance to be assured of meeting the necessary requirements. The University reserves the right to deny this privilege to anyone.

Minimum Estimated Expenses for an Academic Year

	UNDERGRADUATE		GRADUATE	
	In-State	Out of State	In State	Out of State
Full time Student				
Registration and Tuition	$ 550	$2,100	$ 605	$2,310
Books and Supplies	200	200	200	200
Room and Board - University Housing (Housing limited)	1,300	1,300	1,300	1,300
	$2,050*	$3,600*	$2,105*	$3,810*

*Amounts are approximate since cost of books, supplies, room and board are variable. All students should add incidental personal expenses and other special charges pertinent to their field of study.

Forfeiture of Refunds

All refunds and deposits due students for any reason are subject to forfeiture unless obtained on or before June 30 of the year in which they were originally paid Refunds will not be made without student identification Should June 30 fall on a day when the Business Office is closed, the refund must be picked up during the regular office hours preceding

Checks Returned by the Bank

Checks returned by the bank for any reason will cause that student's classes to be subject to immediate cancellation A returned check will be subject to a $5 00 service charge Registration fee payment checks returned will cause the student to be subject to withdrawal on the date the check is returned and the student will pay fees based on the percentage refund available as of that date (See Refunds). In all cases student services will be immediately suspended

Delinquent Financial Accounts

Students with outstanding financial obligations will be refused all University services until such obligations are paid. They will be denied subsequent enrollment, transcripts, grades, transfer of credit, and graduation. Failure to respond to notifications of outstanding financial accounts will result in a Records Hold

Parking

Anyone who parks or expects to park (whether owned, leased, or borrowed) a vehicle on the University Campus must register each vehicle and secure and display a current parking decal. Decals are issued from August to August Violations of the parking regulations are subject to citation and fines. Parking fines are payable at the Cashier's Office, Administration Building. Appeals to parking citations may be filed with the Parking Administrator, Physical Education Building West, and after payment may be further appealed through the Parking Appeals Board. Unpaid parking citations will become part of delinquent accounts and are subject to the above paragraph.

Fines

If you violate the regulations for parking, then you are subject to the appropriate penalty:

1.	Parking in an unauthorized parking area or lot	$ 4 00
2	Parking by faculty, staff, or students in a visitor area	4 00
3	Obstructing a drive or driveway	10 00
4	Obstructing a properly parked vehicle	10 00
5	Removing a barricade or other traffic control device	10 00
6	Parking on a pedestrian path, sidewalk, or safety zone	10.00
	Parking in a drive or driveway posted for emergency vehicles	0.00
8	Misuse of Car Pool Decal	10.00
9	Improperly parking a bicycle	3.00
10	Failing to register a vehicle or to display a parking decal	10.00
11.	Improperly displaying a parking decal	3.00
12	Improperly transferring a parking decal	5.00
13	Falsifying information on registration	25.00
14.	Using an altered or substituted decal	25.00
15	Parking in a non designated parking zone	3.00
16.	Parking in a space designated for disabled or car pool	25.00
17	Overtime parking	3 00
8.	Impound Fee	25 00

Fee Status Classification Procedures and Policies

The Arizona Board of Regents is required by law to establish for the universities under its jurisdiction and control uniform guidelines and criteria for the classification of students for payment of registration and tuition. Attention is invited to relevant provisions of the constitution, statutes, and laws of Arizona, including Sections 3 and 6, Article 7 of the Constitution (which provisions have been held by the Supreme Court of Arizona to govern domicile for all purposes), Sections 15-724, 15-725, and 15 -791 through 15 795 Arizona Revised Statutes, as amended

A. A person not qualifying to enroll as a student with in state status must pay out-of state fees, in addition to other established fees and charges that are required for all students The following provisions govern the assessment of fees.

An undergraduate student with out-of-state fee status must pay a registration fee of $275 00. A graduate student must pay a registration fee of $302 50. In addition, out of state undergraduate students pay tuition of $775.00. while out of state graduate students pay a tuition of $852.50 per academic semester for 12 hours or more For enrolment of 7 11 hours, the out-of state undergraduate student must pay the applicable registration fee plus tuition of $65 00 per credit hour, while the out of state graduate student must pay the applicable registration fee plus tuition of $71.00 per credit hour.

Out of state fee classification is not applicable for students enrolling for less than 7 units.

B. A person may not be classified with in state status for the purposes of registration and payment of fees and expenses at the university until he has been domiciled in this state for one year next preceding the last day of registration for credit published by the university.

C. Mere presence of a person in the State of Arizona for one year does not necessarily establish a domicile for classifying that person

with in-state fee status. No person shall be deemed to have gained or lost a domicile by reason of his presence or absence while a student at any institution of learning

D. The person must have his fee status determined prior to registration and payment of fees. The responsibility of registration under proper status is placed upon the individual Prompt filing of the required domiciliary information will enable the University to determine classification prior to registration. The Board of Regents has promulgated a publication, entitled: "Information and Guidelines for Determining Fee Status" which is incorporated by reference in this catalog and the attention of all persons concerned with classification for fee purposes is directed to this publication available in the offices of the Registrar and Director of Admissions at the Moeur Building and the Fee Classification Office (These materials include: (a) definitions related to domicile, (b) guidelines, rules and regulations applied to determine domicile, and (c) information for appeal)

An affidavit must be completed and filed prior to any decision concerning domicile. The affidavit is required upon a desired change in classification or after an absence for a semester or more.

In all cases where the records indicate the student's domicile is not in Arizona, out of state fees will be assessed Any student found to have made a false or misleading statement concerning his domicile shall be subject to dismissal from the University.

E. The Fee Classification Office of the University has been designated to determine domicile. If there is any question as to domicile, the matter should be brought to the attention of the classification office and passed upon prior to registration and payment of fees. The same classifiction office can, during registration period published by the University or at other times, pass upon the domicile of a person.

F. The president of the University has appointed an appeals committee to hear the cases of individuals who believe that the decision regarding their domicile is not consistent with the laws of the State of Arizona or the guidelines promulgated by the Arizona Board of Regents. An appeal shall be filed in the Fee Classification Office It shall be written, signed by the student, and accompanied by a sworn written statement of all facts relative to the matter Notice of appeal shall be filed at any time within 35 days from the last day of registration published by the University. The person appealing shall have the right to appear and testify before the committee and to be represented by an advisor.

G. Students should refer to their admission certificate for initial notification of fee status In addition the student enrollment form should be examined each semester for verification of fee status.

H. If the student enrollment form and or admissions certificate indicates an out-of-state fee status, out-of-state fees must be paid unless an application for change in fee status has been filed with the Fee Classification Office and a decision has been rendered for in state status prior to the fee payment due date. It is the responsibility of the student to file an application early enough that a decision can be rendered before the fee due date. Generally a minimum of 30 days is required For information on refunds see catalog subsection Refunds Registration and Tuition Fees

I. All questions and discussions relating to classification for fee status should be directed to the Fee Classification Office, Arizona State University, PEBW 124, Tempe Arizona 85281 or call (602) 965-7712.

Financial Aids

Individuals who wish more detailed information on any scholarships grants loans or other financial assistance programs are urged to write or call the Office of Financial Aids, Matthews Center, 602 965 3355.

Financial Aid

Student aid at Arizona State University combines private, institutional, state and federal scholarship, grant, loan, and employment programs.

The Financial Aids Office assists qualified students in obtaining financial aid to attend ASU to the extent that funds are available *Financial aid is an individual process from admission and requires separate applications.*

Eligibility Requirements for All Types of Financial Aid

1. Only students who are United States citizens, nationals, or permanent residents are eligible for financial aid. Exceptions are (a) Foreign Student Scholarships and (b) Short Term Loans

2 Students must be in good standing and making satisfactory progress toward a degree (see Financial Aids Academic Standards)

3. Students must be carrying at least a half time academic workload for most federal aid programs and a full time academic workload for scholarships. *For financial aid purposes, undergraduates enrolled for a minimum of 12 semester hours are considered full-time 6 hours half time, graduates, 9 hours full time, 5 hours half time.*

4. Students who attend Arizona State University only during the summer sessions are not eligible for financial assistance.

5. The essential condition for most financial assistance is that need must be clearly established To determine financial need, Arizona State University uses the American College

Testing Program Family Financial Statement (FFS). However, the College Scholarship Service Financial Aid Form (CSS-FAF) will also be accepted. The Arizona Student Data Form must also be completed. The following types of financial aid require additional or separate applications. Federally Insured Student Loans (FISL); Law Enforcement Education Program (LEEP); Bureau of Indian Affairs Tribal Funds; and selected scholarship funds. See below for further information regarding determination of financial need.

Application Priority Date: April 15 for All Students

Completed applications (all forms and necessary documentation) received by the priority date assure applicants that they will be considered for applicable aid programs carried at ASU. Other complete applications received after this date will be processed according to the date received and the availability of funds. *Applications received after June 1 have no assurance of being reviewed or funded prior to the beginning of Fall Semester*

Therefore, students desiring aid during Summer 1979 or Fall and or Spring 79 80 should apply during January and February for the following Fall Semester.

Application Procedures and Information

1. Applicants should obtain the ACT Family Financial Statement (FFS) from their high school counselor or community college or Arizona State University Financial Aids Office.

2. Applicants should then complete the FFS and the Student Data Form and forward to ACT in Iowa City in the envelope provided with the FFS. The proper fee should be enclosed.

3. Other applicable forms, e.g., Affidavit of Independency, Financial Aid Transcript, etc., should be processed and forwarded to the proper office.

4. Undergraduate students who apply for general financial aid at ASU must also apply for the Basic Educational Opportunity Grant Program (BEOG) and submit the Student Eligibility Report (SER) which they receive from BEOG to the ASU Financial Aids Office before their ACT FFS application can be processed

5. All types of student aid must be applied for with a new application each academic year.

6. It takes ACT and BEOG approximately six weeks to process an application It takes ASU approximately four weeks to inform applicants of the status of their applications once the application is complete. Applicants should remember this timetable and apply early. Income amounts on the ACT FFS must be *actual,* as reported on the Federal Income Tax Form 1040 Applicants may be asked to submit current copies of their own or parents' income tax return as documentary material to their ACT FFS report

7. All changes in areas affecting the award of aid such as scholarships, obtaining a job, dropping classes below a projected course load, change in marriage status, or any other change which varies from the originally submitted information must be reported to the Financial Aids Office.

8. Married students, if both apply and are qualified, are eligible, but should submit their applications together so that a family package can be designed.

9. Transfer Students Students who have attended other post secondary schools colleges universities are required to fill out a Financial Aid Transcript (FAT) and send one to each university involved.

10. Independent Students An Affidavit of Independency must be submitted by students who file as self-supporting and who are under 25 years of age. An independent student is defined as one who does not live with the parents for more than six weeks annually, who has not been claimed on the parents' Federal Income Tax Form 1040, nor received $750 or more in support from the parents.

Types of Financial Assistance

Please refer to publications of the Financial Aids Office for detailed information on

Basic Educational Opportunity Grants (BEOG)
Supplemental Educational Opportunity Grants (SEOG)
College Work Study Employment (CWS)
National Direct Student Loans NDSL)
Federally Insured Student Loan Program (FISL)
Law Enforcement Education Program Loan (LEEP)
Law Enforcement Education Program Grants (LEEP)
Nursing Student Loans
Bureau of Indian Affairs Grant (BIA)
State Student Incentive Grants SSIG
Veterans Educational Loans
Migrant Opportunity Program (MOP)

Short-Term Loans (STL)

Full time undergraduate and graduate students are eligible.

STL are available only for emergency educational expenses, e.g., registration fees, books and supplies, room and board, personal incidentals, and transportation.

Cash maximum of $200 (or one semester's fees tuition).

Repayment may be up to 90 days or the end of the respective school term, whichever occurs first

STL are available any time school is in session to students who have been enrolled at the University for one semester or longer.

Scholarships

Board of Regents Academic Scholarships

Awards are based on high scholastic standing and generally require financial need

University fees are waived for recipient

Student must be full time and an Arizona resident

Awards can be renewed each undergraduate year (total 8 consecutive semesters).

Special and Board of Regents Scholarships

Selection is based on scholastic promise, financial need, and Arizona residency

Included in this category are the following: Upward Bound, Migrant Opportunity Program, Educational Opportunity Program, Reservation Indian, etc

Others are sponsored by individual firms and donors.

Activity

Music, athletic and other activity awards generally are given upon recommendation of the chairpersons of the appropriate departments.

Interested students should apply to the respective department directly.

Most activity scholarships do not require financial need

Departmental

Various scholarships are available through academic departments of the University.

These scholarships should be applied for by contacting the respective department directly

Graduate assistantships and fellowships are awarded by the Graduate College and its various academic departments, which should be contacted directly by the student

Army and Air Force (ROTC

For two-, three- and four-year scholarships and stipend, applicants should contact the respective department directly.

Financial Need Determination

Arizona State University uses the ACT FFS needs analysis system which takes into consideration all of the income and resources of a student and the family in the case of a dependent or married student. This information is held in strict confidence in keeping with federal requirements. The amount determined to be available for educational costs through these resources is then subtracted from the "budget" which represents the cost of education for that particular student to attend ASU for the requested school period. The difference, if there is one, is called the "need" for that particular student It is that need which the Financial Aids Office tries to meet by an aid package of grants, loans, scholarships, or part-time work.

The following budgets represent approximate costs of education involving the allowable cost areas of tuition and fees, books and supplies, board and room, personal (clothing, toiletries, laundry, entertainment, etc.), and transportation. They cover a nine month academic year for the type of student indicated.

	Commuter*	Dorm	Off-campus	Married**
University Fees	$ 550	$ 550	$ 550	$ 550
Books Supplies	220	220	220	220
Room Board	970	1,930	2,450	4,050
Personal	490	550	550	1,190
Transportation	290	290	290	390
Total (Arizona Resident)	$2,520	$3,540	$4,060	$6,400
Tuition (Out of State)	$1,550	$1,550	$1,550	$1,550
Total (Out-of-State)	$4,070	$5,090	$5,610	$7,950

Other expenses such as child care, dissertation costs, medical expenses which exceed 5% of the budget, etc., may be included in a budget with proper documentation

*A commuter student is defined as one who lives in the college community with the parents Room and board expenses have been allowed

** With one spouse enrolled

Changes in Student Status or Resources

The budget and aid award is much like a contract with the student, issued for a specific school term(s), and based on a designated course load and the student's status as dependent or self supporting. The need is primarily responsive to this budget and the resources the student says will be available.

Any change in those areas which affect a student's status and resources must be reported to the Financial Aids Office. Failure to do so may result in the cancellation of future student aid or a mandatory repayment of an overaward.

Items Considered by the University in Making Awards and Student Notification Procedures. Please refer to the publications of the Financial Aids Office for detailed information.

Academic Requirements. In order to be eligible to receive aid from most federal programs, students are required to maintain satisfactory progress and academic good standing. Refer to publications of the Financial Aids Office for additional information.

Federal Grant Refund Policy. Please refer to publications of the Financial Aids Office for more detailed information.

Classification of Courses

The course numbering system has been designed to facilitate sorting and tabulating by machine methods.

Three letter designations relate to departmental offerings and subject fields. A complete list of the three letter designations, subject fields and departments or divisions in which courses are offered appears on pages 32-33 and each issue of the *Schedule of Classes*.

Names of faculty and times of offering are listed with each course description to aid in planning individual curricula. While every effort will be made to adhere to the listings, circumstances may require changes in faculty assignments or changes in scheduling. Accordingly, the listings should not be construed as a guarantee that any specific course will or will not be offered as listed.

The University course numbering system is as follows:

100-299 (Lower Division Courses) are freshman and sophomore level courses and are designed primarily for these students. Certain courses are closed to freshmen unless they have had the designated prerequisites or are majoring in that department. This fact may be obtained from the catalog, the *Schedule of Classes*, or the student's curriculum advisor prior to registration.

300-499 (Upper Division Courses) are junior and senior level courses and are designed primarily for these students and other advanced students. Courses at the 400-level will apply to graduate degree requirements when appearing on an approved program of study. Prerequisites and other restrictions must be noted before registration. When approved for inclusion in an individual program of graduate study by the Graduate College, selected courses may serve the needs of individual graduate students.

500-799 are graduate level courses open only to graduate students under the conditions posed by their respective programs of study. Ordinarily 600 level courses are reserved for second year Master's or Education Specialist students. Ordinarily 700 level courses are reserved for doctoral students. Undergraduate upper-division students at Arizona State University may enroll in graduate courses with the approval of their advisor, the course instructor, the chair of the department and the dean of the college offering the course. If the course is not used to meet an undergraduate graduation requirement, it may be eligible for use in a future graduate program on the same basis as work taken by an unclassified graduate student.

Special Topics 294, 494. The numbers 294 and 494 have been reserved for courses covering topics of immediate or special interest of a faculty member and students. Credit, 1-4 hours.

Pro-Seminar 498. Small group study and research for advanced students within their major area. Prerequisite: Major in the department or approval of instructor. Credit, 1-7 hours.

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

An Independent Study course is designed to provide an opportunity for the superior senior student or for the graduate student to do an original study or investigation 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 in which the course is taken. A

special class fee may be required. Credit 1-3 hours.

Special Liberal Arts Courses. Liberal Arts 100, 101, 150, 401, 402 are interdisciplinary courses offered by the College of Liberal Arts. LIA 100 (University Adjustment and Survival) and LIA 101 (Use of Research Libraries) are open to all students; LIA 150 (Introduction to Asia) is open to students who have not had any exposure to the Asian studies; LIA 401 (The Meaning of the 20th Century) follows a lecture structure and is open to all upper division students and to others by approval of the instructor; LIA 402 (Movements and Meaning in Latin America) offers lectures by a variety of specialists.

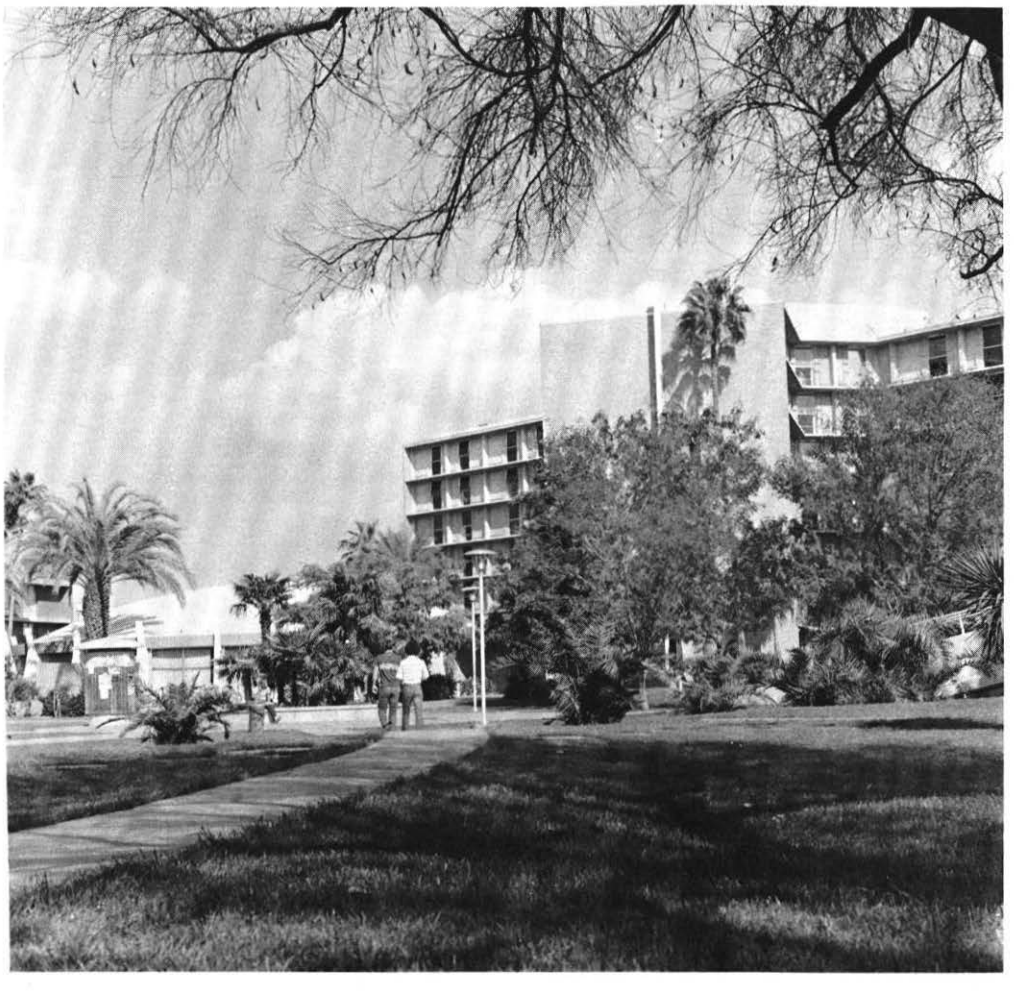
Honors Courses. The courses listed in the schedule as 298 and 492 (Honors Individual Study), 493 (Honors Thesis) and 497 (Honors Colloquium) are reserved for students in Honors Programs.

An omnibus course is one at a certain level available to academic units who may use their own prefixes before the number. The omnibus number (initially approved by the Provost) is to be used for courses offered on an experimental basis. The title and course content varies with the subject matter.

Special Courses. Undergraduate Internship (484), Special courses for Research Methods (500), Practicum (580), Field Work (583), Internship (584), Reading and Conference (590), Seminar (591), Research (592), Applied Project (593), Conference and Workshop (594), Special Topics (598), Thesis (599), Research Methods (600), Practicum (680), Field Work (683), Internship (684), Reading and Conference (690), Seminar (691), Research (692), Applied Project (693), Research Methods (700), Practicum (780), Field Work (783), Internship (784), Reading and Conference (790), Seminar (791), Research (792), Dissertation (799), are set forth in announcements of the Graduate College and are also listed in the respective departments, where offered.

Prerequisites. A student registering for a course must meet the prerequisites listed for it or otherwise satisfy the instructor that equivalent preparation has been completed.

Courses Offered. The University does not offer all of the courses listed in the catalog annually or each semester. The *Schedule of Classes* should be consulted for those courses offered each semester and during the summer terms.



Prefix Designations for Courses and Subject Field (by College)

Prefix	Discipline
	Architecture
AAD	Architectural Administration and Management
ACH	Housing and Urban Development
ADL	Architectural Design and Technologies Laboratories
ANP	Environmental Analysis and Programming
APH	Architectural Philosophy and History
ARP	Special Studies
ATE	Architectural Technologies
AVC	Architectural Communications
DSC	Design Sciences
DES	Pre-Professional Core Courses
EDE	Energy Design Planning and Technology Laboratories
EDH	Environmental Design History
ETE	Energy Technologies and Planning
IND	Industrial Design
INT	Industrial Architecture
PLA	Landscape Architecture
PUP	Urban and Regional Planning
VCD	Visual Communication Design
	Business Administration
ACC	Accounting
ADS	Administrative Services
ADV	Advertising
BUE	Business Education
CIS	Computer Information Systems
ECN	Economics
FIN	Finance
HSA	Health Services Administration
INS	Insurance
MGT	Management
MKT	Marketing
OFA	Office Administration
QBA	Quantitative Business Analysis
REA	Real Estate
TRA	Transportation
	Criminal Justice
CRJ	Criminal Justice
	Education
AED	Adult Education
CED	Counselor Education
EDA	Educational Administration and Supervision
EDF	Educational Foundations
EDP	Educational Psychology
EDT	Educational Technology
EED	Elementary Education
HED	Higher Education
IED	Indian Education
IME	Instructional Media
LIS	Library Science
MCE	Multicultural Education
RDG	Reading Education
SAE	Safety Education
SED	Secondary Education
SPE	Special Education
SPF	Social and Philosophical Foundations
	Engineering and Applied Sciences
AET	Aeronautical Technology
AGI	Agricultural Industry
ASE	Analysis and Systems
BAS	Bio Agricultural Sciences
CEE	Civil Engineering
CHE	Chemical and Bio Engineering
CON	Construction
CSE	Computer Science Engineering
ECE	Engineering Core
EEE	Electrical and Computer Engineering
ELT	Electronics
ERA	Environmental Resources in Agriculture
ESE	Aerospace Engineering and Engineering Sciences
GRC	Graphic Communications
IEE	Industrial and Management Systems Engineering
ITE	Industrial Technical Education
MEE	Mechanical Engineering
MET	Manufacturing and Energy Systems Engineering Technology
STE	Society, Values, and Technology
TST	Technical Science
	Fine Arts
ARA	Art Auxiliary Courses
ARE	Art Education
ARH	Art History
ART	Art
CDX	Communication Disorders
COM	Communications
FIA	Fine Arts
HUM	Humanities
MHL	Music History Literature
MTC	Music Theory Composition

Prefix	Discipline
MUE	Music Education
MUP	Music Performance
REL	Religious Studies
THE	Theatre
THP	Theatre Performance and Production
	Liberal Arts
AES	Aerospace Studies
ASB	Anthropology (Soc Beh.)*
ASM	Anthropology (Sci Math.)*
AST	Astronomy
BIO	Biology
BOT	Botany
CDE	Child Development
CHI	Chinese
CHM	Chemistry
DAH	Dance History
DAN	Dance
DEH	Decorative Arts
ENG	English
ENT	Entomology
FAS	Family Studies
FLA	Foreign Languages
FON	Food and Nutrition
FRE	French
GCU	Cultural Geography
GER	German
GLG	Geology
GPH	Physical Geography
GRK	Greek
HEC	Home Economics
HEE	Home Economics Education
HES	Health Science
HIS	History
ITA	Italian
JPN	Japanese
LAT	Latin
LIA	Liberal Arts
MAT	Mathematics
MCO	Mass Communications
MIC	Microbiology
MIS	Military Science
PAF	Public Affairs
PED	Physical Education
PGS	Psychology (Soc. Beh. *
PHI	Philosophy
PHS	Physical Science
PHY	Physics
POR	Portuguese
POS	Political Science
PSE	Science Education
PSY	Psychology (Sci Math.)*
REC	Recreation
RUS	Russian
SOC	Sociology
SPA	Spanish
TXC	Textiles and Clothing
ZOL	Zoology
	Law
LAW	Law
	Nursing
HDE	Human Development
NCE	Continuing Education
NUR	Nursing
	School of Social Work
SWC	Social Work Continuing Education
SWG	Social Work (Graduate Program)
SWU	Social Work (Undergraduate Program)

*Soc Beh. Social Behavioral
Sci. Math Science Mathematics

Key to Course Listing Abbreviations

GLG	Departmental prefix designation
410	Course number
3) .	3 units credit
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'79,S'80	Course offered every other year on semester indicated
NR . . .	Course not regularly offered

Grading System

Scholarship Grades and Marks. Scholarship grades and marks are indicated by the letters and explanations given below. All grades and marks will appear on the grade report and the permanent record

A	Excellent	NR	No Report
B	Good	E	Failure
C	Average	Y	Satisfactory
D	Passing	W	Withdrawal
CR	Credit	I	Incomplete
NC	No Credit	X	Audit

Grading Options. All students are graded for credit (A, B, C, D, E, I or Y) unless a grading option is indicated at the time of registration. Grading options are Audit and Credit No Credit. *Grading options cannot be changed after the close of the drop add period*

Credit/No Credit. This grade option is available only as described by the Colleges of Liberal Arts and Fine Arts Consult each college for restrictions prior to registration for credit no credit

Audit Enrollment. A student wishing to audit a course must first obtain approval of the instructor The student must be properly registered and have fees paid for the course which is to be audited. Audit enrollment must be indicated at the time of registration. An audited course is counted in the student load, however, no credit is earned for the course. The mark of X will be recorded for the completion of an audited course. The mark of W may be recorded if the instructor determines that the student's participation or attendance was inadequate *Audit enrollment cannot be changed to credit enrollment nor credit enrollment to audit enrollment after the close of the drop add period*

Satisfactory. Each college or school within the University may elect to evaluate the students' performances in a class by using the mark of Satisfactory (Y). The Y is appropriate for seminars, internships, projects, dissertations, workshops, theses, readings and conference and research. The Y is included in earned hours but does not calculate in the GPA.

Mark of Incomplete (I). A mark of I is given by the instructor only when a student who is otherwise earning a passing grade is unable to complete a course because of illness or other conditions beyond the control of the student. It is the student's responsibility to contact the instructor, or the dean of the college in the instructor's absence, to arrange for timely completion of the course Upon completion of the course the instructor will submit a change of grade to the Registrar's Office at which time the I will be slashed and the appropriate grade and credit entered If an I is not subsequently changed by the instructor, it becomes a part of the student's permanent record See special regulations in the College of Nursing, the School of Social Work and other colleges with restrictions on the mark of I. A student does not register or pay fees for a course for which an incomplete (I) has been received in order to complete the course.

Mark of Withdrawal (W). The mark of W is automatically recorded in a course whenever a student withdraws from a course or officially withdraws from the University during the Guaranteed W period (first six weeks) An instructor may assign the mark of W in a course from which a student withdraws after the Guaranteed W period, depending on the student's status at the time of withdrawal.

An instructor may not assign the mark of W unless a withdrawal form has been properly processed with the Registrar's Office. (See section on Withdrawal)

Deletion and Repetition of Courses. An undergraduate student may repeat any course(s) taken at ASU in which a grade of D or E was received. The student must be properly registered and have fees paid for the course which is to be repeated. When a course is repeated the original entry remains on the student's record and will only be counted once in earned hours for graduation A student may, by formal application to the Registrar, request that a grade of D or E not be included in the cumulative grade point index. The course must have been repeated in residence at Arizona State University with a passing grade and prior to completion of the first bachelor's degree See limitations on repeating courses in the Colleges of Architecture and Nursing and the School of Social Work

A course in which a grade of C or better has been earned, may *not* be repeated. If repeated, the second entry will *not* be counted in earned hours or grade point index for graduation.

A graduate student is not eligible for the deletion of a D or E grade. A course repeated by a graduate student will remain in the earned hours and the grade point index.

Instructor May Withdraw Student from Class. An instructor may withdraw a student from the class with a W or E, when the student's progress or conduct justifies such action The instructor must initiate a withdrawal form prior to the withdrawal deadline

Among reasons for withdrawal are

1. Unjustified absences;
2. Conduct detrimental to the student or other class members;
3. Lack of achievement or progress

A student may appeal an instructor-initiated withdrawal to the standards or academic committee of the college in which the course is offered. The decision of the college standards committee is final.

Change of Grade. The grade reported for a

course is the sole and final responsibility of the instructor of the course.

A grade, once reported to the Registrar's Office, may be changed only (1) upon the authorization of the faculty member issuing the original grade or (2) in the instructor's absence, by the academic grievance committee of the college in which the course was offered. In either case, the approval of the dean of the college concerned is required

A student who feels an unjust grade evaluation has been made, may appeal to the academic grievance committee of the college in which the course is offered. The decision of the college committee and dean is final.

Grade Points. For the purpose of computing the grade point index, grade points are assigned to each of the grades as follows: A, 4 points for each semester hour; B, 3 points; C, 2 points; D, 1 point, and E, 0 points.

Grade point averages are rounded to the nearest hundredth of a grade point.

Grade Point Average. The grade point average (GPA) is obtained by dividing the total number of grade points earned by the number of semester hours in the student's course load graded A, B, C, D, or E (net hours). *Semester* GPA is based on *semester* net hours. *Cumulative* GPA is based on *total* net hours.

Mid-Term Deficiency Report. Instructors are required to evaluate students at mid term for scholarship deficiencies. A student who has been evaluated for a D or E at mid-semester will receive a deficient scholarship report. The mid-term D's and E's are not recorded on the student's permanent record. Mid-term reports are mailed to the student's local address of record.

Final Grade Report. A grade report will be sent to each student at the end of each semester to the home address of record.

It is the responsibility of the student to keep the Office of the Registrar informed of address changes.

Dean's List. The Dean's List is composed of all undergraduate students who meet the following requirements (1) Twelve or more resident and graded credit hours (exclusive of credit/no credit) must be completed at ASU during the semester and (2) A semester index of 3.50 or better must be achieved. A notation for Dean's List achievement is made on the final grade report.

Records Hold. The Registrar's Office will place a hold on a student's record when requested to do so by the Business Office for an outstanding financial obligation or if requirements for readmission to the University have not been met

If a hold is placed on a record, the student will not receive a grade report and credit earned will not be recorded for the current semester's work. The record will not be released and the student will not be able to order an official or an unofficial transcript. All further registration privileges will be suspended.

The hold will remain on the record until removed by the initiating office. It is the student's responsibility to clear the hold on the record

Transcripts. Official transcripts will only be released by the Registrar's Office *upon written request of the student.* Student I D. number, date of birth, date of last attendance and name(s) used at ASU should be supplied when ordering official transcripts. Transcripts will not be issued if there is a financial obligation or hold on the record. The student is responsible for supplying a specific address if the transcript is to be mailed. The fee for an official transcript is $1.00 per copy Allow two weeks for processing.

Unofficial transcripts may be requested in person at the Registrar's Office or by mail if a self-addressed stamped envelope is enclosed. There is no charge for an unofficial transcript.

Requests will not be accepted from third parties without a written release from the student.

Retention and Academic Standards

Class Standing of Students.

1 - Freshman, 24 or less 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

Good Standing. Good standing for the purpose of retention is defined as follows:

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

Any college may establish higher GPA standards for one or more of its programs. Students need at least a 2 0 GPA to transfer between colleges The GPA for good standing is computed on the courses taken at Arizona State University only.

Probation. A student's college is responsible for maintaining academic standards. The college may place any student on probation who has not maintained good standing as defined above. A student on academic probation is required to observe any limitations or rules the college may impose as a condition for retention.

Disqualification. A student who is 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 im



posed for retention are not obtained. Disqualification is exercised at the discretion of the college. *A disqualified student is notified by the dean of the college and is not allowed to register at the University until reinstated.* A student who receives notice of disqualification may appeal to the college standards committee. A student disqualified or otherwise not eligible for regular admission may not attend as an unclassified student.

Reinstatement. The disqualified student must submit an application for reinstatement to the disqualifying college. To transfer to another college within the University while disqualified, an application for reinstatement must be made to the University Undergraduate Admissions Board.

A disqualified student who has not registered for one semester or more *must apply for readmission as well as reinstatement.* A disqualified student should apply for reinstatement before filing an application for readmission at the Registrar's Office.

Appeals. A student who wishes to appeal the decision of a standards committee of a college, with respect to disqualification or reinstatement, may apply for a hearing before the University Undergraduate Admissions Board. The Director of Admissions will notify the student of the Board's action. The decision of this Board is final.

General Studies

Arizona State University students are required to demonstrate a satisfactory level of basic knowledge in the humanities and fine arts, social and behavioral sciences, and sciences and mathematics. Specific patterns of General Studies requirements are established by the colleges within the overall program. Since requirements under this program vary somewhat from one curriculum to another, students should refer to the catalog description of the recommended General Studies program within the college in which they are enrolled. Specific disciplines listed within the three overall categories are *not necessarily applicable* to the General Studies program and graduation requirements of each college.

Students transferring from approved institutions of higher education ordinarily will be 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.

All students who are candidates for a bachelor's degree are required to complete 36 to 57 semester hours in upper and lower division General Studies courses, depending upon the college and curriculum in which they are enrolled. The total number of semester hours required in each of the fields listed below is specific by the individual colleges:

Humanities and Fine Arts

Architecture, Art, Communication, Dance, English, Foreign Languages, Interdisciplinary Humanities, Music, Philosophy, Religious Studies, Theatre.

Students select with the advisor's approval, two or more courses within a pattern designed to enhance their ability to develop a discriminating appreciation and understanding of the humanities, fine arts and philosophical ideas. This pattern is intended to develop standards of critical judgment, ability to assess and evaluate humanistic ideas and values, and competence in the basic arts of communication and self-expression.

Social and Behavioral Sciences

Aerospace Studies, Agriculture Industry, Anthropology-ASB, Business Administration, Communication, Criminal Justice, Cultural Geography, Economics, Educational Foundations, Engineering, Health Education, History, Home Economics, Mass Communications, Military Science, Political Science, Psychology-PGS, Sociology.

Students select with the advisor's approval two or more courses within the social and behavioral sciences. This pattern is designed to expand knowledge and appreciation of American and other cultures: to estimate the impact of science, technology, and changing business and economic conditions on human societies; and to increase awareness of the major social issues of the time.

Science and Mathematics

Anthropology-ASM, Bio-Agricultural Science, Botany, Chemistry, Engineering, Geology, Mathematics, Physical Geography, Physics, Psychology-PSY, Zoology.

Students select with the advisor's approval two or more courses, one or more of which must have a laboratory. These selections comprise a coherent pattern designed to explore the fundamental concepts of science and mathematics; to reveal the role of observation and experiment, inductive and deductive reasoning, and the quantitative approach in modern physical, biological and engineering science; and to bring into sharp focus the scientific forces that influence their destiny.

To complete the total credit hours requirement in general studies, students with the advisor's approval shall select appropriate electives from the above fields or from other

fields approved within the framework established by each college. Requirements in the three fields of General Studies may be met by advanced standing credit or may be waived by virtue of acceptable performance on a proficiency examination. In such cases, the prescribed requirements are correspondingly reduced by approval of the college. See College General Studies requirement for graduation.

Interdisciplinary Studies

City and Regional Planning. The city and regional planning focus provides undergraduate students of various disciplines a familiarity with this area's concerns, theories, and techniques These draw from course offerings related to planning in various departments of the University (Architecture, Geography, Geology, Civil Engineering, Public Affairs, Business Administration, History, Sociology, Home Economics).

Students must fulfill all requirements within their college and major department If requirements of the interdisciplinary program are also met, the student will receive, in addition to the degree awarded, a certificate issued by the Interdisciplinary Committee on City and Regional Planning verifying an additional "concentration" in city and regional planning.

A core course must be taken by all participating students. The core course, Interdisciplinary Urban Planning, (AUP 571, GCU 494, or other departmental cross-listing) is directed cooperatively by representatives from various disciplines related to city and regional planning

With the approval of the college and or department, the student must elect a minimum of 21 credit hours composed of the 3 credit core course plus at least 18 credit hours outside the student's major department from the list of electives available from the Chair of the Interdisciplinary Advisory Committee on City and Regional Planning

Energy Studies. An expanding instructional and research involvement in energy matters exists through three curricular paths (1) General Studies, which emphasize energy as an elective beyond the scope of a chosen major (for more information contact Chair, Department of Geography); (2) Specific studies in the Department of Planning (College of Architecture, usually for those pursuing the Master of Environmental Planning degree); (3) Specific studies in the College of Engineering and Applied Sciences, usually for those seeking a degree in a branch of Engineering

General Studies courses (a non technical introduction to energy) in the College of Liberal Arts include: GCU 364 Introduction to Energy, GPH 401 Energy and Environment, PHS 361,362 Science and Man, PHS 375 Energy Crises, EDF 445 Education for Survival and LIA 401 Alternative Futures.

Other General Studies courses are: LAW 791 Energy Law; Architecture: ETE 452 Introduction to Solar Energy, ETE 501 Energy Environment Theory, ETE 551 Desert Habitation Technology and ETE 552 Solar Energy Technology; Engineering STL 303 Energy, Technical and Societal Aspects, STE 403 Technology and Public Policy, ASE 407 Environmental Systems Planning and CEE 567 Atmospheric Pollution

Other instructional opportunities and facilities for those interested in energy studies are available each year through public lectures by energy experts, short courses offered in some disciplines, and field trips to sites of energy development Among library holdings is the extensive Solar Energy Collection A solar equipment test platform and other test facilities are available, as well as a solar demonstration house for research and community education

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. Individual course descriptions may be found in this catalog under the several departments involved Current offerings are listed each semester in the *Schedule of Classes* and in the special listings issued by each of the colleges offering courses

With the approval of the college and or department, a student may elect a 15 or 24 hour program of film as a related field or field of emphasis. The 15-hour related field is available within the requirements of the B. A degree program; the 24 hour field of emphasis may be used as a minor in the B A in Education degree program with prior approval from the College of Education.

Inquiries about this program should be directed to the Chair of the Interdisciplinary Film Committee or the Film Studies Advisor in participating colleges.

Gerontology. Course work in gerontology is currently offered in nine departments throughout many disciplines. Gerontology by its very nature is an interdisciplinary study of the biological psychological and sociological aspects

of aging; and the economic, political, legal, social and health-related issues of the older person. The purpose of this interdisciplinary activity is to provide a student with sufficient background to work in a variety of gerontolog ical occupations. A student majors in one of the currently existing disciplines but takes individual course work within the variety of departments which offer gerontology related courses.

Current offerings are listed each semester in the *Schedule of Classes* Inquiries about the program should be directed to Chair of the Multi Disc plinary Coordinating Committee on Aging.

Courses are offered on gerontology in the Colleges of Nursing, Law, Education (Adult Education), Fine Arts (Communication), Liberal Arts (Home Economics, Recreation, and Sociology)

International Programs and Studies. Inter national matters and an understanding of other nations are reflected in course offerings throughout the University Special area emphases are coordinated through the Center for Asian Studies (page 60) and the Center for Latin American Studies (page 62) These two centers also publish quarterly ournals, re search reports, and scho irly monographs. The Hayden Library has extensive collections on international subjects in selected areas.

University academic year student exchange programs exist with universities located at Guadalajara, Hermosillo and Monterrey in Mexico and at La Paz in Bolivia. Summer school programs in Guatemala and Europe are also available. Foreign students are also at tracted annually to the intensive English Skills Program for International Students (page 19).

Faculty within many disciplines engage in research directly related to foreign nations and international matters. Special seminars and conferences hosted regularly by the University deal with the international dimension and at tract scholars from around the world. A number of additional special international programs exist in the College of Business Administration (page 140).

Islamic Studies. The art, history, geography and religion of the Islamic world are the subjects of several courses offered by departments in the Fine Arts and Liberal Arts Colleges. The core of this curriculum is an integrated interdisciplinary course, Islamic Civilization, team-taught by faculty experts in these areas. The coordination of courses in a curriculum of Islamic Studies is designed to meet the grow ing interest in the history and cultures of Islamic peoples. In addition to course offerings, other opportunities to learn about Islam exist at Arizona State University. Well known speakers, programs and art exhibitions are regularly brought to the campus. The Art Department's collection of 12,000 slides on Islamic art is among the largest and finest in the country. For a list of courses in Islamic Studies, see Interdisciplinary Studies in the Liberal Arts College.

Women's Studies. An interdisciplinary perspective on women serves as the vehicle for a critical exploration of the role and status of past and present women, assumptions about women accepted in American culture, the validity of research on women, the effect on women of political, economic, and social sys tems, and the contributions of women to world culture The student has the opportunity to consider alternative ways of looking at the assumptions that affect the image of women and to make a research contribution to the field.

Since Women's Studies extends into the social and behavorial sciences, the natural sciences, fine arts, and education and other professional fields, women's studies courses are found in many university departments. With the approval of the college and/or department, a student may elect among these courses. Course topics include: Women and Society; Women's Communication, Education, Social History, View of Art; Women in U.S. History; Women and the Arts; 18th and 19th Century Feminine Images; Modern British and American Women Writers of Fiction; French Women and Art: Womankind (KAET telecourse); Minority Women; Advanced Children's Adolescent Literature; and Women and Mental Health: Feminist Therapy. Inqui ries about this program should be directed to the Director of Women's Studies, College of Liberal Arts, and the fall and spring Women's Studies brochure.

Special Services Program

Special Services provides a major educational thrust for low income and ethnic minority students through its programs

Disabled Student Program. This program coordinates in one centra office various resources and services required to meet the varied needs of the disabled students. (See page 18.)

Educational Opportunity Center. A one stop shopping center for the consumers of education where disadvantaged youth and other clients can obtain the assistance and encouragement to enter and continue their postsecondary education. (Off campus loca tion).

Educational Opportunities Program. The Educational Opportunities Program provides direct academic tutorial support to any stu dent experiencing academic difficulties. Services include a learning skills center which houses diagnostic testing, course advisement, orientation and a remedial math laboratory. Mini courses are available in specific problem areas requiring individual concentration and self instruction under the guidance of a tutor.

EOP strives to develop within each of its participants a sense of academic discipline while reinforcing academic proficiency and pride in personal achievement.

Upward Bound. Upward Bound assists the underachieving, talented high school student by providing an innovative and stimulating curriculum during his/her high school years, through a specially-designed program within the university atmosphere. Its goal is to provide the academic foundation and motivation for the successful transition to the college campus upon high school graduation.

Veterans Affairs Office

Coordination of separate University services assisting student veterans of the Armed Forces of the United States is centered in the Veterans Affairs Office. Counseling is available to the student veteran regarding admissions, financial aids, registration, veteran benefits and academic and personal advisement. Veterans Affairs programs serve the State of Arizona by advising all interested veterans regarding educational benefits and their optimum use. The program also assists veteran students to obtain suitable paid tutors, when needed, using their federal benefits.

Veterans must make adequate grade-point average and semester hour progress towards their academic program for continued funding by the Veterans Affairs Office. The University must report this progress each semester.

Veterans programs are maintained by a cooperative arrangement between Arizona State University, the State of Arizona and the United States Office of Education.



Registration

The University defines a student as being registered for a class when the student's name appears on the instructor's official class list throughout the semester.

Eligibility. Only eligible students may register for courses at Arizona State University. To be eligible, a student is either continuing from the previous semester or has been admitted or readmitted to the University (see Admissions). Each student is assigned to a college in which to seek advisement based on the curriculum chosen on the application for admission.

Advisement. A curriculum is a program of study which fulfills the degree requirements of a student's major. Each college provides for academic advisement to assist the student in developing the program of study and selecting a program of courses for each semester. It is the student's responsibility to seek advisement and meet all requirements for the completion of the degree.

Registration Opportunities. The University conducts early registration, walk-through registration and late registration for each semester and Summer Session in accordance with the dates, times and procedures published in the *Schedule of Classes*.

Registration Fees. Registration fees are due and payable in full at the time specified in the *Schedule of Classes* issued each semester.

Registration in a class is not cancelled or dropped due to non-payment of fees except in the case of Early Registration.

Schedule of Classes. The *Schedule of Classes* is the official publication of the Registrar's Office each semester. It is the student's guide to the semester's course offerings, dates, times, places, procedures for registration, and other important information pertaining to that semester. Also see pages 6-7 for the University academic calendar.

The *Schedule of Classes* is distributed without charge and should be consulted as the official source of information for each semester.

Unit of Credit. The semester hour is the unit of credit. It represents one 50-minute class exercise per week per semester with two hours of outside preparation.

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, except for students in the Colleges of Engineering and Applied Sciences and Architecture, which is 19 semester hours. A student who wishes to register for more than these maximums must petition the standards committee of the college in which they are registered and have an approved overload petition on file with that college prior to registration.

Enrollment Verification Guidelines. Arizona State University is frequently required to certify a student's enrollment as to full time, part-time, etc. The following general guidelines are used primarily to verify enrollment for the purpose of loan deferments and eligibility. The Registrar is responsible for such verifications.

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

Concurrent Enrollment. Provided that the other university regulations concerning enrollment, graduation requirements or transfer of credits are not violated, a student may be enrolled at other institutions and or correspondence courses, and or extension classes while enrolled at Arizona State University However, the student is urged to seek advisement prior to 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.)

Attendance. Because the instructor has full authority to make decisions regarding absences, non-attendance may result in an instructor withdrawal.

Variable Credit Courses. Many courses at Arizona State University are offered for variable credit. (See pages 30 31 for a complete listing.) The credit range authorized is stated in this catalog The credit range offered each semester is shown in the *Schedule of Classes.* A student may not exceed the range of hours offered for a semester. (Most variable credit courses require special permission prior to registration. Consult department involved.) Credit hours desired for a variable credit course must be indicated at the time of registration. If there is no indication, the student will be enrolled for the minimum credit hour offered Note: Permission to register and registration are independent procedures and must be completed separately.

Duplicate Registration. It may occasionally be necessary for a student to register for two sections of the same special course (Example Seminar see special courses, page 30). However, the student may *never register twice* for the *same section* of the *same course* This is considered a duplicate registration and is not permitted.

Adjustment to Course Schedule. Semester course programs should be carefully planned under the guidance of an academic advisor so that once registration has been completed, changes in enrollment will not be necessary. The following procedures are available for making adjustments to the student's course schedule during the semester if necessary. *No changes or registration transactions will be accepted in or after the last two weeks of the semester.*

Drop Add. This is a free adjustment period that occurs twice for each semester; early drop add for early registration and regular drop add after the start of classes Consult the *Schedule of Classes* for dates and times for each semester

It is only during this period that courses dropped will be removed from the enrollment record Also, there is a 100% adjustment of fees for changes in total hours registered as it affects the fee status, i.e., part time full time. Adjustments in the course schedule during this period are transacted through the department office where the course is offered by means of a drop add form. *All* classes for which the student is registered may not be dropped through Drop Add procedures. (See Official Withdrawal.)

Changes in fees (refunds and billings) will be reconciled approximately six (6) weeks after the semester begins when the Business Office conducts their fee audit.

Withdrawing from a Course During the Guaranteed W Period. The guaranteed W period begins immediately after the regular drop add period. No course may be *dropped* (removed from the enrollment record) after the close of drop add A student may only *withdraw* from courses after the drop add period. There is a withdrawal fee of $1 for each course During the guaranteed W period (the first six weeks of the semester) the mark of W will be automatically recorded for that course. Completed withdrawal forms are to be submitted to the Business Office with payment of the withdrawal fee. To withdraw from all courses

registered, see Off c al Withdrawal from the University.

If the withdrawal results in a change of fee status, the student will be eligible for a refund in accordance with the refund schedule at the time of the withdrawal The course from which a student withdraws remains on the student's enrollment record.

Withdrawing from a Course After the Guaranteed W Period. After the six (6) week guaranteed W period, withdrawing from a course does *not* result in the automatic recording of the W. The instructor will assign a W or E depending on the student's status in the course at the time of withdrawal

Completed withdrawal forms are submitted to the cashier with payment of the withdrawal fee of $1 per course The form will be processed to record the option W or E on the instructor's final class list. To withdraw from all courses registered see Official Withdrawal from the University

No one will be permitted to withdraw from a course or conduct any registration transaction in the last two 2 weeks of the semester.

Official Withdrawal from the University. This is the only procedure whereby a student may withdraw from *all* classes. A student may officially withdraw from the University after paying registration fees anytime before or during the semester until the last two weeks.

The student is the only person who may initiate a voluntary official withdrawal from the University. If the student is unable to withdraw in person, a letter requesting official withdrawal bearing the student's signature should be addressed to the Registrar's Office, Arizona State University The date of official withdrawal is always the date the withdrawal form or letter is *received* in the Registrar's Office

If a student withdraws before the end of the guaranteed W period, the W will be automatically recorded for all classes for which the student has registered. The student is eligible for a refund of fees paid in accordance with the refund schedule at the time of withdrawal.

If a student withdraws after the guaranteed W period, the instructor of each course for which the student has registered will receive a notice of the date of withdrawal and a W or E will appear on the final class list for each class The instructor's assignment of a W or E depends upon the student's status in each course at the time of official withdrawal.

No one will be permitted to officially withdraw from the University or conduct any registration transaction in the last two 2 weeks of the semester

University Baccalaureate Degree Requirements

The University grants the following baccalaureate degrees:

Bachelor of Arts
Bachelor of Science
Bachelor of Architecture
Bachelor of Science in Engineering
Bachelor of Science in Nursing
Bachelor of Arts in Education
Bachelor of Music
Bachelor of Fine Arts
Bachelor of Social Work

Application for Graduation. A student must apply for graduation upon completion of 87 semester hours The application may be obtained in the Graduation Office, 134 Moeur Administration Building. Two Arizona State University transcripts will be supplied in the Evaluator's Section, 114 Moeur Administration Building, to assist in processing of the senior check sheets The check sheets are to be processed by the college in which the student will earn the degree. The application and senior check sheets must be on file in the Graduation Office at least one semester before the planned date of completion. Diploma information will be verified with the student when the application is processed in the Graduation Office. The degree will be awarded when all the requirements on the senior check sheet are fulfilled.

If the student or advisor makes an adjustment in the designation of courses to be completed, an approved petition with the necessary signatures is required and must be forwarded to the Graduation Office.

The student is responsible for successfully completing all courses designated on the application. The Graduation Office is responsible only for verifying courses to be completed The student will receive the degree on the conferral date of the semester in which all designated courses are completed

There will be no further contact from the Graduation Office with the student until the final grades for all designated courses to be completed are received. At that time, if all degree requirements have been fulfilled, the diploma will be mailed to the student. If all degree requirements are not met, the application for graduation will be withdrawn, and the student will be notified by a letter sent to the diploma address

A graduation reapplication is required to apply for the degree at a future date.

Credit Requirements. A minimum of 126 semester hours is required for graduation with a bachelor's degree unless otherwise noted by the college offering the degree A minimum of fifty (50) semester hours in upper division courses numbered 300 or 400 are required for graduation.

Not more than 30 hours of credit in correspondence courses, extension and or by comprehensive examination will be accepted for credit toward the bachelor's degree

English Proficiency. ENG 101 and 102 (6) or ENG 104 (3) are required for graduation from Arizona State University in any baccalaureate program. (See page 22.)

Grade Point Requirements. The cumulative grade point average must be 2.00 or better for all courses taken at Arizona State University for a bachelor's degree.

Resident Credit Requirements. Resident credit refers to a course which is offered in a regular semester or summer session. A minimum of 30 semester hours earned in resident credit courses at Arizona State University is required of every candidate for the bachelor's degree. The final 12 semester hours immediately preceding graduation must be of resident credit.

Petition for Waiver of Degree Requirement. Any student wishing to have a degree requirement waived must petition the standards committee of the college in which they are enrolled. All petitions for waiver of degree requirements are to be forwarded to the Graduation Office indicating the action of the standards committee.

Graduation with Academic Recognition. A student must have completed at least 60 semester hours of resident credit courses at Arizona State University to qualify for graduation with academic recognition. A student with a cumulative grade point average of: 3.40 will graduate *cum laude*, 3.60 will graduate *magna cum laude* and 3.80 or above will graduate *summa cum laude*. The cumulative grade point average for these designations will only include all course work taken at Arizona State University. All designations of graduation with academic recognition will be indicated on the diploma and on the student's permanent record.

Determination of Catalog for Graduation. A student in continuous attendance will graduate under the curriculum, course requirements and regulations for graduation as stated in the catalog in effect at the time of admission to the University. A student may elect to graduate under any subsequent catalog issued while in continuous attendance.

A student not enrolled for one or more semesters must be readmitted to the University. A readmitted student will graduate under the curriculum, course requirements and regulations for graduation as stated in the catalog in effect at the time of readmission, or thereafter while in continuous attendance, to the University.

Only one catalog may be utilized when determining graduation requirements.

Applications for Teaching Certificates. Applications for teaching certificates should be obtained from the office of the Director of Student Services in the College of Education.

Second Bachelor's Degree. To obtain a second bachelor's degree, the student must successfully complete a *minimum* of 30 additional hours or more of resident credit and must meet all degree and University requirements of the second degree.

The student may pursue two bachelor's degrees at the same time only with the approval of the standards committee(s) of the college(s) involved. The student seeking a second bachelor's degree must meet admission criteria for that degree.

Graduate Degrees. See section of this catalog headed Graduate College and College of Law for graduate degrees offered and statements of requirements for graduate degrees. A separate catalog can 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 podiatry 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 pre-professional 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 Mr. Marvin North, Certifying Officer, Arizona Board of Regents, 1535 West Jefferson, Phoenix, Arizona 85007, (602) 255-4082, or Dr. Brice W. Corder, Assistant Dean, College of Liberal Arts, Pre-Health Professions Office, SS 107, (602) 965-2365.



Student Services

Housing

Residence halls make a genuine contribution to the educational program at Arizona State University. The primary objective of the residence hall program is to provide an atmosphere which will facilitate the individual student's educational program. Programming is planned to complement the University's curricular offerings in the following areas: academic programs, athletic events, service projects, social events, cultural offerings and recreational programming.

In order to provide a variety of living experiences, there are graduate and all class halls. Mariposa Hall is for graduate students. Each hall provides mail service, a library, resource facilities, and desk services. In some halls cafeteria facilities are available. Telephones are provided in all student rooms.

Reservations. Application materials obtained from the Housing Office, Memorial Union Room 110, will include forms to be completed by prospective students desiring living quarters in University residence halls. The housing packet includes an application form and contract.

Housing applicants must forward the application and contract together with a room deposit of $50 to the Housing Office. Room reservations are contingent upon the applicant's being admitted to the University by the Admissions Office. However, prospective students are urged to file their applications for housing before admissions acceptance is received.

A residence hall preference may be stated at the time of making reservations. Preferences are honored on a deposit date basis; thus, students with specific residence hall requests should file their requests as early as possible with the Housing Office. Assignments to halls are made by the Housing Office in accordance with policies established by the University. Room assignments are made by the unit director of the individual residence complex. Students must be admitted to the University before checking into a residence hall. Rooms must be claimed by dates outlined in the contract or reservations will be cancelled. (See Housing Charges, page 24.)

Only those disabled students who are able, through their own efforts or with assistance provided by an attendant, to carry on routine tasks of daily living shall be permitted to live in the residence hall. Special rooms are available for disabled students. Requests for such rooms should be noted on the application. (See also page 18.)

Residence Hall Regulations. Rules and regulations, other than those set forth in the University *Code of Conduct*, may be formulated by the Dean of Students. Individual halls may formulate additional regulations for their respective situations. (See also pages 24-25.)

Health Service

Student Health Service. This service is staffed by physicians and registered nurses. The Arizona State University Health Questionnaire form is a part of the admission requirement for all new students (see page 15).

Also required is a tuberculin skin test of all new students. This is a public health procedure to help prevent the spread of disease of a contagious nature. This will be done at the Health Service prior to registration and during Orientation Week at no expense to the student. The above also can be obtained on announced summer dates for early registration.

Former students who have not been in attendance at the University for two years or more must meet the same requirements as new students.

Student Health Service Treatment. Clinic services are available to students during regu

larly posted hours, and at any hour for emergencies. No illness will be cared for in the residence halls, nor will any prescription be made for a student not reporting in person to the Health Service. Bedside care will be given in the infirmary for four days per confinement without charge. A nominal charge is made after that time should further care be needed. Extended treatment may require medical withdrawal from the University.

Students who do not have meal tickets at one of the University dining halls will pay for meals served while in the infirmary. Contagious illness will be cared for in the Health Service whenever possible, but diseases requiring long periods of isolation must be treated either at home or in a local hospital at the student's expense. Students suffering from uncompensated psychiatric illness may be required to withdraw temporarily or permanently from the University

Illness or Injury to Campus Resident. A campus resident is required to report illness or injury immediately to the head resident of the residence hall Failure to do so may result in one being asked to leave the hall. Health reports are sent to the family physician upon request of the student

Financial Responsibilities. With the payment of the registration fee each semester, all regularly registered students are entitled to Student Health Service care according to established policies. Students may be referred to consultant specialists when the University physicians consider it advisable, but such fees must be borne by the student. When hospitalization is considered necessary, the University assumes no financial responsibility.

Student Insurance. Insurance policies available through Student Health Service help defray the cost of accidents or any necessary hospitalization. Students are expected to take advantage of these plans which supplement the Student Health Service. Insurance coverage is mandatory for international students. Graduate and undergraduate students enrolled at the University are eligible for health insurance enrollment.

Counseling Services

Counseling Service. A staff of psychologists and social workers is available for confidential interviews. Appointments may be made to discuss personal social adjustment, understanding of self and evaluation of long-term goals Increased self understanding often offers students the opportunity to make more effective use of their intellectual and personal resources.

Counseling does not involve telling the student what to do; the student makes the decisions Thus, emphasis is placed on the ultimate responsibility of individuals conducting their own lives and making the most of their opportunities

Group counseling is also available. This allows students the opportunity to explore and share their problems with other students.

The Counseling Service does not offer academic course or program advisement. This is a service offered by faculty advisors.

Dean of Students Office

The Dean of Students Office, located in Matthews Center, offers opportunities for student development and participation through various activities, organizations and programs. The office is composed of the following program and service areas: Student Organizations, Student Activities, ASU Student Foundation, Student Conduct, Special Use Facility Scheduling, and advisement of Interfraternity Council , Panhellenic Council, Native American Students, and Student Personnel Internships.

The descriptions below provide an overview of the activities of this office For further information, contact the Dean of Students Office.

Student Organizations

Student organizations offer the opportunity to participate in leadership experiences and to explore areas of specific interest. Students are encouraged to consider the values of membership in an organized group. Each of the approximately 300 existing student organizations has its own membership requirements and University advisor. Below is a listing of student organizations at the University More detailed information regarding these organizations may be obtained from the Dean of Students Office.

Councils

College of Architecture Council
College of Business Administration Student Council
Criminal Justice Student Council
College of Education College Council
Engineering Sciences College Council
Fine Arts College Student Council
Liberal Arts College Council
College of Nursing Council (Arizona Association of Student Nurses)
College of Law Council Student Bar Association)

Scholastic Honorary and Honorary Groups

Alpha Epsilon Delta
Alpha Epsilon Rho
Alpha Lambda Delta
Alpha Mu Gamma
Alpha Pi Mu
Alpha Zeta
American Society of Pre Dental Students
Angel Flight
Beta Beta Beta

Blue Key National Honor Fraternity
Devils' Advocates
Eta Kappa Nu
Honorary Chemistry Society
Kappa Delta Pi
Kappa Kappa Psi
Mortar Board
Pershing Rifles, CO. D 17
Phi Alpha Theta
Pi Omega Pi
Sigma Iota Epsilon
Society of the Scabbard and Blade
Sigma Lambda Chi
Sophos
Spurs
Tau Beta P
University Dance Theatre

Professional Organizations

Accounting Association
Administrative Management Society
Advertising Club Alpha Delta Sigma
Alpha Chi Sigma
Alpha Eta Rho
Alpha Kappa Psi
American Chemical Society, Student Affiliates
American Criminal Justice Organization
American Institute of Aeronautics and Astronautics, Student Branch
American Institute of Architects, Student Chapter
American Marketing Association
American Nuclear Society, Student Branch
American Society for Personnel Administration
American Society of Civil Engineers at ASU, Student Chapter
American Society of Interior Designers
American Society of Mechanical Engineers, Student Chapter
Arizona Association of Student Nurses
Arnold Air Society, Tex May Squadron
Associated General Contractors, Student Chapter
Associated Students Center for Public Affairs
Association for Childhood Education International
Association for Children With Learning Disabilities
Association for Computing Machinery
Association of Electronics Students
Beta Alpha Psi
Collegiate Distributing Education Clubs of America
Delta Phi Epsilon
Delta Sigma Pi
Gamma Iota Sigma
Gamma Theta Upsilon
Graduate Nurse Organization
H Bar
Industrial Designers Society of America
Institute of Electrical and Electronic Engineers
Masters Business Association
Masters in Health Services Administration
Mech Tech
National Academy of Television Arts and Sciences, Student Chapter
Phi Alpha Delta
Pi Sigma Epsilon
Pre Veterinary Medical Society
Range Ecology Club
Real Estate Association
Recreation Majors' Club
Sigma Alpha Iota
Sigma Delta Chi
Society for Range Management
Society of Automotive Engineers Student Club
Society of Manufacturing Engineers
Society of Physics Students
Society of Professional Journalists
Society of Women Engineers
Student Alliance of Black Social Workers
Student Bar Association
Student Council for Exceptional Children
Student National Education Association
Student Society of Medical Technology
Women in Communications, Inc.

Special Interest General

Adventure Advertising Club
AFROTC Couples Club
Ag-Industry Club
Al Directions
Alpha Angels
Amateur Radio Society
Amigos de las Americas
Anthropology Club
Arizona Environmental Alliance
Arizona Mobilization for Survival
Arizona Outing Club
Army ROTC Desert Rangers
AWARL - Association for Women's Active Return to Education
Baile Folklorico Conjunto
Beautiful Music for Our Friends
Black Student Union
Brazilian Club
Campus Civil Liberties Union
Campus Organization for Awareness of Disabilities
Chicano Business Student Association
Chinese Student Association
Circle K International
Citizens for Environmental Responsibility
Club des Jeunes France
College Democrats
College Republicans
Committee for a Safe Israel
Communication Association of Undergraduate Students
Communication Graduate Students Association
Devil's Dagger Drill Team (AROTC)
Doctoral Students Organization Counselor Ld.
Dry Wash Canoe and Kayak Club
Fencing Club
Flying Club Flying Team
Freestyle Travel Club
Gallery Exhibitions Club
Gay Campus Community

Geology Club
High Rollers Skate Club
Ice Hockey Association
India Association
Integrity Club
Interpreters Theatre Organization
Italian Language Club
Japan Club
Judo and Ju Jitsu Club
Karate Club
Korean Student Association
La Raza Law Students Association
Linguistic Circle
Masters Business Association
Masters Student Organization
Movimiento Estudantil Chicano de Aztlan (MECHA)
MU Activities Board
MU Entertainment Committee
MU Film Committee
MU Hostess Committee
MU Ideas and Issues Committee
MU Recreation Committee
Music Therapy Club
National Association of Jazz Educators
Native American Student Association
Neo Hellenic Students and Faculty Association
Northlight Student Center for Light Sensitive Medi
Nutrition Club Student Dietetic Association
Organization of Arab Students
Peculiar Institution
Rodeo Club
Royal Cricket Club
Satyr
Scholers Club
Sleeper Fi Club
Shando Ski Club
Sigma Tau Alpha
Skyriders
Student Alliance of Black Social Workers
Student Association for International Business and International Relations
Student Gerontological Society
Students Concerned About the Project
Students for a Campus Radio Station
Students International Meditation Society SIMS
Students for Solar Energy
Sun Dev Perspective
Sun Dolls
Sun Peoples Singles
Table Tennis Club
Three Ho Kundulini Yoga Club
Transportation Club
University Frisbee Club
University Gospel Ensemble
University Players Council
Water Polo Club
Wildlife Society
Women Image Now (WIN)
Young Libertarian Alliance
Young Socialist Alliance

Religious Groups

Advance for Christ
Adventist Student Forum
All Saints Student Council
American Baptist Campus Foundation
American Indian Crusade
Ananda Marga Meditation Society
Baha'i Association
Baptist Student Union
Beth Sar Shalom
Campus Crusade for Christ
Canterbury Association
Catholic Action
Chabad Lubavitch
Christian Coalition
Christians on Campus
Christian Science College Organization
Daybreak Interdenominational Ministries
Eckankar
Fellowship of Christian Athletes
Friends
Gamma Delta
Gospel Outreach
Grace Fellowship
Hillel Union of Jewish Students
International Fellowship of Christian Students
Intervarsity Christian Fellowship
LDS Institute Council at ASU
Lutheran Student Movement
Muslim Students Association
Navigators
People's Campus Outreach
Tempe Jesus People
The Way at ASU
Wesley Foundation (Methodist)
Young Life

Fraternities

Inter Fraternity Council
Alpha Epsilon Pi
Alpha Gamma Rho
Alpha Phi Alpha
Beta Theta Pi
Delta Sigma Pi
Epsilon Zeta Epsilon
Kappa Alpha Psi
Kappa Sigma
Lambda Chi Alpha
Omega Psi Phi
Phi Delta Theta
Phi Gamma Delta
Phi Kappa Psi
Phi Sigma Kappa
Pi Kappa Alpha
Sigma Alpha Epsilon
Sigma Chi
Sigma Nu

Sigma Phi Epsilon
Theta Chi
Theta Delta Chi

Sororities

Panhellenic Council
Junior Panhellenic Council
Alpha Delta Pi
Alpha Kappa Alpha
A pha Phi
Chi Omega
Delta Delta Delta
Delta Gamma
Delta Sigma Theta
Gamma Phi Beta
Kappa Alpha Theta
Kappa Delta
Kappa Kappa Gamma
Pi Beta Phi
Sigma Gamma Rho
Sigma Sigma Sigma
Zeta Phi Beta

Student Activities

Listed below are some of the student activities available at ASU. Associated Students, the Memorial Union, and Gammage Center for the Performing Arts offer a variety of activities. Information regarding these activities may be obtained through the particular department or group concerned.

Musical Activities. All students can participate in one or more of the performing organizations in the Department of Music. Credit is awarded for regular work in Symphony Orchestra, Bands, University Choral Organizations and Opera Workshop. Students interested in enrolling for these groups should contact the various directors prior to enrolling.

Dance. Programs and concerts are presented by members of the University Dance Theatre under the supervision of the dance faculty Presentations are in the dance studio in the Physical Education Building East and Gammage Center. Any student interested in performing is eligible to audition for the group.

Forensics. A Sun Devil Forensic squad associated with Pi Kappa Delta, national forensic honorary, travels to trophy tournaments sponsored by major universities throughout the United States. Participants engage in national competition in extemporaneous speaking, impromptu speaking, oral interpretation, and oratory as well as debate Students may enroll for credit under COM 301 or participate in the forensic programming as an extracurricular activity

Interpreters Theatre. Participants in this activity write, compile, and perform scripts for presentation in diverse settings, both on and off campus under the supervision of a faculty member in the Department of Theatre. Students may enroll for credit, or may participate as an extra curricular activity.

Theatre. All plays are produced by the University Theatre under the supervision of the Department of Theatre. The University Theatre presents six to ten faculty directed productions during the regular school year. The Student Experimental Theatre produces six student-directed productions Productions are mounted in a variety of theatre spaces. All students are invited to participate in these activities

Religious Activities. Arizona State University believes that one of its responsibilities is to maintain an atmosphere of religious freedom for the individual and to provide adequate opportunity for the development of spiritual maturity and the exercise of spiritual interests Various religious centers in Tempe devote their facilities to meeting student needs. These centers provide students with the opportunity to participate in programs of religious worship and to meet other students through well planned social activities. (See Student Organizations for the list of religious groups.)

Interfraternity Council. IFC is the coordinating body of the 20 member fraternities on campus. The IFC provides a medium for communication and organization for the development of fraternity programming in such areas as scholarship, public relations, community and university service projects, membership recruitment and educational pursuits.

Panhellenic Council is the governing body for the 13 sororities at Arizona State University Panhellenic continually works toward fostering communication between houses, encouraging and rewarding scholastic achievement, service and promoting the continual improvement and welfare of the members

Student Conduct. Specific reference should be made to the *Code of Conduct,* which sets forth guidelines regarding student rights and responsibilities. For additional information, see the section on Student Membership in the University (See page 13).

Native American Student Program. This program offers general counseling, advisement, student referral services and encouragement to the American Indian student regarding academic performance and retention.

ASU Student Foundation. The Student Foundation raises funds for areas of the University having wide student support and serves the University through public relations with students, alumni and the community Equally important is the Foundation's ability to involve and commit students to the betterment of Arizona State University and the State of Arizona

Student Legal Services. The purpose of this office is to advise students of their legal rights and responsibilities. The attorneys do not represent students in court but do offer assistance in the areas of landlord tenant relations, domestic relations, consumer concerns and other areas where legal assistance is indicated.

Associated Students

The Associated Students of Arizona State University (ASASU) is the body established by the Board of Regents through which student activities, concerns and needs outside the classroom are partially met.

ASASU, operating under the *Articles of Association* is composed of an executive committee, first council and college councils. Major ASASU programs include:

Funding: Budget allocations to the various student boards and college councils for student activities and programs.

Activities Boards: Programs designed by students, ranging from film and guest artist series; film, literary and music writing contests, to rock, jazz and other musical concerts; dances and traditional spirit-oriented activities.

Administrative Boards: Programs designed to measure student interest and concerns by the use of attitude surveys and other barometers of social change on campus among students. Also, the Boards facilitate the effectiveness of women's and minority student groups on campus

Student Tenants Association: An organization established to provide information regarding off campus living accommodations and to mediate differences between student tenants and landlords

Sports

Intramurals/Club Sports/Recreation. Students may choose from a variety of sports and recreational opportunities which are sponsored by the Intramural, Club Sports and Recreation Department.

Approximately 60 intramural sports are offered during each school year. Men and women may participate together in Corec Intramurals or separately in the men's and women's programs. The emphasis is on the enjoyment of sports participation, not a person's skill level or previous sports experience Students of all skill levels will find a place in the intramural program

Club sports are registered student organizations interested in competitive sports and recreational activities ASU club sports are canoe and kayak, cricket, flying, jujitsu, karate, lacrosse, outing, rugby, soccer, and water polo. New club sports form each year. Membership is open to interested ASU students.

Open recreation hours are available in the Physical Education Building West gymnasium, the swimming pool, Apache Boulevard and Whiteman tennis courts, handball/racquetball courts and the weight room. Call the Intramural Hotline, 965-2626, for up-to date information on the hours the facilities are open for student use. The Hotline is recorded daily and also includes information about intramurals and special activities.

The 100 Mile Run, Cycle and Swim Club, the 500 Mile Jogging Club and the 500 Mile Bicycle Club are examples of special activities offered to the student interested in individual sport pursuits. Slimnastics, a fun way to exercise, meets twice a week in the Physical Education Building East gymnasium.

The Intramural, Club Sports and Recreation office is located in the Physical Education Building West lobby, 965-5638.

Intercollegiate Athletics. The University is a member of the Pacific Athletic Conference (PAC 10), the National Collegiate Athletic Association, the National Association of Intercollegiate Athletics for Women and both its regional and Arizona associations. Under the regulations of the Board of Regents, the respective association or conference listed above, and the University, intercollegiate athletics at Arizona State University is governed by a board of faculty, students, and staff Policies are administered by the Department of Intercollegiate Athletics. All athletic grants-in-aid and scholarships are administered by the faculty committee on scholarships and student aid Intercollegiate competition includes such sports as football, basketball, baseball, tennis, swimming, diving, gymnastics, golf, track and field, wrestling, softball, and volleyball

Honors and Awards

Requirements are listed after award or honor title.

Scholastic Achievement Awards

Alumni Association: *Moeur Award* Given by the Alumni Association, since 1907, this award is presented to the graduate of any four year curriculum who attains the highest standing in academic work during the four years immediately preceding graduation

Alumni Association Outstanding Graduate Award. Presented to the outstanding senior in each of the colleges

Anthropology: Cynthia Lakin Memorial Award, R. K Reynolds Scholarship.

Associated Students: Awards given in conjunction with the ASU Alumni Association ASU Man of the Year, ASU Woman of the Year, ASU Male Scholar of the Year, ASU Female Scholar of the Year, *Who's Who Among Students in American Universities and Colleges*

Business Administration: American Business Women's Association, Las Reveldes Chapter, American Business Women's Association, Mesa Chapter, American Marketing Association, American Society of Women Accountants, American Statistical Association, Outstanding Student in Quantitative Business Analysis, American Trucking Associations

Transportat on Scholarsh p; Arizona Alumni Asso ciat on, Beta Gamma Sigma, Arizona Assoc at on of Rea tors, Arizona Insurance Cla msmen, Ar'zona Society of Certified Public Accountants; Arizona State Un vers ty A umni Outstanding Gradu te Award; Arizona State University Business Admin s tration Junior Ach evet ent, Arizona State University Student Foundation Scho arsh p; Asso ciat on for Systems Management, Outstanding Student n Computer; Infor ation Systems, Wayne J. Brown Accounting Scho arship, Roy Campbe l Scho arsh p, Clair R Carr Memor al in Insur ince, Gordon R Chambers Foundation Loan Fund, Con tine tal O Company Transportat on Scholarsh p; Delta Nu Alpha Transportation Scholarship, Delta Pi Epsilon, De ta Sigma Pi Scholarship Award; Delta Sigma P Scholarsh p Key Diamond s Schol arship; Distinguished Colleg ite Sa es Award; Dow Chem cal Company, John F. Downing Memoria Scho arsh p Fund; DuBois F und it on Scholarships' East Va ey Personnel Management Assoc ation, Feldman Scho arsh p in Insurance; John N. Har greaves Men or al Loan Fund, Stephen Robert Henning Memoria ; John F. Henson Memorial Scholarship provided by Beta Alpha Ps , Fred Hur ley Memorial Transportation Scholarship, Independent Insurance Agents of Arizona, Institute of Internal Auditors, Phoen x Chapter, Insurance Women of Phoenix; Pasca lacks Memor a Trans port it on Award Howard B Johnson Scholarship n Marketing, Kans as C ty Life Insurance Com pany, Howard J. Stansfield Award, Koener Scholar ship in Marketing, Ca Krueger Memorial Scholarship; Mahoney-O'Donnell Agency Scho ar ship, Marketing Department Outstanding Marketing Student Award, Marketing Department Outstand ng Advertising Student Award, Marketing Department Outstanding Transportation Student Award, National Association of Accountants Scotts dale Chapter, National Assoc'ation of Purchasing Management; National Bus ness Education Associa tion Outstanding Senior in Business Education Award National Secretaries Association, Kach na Chapter, National Secretaries Association, Valley of the Sun Chapter, E larie C Becker Memorial Schol arship, Omicron Delta Epsilon Outstanding Senior in Economics, Phi Ch Theta Award; Phoenix Per sonnel Management Association Scholarship; Phoenix Tax Workshop Tax Scholarship; Pi Omega Pi Award; P Sigma Epsilon Award Profess onal Insurance Agents of Arizona, Inc. Purchas ng Management Association of Arizona Doctoral Fel lowship, Real Estate Association of ASU Bu lder's Award, Real Estate Outst and ng Graduating Senior Award; Rea Estate Assoc ation of ASU Profes sional Award, Outstand ng Real Estate Ma or Specializing in Real Estate Appraising; Outstanding Senior in Management, Realty Executives Scholar ship; Risk and Insurance Management Associat on Phoenix Chapter; Edward Rondthaler Pr ze Out stand ng Junior in Econ mics, Harry Rosenzweig Scholarships, Sentry Insurance Con pany, Shell Company Scholarship, Sigma Iota Epsilon Award; Society of Real Estate Appraisers; Soroptimist Club of Tempe Helen Kiser Memorial, Dilman M. K. Smith Memorial Scholarship in Marketing First Ra ph Staggs Scholarship in Busiress, Second Ralph Staggs Scholarship in Business, Sun Angel Foundation Business Award, Joe L Terrell Sr. Scholarship in Bus ness, Tri C ty Plus Association of Insurance Women Scholarship; Valley National Bank Market ng Research Scholarship, *Wall Street Journal* Award; Del E. Webb Corporation Scholar ships, Arthur Young ind Company

Chemistry: Chen ical Rubber Company Freshman Chemistry Achievement Award, Monsanto Scholar ship; American Chem cal Society Divis on of Analytical Chemistry Undergraduate Award, Mon santo Award; Merck Index Award, American Institute of Chemists Honor Medal, Chemistry Depart n ent Merit Award.

Communication: Pi Kappa Delta Awards. National Forensic honorary

Education: ASU Alumn Outstanding Senior Award; ASU Student Foundat on Scholarship, Ari zona Alpha Delta Kappa Scholarship, Deanna Womack Caldwell Scho arsh p, Carnation Teaching Incentive Award; Cooperating Teacher Award, Delta Kappa Gamma; Deborah M. Patrick Scholar-sh p; Ruth B Morris Scholarship

Engineering: ASASU Engineering Counc l Distin-guished Senior Awards to a student n the School of Engineering, Division of Agriculture, Division of Construction, Divis on of Technology; ASASU Alumni Associat on Outstanding Senior Award, Dean's Award, Honeywell Award, Honeywell Award for Engineering Excellence Tau Beta Pi Award *Agriculture Wall Street Journal* Award; The American Society of Animal Science Scholastic Achievement Awards *Construction* Department of Construction Dist nguished Achievement Award; Associated General Contractors Outstanding Senior in Construction Aw ard *Technology* American Welding Society Outstand ng Senior Award, Soc ety of Manufacturing Engineers Outstanding Senior Award, American Institute of Chemical Eng neers Scholastic Award, Eta Kappa Nu Outstanding Elec trica Engineer ng Student, nstrument Society of America Central Ar z na Section Graduate Award, Instrument Society of Amer ca Central Arizona Section Undergraduate Award; American Institute of Industria Engineers Outstanding Senior Award, American Institute of Industrial Engineers Gradu ate Student Award, Glasstone; Award American Nuclear Soc ety Award, American Society of Me chan cal Eng neers Achievement Award; Out standing Mechanical Engineering Graudate

Fraternities and Sororities: Greek Week Man and Woman of the Year Awards; Interfraternity Council and Panhellen c Outstanding Pledge Award, Indi vidual Chapter Scho astic Awards (plaques and trophies , Interfraternity Council Outstanding Se nior Award and Panhellenic Woman of the Year.

History: Guilford Dudley Men orial Award, George A and Esma B Johnson Award H story Depart ment Associates Graduate and Undergraduate Awards

Home Economics: Altrusa Club Scholarsh p, Ari zona Dietetics Association Award of Mer t, Jane Brown Scholarship; College Chapter of Ar zona Home Economics Association Award; Cowden Scho arship; Mildred Fitch Scholarship; Ph Ups lon Omicron Alumni Association Scholarship, Jessie M Rannel s Scholarship; Barbara Jean Wegener Mem-orial Scholarship

Humanities: The Ernest L. Parker Senior Medallion of Merit, the Ernest L. Parker Graduate Medallion of Mer t

Law: The John S Armstrong Award (the outstand ing aw graduate, selected by the faculty on the basis of academ c performance and contribut on to the law school, receives a collection of law books presented by the Armstrong family); Arizona State University Alumni Assoc ation Outstanding Sen or

Award (bronzed diploma to the graduating senior honored by the law faculty for contributions to law school and the community); Joseph S. Jenckes Jr Memorial Award (the Phoenix law firm of Evans, Kitchel and Jenckes awards $750 to the editor in chief of the *Arizona State Law Journal*)· Joseph S. Jenckes Jr Oral Advocacy Competition (a jury argument competition, sponsored by fellows of the American College of Tr al Lawyers, is held annually between teams from the Arizona law schools. The event honors a distinguished trial lawyer Cash awards are made to each team); Law Week Award (The Bureau of National Affairs, Inc supplies a one year subscription to *United States Law Week* to the graduat ng student who is udged by the faculty to have made the most satisfactory scholastic prog ress after the first year), Lawyers Cooperative Publishing Company and Bancroft Whitney Com pany American Jurisprudence Awards (bound volumes of *American Jurisprudence* are presented to students receiving the highest grade in selected courses), Jennings, Strouss and Salmon Award ($250 is awarded by this Phoenix law firm to the student who achieves the highest scholastic average in the first year of law study); O'Conner, Cavanagh Anderson, Westover, Killingsworth & Beshears Trial Advocacy Award of $100 is presented each year to an outstanding student oralist; Roger W Perry Writing Award (an annual prize of $250 is given to the student whose paper selected by a panel of lawyers from those nominated by the faculties of the Arizona law school); State Bar of Arizona Award (an award of $100 is given to the law student who receives the highest grade in a course in profes-sional responsibility ; West Publishing Company Book Awards (selected titles from the Hornbook Series and from *Corpus Juris Secundum* are given to members of the three law classes who have achieved the highest grade averages for law study and for contributions to the law school.

Mass Communications: KOOL Broadcasting Award; *Mesa Tribune* Journalism Award, Sigma Delta Ch' Society of Professional Journal sts Outstanding Graduate Award, *Tempe Daily News* Journalism Award.

Music: Faculty Chamber Mus c Society Award; Victor Chesna s Memorial Award in Music Theatre, Harry B. Harelson Award; Norman Mendelsohn Memorial Award, Ra ph H Morris Instrumental Music Award, Miles Dresskell Memorial Award in Music; Elizabeth C Wood Award in Mus c, piano scholarships from the Arizona Federation of Music Clubs, Arizona State Music Teachers Central Dis trict, Phoenix Piano Teachers Association, Arthur Emery Harvey, and 'nstrumenta scholarships from the Phoenix Symphony Guild, Mu Phi Eps lon A umni Scholarship; Ray Rosales Tenor Scholar ship; Margo Smith Award in Accompanying, Herb Johnson Scho arship in Jazz, Arizona Ce lo Society Scholarship, I loyd Bell Graduate Music Award; Louise Kerr Merit Awards

Women's Physical Education: Physical Education Award Outstanding Sen'or

Athletic Awards

Glen Hawk ns Sportsmanship Award Football)
Intramura Sports Annual Team Awards
Most Va uab e P ayer Award (Basketbal)
Rosenzweig Trophy (Outstanding Letterman)
Scottsdale QB C ub Most Improved Player Aw ard Football)
Spark Plug Award Basketbal)
Sun Ange Achievement Awards (Football Outstanding Offensive Pl ayer and Outstanding Defens ve Player)
M ke Bartholomew Award (Footb l Outstanding Lineman)
KIFN Most Va uab e Player Football)
Cec l Abon Oil Can Award (Football)
Most Improved Player (Basketball)

Reserve Officer Training Corps Awards

(Military Science and Aerospace Stud es)

Academic Vice President's Award (Decoration to senior year Squadron and Company Commanders , Aerospace Education Foundation W Randolph Lovelace Memoria Award (Outstanding Air Force Association Award winner), Air Force Association Award (Outstanding Aerospace Stud es Senior Cadet), Air National Guard Award Outstanding Graduate of Flight Instruction Program); American Defense Preparedness Association Award (Presented to an Army and Air Force ROTC cadet who has made sign ficant achievements in a field a lied to ordnance research); American Fighter Aces Asso-c ation Award (Outstand ng category IP (Pilot) graduating cadet),

American Leg on Awards for Military and Scholas tic Excellence (Presented to Army and Air Force ROTC cadets who demonstrate outstanding quali t'es of leadership potential and scholastic achieven ent); American Logist cs Association Award Presented to any Army cadet who has made significant achievements in a field allied w th logis tics management), Amer can Veterans Medal (Presented to an Army undergraduate advanced course cadet who has demonstrated outstanding eadership potential); Ange Serv ce Award (Angel Fl ght member contributing most to service pro ects , Armed Forces Communications and Electron c Association Award Medals to the out-standing Army and Air Force ROTC senior cadets in a communicat ons or electronics curriculum),

Arnold A r Society Award (AFROTC senior cadet for outstanding service to Arnold Air Society); As-sociation of the United States Army Military History Award (Army ROTC cadet achieving high est grade in semester military h story s studied); Commandant's Marksmanship Award (Top marks m in on Army ROTC rifle team), Daughters of Founders and Patriots of America Award (Presented to Army and Air Force ROTC sopho more cadets of high leadership potentia and patr otism), Daughters of the American Revolution Award (Outstand ng Air Force and Army ROTC senior cadet); Dean of the College of Liberal Arts Award (Decoration to senior vear cadet officer and flight commander), Dean of Students ROTC Award (Decoration for eadership, Army and Air Force cadets); Professor of Aerospace Studies Award (Outstanding AFROTC seniors), Distinguished Mi tary Students Award (Presented to outstanding sen or Army cadets who have ranked in the upper third of their c ass academical y, and in the upper third of their un t at the Advanced Sum mer Camp),

General Dynamics Award (Model aircraft to sec-ond year basic AFROTC cadet accepted for advanced study), Governor's Award (Commanders of Army and Air Force Corps of Cadets); Hughes Trophy Presented to the outstanding comm ssioned graduate of Army ROTC throughout the nation); Legion of Valor Bronze Cross of Achievement Award (Outstanding MS III cadet to achieve excell-

ence in both military and academic subjects),

Military Order of World War Meda s (Awarded to Army and Air Force cadets who have demonstrated the greatest improvement); National Defense Trans portation Associat on Award (Outst nding Army and A r Force ROTC senior cadets ma oring in A'r or Space Transportation), Nat'onal Sojourners Medal (Presented to a lower classman who contr b utes most t> encourage Americanism), Outstanding Angel Award (Member of Angel Flight AFROTC Aux liary, contribut ng n ost to goals of the organization), Desert R ngers Outstanding Member, Scabbard and B ade Outstanding Member, Dr ll Team Outstand ng Member;

Pershing R fles Award (Outstanding ROTC cadet member); President's Award (Decoration to two outstanding cadets of second-year advanced course in Army and Air Force Cadet Corps , Reserve Off cer's Association Med s (Meda s and cert ficates to Army and Air Force cadets sh wing leadership promotion potential and an "A" average n ROTC subjects) ROTC Awards (For greatest personal contr bution t(Army and Air Force ROTC pro gra is at ASU),

Society of American Military Eng neers ROTC Award (Outstanding AFROTC and Army cadets in last and next to last year of engineer ng study) Sons of Amer c an Revo ution Aw rd (Awarded to two cadets n the f rst year of either the basic or ad vanced course of Army and Air F rce ROTC having highest academic and itary c ass standing, serv ce to department and ASU), Superior Cadet Ribbons (Department of Army award to one Army ROTC cadet in each academic c ass), Veterans of Fore gn Wars Meda s (Bob Finch Post Number 3632, to two cadets both A r Force and Army ROTC), AFROTC Valor Awards (For AFROTC cadets who perform valorous acts), George C Marshall ROTC Aw rd (Aw rded to the Most Outstanding Senior Cadet)

Scholarship Awards: Lt. Col. Virg I. Grissom Memor al Award (For outstanding ach evement of a sec nd year AFROTC cadet se ected for the ad vanced course); Armed Forces Communication and E ectronics Assoc ation Scholarsh p Award (Aw rded to rising unior Air Force cadets for un dergraduate study in Communication and E ectronics; Awarded to Basic Army ROTC cadets who have been accepted for the dvance course), A r Force Historical Foundation Award (Awarded to outstanding graduat ng senior Air Force cadets who w ll be in educat on delay status)

Career Services

The office of Career Services assists undergraduates, graduates and alumni n obtaining employment according to education, ability and experience Candidates seeking assistance are encouraged to register in the appropr'ate division both for contacts with employers and the process of self directed placement

All correspondence should be addressed to the appropriate division in the office of Career Services as follows.

Career Resource Division. Career Services researches relevant up to date information helpful to the faculty and staff who work with students still mak ng career decisions Acting as a catalyst between student and faculty, this division attempts new approaches to career selection.

Off-Campus Student Part-Time and Summer Division. Career Services aids students attending the University in securing off-campus part time and summer employment to supp ement their income and educational goals.

Education Division. Career Services assists graduating students and alumni in obtain ng teaching and administrative positions in elementary schools, secondary schools and institutions of higher education. It seeks, at the same time, to serve the best interests of these institutions by referring candidates adapted to their particular needs.

Business, Industrial, and Governmental Division. Career Services serves graduating students and alumni who are seeking professional posit ons in these areas Efforts are made to place students in their chosen f elds and, at the same time, aid employers to obtain h'ghly qualified personnel.

Alumni Association

The Alumni Assoc'ation, founded in 1894, is one of the University's most active organiza tions, involving graduates and ex students throughout Arizona and around the world. In addition to mainta'ning communications w th all alumni and providing many services to dues paying members, the Association also raises money in support of the University, recruits high school scholars, assists student and faculty groups, and supports various University and community projects.

Membership. Approximately 86,000 gradu ates are on the Alumn Associat on files.

Alumni Center. The campus headquarters for alumni of the University is Alumni Center, located at 601 E'st Apache Boulevard, on the south edge of the campus It houses the offices of the Associat on's executive director and the *Arizona Statesman* (alumni publication), as well as reception and meeting areas for alumni and various organizations.

Annual Alumni Fund. During the past 17 years, more than $1.3 million has been contributed to the University through individual alumni gifts Donors to the Alumni Fund provide books for the library, scholarsh ps and loan funds for student aid, and funds for indi vidual colleges within the University

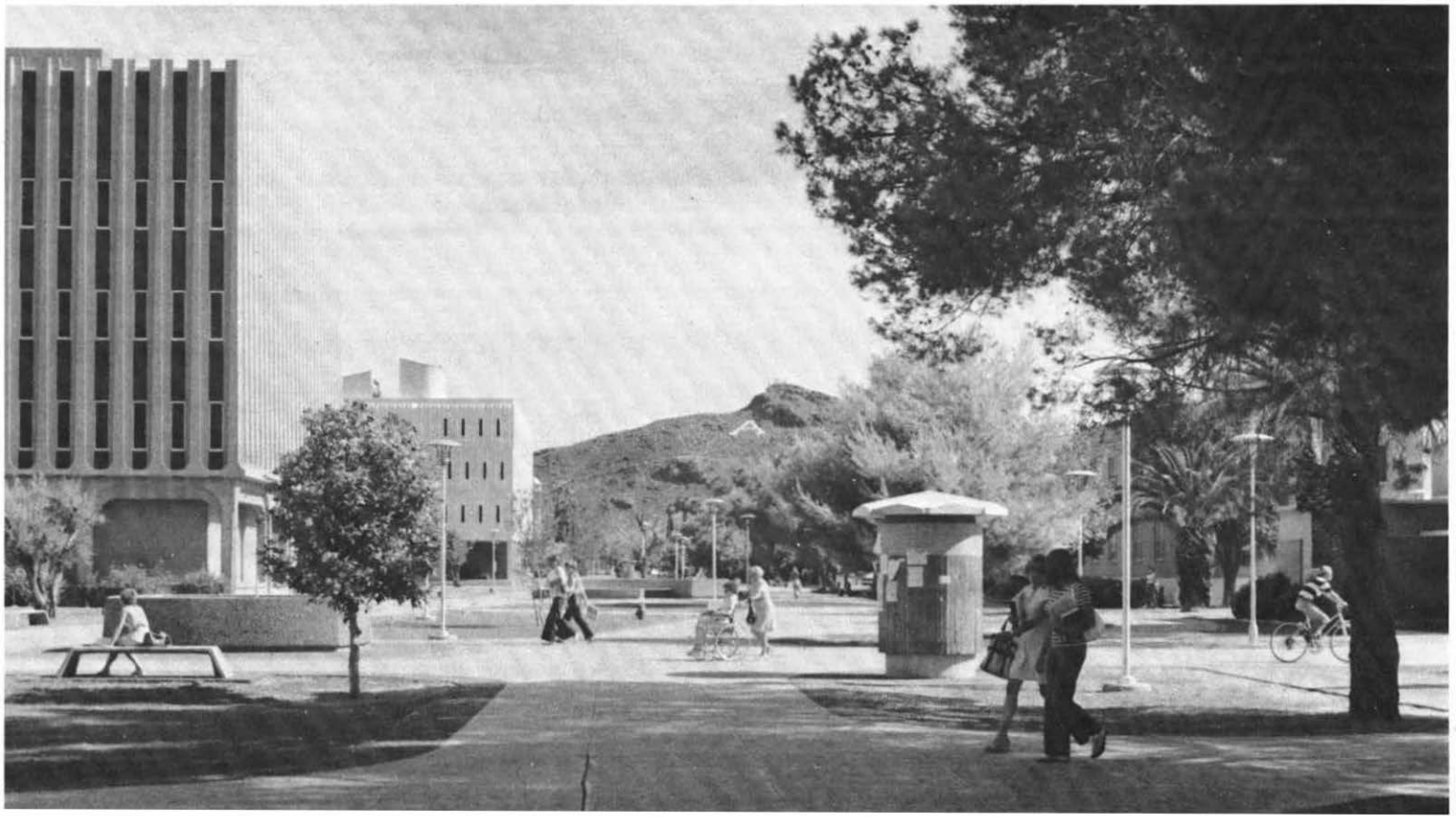
John R. Sandige Endowment Fund. More than $130,000 has been contributed to the Sandige Endowment Fund over the years. Earnings from this endowment are transferred to the ASU Alumni Loan Fund for needy stu dents. This is the largest privately financed loan fund at the Un versity In 1977 alone, more than 1,200 students borrowed and repaid loans from this fund.

The Arizona Statesman. The Association's official publication is published regularly in both magazine and newspaper format.

Alumni Awards. Annually the Alumni Association recognizes pre-students, students, faculty, alumni and friends of the University through a comprehensive awards program. Faculty are honored during the March Founders Day celebration, an alumnus and a non-alumnus are saluted at Homecoming for their service to the University and alumni are recognized during the year for achievement in their professions. The Medallion of Merit Award is presented annually to the outstanding junior in each Arizona high school. A full-tuition scholarship for the freshman year is available for each Medallion recipient. In addition to the awards listed under Honors and Awards for students, the Alumni Association co-sponsors with ASASU the awards to the Man and Woman of the Year, the Male and Female Scholars of the Year and the Male and Female Athletes of the Year. Members of each athletic team, men's and women's, who win a conference or national title; receive plaques recognizing their championship.

Alumni on Campus. Each student at the University is considered by the Alumni Association as "an alumnus in residence" and as such, the alumni staff cooperates with student organizations and individuals.

The Association includes three student voting members on its Board of Directors and sponsors the Devil's Advocates, consisting of outstanding students from all colleges. Members aid in recruiting outstanding scholars through speaking engagements at high schools, special events and tours of the campus for prospective University scholars.



College of Liberal Arts

Guido G. Weigend, Ph.D.
Dean

The College of Liberal Arts provides the student with an opportunity to obtain a broad, balanced, liberal education In order to guide his her life intelligently in a highly complex and rapidly changing world, a person must have an understand'ng of modern science, of the roots of civilizations, of the n ıture of our present world, and of the expression of this world ın literature, philosophy and the arts The Liberal Arts College attempts to develop the qualities of mind and impart the types of know edge that will enable the student to understand the world in all its complexity and variety As a consequence, the College does not, for the most part, offer training designed merely to prepare the student to take on a par ticular job; it offers, more significantly, a broad education designed to help the student in the career of liv ng

W thin the framework of the curriculum, students, with the assistance of faculty advisors, determine their own progress to fit their particular aims. Vocational interests are taken into consideration within this context, and students may prepare for professional schools, graduate work, or particular careers. Final responsibility for meeting the requirements for graduation in a chosen field rests with the stu dent.

Degrees

At the undergraduate level, instruction in the College of Liberal Arts offers programs leading to the degrees of Bachelor of Arts and Bachelor of Science

The curricula for these degrees are designed to give the student a broad, general back ground in the principal fie ds of human knowledge and at the same time provide for a reasonable amount of specialized training in a selected area The curriculum for the Bachelor of Arts degree emphasizes breadth of studies, while the curriculum for the Bachelor of Science degree permits a somewhat greater extent of specialization in a selected area of scientific endeavor.

Admission to the College of Liberal Arts

Any student who has met the minimum requirements for ıdmission to the Ui 'versity (see pages 15 18) and who wishes to ma or ın a sub ect offered within the College of Liberal Arts or who wishes to register in Pre Elementary Education or Pre Secondary Edu catı ır will be admitted to the College of Liberal Arts

Any student with a cumulat ve gr ıde point average of at least 2.0 who is currently registered in another college at Arizona State University and who wishes to major in a sub- ect offered within the Col ege of Liberal Arts or to register in one of the pre professional curricula listed above may tr ınsfer into the College by making applic ıtion in the Dean's Office, Social Sciences Building, Room 111

Transfer Credits

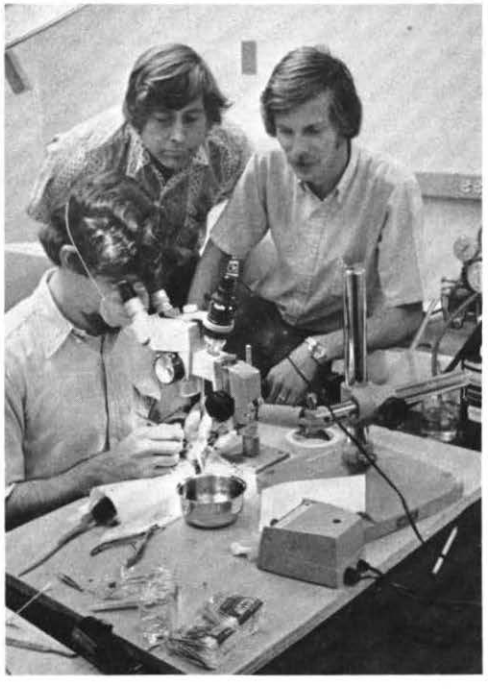
Students from accredited four year institutions of higher education ordinarily will be given credit, hour for hour, for work successfu y completed in such institutions insofar as t app ies to the requirements for the curriculum pursued at Ar'zona State University Such credit will be accepted at tl e level indicated on the transcript of the transferring institution

Courses transferred from two-year (comn unity) colleges will not be ıccepted as upper d'vision credit Students are urged to choose their comn unity college courses care ful y, in view of the fact that a min mum of 50 sen ester hours of work taken at the University must be upper div sion credit (see page 17).

Major Fields of Study

Programs leading to the Bachelor of Arts and Bachelor of Science degrees are offered by the College of Liberal Arts, with major fields of specialization in the following subjects. Each field is administered by the academic department indicated.

*The Department of Economics is located administratively in the College of Business Administration. The Bachelor of Science degree with a major in Economics is offered by both the College of Liberal Arts and the College of Business Administration. Requirements differ according to College (see page 77 and page 136).



MAJOR FIELD	DEGREE	DEPARTMENT
Anthropology	(B.A.)	Anthropology
Asian Languages		
Chinese/Japanese	(B.A.)	Foreign Languages
Biology	(B.S.)	Botany-Microbiology; Zoology
Botany	(B.S.)	Botany-Microbiology
Broadcasting	(B.A.,B.S.)	Mass Communications
Chemistry	(B.A.,B.S.)	Chemistry
Dance	(B.A.)	Health, Physical Education, Recreation and Dance
Economics*	(B.A.,B.S.)	Economics
English	(B.A.)	English
Entomology	(B.S.)	Zoology
French	(B.A.)	Foreign Languages
Geography	(B.A.,B.S.)	Geography
Geology	(B.A.,B.S.)	Geology
German	(B.A.)	Foreign Languages
Health Science	(B.S.)	Health, Physical Education, Recreation and Dance
History	(B.A.,B.S.)	History
Home Economics	(B.A.,B.S.)	Home Economics
Journalism	(B.A.,B.S.)	Mass Communications
Mathematics	(B.A.,B.S.)	Mathematics
Medical Technology	(B.S.)	Botany-Microbiology
Microbiology	(B.S.)	Botany-Microbiology
Philosophy	(B.A.)	Philosophy
Physical Education	(B.S.)	Health, Physical Education, Recreation and Dance
Physics	(B.S.)	Physics
Political Science	(B.A.,B.S.)	Political Science
Psychology	(B.A.,B.S.)	Psychology
Radiology	(B.S.)	Botany-Microbiology
Recreation	(B.S.)	Health, Physical Education, Recreation and Dance
Russian	(B.A.)	Foreign Languages
Sociology	(B.A.,B.S.)	Sociology
Spanish	(B.A.)	Foreign Languages
Wildlife Biology	(B.S.)	Zoology
Zoology	(B.S.)	Zoology

Pre-Education Programs

The College of Liberal Arts offers pre-professional programs in cooperation with the College of Education Any student planning to pursue the degree of Bachelor of Arts in Education shall register in the appropriate Pre Elementary Education or Pre Secondary Edu cat on program in the College of Liberal Arts until he has qualified for admission to his planned professional course of study. See the appropriate section of this catalog for detailed requirements of the program in Education.

Teacher Certification for Liberal Arts Majors-Secondary Education. A Liberal Arts student may obtain a Bachelor of Arts or a Bachelor of Science Degree in Liberal Arts and meet the State of Ar zona requirements for teaching certification in Secondary Educa tion. The student must meet all requirements established by the Arizona Department of Education, including professional education courses and directed teaching, and all the College and departmental requirements for the major degree program in the College of Liberal Arts. For further information regarding the curriculum or certification the student may consult the Department of Secondary Education, Off ce of Student Services, in Payne Hall (Ed B 2 The curriculum leading to the Bachelor of Arts in Education is de scribed in this catalog on page 155.

Advisement

Regular Advisement. A prospective student who already has selected a major field of specialization will ordinari y be assigned to an advisor selected from the faculty of the department offering that field Questions relating to the assignment of an advisor should be taken either to the departmental office or to the Coordinator of Advisement, College of Liberal Arts, Social Sciences Building 111.

"No-Preference" Advisement Option. Students in the College of Liberal Arts who have not yet selected a major field of specialization may choose the "No Preference Option" upon entering the College as a freshman or at any time thereafter until the semester in which 60 semester hours are earned Students selecting this option will be assigned advisors through the Student Academic Affairs Office of the College of Liberal Arts, located in the Social Sciences Building, Room 111. During the semester in which they earn 60 credit hours, or before, students in consultation with their advisors select their majors and transfer into the appropriate department. Thereafter, they receive advisement from a faculty advisor in that department. NOTE: Students who wish to enter a program of study which has a rigidly structured curriculum should be aware that delay in choosing a major initially could result in added time and cost in completion of requirements.

Advisement For Other Pre-Professional Programs

A student who plans to enter one of the baccalaureate degree programs in the College of Liberal Arts, and who also plans to pursue post graduate training in a professional field, will ordinarily be assigned an advisor from the faculty of the department of his her major field of study. Special advisement is available for students planning to enter the following fields:

PROFESSIONAL FIELD	OFFICE WHERE ADVISOR IS LOCATED
Bilingual Secretarial	Department of Foreign Languages
Dentistry*	Pre-Health Professions, SS 107
Foreign Service	Department of chosen major
Law	Student Academic Affairs Office, SS 111
Medicine*	Pre Health Professions, SS 107
Ministry	Department of Philosophy
Occupational Therapy*	Pre Health Professions, SS 107
Optometry*	Pre-Health Professions, SS 107
Osteopathy*	Pre-Health Professions, SS 107
Pharmacy*	Pre Health Professions, SS 107
Physical Therapy*	Pre-Health Professions, SS 107
Podiatry*	Pre Health Professions, SS 107
Public Service Training Program	Center for Public Affairs

*Students preparing for a career in these areas shou d register with the Secretary in the Off ce o Pre Health Professions No school n the St ite of Arizona offers a program in Dentistry, Occupational Ther apy, Optometry, Osteop thy, or Pod at y Students interested in pursuing these pr ofessions should confer with the advisor concerning out of st ite schools where they may complete their training

Pre-Education Advisement

Pre-Elementary Education. A student en tering the Pre-Elementary Education program wil be assigned an advisor from the Co lege of Education (see page 154). Questions regarding the assignment of an advisor for this program should be referred to the Office of Student Services in Payne Hall (Ed B 2)

Pre-Secondary Education. A student who is entering the Pre Secondary Education program and has selected a proposed major teaching field (see page 155) from those sub jects offered by the College of Liberal Arts, will be assigned an advisor within the depart ment offering the major subject Questions relating to the assignment of an advisor may be taken to the Student Academic Affairs Of fice, Social Sciences Building, Room 111

Program of Studies

Students construct their own programs of studies in accordance with the degree requirements set forth below

Advisement and academic counseling are freely available both in academic departments and in the Student Academic Affairs Office of the College of Liberal Arts, however, it is the student's responsibility to be aware of the re quirements for a degree program and to plan course selections accordingly, giving due regard to prerequisite courses.

Chains of Prerequisites. Prerequisite course numbers marked with a dagger (†) have fur ther prerequisites. Each student is cautioned to be aware of the existence of such chains of prerequisites and to plan course selections accordingly. Failure to heed this warning may result in extra time and expense to complete degree requirements

Degree Requirements

Course Load. The normal course load is 15 16 semester hours of credit First semester freshmen and entering transfer students are not permitted to register for more than 18 hours of credit in their initial semester. Other students who wish to register for more than 18 hours must have an average of at least 3.0 and must file a petition in the Student Academic Affairs Office, Social Sciences 111 Any peti tion for an overload in excess of 21 hours must be presented to the Standards Committee of the College Unauthorized excess hours will be removed at random from the student's class list by administrative action.

Credit Requirement. All candidates for graduation in the Bachelor of Arts and Bache lor of Science degree curricula are required to present at least 126 semester hours of credit, of which at least 50 hours must consist of upper division courses. A cumulative grade point index of 2.00 is required for graduation

English Proficiency Requirement. All stu dents must demonstrate reasonable proficiency in written English If a student receives a grade of "C" or better in both ENG 101 and ENG 102, or in ENG 104 or its equivalent, he she will be presumed to have demonstrated the necessary degree of writ ng proficiency. Students who receive a "D" in either course must successfully complete a written English Proficiency Examination The examination will be given at least twice a year, and a student must take it during the semester immediate y following the completion of ENG 102 or ENG 104 or the equiva ent A student who does not complete the examination suc cessful y on the first try must enroll in an English course prescribed by the Director of Freshman English A student who receives a grade of "C" or better in such a course will be considered to have satisfied the proficiency requ rement Otherwise, students must repeat the above procedure until they have demonstrated the necessary degree of writing proficiency. Any questions concerning the English Proficiency Requirement should be addressed to the Director of Freshman En glish. Foreign students whose native language is not English may substitute ENG 111, ENG 112 for ENG 101, ENG 102

Foreign Language Requirement. For the degree of Bachelor of Arts, the College of Liberal Arts requires knowledge of one foreign language equivalent to the complet on of two years' study at the college level A student who desires to fulfill the requirement in whole or in part through foreign language study in secondary schools may do so in accordance with the equivalency prin ciples explained under Foreign Languages, Placement, page 81. Students who transfer from other colleges with less than two years of credit in a foreign lan guage will be placed in a course at the next level above the work completed

Students who have received their secondary education from a school where the language of instruction was other than English will be con sidered to have satisfied the foreign anguage requirement Certification of this status will be made at the time of admission to Arizona State University. Questions should be ad dressed to the Foreign Credentials Evaluator in the Adm ssions Office. See page 61 for specific requirements in e ch anguage.

The College of Liberal Arts does not require knowledge of a foreign language for the degree of Bachelor of Sc ence. Some depart mental curricula leading to the Bachelor of Science degree do, however, include knowledge of a foreign language among their degree requirements. Foreign languages taken to ful fill a departmental requirement for the Bache or of Science degree may be used to satisfy the minimum General Studies require ment in Humanities and Fine Arts

General Studies Requirement

In order to obtain a baccalaureate degree through the College of Liberal Arts, the stu

dent must take a minimum of 54 semester hours of credit in the subjects and areas listed below. Courses in the subject field of the major may not be used toward this requirement, but courses in related fields may be used even if they are considered to be part of the major requirement.

The General Studies requirement for the College of Liberal Arts is more extensive than the minimum requirement for graduation from the University (see pages 36-37). The latter requirement will automatically be fulfilled by any student who completes the requirement for Liberal Arts.

To assure breadth and encourage depth within the degree requirements, all Liberal Arts students must meet the following minimum distribution patterns in the following three areas:

1) Humanities and Fine Arts—12 semester hours,
2) Social and Behavioral Sciences—12 semester hours,
3) Science and Mathematics—12 semester hours,

and additional courses selected from the lists below for the total of 54 credits. Courses offered by any single department—ASB, ASM, GCU, GPH and PGS PSY—may be used to fulfill the minimum requirement in *either* Social and Behavioral Sciences *or* Science and Mathematics, but not both.

Humanities and Fine Arts. Only courses offered by the following departments may be used toward fulfilling the minimum 12 hour requirement:

- Architecture (API and FDH courses *only*)
- Art (ARH courses *only*)
- Communication (COM 241 *only*)
- Dance (DAH courses *only*)
- English (any course except ENG 101, 102, 104, 111, 112)
- Foreign Languages (any course except those below 300 used to satisfy the language requirement for the Bachelor of Arts degree)
- Humanities and Religious Studies
- Music (MHI and MTC courses *only*)
- Philosophy
- Theatre (THE courses *only*)

Social and Behavioral Sciences. Only courses offered by the following departments may be used toward fulfilling the minimum 12 hour requirement:

- Anthropology (ASB courses *only*)
- Economics
- Geography, Cultural (GCU courses *only*)
- History
- Political Science
- Psychology (PGS courses *only*)
- Sociology

Science and Mathematics. Only courses offered by the following departments may be used toward fulfilling the minimum 12 hour requirement. At least one course must include a scheduled laboratory of at least 30 class hours per semester in natural science. At least two courses must be taken in one department.

- Anthropology (ASM courses *only*)
- Botany and Microbiology (all BIO, BOT, and MIC courses)
- Chemistry
- Geography, Physical (GPH courses *only*)
- Geology
- Mathematics (may not be used to satisfy laboratory requirement)
- Physics (PHY, AST, and PHS courses *only*)
- Psychology (PSY courses *only*)
- Zoology (all BIO, ENT, and ZOL courses)

Additional Courses. To complete the 54 hour requirement, additional courses may be taken from the lists above, and from the following optional group:

- Aerospace Studies (maximum of 6 hours of ROTC credit)
- Art (except ARE)
- Communication
- Criminal Justice (maximum of 6 hours CRJ 100 and one 300 level course)
- Health, Physical Education, Recreation and Dance (HES 100, 486, DAN 130, 230, 330, and PED 105, 205, 305 [a maximum of 4 hours in all activities courses], PED 450, REC 160 *only*)
- Home Economics (CDE 232, DEH 127, 272, 472, 474, FON 141, FAS 330, 333, 354, 357, 433, TXC 122, 424 *only*)
- Liberal Arts (LIA courses—Liberal Arts, see page 114)
- Mass Communications
- Military Science (maximum of 6 hours ROTC credit)
- Music (except MUF)
- Social Work (SWU 311, 474 *only*)
- Theatre

Major Field of Study. Each candidate for the degree of Bachelor of Arts or Bachelor of Science must complete requirements for a major field of study, as established by the department concerned. The specific course content of the major is selected by the student in consultation with the advisor under the rules and regulations of the department.

For the degree of Bachelor of Arts, the major and related fields requirement consists of a total of 45 semester hours of credit. A maximum of up to 36 semester hours may be required in the subject field of the major. Students should consult departmental listings for specific requirements in major and related fields.

For the degree of Bachelor of Science, the major field of study may require up to a maximum of 45 semester hours of credit in the subject field of the major, plus additional related studies.

No credit will be granted toward fulfilling

major requirements in any upper division course in the student's major unless the grade in that course is at least a "C".

Special Credit Options

Credit-No Credit Grade Option.* The Liberal Arts Credit-No Credit Option is intended to broaden the education of undergraduate students in the College of Liberal Arts by encouraging them to take advanced courses outside their fields of specialization. A student enrolled in a course under the Credit-No Credit Option will receive the mark of either "CR" or "NC" but neither mark will affect the cumulative grade point index.

Under the conditions stated below, undergraduate students enrolled in the College of Liberal Arts may exercise the Credit No Credit Option in any course in the 300 and 400 series offered by the College of Liberal Arts with the exception of Independent Study 499 and all courses taken for Honors credit

Enrollment in a course for Credit No Credit Option must be explicitly indicated during registration. After the close of Late Registration no student may change registration in any course to or from Credit No Credit.

No course which is 1) offered by the student's major department, 2) counted toward the major, or 3) required by the department to support or supplement the major may be taken under the Credit-No Credit Option. Up to four courses taken under Credit No Credit may be counted toward graduation requirements.

The Credit No Credit Option may be taken only by a student with a total of at least 60 semester hours of earned credit and a cumulative grade point index of at least 2.00

Only one course may be taken under the Credit-No Credit Option during a semester

**Formerly listed as 'Pass No Credit'*

The minimum semester load must total at least 12 hours, including the Credit-No Credit course. No overloads can be authorized for the semester in which the Credit No Credit Option is taken

The Credit No Credit Option may not be taken during the Summer Sessions, or in extension or correspondence courses.

The Credit No Credit Option is ordinarily open only to students who are registered in the College of Liberal Arts Students registered in another college may register under the Credit-No Credit Option only if specific approval is provided in their college's regulations.

The Credit-No Credit Option may not be exercised by students enrolled in Liberal Arts for courses offered by colleges other than Liberal Arts except for courses in Economics offered by the College of Business Administration.

Undergraduate Credit for Graduate Courses. To enable interested students to benefit as much as possible from their undergraduate studies, the Graduate College and the College of Liberal Arts extend to undergraduate students the privilege of taking 500 level graduate courses for undergraduate credit. The application must be approved by the advisor, the instructor of the 500 level graduate course, and the chair of the department.

Students who transfer to professional or other graduate colleges before receiving an undergraduate degree may not transfer credits back to Arizona State University to be applied to a degree *in absentia*

Academic Standards and Retention

Standards. The College of Liberal Arts standards for grade point average (GPA) and the terms of probation, disqualification, reinstatement, and appeal are identical with those of the University as set forth on page 34 of this catalog, except that the disqualified student is suspended for at least *two* regular semesters at the University.

Academic discipline is one of the functions of the Student Academic Affairs Office, Social Sciences Building, Room 111. All students who are having academic difficulties of any kind should maintain close contact with this office.

Probation and Disqualification. Appeals with respect to academic probation or disqualification may be addressed to the Academic Standards Committee of the College of Liberal Arts Petitions should be submitted to the Student Academic Affairs Office, Social Sciences Building, Room 111.

Special Programs

Honors Program. The College of Liberal Arts provides a full four year Honors Program which affords the superior undergraduate with opportunities for an enhanced liberal arts education and in depth experiences in his or her major field. Characteristic of the program is the personal attention given to each student by members of the Honors Faculty, who are selected from among the leading scholars and teachers in the College In instructing specially designed Honors courses, and in supervising individual study and Honors Theses, the faculty share an enthusiasm for working with talented and motivated students.

Admission to the Honors Program:

Entering Freshmen. Entering freshmen who are in the top 5% of their high school graduating class, or who have an ACT composite score of 27 or better, or who can demonstrate similar indications of academic aptitude, are invited to apply for admission to the program upon entrance

Continuing and Transfer Students. A continuing or transfer student who has completed at least 15 credit hours of study with a 3.25

cumulative grade average or better may, with the recommendation of his or her academic advisor, apply for admission to the program

Retention in the Honors Program. An Honors student must maintain exceptionally high standards of performance while in the program, demonstrating evidence of progress toward satisfying the requirements for graduation from the program (see below) It is expected that an Honors student will register for at least one Honors course each semester in order to obtain full benefit from the program. An Honors student may leave the program at any time. All courses taken while in the program will count toward graduation from the University

Graduation from the Honors Program. To graduate from the Honors Program, a student must:

Attain a cumulative grade average of at least 3 40;

Satisfy departmental major requirements, including major honors requirements where they exist, and College General Studies requirements;

Complete a minimum of 18 hours of Honors credit, of which at most 6 can be XXX 493 (Honors Thesis), and of which at least 6 must be upper division credit in non-major areas;

Write a senior thesis and pass an oral thesis defense.

For additional information, the interested student should contact the Director, Honors Program, College of Liberal Arts, Social Sciences Building, Room 107.

Interdisciplinary Studies

Within the framework of a regular major chosen from those listed on page 54, students may, in consultation with their advisors, use courses outside the major subject field to put together a program of interdisciplinary studies. Recommended programs in American Studies, Asian Studies, Islamic Studies, Latin American Area Studies, and Women's Studies are described below Students may contact the Dean's Office for further information.

American Studies. The development of insight into the complexities and inner workings of modern American society is a unique interdisciplinary task for which universities are especially suited To foster and coordinate activities with this objective at Arizona State University, an American Studies program has been established. The current program emphasizes studies in the history, cultures, and problems of specific groups in America. The program will be expanded as conditions warrant

Although a minor is not required by the College of Liberal Arts, a minor in American Studies is offered for those who desire it A minor consists of at least 18 hours of approved courses. Not more than 12 hours in the subject field of the major may be used toward the minor in American Studies. A list of approved courses is given below. Refer to the *Schedule of Classes* to determine which courses are being offered currently. Courses included in the minor may also be used for General Studies credit if they appear in the categories of accepted General Studies courses (see pages 36-37).

In addition to regular courses, the program includes seminars, public lectures, and related extracurricular activities. Inquiries about the program should be directed to the Coordinator of the American Studies Program, Social Sciences Building, Room 109.

American Studies. (Courses approved for a minor.) *For course descriptions refer to the course offerings by departments.*

APH	304	American Architecture
APH	3 7	20th Century Architecture II
MCE	44(	The Disadvantaged Child
POS	439	Minority Group Politics in America
REL	322	Religion in American Life and Thought
REL	325	Biography in American Religion
REL	422	American Puritanism and Its Rivals
REL	423	Revivalism Reform, and Americanism
RLL	424	Secularization and American Religion
SOC	341	Modern Social Problems
SOC	440	Racial and Ethnic Minorities
SWU	474	Ethnic Cultural Variables in Social Work

Black Studies

ASB	327	Perspectives of Africa
ENG	358	African American literature
GCU	32	Geography of Africa
HIS	364	Black American Experience
HIS	498	Pro Seminar Black Culture
SOC	454	The African in Modern Society

Mexican American Studies

ARH	406	Mexican Art
GCU	421	Geography of Arizona and Southwestern United States
GCU	424	Geography of Middle America
HIS	380	History of the Mexican American
HIS	424	The Hispanic Southwest
HIS	425	The American Southwest
HIS	430	Twentieth Century Chicano History
HIS	463	Intellectual and Cultural History of Latin America
HIS	466	Mexico
HIS	467	Mexico
HIS	498	Pro Seminar (Recent History of the Mexican Americans)
HIS	591	Seminar (The Southwest)
MCE	448	The Mexican American Child

POS	454	Government and Politics in Mexico
POS	498	Pro Seminar (Chicano Political Experience)
SPA	203	Intermediate Spanish*
SPA	204	Intermediate Spanish*
SPA	315	Spanish Conversation and Composition
SPA	316	Spanish Conversation and Composition
SPA	42	Spanish in the Southwest
SPA	464	Mexican American Literature
SPA	471	Civilization of the Spanish Southwest
SPA	472	Spanish American Civilization
SPA	542	Studies in the Spanish of the Southwest

American Indian Studies

ARH	103	Introduction to American Indian Art
ARH	403	Pre-Columbian Art
ARH	404	North American Indian Art
ARH	405	Southwest Indian Art
ARH	494	Special Topics, where appropriate
ARH	498	Pro Seminar, where appropriate
ARH	591	Seminar, where appropriate
ASB	321	Southwestern Ethnology
ASB	335	Southwestern Anthropology
ASB	337	Archeology of Mesoamerica
ASB	355	American Indian Views of Man
ASB	356	Aspects of Southwest Region
ASB	418	Indian Reservations Today
ASB	421	The North American Indian
ASB	422	Archaeology of North America
ASB	424	Indians of Mesoamerica
ASM	553	New World Physical Anthropology
ASM	554	Southwestern Physical Anthropology
GCL	421	Geography of Arizona and Southwestern United States

*For Spanish speaking students only

HIS	367	The American Indian
HIS	428	Arizona
HIS	498	Pro Seminar (American Indian History)
IED	411	Indian Education (Prerequisite for other Indian Education courses
IED	422	Method of Teaching Indian Children
IED	424	Curriculum and Practices for Indian Education
IED	433	Guidance for the Indian Student
IED	490	Problems of Teachers of Indian Children
IED	511	School Community Relations in Indian Education
IED	522	Education of Indian Adults
IED	544	Community Development in Indian Education
IED	594	Workshop in Indian Education
REL	330	Native American Religious Traditions
REL	435	Problems in Native American Religions

Jewish Studies

HIS	494	Special Topics European Jews, 1348-1879
RLI	316	Types of Judaism
RLI	373	Introduction to the Talmud
RLI	475	The Jewish Mystical Tradition

Asian Studies. The Center for Asian Studies is designed to encourage and coordinate student, faculty and community study of the area through the support of public lectures, symposia, research and curricular development. Interdisciplinary programs have been developed, both undergraduate and graduate, to prepare students for governmental or private employment or for admission to graduate programs at other institutions.

At the undergraduate level, programs can be devised leading to an emphasis within a major example. History Asian Studies, Anthropology-Asian Studies. Any department in the university may, at its discretion, accept an Asian Studies component. The goal is to offer programs which, while insuring a rigorous training for students in the chosen field of study, will enable them to relate their discipline to Asian conditions and problems.

The requirements for Asian Studies in such an emphasis are 30 semester hours of wholly Asian content courses, and knowledge of an Asian language. The 30 semester hours of Asian courses shall be selected from the list of Asian courses drawn up by the Center. These courses may be used where appropriate to fulfill General Studies requirements. Knowledge of an Asian language shall comprise the equivalent of 16 semester hours of credit in Chinese, Japanese, or any other Asian language approved by the Center in respect to a particular individual program. Fulfillment of these requirements will be recognized on the transcript by a bachelor's degree with a major in "(Discipline)-Asian Studies."

At the graduate level, the Center for Asian Studies cooperates with a number of departments in master's and doctoral programs. At the M.A. and Ph.D. levels the cooperating departments are Political Science, History, Anthropology, Geography and Sociology. At the M.A. level only, the departments include Philosophy and Humanities. In cooperation with the College of Education, the Center offers two graduate programs to prepare teachers of Asian Studies for the high schools and community colleges. One program is the Master in Education - Secondary Education with a major field in Asian Studies consisting of 30 credit hours: 15 each in Asian Studies and Education. The other is Teaching Specialist in Asian Studies (within the Education Specialist degree program), which requires 36 hours beyond the M.A. degree. 18 each in Asian Studies and Education. Consult the Chair of the Secondary Education Department

or the Director of the Center.

The Center cooperates and coordinates with other university centers in the summer or in one year study programs in several Asian countries.

The Center also publishes occasional papers or reports and symposium proceedings, all of which are distributed throughout the world

For further information consult the Director of the Center for Asian Studies

Asian Studies Courses. *For course descriptions refer to the course offerings by departments*

ARH	103	Introduction to Asian Art
ARH	294	Special Topics, where appropriate
ARH	470	Art of India
ARH	471 472	Oriental Art
ARH	474	Chinese Painting
ARH	494	Special Topics, where appropriate
ARH	498	Pro Seminar, where appropriate
ARH	591	Seminar, where appropriate
ASB	323	Peoples of Asia
ASB	325	Peoples of Southeast Asia
CHI	101 102	Elementary Chinese
CHI	201 202	Intermediate Chinese
CHI	305	Chinese Calligraphy
CHI	309 310 311 312	Chinese Conversation
CHI	313 314	Advanced Chinese
CHI	321 322	Chinese Literature
CHI	413 414	Introduction to Classical Chinese
CHI	492 493	Special Courses
	499 590	
FLA	420	Foreign Language in Translation Chinese Literature
GCU	326	Geography of Asia
GCU	428	Geography of the Middle East
GCU	429	Geography of Southeast Asia
GCU	430	Geography of South Asia
GCU	431	Geography of the Far East
HIS	305 306	Asian Civilization
HIS	470	Chinese Cultural History
HIS	471 472	Diplomatic History of East Asia
HIS	473 474	China
HIS	475	Modern India
HIS	476	Modern Southeast Asia
HIS	477 478	Japan
HIS	479	The Chinese Communist Movement
HIS	498	Pro Seminars in Modern China and Japan
HUM	150	Introduction to Asian Humanities (same as LIA 150)
HUM	303 304	Humanities in the Eastern World
HUM	428 429	Religions of the Far East
HUM	544 545	Esthetic Principles in Eastern Humanities
LIA	150	Introduction to Asia (same as HUM 150)
JPN	101 102	Elementary Japanese
JPN	201 202	Intermediate Japanese
JPN	311 312	Japanese Conversation
JPN	313 314	Advanced Japanese
JPN	321 322	Japanese Literature
JPN	492 493 493 590	Special Courses
FLA	420	Japanese Literature in Translation
MHL	4	World Music II
PHI	319	Indian Philosophy
PHI	321	Buddhist Philosophy
POS	445	Asian Political Thought
POS	448	Comparative Politics of China and Japan
POS	457	Government and Politics of China
POS	458	Government and Politics of South and Southeast Asia
POS	468	Comparative Asian Foreign Policies
POS	250 492 493 498 499 590 591 595	Special Courses
REL	35	The Religious Traditions of the East
REL	451	The Religious Traditions of India
REL	455	The Religious Traditions of China and Japan
REL	550	Selected Religious Thinkers of the East
SOC	498	Pro Seminar, Asian-Americans
THL	475	History of the Oriental Theatre

Islamic Studies. Although the Middle East is frequently in the news, the West has much to learn about the history and cultures of its peoples. Arizona State University faculty members with special expertise in Islam offer

courses in several departments, as well as an interdisciplinary course on Islamic Civilization. Numerous programs guest speakers and art exhibitions on the Islamic world are brought to the campus For further information, contact the History Department, SS 204.

Islamic Studies Courses. *For course descriptions refer to the course offerings by departments*

ARH	105	Introduction to Islamic Art
ARH	406	Islamic Architecture
ARH	407	Islamic Painting
ARH	478	Persian Art
ARH	595a	Pro Seminar, Islamic Art
ARH	591h	Seminar Islamic Art
GCL	425	Geography of Middle East
HIS	437	Eastern Europe and the Balkans
HIS	439	The Modern Middle East
HIS	456	Iberian Empires
REL	312	Western Religious Traditions
REL	460	Religious Traditions of Islam
RL	464	The Sufi Way

Team taught interdisciplinary course: ARA, HUM or REL 365 Islamic Civilization

For special topics courses 494 and independent studies 499 on Islamic and Middle Eastern subjects, consult departments indicated above

Latin American Area Studies. Arizona maintains an ever growing interest in Latin America that draws upon an extensive experience of historical and geographical ties. The Center for Latin American Studies is the focal point for these interests at Arizona State University, and through its program endeavors to serve the University community and maintain strong ties with various Latin American organizations in the state and the nation. Principal activities are coordinating Latin American Studies at the undergraduate and graduate levels, sponsoring student exchange programs, a Guatemalan Summer School, numerous seminars and conferences, publishing a wide range of professional materials, and facilitating research about the region.

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, Geography, History, Political Science, and Foreign Languages (Spanish). In this program the student majors 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 in other disciplines. Successful completion of LAA 402, Movements and Meaning in Latin America and a reading knowledge of Spanish or Portuguese is required. The 15 hours required in other disciplines shall be selected from the list of Latin American content courses established by the Center (a list of courses follows) Completion of the requirements of this program of study is recognized on the transcript as a bachelor's degree with a major in "(Discipline) Latin American Studies."

Master's degree students in the departments of Geography, History, Political Science, or Spanish may elect an emphasis in the field of Latin America Two departments, History and Foreign Languages, offer Latin American areas of focus at the Ph.D level. A cognate minor in Latin American studies is also available in various disciplines.

The Center administers student exchange programs with the Catholic University of Bolivia and three Mexican universities the Autonomous University of Guadalajara, the Autonomous University of Nuevo Leon, and the University of Sonora. Each semester several ASU students are selected to receive credit for course work taken on the Latin American campuses while Bolivian and Mexican students study here. In the summer, the Center sponsors a summer school at the University of Francisco Marroquin in Guatemala City.

Each year the Center typically sponsors several major conferences as well as a number of seminars, often featuring presentations by scholars from Latin America

The extensive publications program includes the issuing of the quarterly *Latin American Digest*, as well as the publication of research through the Reference Series, Reprint Series, a Special Studies Series, and the ALAC Papers Series Several scholarly books are published each year

The Center is a member of the Arizona-Mexico Commission, the Border States University Consortium for Latin America, the Consortium for Latin American Studies Programs, the Latin American Studies Association, the Rocky Mountain Council on Latin American Studies, the Pacific Coast Council on Latin American Studies, and the Southwest Alliance for Latin America It also serves as the unofficial home of the ASU Association of Latin American Students

The Center directly encourages research, not only through its publications program, but also through the maintenance of a Latin American newspaper reading room.

For further information consult the office of the Center for Latin American Studies, Room 213, Social Sciences Building.

Latin American Content Courses. *For course descriptions refer to the course offerings by departments.*

ARH	110	Introduction to American Art
ARH	403†	Pre-Columbian Art
ARH	406†	Mexican Art
ASB	321†	Southwestern Ethnology

ASB 335 Southwestern Anthropology
ASB 337 Archaeology of Mesoamerica
ASB 419† Social Inequality
ASB 423† Archaeology of South America
ASB 424† Indians of Mesoamerica
ASB 479† The Anthropology of Peasant Peoples
ECN 311† Economic Development
ECN 331† Comparative Economic Systems
ECN 336† International Economics
ECN 371† Latin American Economies
ECN 488† International Monetary Economics
ECN 570 Economics of Developing Nations
GCU 323 Geography of Latin America
GCU 423† Geography of South America
GCU 424† Geography of Middle America
HIS 200 Latin American Civilization (not open to history majors)
HIS 380 History of the Mexican American
HIS 383 Latin America
384
HIS 424 The Hispanic Southwest
HIS 430 20th Century Chicano History
HIS 456 Iberian Empires
457
HIS 458 Colonial Latin America
459
HIS 460 Spanish South America
461
HIS 463 Intellectual and Cultural History of Latin America
HIS 464 The United States and Latin America
HIS 466 Mexico
467
HIS 468 Brazil
HIS 514 Latin American Historiography
HIS 591 Seminar (Latin American History)
LIA 402 Movements and Meaning in Latin America
LIS 465 Library Materials for Minority Students
MCE 448 The Mexican American Child
MCE 498 Minority Women
MCO 430 International Communications
MGT 459† International Management
MKT 331† International Business
MKT 435† International Marketing
MKT 591 Seminar International Business
POR 321† Luso Brazilian Literature
322†
POR 472† Luso Brazilian Civilization
POS 426 Comparative Administration
POS 435 Modernization and Political Change
POS 438 Revolution and the Social System
POS 453 Government and Politics of South America
POS 454 Government and Politics of Mexico
POS 455 Government and Politics of Central America and the Caribbean
POS 460 World Politics
POS 463 Inter American Relations
POS 46 International and Regional Organizations
POS 467 Comparative Defense Policy
POS 474 International Law
POS 550 Comparative Governments
POS 591 Seminar (Comparative Government, International Relations
SOC 401 Comparative Sociology
SPA 325† Introduction to Hispanic Literature
SPA 421† Spanish in the Southwest
SPA 424† Masterpieces of Hispanic Literature
SPA 425† Spanish Literature
SPA 426† Spanish Literature
SPA 427† Spanish American Literature
428†
SPA 454† 19th Century Spanish-American Narrative
SPA 455† Spanish American Modernism
SPA 456† 20th Century Spanish American Fiction
SPA 457† Contemporary Spanish American Poetry
SPA 464† Mexican-American Literature
SPA 47 †Civilization of the Spanish Southwest
SPA 472† Spanish American Civilization
SPA 541 Spanish Language in America
SPA 542 Studies in the Spanish of the Southwest
SPA 570 Indigenous Literature of Spanish America
SPA 571 Colonial Spanish American Literature
SPA 572 Spanish American Drama
SPA 573 Spanish American Essay
SPA 574 Spanish-American Vanguard Poetry
SPA 575 Contemporary Spanish American Novel
SPA 576 Contemporary Spanish American Short Story
SPA 577 Regional Spanish American Literature
SPA 579 18th Century Hispanic Literature
SPA 591 Seminar
SPE 534 Education and Change in Developing Nations
TRA 463† International Transportation

Several departments offer additional Latin American content courses under the following designations: special topics 494, honors colloquium 497, pro seminar 498, reading and conference 590, seminar 591, and special topics 598. Students should consult a schedule of classes for the availability of these courses. In addition, the University offers Latin American content courses for law students and doctoral students in several departments.

†Denotes prerequisites

Women's Studies. The curriculum of Women's Studies involves courses from several colleges of the university. Its program aims to give clarity and organization to the existing data on women, to increase research in new and neglected fie ds, and to generate and eval uate theory. Through the interdisciplinary approach, the curriculum of Women's Studies emphasizes sexual roles in society as well as contributions made by women throughout his tory. Each student's program must be approved by the Director of Women's Studies to ensure the appropriate integration of disci plines

Although there is no major in Women's Studies, a Certificate of Concentration is awarded by the Director of Women's Studies in connection with the Women's Studies Advi sory Committee To be eligible for the Certificate, students must complete sat'sfacto rily a minimum of 21 credit hours from the electives offered in the program, which in cludes the introductory 3-credit course, LIA 294, plus 18 credits, only six of which may be applied toward the n ajor For some majors in the College of l iberal Arts the courses in this concentration may be accepted is fulfilling the related field requirements Students who wish to take advantage of this option should consult the Director. Inquiries about the progr am should be addressed to the Women's Studies Office, Social Sciences 107G, where the current list of approved courses is avail able Credit for additional related courses may be accepted upon petition to the Women's Studies Advisory Committee

Women's Studies Courses. *For course descrip tions refer to the course offerings b1 departments.*

ARL	498	Pro Sen ir: Women s View of Art
COM	794	W r en's Con n unicat n
ENG	461	Won e and l iterature
ENG	494	Spec al Topics: Modern Br tish and American Women Writers; 20th Century Women Poets
FAS	330	Personal Growth in Human Relationships
FAS	331	F mily Relationsh ps
FAS	332	Hun in Sexual ty
FLA	420	French Women n Soc ety
FRE	431	Frenel Women in S ciety and the Arts
HES	494	Special T p cs Sexuality and Repr ductive He alth
HES	598	Special Topics Women and He alth
HIS	370	W en en n United States H story
HIS	422	S c al History o U ited States W r en
H M	470	Women and the Humanities
HUM	494	Specia Top s: Wo en is Hero; Fen inist Imagination
LI A	100	Uni ersity Adjust ent and Surv va for Matur Women
LIA	294	Women and S ciety
l IS	534	Eva uat n of Ch ildren's Literature
MCE	498	Min r ty Wo en
NCE	194	Women's Healtl
NCE	494	Women and Menta Hea th
NCE	598	Feminist Therapy I and II
PGS	331	Sexual Ident f cation
REL	494	Spec al Topics Women n Christ an Tr idit n
SOC	305	Courtship and Marriage
SOC	360	The S cial Syste n and the Individual
SOC	415	The Fam y
SOC	440	R cial and Ethn c M n r ties
SOC	497	Family V o ence
SOC	498	Pro Se minar Str it fic tion of W omen
SPF	498	Educati n of Wo n en
	515	
SPF	498	(or COM 494, 598, or FAS 498)
	591	Womankind (KAET telecourse)

Center for Public Affairs. As a separate academic unit within the College of Liberal Arts, the Center for Public Affairs offers a program ofstudy leading to the Master of Pub lic Administration (M.P A) The purpose of the M P.A degree is to prepare students for managerial and leadership positions within the public sector. The program of study consists of a core curriculum designed to give the student a broad, balanced, liberal education in the field of public affairs. In addition, an inter disciplinary curriculum has been developed that will allow the student a certain flex'b'lity to construct a program of study best suited for his her individual needs. An important func tion of the Center is to serve as an intermedi ary between the University and governmental agencies. The Center, in cooperation with var ious public agencies and organizations, helps to sponsor various workshops and conferences des gned to deal with problems of state and local government. In addition, the Center maintains a research publication program that helps identify, analyze, and propose solutions to ma or public problems. See page 125).

Solid State Science. As a separate academ c unit within the College of Liberal Arts, the Center for Solid State Science is engaged in research in many aspects of the physics, chem istry and applications of solids The Center operates modern research facilities, sponsors a colloquium series, maintains a library of research publications and works cooperatively with local industry While the Center itself does not grant degrees, it does provide oppor tunities for both graduate and undergradu ate students to do research in this cross disciplinary area Students would include this research activity as part of a program of study within one of the departments, normally Chemistry

and or Physics, under the supervision of one of the faculty members of the department or of the Center.

Aerospace Studies
(Air Force ROTC)

PROFESSOR:
HAMMOCK (MAIN 340)
ASSISTANT PROFESSORS:
BOSTW CK GAMBONE ROBERTSON

Purpose. The Department of Aerospace Studies curriculum consists of the General Military Course for freshmen and sophomores (GMC-AES 101, 102, 201, 202) and the Professional Officer Course for juniors and seniors (POC AES 301†, 302†, 401†, 402†) The goal of this professional education is to provide the foundation of military knowledge and skills needed by Air Force junior officers Upon graduation, each student who satisfacto rily completes the Professional Officer Course and degree requirements will receive a commission as a Second Lieutenant in the Air Force Reserve

General Qualifications. Men or women entering AFROTC must (1) be a citizen of the United States (noncitizens may enroll, but must obtain citizenship prior to commissioning); (2) be of sound physical condition; (3) be at least 17 years of age for scholarship ap pointment or admittance to the 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 commis sioning requirements prior to age 26 .; other categories must be able to complete all com missioning requirements prior to 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 2.0 semester hours of credit for each AES 100 and 200 class completed, a total of 8.0 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 an interview board of Air Force officers If selected, the student then enrolls in the Professional Officer Course (POC) the last two years of the Air Force ROTC curriculum Students normally attend a four week field training course between the sophomore and junior year at an Air Force base. 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 Lieuten int The new off cer 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 under graduate or graduate level Applicants seek ng enrollment in the two year program must pass an Air Force aptitude and medic al examina tion, and be selected by an interv ew board of Air Force officers. After successfully complet ing a six week field training course at an Air Force base, the applicant may enroll in the Professional Officer Course in the Air Force ROTC program. Upon completion of the POC and the college requirements for a degree, the student is commissioned

Qualifications for Admittance to the Professional Officer Course (POC). (1) For the four-year student, successfully complete the General Military Course (2) For the two year applicant, complete a s x week field training course (3) Pass the Air Force Officer Qualif cation Test (AFOQT). (4) Pass the Air Force physical examination. (5) Maintain a minimum grade point average of 2 0 ("C").

Deposit. A l non contract students registering for Air Force ROTC are required to make a deposit of $20 with the military property cus todian as the basis for issue of the prescribed uniform, textbooks, and other authorized ma terials. This deposit will be refunded at the end of each semester by the military property custodian

Pay and Allowances. POC members in their junior and senior years receive $100 per month for a maximum of 20 months of Profes sional Officer Course attendance. Students are also paid to attend field training. In addition, uniforms, housing and meals are provided dur ing field training at no cost to the student. Students are reimbursed for travel to and from field training

Scholarships. Air I orce ROTC offers schol arships annually to outstanding young men and women on a nationwide competitive basis. Scholarships cover full college tuition for resi dent and nonresident students as well as books, fees, supplies and equipment, plus a monthly tax free allowance of $100 Scholarships are available on a four , three , and two-year basis To qualify for the four year schol arship, students must be citizens and submit an application prior to December 15 of their senior year in high schoo Interested students should consult their high school counselors or call AFROTC at ASU for application forms to be submitted to HQ AFROTC, Maxwell AFB, AL., 36112. Male and female stu dents enrolled in AFROTC at Arizona State University are elig ble for three and two-year

scholarships Those interested must apply through the Department of Aerospace Studies. Consideration is given to academic grades, score achieved on the Air Force Officer Quali fying Test and physical fitness A board of officers considers an applicant's personality, character and leadership potential

Flight Instruction Program. Senior cadets design ated to enter U.S. Air Force Under graduate Pilot Training after graduation partic pate in the Flight Instruction Program (FIP) during their last year in college unless they already have a private pilot's license. Each cadet receives 25 hours of instruction at an FAA approved flying school at no expense to the student This training also includes ground school instruction in weather, naviga tion and Federal Aviation Regulations.

AEROSPACE STUDIES

AES 101 Aerospace Studies. 2 F
Introdu t on to U S A r Fo ce organ zat on m ss on doctr ne ffens ve and defens ve f rces One ecture 1 h ur Leadersh p Pract ca App cat on 101L

102 Aerospace Studies. 2 S
Backgrou d on strateg c m ss e defense forces genera purpose and aerospace support forces n nat ona de fen e One ecture 1 hour Leadersh p Pract ca App cat on 102L

201 Aerospace Studies. 2 F
H stor ca su vey of events trends and po c es ead ng to the emergence f a r power thr ugh WW One ec tu e 1 hour Leade sh p Pract ca App cati n 201L

202 Aerospace Studies. (2 S
Devel pment of aerospace power from WW I to the p esent emphasiz ng the mpact of m ted war and techno ogy on ro es and m ss ons One ecture 1 hour Leadersh p Pract cal App cation 2 2L

301 Aerospace Studies. 3 F
An integrated management co rse emphas z ng the n d v dua as a manager n an A r Force m eu nd v dua mot vat ona and behav ora processes eadersh p commun cat o and group dynam cs are covered Two ect res 1 ho r Leadersh p Pract ca App cat on 3 1

302 Aerospace Studies. 3 S
Organ zat ona a d persona va ues, management f force in change, organ zat ona power po t cs mana geria strategy and tact cs Two lectures, 1 hour Leadership Pract cal App ication 302L)

401 Aerospace Studies. (3) F
Armed Forces as a techn ca e ement of soc ety w th emphasis on the broad range of American c v l-m itary re at ons, pr nciples and techn ques of commun cat ve sk ls the po itica econom c and soc a constraints on the nationa defense structure Two ectures 1 hour Leadersh p Pract ca Appi cat on (401L

402 Aerospace Studies. (3 S
Formu ation and mp ementat on of U S defense pol c es, impact of techno og ca and nternat onal deve opments on strateg c preparedness n the overal defense po cymak ng processes Two lectures, 1 hou Leadersh p Pract cal App ication 402L

403 Flight Instruction. (0 F S
Fl ght nstruct on 25 total hours of dua and so o in struct n), 8 hours ground school. Prerequ s tes AES 301 302 and enro ment n POC

Anthropology

PROFESSORS:
PLOG ANTH A-124), BAHR, DITTERT MERBS, MORR S, RUPPE, SCHOENWETTER, STEWART, TURNER

ASSOCIATE PROFESSORS:
BRANDT CLARK, FIRESTONE, MART N, NASH, STARK

ASSISTANT PROFESSORS:
AGU LAR EDER, GAINES STEADMAN, WILL AMS

LECTURER:
CAIN

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Anthropology Consists of 45 semester hours of credit of which 30 must be in anthropology and 15 in related fields to be approved by the advisor in consultation w th the student Courses ASM 101, ASB 102, 311, 331†, and one area course incorporating ethnography are required Students may elect ASM 341†, 342†, or 343† to fulfill the required course in physical anthropology An additional 12 hours in anthropology will be approved by the advi sor in consultation with the student. At least 18 semester hours must be in upper division courses. (See Degree Requirements, pages 56-58)

Latin American Studies Combined Degree Program. (See Interdisciplinary Studies, page 62.) Consists of the Bachelor of Arts degree requiren ents in Anthropology. At least 30 upper div sion semester hours of the total pro gram must be in Latin American content courses ne uding 15 hours in Anthropology and 15 in other disc p ines A reading knowl edge of Spanish or Portuguese is required, as is the successfu completion of LIA 402 Move ments and Meaning in Latin Americ A reading knowledge of the other language is suggested Fu fillment of requirements is rec ognized by a Bachelor of Arts degree with a ma or n Anthropology Latin American Studies

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Social Studies: Anthropology Consists of 63 semester hours of credit, of wh ch 30 hours must be in the anthropology courses required for the B iche or of Arts degree in Liberal Arts Of the remaining hours, two groups of 15 hours are to be taken in related social sci ences. Psycho ogy or a single natural science may be used as one of the 15 hour fields. SED 480 is taken to prov de the remaining 3 hours.

	Seme t H ur
Anthrop ogy	3
Social sciences	5
Social sciences cr n ltural sciences or psycho gy	5

SED 480 (Special Methods of Teaching Social Studies) 3

63

Departmental Minor Teaching Field Requirements

(Secondary Education)

Anthropology—Consists of 24 semester hours of credit in anthropology Courses ASM 101, ASB 102, and two upper division courses in each subdisciplinary field (archaeology, physical anthropology, social-cultural anthropology) are required

Departmental Graduate Program

The Department of Anthropology offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

ANTHROPOLOGY (ASM)

Courses which may be applied toward the General Studies requirement in sciences and mathematics

ASM 101 Human Origins and the Development of Culture. 3 F
Physical anthropology and archaeology Evidence and processes of human evolution and of culture change Primates Fossil hominids and their tools Race, variation and heredity Environment and human biology. Prehistoric culture and society

241 Biology of Race. 3 S
Human variation and its interpretation in an evolutionary context.

338 Anthropological Field Session. 2 8) SS
Anthropological field techniques analysis of data and preparation of field reports. Prerequisite approval of instructor. May be repeated for credit

341 Human Osteology. 4) F
Osteology human paleontology, osteometry. Description and analysis of archaeological and contemporary human populations. Prerequisite: ASM 101 or approval of instructor Three lectures 3 hours laboratory

342 Human Biological Variation. (4 S
Evolutionary interpretations of biological variation in living human populations with emphasis on anthropological genetics and adaptation. Nutrition and disease and their relation to genetics and behavior Prerequisites: ASM 101, MAT 106 or equivalent or approval of instructor Three lectures, 3 hours laboratory

343 Primatology. 3) F
Evolution and adaptations of nonhuman primates emphasizing social behavior including materials from fossil evidence and field and laboratory studies in behavior and biology Prerequisite: ASM 101 or approval of instructor.

344 Fossil Hominids. (3 NR
Ancient African, Asian and European human and primate skeletal, dental and cultural remains. Human biological behavioral and cultural evolution. Prerequisite ASM 101 or approval of instructor

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 approval of instructor

346 Human Origins. (3) S
Human typology space in nature, fossils prehistoric and recent concepts of human races influence of culture on human evolution.

348 Social Issues in Human Genetics. (3 S
Moral and social implications of developments in genetic science particularly as they effect reproduction, medicine and evolution

365 Laboratory Methods in Archaeology. 4 NR
Techniques in artifact analysis. Basic archaeological research techniques, methods of report writing Prerequisite ASM 101 or approval of instructor May be repeated for credit for total of 8 hours

366 Chronological and Ecological Techniques in Archaeology. 3) NR
Procedures for dating archaeological remains and reconstructing ecological conditions of cultural pertinence at archaeological sites. Radiocarbon dating dendrochronology stratigraphy pollen analysis geomorphology zooarchaeology Prerequisite ASB 330 or approval of instructor

435 Archaeological Pollen Analysis. (3) F
Theory methodology and practice of pollen analytic techniques Comparatives in botany, geology and archaeology Field trips and laboratory Prerequisite: approval of instructor Two lectures and 2 hours laboratory

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 Prerequisite approval of instructor Three lectures, 3 hours laboratory

455 Primate Behavior Laboratory. (3 NR
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 Prerequisites ASM 343† and approval of instructor Directed readings and 6 hours laboratory

456 Laboratory Techniques in Anthropological Genetics. (3 NR
A practical introduction to the various serological immunological and electrophoretic techniques used by anthropologists to detect human genetic variation Emphasis on learning the techniques in the laboratory and on theoretical questions of data analysis methods Prerequisite: approval of instructor. One lecture 6 hours laboratory

465 Quantitative Methods. 3) NR
Statistical techniques available and applicable as descriptive and analytical tools useful in processing and interpreting anthropological data Presentation of the concepts underlying parametric statistics nonparametric methods Prerequisites Introductory statistics course and ASB 330 or approval of instructor

466 Computer Archaeology. 3 F
Methods of coding and ordering nonmetric archaeological data Structuring of file systems for storage retrieval and manipulation using computer techniques Student projects and a thorough review of the literature of computer application for the analysis of archaeological data Prerequisite. approval of instructor.

471 Conservation: Museum Collections. 3 NR
Introduction to the documentation analysis, cleaning stabilization and restoration of museum collections method theory and practice Prerequisite approval of instructor

472 Archaeological Ceramics. 3) NR
Analysis and identification of pottery wares types and varieties Systems for ceramic classification and cultural interpretation Prerequisite approval of instructor. Two lectures 2 hours laboratory

555 Advanced Human Osteology. (3) NR
Laboratory and field techniques in dealing with the human skeleton Emphasis on preparation, dental facts on radiography, sectioning, microscopy and data processing Prerequisite ASM 341† or approval of instructor One lecture 6 hours laboratory

591 Seminar. (3 NR
Selected topics in archaeology and physical anthropology

a Physical Anthropology

(b Primates and Behavior

(c Advanced Computer Applications in Archaeology

(d Evo ut on and Cu ture Same as ASB 591)

(e) Interdepartmenta Sem nar Same as ASB 591)

ANTHROPOLOGY (ASB)

Courses wh ch may be appl ed toward the General Studies requ rement in Social and Behavioral Sciences

ASB 102 Introduction to Cultural and Social Anthropology. 3 F S
Pr nc p es of cu tura and soc a anthropo ogy w th l us trat ve mater a s from a var ety of cu tures The nature of cu t re Soc a po itical and econ mic systems re g on esthet cs and language.

211 Women in Other Cultures. 3 S
Cross cu tura ana ys s of the econom c soc a po t ca and re g ous factors that affect women s status n trad tiona and modern soc eties

231 Archaeological Field Methods. 4 S
Excavat on of archae og ca s tes and record ng and nterpretation of data nc udes loca f e d exper ence Prerequ ite ASM 101 or approva of nstructo Two ectures 8 hours aboratory.

311 Principles of Social Anthropology. 3 S
Comparat ve a a ys s of domest c groups and econom c and po tica organ zat ons n pr m t ve and peasant so c et es

312 Political Anthropology. 3 S
Comparat ve exam nat on of the forms and pr cesses of po t ca organ zation and act v ty n pr m t ve peasant and comp ex societ es

314 Comparative Religion. 3) F
Or g ns e ements forms and symbo sm of re g n a comparat ve survey of re g ous be efs a d ceremonie the p ace of re g on n the tota cu ture Prerequ s te ASB 102 or approval of nstru tor

315 Primitive Arts and Technology. (3 F
Comparat ve survey of the mater a cu tu e of peop e of the wor d emphas z ng product o and use of art fa ts Prerequ s te ASB 102 or approva of n tructor

320 Indians of Arizona. 3 F
The trad t ona cu tures and the deve opment and na ture of contemp rary pol t cal, econom c and educat ona cond t on among Ar zona ndians

321 Southwestern Ethnology. 3 F S
Cu tures f the contemporary ndians of the Southwest ern Un ted States and the r h stor c a tecedents Prerequ s te ASB 102 or app ova f nstructor

323 Peoples of Asia. 3 NR
Races and cu tures f As a nc ud ng the more comp ex cu t ires of nd a Ch na Japan and e ated areas Pre requ s te ASB 102 or approva f n tructor

324 Peoples of Oceania. (3 NR
Peop es and cu tures of Ocean a focus ng partıcu ar y on soc et es of Me anes a, M crones a and Polynesia Prerequisite: ASB 102 or approva of nstructor.

325 Peoples of Southeast Asia. (3) F
A cu tura eco ogica perspect ve on the peop es of ma n and and nsu ar Southeast Asia Subs stence modes, soc a organ zat on and the mpact of modern zat on Prerequ s te ASB 102 or approval of nstructor

330 Principles of Archaeology. (3) F
Preh stor c soc eties Survey of dat ng methods f e d techn ques and artifactua nventor es Geographic l mat c and geolog ca re at onships.

331 Old World Prehistory I. (3 F
Deve opment of peop e as b o soc al an ma s n the Ple stocene, emphas z ng technologica ach evements and focus ng upon the relationsh p between techno ogy and env ronment Areas nc ude western Europe sub Saharan Afr ca and western As a Prerequ s te. ASM 101 or approva of nstructor

332 Old World Prehistory II. (3) S
Post P e stocene focus on the trans t on from hunting co ecting socıet es to dependence upon do mest cates Factors ead ng to the estab shment of sett ed v age fe and the deve opment of the ear est urban centers Prerequ s te. ASM 1 1

333 New World Prehistory. 3 S
The var ety of archaeo og ca pattern encountered n the Western Hem phere. Covers the per od from the appearance of huma s n the New Wor d to European contact covers the area from A aska to T erra de Fuego

334 Arctic Anthropology. 3 S
Past and present A eut Esk mo preh tory or g ns, phys ca features adaptat ons var at on and cu ture w th compar sons f As an Arct c popu at ons Prerequ s te ASB 101 or approva of nstructor

335 Southwestern Anthropology. 3 NR
Past cu tures n the Southwest and the r re at on to pre sent peop es us ng archaeo og ca ethno og ca , and ngu t c ev dences Env ronmenta and resource ut za t on from ear est times to the present

337 Archaeology of Mesoamerica. 3 S
Pre conquest cu tures and c v zat ons of Mex co The Aztecs, Mayas and the r predeces ors. Prerequ site ASM 101 or approva of nstructor

351 Culture and Personality. (3 S
Approache to the nterre at ons between the persona ty sy tem and the soc o-cultural env ro ent Prerequ s te ASB 102 or approval of nstructor

355 American Indian Views of Man. 3) NR
The ma n h stor ca and geographica group ngs of re g ous mater a from North Amer ca (nc ud ng Mex co Myths r tua and prose teach ngs ora and wr tten

356 Aspects of Southwest Indian Religion. (3) NR
Selected topics of general nterest n wh ch new nter pretat ve work s tak ng place Emphas s on compar son between tr bes n respect to one or more top cs such as mytho ogy ca endrica r tuals, curing drama etc

364 Museum Techniques. (3) F
Laboratory techniques n restorat on of art facts. Mu seum disp ay pract ces to present anthropo og cal mater al. Prerequ s te ASM 101 or approval of instruc tor

381 Introduction to Linguistics. 3 F
Descr pt ve and h stor cal ngu st s Survey of theor es of human anguage emphasiz ng synchron c l ngu stics.

383 Linguistic Theory: Phonology. 3) F
Contemporary theor es of the sound system of lan guage Prerequ s te· ASB 381 o FLA 400 or approval of nstructor

411 Kinship and Social Organization. 3) S
Mean ngs and uses of concepts referr ng to k nsh p consangu n ty affin ty descent a ance and res dence n the context of a survey of the var et es of soc a groups marriage ru es and kinship termino ogica sys tems Prerequ s te 6 hours of anthropo ogy or approva of nstructor

412 History of Anthropology. 3 F
H stor ca treatment of the deve opment of the cu ture concept and ts express on n the chief theoret ca trends n anthropo ogy between 1860 and 1950 Prereq uis te. ASB 102 or approva of nstructor

415 Primitive Art. (3 S
Art forms of pr m t ve peop e n re at onsh p to the r cu tura sett ng Prerequ site ASB 102 or approva of n tructor

416 Economic Anthropology. 3 F
Econom c behav or and the eco omy n pre ndustria soc et es, descr pt on and c ass f cat n f exchange systems re at ons between product on exchange sys tems and other societa sub systems Prerequ s te ASB 1 2 or approva of nstructor

418 Indian Reservations Today. 3 NR
Prob ems of reservat on fe re at n h ps between on and off reservation Indians

421 The North American Indian 3 F S
Archaeo ogy ethnology and ngu st c e at onsh p of the Ind ans of North Amer ca Does not nc ude M dd e America Prerequ s te. ASB 102 or approval of nstruc tor.

422 Archaeology of North America. 3 S
Orig n spread and development of the p eh stor c nd ans of North Amer ca up to the h st c tr bes Does not nc ude the Southwest Prerequ s te ASM 101 or ap prova of nstructor.

424 Indians of Mesoamerica. (3) F
Histor c tribes and folk cu tures. Prerequ s te ASB 102 or approval of nstructor

426 Historical Archaeology. 3) NR
Princip es techn ques and mportant s tes Use of eth noh story, laboratory techn ques, and art fact ana ys s D scuss on of va ue to histor cal understand ng Prereq u site one course in archaeology or approva of nstructor

430 Underwater Archaeology. 3 S
Survey of methods and techn ques Effects of chang ng sea eve s on ocat o and movement of human gro ps Prerequis te one course in archaeology or approva of instructor

431 Ritual: The Creative Process. (3 NR
R tua as an essent a and creative re g ous act Funda menta structures and typo og es of r tua tech ques for interpretat on and understand ng r tua . Prerequis te. ASB 314†

432 Mythology. 3) NR
How myth emerged as a concept in western c v za t on Myth c wor d v ew as a supposed feature of pr mitive c tures Methods for study ng myth c and other texts co ected from spoken trad t ons Prerequ s te ASB 314†

479 The Anthropology of Peasant Peoples. 3) NR
Descr pt on compar son and theor es perta n ng to the soc a a d comm in ty structure a d wor d v ew of peasant peop es Prerequ s te ASB 10

481 Language and Culture. 3 S
App cat n of ngu st c theor es and f nd ng to non n gu stic aspects of cu ture anguage hange psycho n guist cs Pre equ te ASB 102 r approval of nstruct r

482 Linguistic Practice. (3 NR
Study of a non ndo European language w th an nform ant Prerequ s te ASB 381 or F A 400 or approval of nstructor

483 Sociolinguistics and the Ethnography of Communication. 3 NR
Re at o sh ps between gu st c a d so a categor es funct na ana ys s of la guage use ma ntenance and d vers ty nteract on between verba and nonverba commun at on P ereq s te ASB 381 or approva of nstru tor

510 Archaeology of Lowland Civilization in Mesoamerica. 3 F
Character st cs and adaptat ons of trop ca ow a d c v zat ons in Mesoamer ca Trop cal owland eco ogy ar d contrasts of soc o pol t ca and economic organizat on w th h ghland Mesoamerican c v zat ons Ut zes both archaeo og ca and ethnoh stor ca data Prerequ s te ASB 337† or approva of i structor

532 Graduate Field Anthropology. 2 8 NR
ndependent research on a spec f c anthropo og ca prob em to be se ected by the student in consultat on with the staff. Prerequis tes ASM 338† or equ valent, and approva of nstructor May be repeated for cred t

533 Cultural Inventory Methods. (3 NR
Problems and procedures in ocat ng and record ng archaeolog cal s tes. Ana ys s of site types s tuat ons and re at on to natural resources nterpretat on from surface rema ns F e d work Pre equ site approva of nstructor

534 Public Archaeology: Legislation. 3 F
Laws affect ng archaeo og ca research; po ic es and procedures used to admin ster aws ph osoph ca and pract ca prob ems of ega constra nts on resear h ana ysis of pub c documents generated through com pl ance w th such aws. Prerequ s tes regu ar graduate student status 12 comp eted graduate hours n archae ology approva f nstructor

535 Public Archaeology: Implementation. 3) NR
Theoret ca and pract ca app cat ons of cu t ra re s urces eg s at on a d po cy C nservat on deve opment and management of cu tura resources Prerequ s te ASB 534† or equiva ent or approva of nstructor Sem nar and f e d work.

542, 543 Method and Theory of Archaeology. 3 3 F S
Deve pment and the ret ca bas s of archaeo ogy Ra t ona e and methods of reconstru t n f past human behav r from ar haeo o a data Prerequ s te ap p ova of nstructo

544 Settlement Patterns. 3 NR
Spat a ar ar gement of res dences d str but on and dens ty over the a dscape and ut zat on of a g ven env onment for hab tat on Prerequ s te approva of nstructor

546 Pleistocene Prehistory. 3) F
Deve pment f soc ety and cu ture n the O d World dur g the P e st cene epoch, emphas z g techno og ca change thr ugh t me and the relat onsh p f peop e to the r env onment Prerequ s te ASB 331† or equ va le t

547 Rise of Urban Life. 3 S
Fo us on the archaeo og ca ev dence n the Old Wor d for the trans t on from s bs stence econ m es depen dent upon h nt ng and gathe ng to those dependent upon don est cated pla t a d or a ima s mpact of th s sh ft n subs stence on ca groups and on seden t sm n both nuclear and nonnuc ear areas Pre equ s te ASB 332† or equ valent

582 Linguistic Theory· Syntax. 3 NR
Contemporary the r e of the grammat ca structure of languages Prerequ s te ASB 381 or FLA 400 or ap proval of nstructor

583 Linguistic Theory: Phonological Systems. (3) F
Or gins and deve opment of contemporary phono ogical systems with part cu ar attent on to non Western lan guages Prerequ s te FLA 400 or ASB 381 or approva of instructor

585 Linguistic Theory: Semantics. (3 NR
Contemporary theories on the semant c structure of anguages w th part cu ar attention to non Western an guages Prerequ s te ASB 381 or FLA 400 or approva of instructor

591 Seminar. (3 NR
Se ected top cs n archaeo ogy ngu st cs and soc a cultura anthropology

a) Cultura Anthropo ogy
b Soc a Anthropo ogy
c Prob ems n Southweste n Ethno ogy
d) Cu ture and Personal ty
e L nqu st cs
f Museo ogy
g) Prob ems n Southwestern Archaeo ogy
h Archaeo ogy
) Evo ut on and C ture Same as ASM 591
(j nterdepartn enta Sen nar Same a ASM 591

Special Courses: ASM and ASB 484 493 498 499 500 580, 584 590 592 598 599 790 92 and 799
See pages 30 31

Biological Sciences

The following curr cu a are offered jointly by the Department of Botany and Microbiology and the Dep irtment of Zoology. Students who elect ne of these progr ims are advised by a member of the Bot iny ind M crobio ogy De p irtn e t or by men ber of the Zoology Department

Bachelor of Science Degree Curriculum

Biology A cor ibined offering by the faculties of the Depart nents of Botany M crobiology and Zoo ogy. This Liber il Arts major in b'o cgy is designed to serve students des ring broader program n the bio ogical sciences

than that provided by the more specialized majors in the degree programs of the individual departments. The major consists of a minimum of 45 semester hours of credit, of which 18 must be in upper division courses. Required courses are BIO 101, 102†, 340†; MIC 201† or 210†, 202†. The additional 30 hours in the major must reflect a balanced distribution of courses in the two departments in the areas of physiology, ecology, morphology, and systematics Supporting courses required are CHM 113†, 115†, 231† or 331†, 332†, 335†, 336†, PHY 101 or 111†, 112†, 113†, 114†; MAT 115†, 117†, and 118†; one year of an approved foreign language. (See Degree Requirements, pages 56-58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Biological Sciences A combined offering by the faculties of the departments in the life sciences. The major consists of a minimum of 42 semester hours of credit, of which 18 must be in upper division courses Required courses are BIO 101, 102†, 320†, 340†, BOT 300† or 370†, MIC 201† or 210†, 202†; BOT 360†; ZOL 360† or BAS 460†, ZOL 350† and one additional course selected from one of the following areas Ecological area, BIO 426†, 427†; BOT 420†, ZOL 425†, 427†, ERA 333†. Systematic area, BOT 410†, 434†, 445†, 450†, 470† or 475†; ENT 300†, 400†; MIC 470†, ZOL 270†, 453†, 472† 473† 474†, 475†. Morphological area, BIO 432†; BOT 350†, 445†; ZOL 330†, 432†, 433†, 450† Physiological area, BOT 461†, MIC 420†, 460†, 485†, ZOL 461†, 462†, 463†, 465† Genetic area, BIO 441†, 442†, 443†; MIC 441†, 442†; ZOL 241† Developmental area, BIO 430†, 431†; ZOL 330† Behavioral area, ZOL 280†, 481† The total program must reflect a balanced distribution of courses from both Departments. Supporting courses are CHM 113†, 231†; elementary biochemistry is strongly recommended. BIO 480† is required in the professional education program.

Departmental Minor Teaching Field Requirements

(Secondary Education)

Biological Sciences Consists of 24 semester hours as follows: BIO 101, 102†, 340†, MIC 201† or 210†, 202† and 9 additional hours in courses listed under biology, botany, entomology, microbiology, and zoology with the exception of the following BIO 100, 218†, 318†, BOT 100, ZOL 110, 300. Supporting course. BIO 480† is required in addition to the 24 semester hours of credit in the biological sciences

Botany and Microbiology

PROFESSORS:
PATTEN (LS C-206) ARONSON, CANRIGHT, JOHNSON, NORTHEY, P NKAVA, REEVES SOMMERFELD

ASSOCIATE PROFESSORS:
BIRGE, LEATHERS NASH, SCHMIDT, TRELEASE

ASSISTANT PROFESSORS:
ARCHER, BURKE, CLARK, EUBANKS SWAFFORD, SZAREK, TOWILL

Departmental Major Requirements

Bachelor of Science Degree Curriculum

Botany Consists of a minimum of 45 semester hours of credit in botany and approved related fields, of which 18 must be in upper division courses. Required courses are BIO 101, 102†, 320†, 340†; MIC 201† or 210†, 202†; BOT 350†, 360†, 370† and at least one of the following: BOT 410†, 434†, or 450†. Supplementary courses CHM 113†, 115†, 121†, 231†, or the sequence 331†, 332†, 335† and 336†, MAT 115† or 141†; and one year of an approved foreign language are also required. (See Degree Requirements, pages 56 58)

Microbiology—A student majoring in microbiology is required to take the following courses· BIO 101, 102†, 340†, CHM 331†, 332†, 335†, 336†; MIC 202†, 210†, 302†; plus 16 hours of upper division electives in microbiology or approved related fields Total. 41 semester hours. In addition, the student is required to have proficiency equivalent to one year of college French, German or Russian The required supplemental courses are: CHM 113†, 115†, 121†; MAT 115† or 141†, PHY 111†, 112†, 113†, 114† (See Degree Requirements, pages 56-58.)

Medical Technology Consists of 55 hours of approved courses in the pre internship program selected by the advisor in consultation with the student, and one year of internship in an approved hospital program Completion of the degree is dependent upon acceptance of the student by the hospital into an accredited internship program The University does not guarantee that all students will be accepted into a hospital internship program

Radiology Consists of 55 hours of approved courses in the pre-internship program selected by the advisor in consultation with the student, and 24 months internship in an approved hospital program Completion of the degree is dependent upon acceptance of the student by the hospital into an accredited internship program. The University does not guarantee that all students will be accepted into a hospital internship program.

Departmental Graduate Programs

The Department of Botany and Microbiology offers programs leading to the degrees of Master of Science and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

BIOLOGY

BIO 100 The Living World. (4 F S SS
Princ p es of biology Not offered for cred t to students who have had advanced b ology in h gh schoo . Cannot be used for major cred t in the b o og ca sc ences. Three ectures, 2 hours laboratory.

101, 102 Biological Principles and Processes. (4) F S SS
A comprehens ve treatment of b o og ca concepts emphas zing fundamenta pr nciples of bio ogy and the interp ay of structure and function at the molecular, ce - lu ar organisma and populat on eve s of organ zation For majors in b o og ca sc ences and preprofess onal students in hea th re ated sc ences B O 101 is a pre requis te for BIO 102). Three lectures 3 hours laboratory

217 Introduction to Fisheries and Wildlife Management. 3 F
Pr nciples re at ng to management of cold and warm water fisheries and terrestr al w ldl fe, emphas z ng management of ecosystems Des gned for prospect ve wild fe b o og sts Prerequ s tes 8 semester hours of b o og ca sc ences.

218 History of Medicine. 1) F
Deve opment of med ca concepts

300 Natural History of Arizona. 3) F
P ant and animal commun t es of Ar zona. Cannot be used for major cred t in the b ological sciences Prereq u s te jun or stand ng

310 Special Problems and Techniques. (1 3) F, S
Qua f ed undergraduates may nvest gate a spec f c bio ogica problem under the direct on of a faculty member. Prerequisites formal conference with the fac u ty member and approva of the prob em by the facu ty member and of the departmenta cha r May be repeated for a tota of 6 credits

318 History of Biology. (2 NR
Development of b o og ca concepts Prerequ s te. 12 semester hours of b o og ca sc ences

320 Fundamentals of Ecology. 3) F S SS
Bas c concepts n eco ogy Organ zat on function ng and development of eco og ca systems energy f ow, b ogeochemica cyc ng environmental re ations, popu- ation dynam cs Prerequ sites: B O 102 or equ va ent or approval of nstructor

330 Ecology and Conservation. (3) F
Eco og cal and b o og cal concepts of conservat on used to understand man made eco og ca prob ems Cannot be used for major credit in the b o og cal sc ences.

340 General Genetics. (4) F S SS
Science of hered ty and variation. Prerequ site. BIO 101 102† Three hours ecture 1 hour rec tation

415 Biometry. (4 F
Stat stica methods app ied to b o og cal problems n c ud ng design of exper ments, est mat on, tests of s gn f cance ana ysis of var ance regress on corre a t on ch square and b oassay Th s course w l not sat sfy laboratory requ rements for the L bera Arts Genera Stud es program Prerequ s te MAT 142† or equ va ent. Two ectures, 6 hours laboratory.

424 Analysis of Ecosystems. (3) S
Emphasizes product on, respirat on and decompos tion Prerequ sites sen or or graduate stand ng BOT 420† ZOL 425† or equiva ent courses

425 Laboratory Ecosystem Analysis. (1) S
Methods of ana yz ng energy flow and nutr ent cyc ing. Prerequisites. BOT 424† ZOL 425† or equ va ent 3 hours aboratory.

426 Limnology. (3 F
Dynam cs of n and waters, stress ng the interre at ons of c mat c geolog ca topograph ca phys ca and chem ca factors w th spec al reference to aquat c fe. Prerequ sites CHM 113† ZOL 350†.

427 Limnology Laboratory. (1) F
Prerequisites BIO 426† or approval of nstructor Three hours aboratory.

428 Biogeography. (3) F
Developmental h story of the wor d's phys ca and env ronmental character stics and the r relationships and nf uences on the patterns and s gn f'cance of wor d plant and animal d str but ons of the past and present. Prerequ site. 4 hours of b o ogy or approva of instruc tor

429 Advanced Limnology. (3) S
Recent terature deve opments, methods and l mno og- cal theory, field and laboratory app ication to some part cu ar topic n l mnology Prerequ site: BIO 426†

430 Concepts in Developmental Biology. (3) S
Current concepts and experimenta methods nvo ving d fferentiation and b osynthet c activit es of cel s and organ sms with examp es from m cro organ sms, plants and an ma s Prerequ s te BIO 102† or equ valent.

432 Biochemical Cytology. (3) S
Cel uar funct ons and chem stry based on the macro mo ecu ar organ zat on of ce lu ar components empha siz ng the use of analyt ca procedures such as cel fractionat on, u trastructura radioautography, and cyto chemistry Prerequ s tes: BOT 360† or ZOL 360† or equ valent CHM 231† or 331† or equivalent.

441 Cytogenetics. 3) F
Chromosoma basis of inheritance Prerequisite: B O 340†.

442 Cytogenetics Laboratory. (2) F
Microscop c analys s of meios s m tos s and aberrant ce d v sion. Prerequis tes or concurrent y: B O 441†, and graduate status Four hours aboratory.

443 Molecular Genetics. (3) F
Nature and funct on of the gene Prerequ sites BIO 340† and a course in organ c chem stry

445 Organic Evolution. (3) F
Processes and adapt ve change and spec at on n popu- at ons Prerequ s te BIO 340† or ZOL 241†.

464 Photobiology. 3) S
Princ p es underlying the effects of l ght on growth, development and behavior of plants an mals and mi cro organisms Prerequ s tes. 12 hours of courses n fe sc ences CHM 231† or 331†.

480 Methods of Teaching Biology. (3) F, S
Methods of nstruct on experimentation organ zat on and presentat on of appropriate content in b o ogy Pre requ sites E ther SED 311† or concurrent enro lment n SED 311 and 20 hours n the b o og ca sc ences. Two ectures 2 hours laboratory

512 Transmission Electron Microscopy. (4) F S
Theory use and methods of prepar ng b o og ca ma ter als for transm ssion electron microscopy Prerequ s tes approva of nstructor Materia s fee. Two ectures 6 hours laboratory.

515 Scanning Electron Microscopy. (2) NR, SS
Theory and use of scanning e ectron m croscope for biolog cal mater als ntens ve five week m n course Prerequis te approva of instructor. Mater als fee Three hours ecture 6 hours aboratory

520 Biology of the Desert. (2) S
Factors affect ng p ant and an ma fe n the desert re gions and adaptat ons of the organisms to these factors. Prerequ site. 10 hours of b o og ca sc ences and or approva of instructor

526 Quantitative Ecology. 3) S
Samp ing strategies, spat a pattern ana ysis species d versity, class f cation and app cations of mu t var ate techn ques to eco ogy Prerequisites one course n eco ogy, B O 415† or equ va ent. Two lectures 3 hours aboratory

Special Courses: B O 484 492, 493 494, 497 498 499 590, 591, 592, 598 599 (See pages 30-31.)

BOTANY

BOT 100 Botany. (4) F, S, SS
Major principles and processes in plant biology, including a brief survey of the plant kingdom. Emphasis on morphology, evolution, diversity, physiology and economic significance of plants. For nonmajors in the biological sciences. Three lectures, 3 hours laboratory.

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. Prerequisite: one of the following: BIO 100, 102, BOT 100, ZOL 110, or equivalent.

301 Economic Botany. (3) F
Plants and plant products used by man throughout the world including their cultivation, processing and uses in modern life. Fibers, medicinals, beverages, perfumes, foods. Prerequisite: BIO 100 or equivalent.

350 Plant Anatomy. (4) F
Development and mature structure of tissues of vascular plants; patterns and modifications of leaf, stem, root and flower. Prerequisite: BIO 102† or equivalent. Three lectures, 3 hours laboratory.

360 Plant Physiology. (4) F, S
Plant growth and development, nutrition, water relations, reproduction, metabolism and photosynthesis. Prerequisites: BIO 102† or equivalent; CHM 231†. Three lectures, 3 hours laboratory.

370 The Flora of Arizona. (4) S
Principles of taxonomy, identification of Arizona plants. Prerequisites: BIO 101 and 102, or equivalent, or approval of the instructor. Two lectures, 6 hours laboratory.

410 Lichenology. (3) F '79
Chemistry, ecology, physiology and taxonomy of lichens. Prerequisite: BIO 102† or equivalent. Two lectures, 3 hours laboratory.

420 Plant Ecology. (4) S
Plants in relation to environments. Prerequisite: BIO 320† or equivalent. Three lectures, 3 hours laboratory or field trip. One weekend field trip.

425 Plant Geography. (3) F '80
Plant communities of the world and their interpretation, emphasizing North American plant associations. Prerequisite: BIO 102† or equivalent or approval of instructor.

434 General Mycology. (4) F
Various groups of fungi, their morphology, identification procedures and economic significance. Prerequisites: BIO 102† or equivalent, and/or MIC 202†. Two lectures, 6 hours laboratory.

445 Morphology of the Vascular Plants. (4) S '81
Comparative structure and evolutionary trends in the Tracheophyta. Prerequisites: BIO 102 or equivalent, BOT 350† or approval of instructor. Three lectures, 3 hours laboratory.

448 Palynology. (2) NR
importance of spores and pollen (both fossil and modern) to systematics, evolution, ecology and stratigraphy. Prerequisite: approval of instructor.

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. Prerequisite: BIO 102† or approval of instructor. Three lectures, 3 hours laboratory.

455 Experimental Phycology. (4) NR
Techniques employed in the isolation, identification, purification and culturing of fresh water and marine algae, emphasizing their use as experimental systems. Prerequisite: approval of instructor. Two lectures, 6 hours laboratory.

461 Physiology of Lower Plants. (3) F '80
Cellular physiology and biochemistry of algae and fungi; responses of these organisms to chemical and physical stimuli and their process or morphogenesis. Prerequisites: BIO 102† or equivalent; CHM 231†.

470 Taxonomy of Southwestern Vascular Plants. (4) SS
Identification of the vascular plants of the Southwest and the principles underlying their classification. Not open to students who have had BOT 370. Three lectures, 6 hours laboratory. Two field trips. Summer only.

475 Angiosperm Taxonomy. (3) S '81
Principles underlying angiosperm phylogeny. Prerequisite: BOT 370† or approval of instructor. Two lectures, 2 hours laboratory.

490 Paleobotany. (4) S '80
Plant life of the past, including types of plant fossils, kinds of fossilization, their geologic history and past geographic distribution. Preparing plant fossils for study; identification and interpretation of fossilized plant organs. Prerequisites: BIO 102† or equivalent; GLG 102 or approval of instructor. Three lectures, 3 hours laboratory or field trip.

510 Experimental Design. (3) S '81
ANOVAS, one-way classification of factorial and partially hierarchic designs, introductory multivariate statistics. Prerequisite: BIO 415† or equivalent. One 3-hour lecture at night.



523 Biophysical Plant Ecology. (2) F '80
Theory of physical microenvironments, and effects on plant growth. Consideration of plant energy exchange, and soil-plant-atmosphere water relations. Optional corequisite: BOT 524† Prerequisite: BOT 360† or approval of instructor. Two lectures.

524 Biophysical Plant Ecology Laboratory. (1) F '80
Methods of analysis of plant energy exchange, and water relations of the soil-plant-atmosphere continuum. Operation and application techniques of methods utilized in analysis of the physical environment. Optional corequisite: BOT 523† Prerequisite: approval of instructor. One 3-hour laboratory.

527 Physiological Plant Ecology. (2) F '79
Investigations of physiological adaptions of plants to environmental stresses; ecological significance for growth and survival. Environmental and biological control of photosynthesis and transpiration. Optional corequisite: BOT 528†. Prerequisite: BOT 360† or approval of instructor.

528 Physiological Plant Ecology Laboratory. (1) F '79
Methods of analysis of photosynthesis and transpiration. Infrared CO_2 analysis, CO_2-radioisotope analysis, and water vapor diffusion. Optional corequisite: BOT 527† Prerequisite: approval of instructor. One 3-hour laboratory.

564 Plant Metabolism. (3) F '79
General plant metabolism and typical plant products, emphasizing biosynthesis and functions of storage products, cell wall constituents, plant acids, pigments, hormones and numerous secondary products. Prerequisites: CHM 231†; BOT 360†; or approval of instructor.

570 Plant Secondary Chemistry. (3) S 80
Biosynthes s and d str but on of plant natural products within var ous plant taxa. Prerequ s tes. CHM 331† and CHM 332† or equ va ent Three ectures.

571 Methods in Biochemical Systematics. 3) S 81
Techn ques in solat on and characterizat on of major c asses of natura products used in b ochem ca system at cs Prerequ s te approval of nstructor Two lectures, 3 hours aboratory

576 Experimental Plant Systematics. (3) S 81
nterpretation of taxa, ut l zing cyto og ca genet c eco og ca morpholog ca and anatom ca techn ques and data Prerequ s te. BOT 370 or 470 or approva of n structor Two ectures 3 hours aboratory

591 Seminar. 1 3) NR
Top cs may be se ected from the fo ow ng

a) Eco ogy	e Myco ogy
b) Biosystematics	(f) Molecular B o ogy
c) Morpho ogy	(g Cact and Succu ents
(d) P ant Phys o ogy	(h Phycology

Special Courses: BOT 484 492, 493 494 497 498 499, 500, 590 592 598, 599 700, 790 791 792 799 (See pages 30-31.

MICROBIOLOGY

MIC 105 Med cal Technology Orientation. (1 F S
ntroduct on to the f e d of c n ca laboratory techno - ogy Includes ecture and laboratory experience Required for med'cal techno ogy majors

201 Microbiology. (3 F,S,SS
Basic course for nonmajors emphasiz ng genera pr nc - p es of the ro e of m croorgan sms n hea th eco ogy and related app ed fie ds Prerequ s tes CHM 101 and any one of the fo low ng BOT 100 B O 100 ZOL 100 or approva of instructor

202 Microbiology Laboratory. (1 F,S,SS
Pr nciples and aboratory techn ques used n identify ng and hand ing microorgan sms Prerequis te cred t or concurrent enro ment n M C 201† or 210† Three hours aboratory

210 General Bacteriology. (3 F S
Detailed study of the bacteria cel ts structure genet ics, phys ology and taxonomy ntended for microb o ogy majors and others w th s mi ar prepara t on. *Not open to students with credit n MIC 201* Prerequ s tes. BIO 102† and CHM 115†

302 General Bacteriology Laboratory. (2) F S
nstruct on by staff members on advanced laboratory techn ques n bacter a growth, phys o ogy, genet cs, m croscopy and basic virology Requ red of m crob o ogy majors Prerequisites e ther group A or B (A) MIC 202† and 210†; (B) M C 201† and 202† and approva of nstructor Four hours laboratory

315 Medical Microbiology. (5) S
Laboratory techn ques used n med ca bacter ology mycology and paras tology L m ted to common y en countered human pathogens Cannot be used for major cred t n Zoo ogy Botany or M crob ology Prerequ s te M C 202† and 201† or 210† Three hours lecture, 6 hours aboratory

360 Bacterial Physiology. 3) S
Mechan sms and contro of ce metabol m structures and f nctions Prerequ s tes MIC 210 credit or concur rent enro ment n CHM 331, or approva of nstructor

370 Instrumentation. 3 F S
Princ p es structure, and app icat on of c n ca ab ra tory nstruments nc ud ng e ectron cs spectrophoto metr c ana ysis qua ity contro aboratory mathematics Prerequ s te CHM 115† and PHY 101 or equ vatents. Two ectures 3 hours aboratory

375 Concepts in Medical Technology. (5) S
Basic concepts and aboratory techn ques n hemato o gy, ur nalys s and sero ogy Prerequ site· acceptance to an affi ated hosp ta nternsh p program Three hours lecture, 3 hours aboratory

401 Medical Technology Laboratory Techniques and Theory. 16 F,S
Exper ence nc ud ng ecture and aboratory, n the areas of hemato ogy, c n ca chem stry m crob o ogy and mmunohemato ogy

402 Medical Technology—Advanced Medical Laboratory Specialization. (16) F S
Advanced lecture series and c in ca aboratory exper ence nc ud ng patient serv ces Spec al zat on n one or more areas of c in ca aboratory technology

403 Specialized Medical Technology Laboratory. 12 F S
Advanced techn ques n a l areas of the aboratory based upon nd v dual zed program development for students w th MLT reg strat on or el g b ity

420 Immunology. (4 F S
Princ p es of mmun ty and the r app cat on to d agno s s systemat cs and a erg es Prerequ s tes· MIC 202† CHM 231† or equ va ent. Two ectures 6 hours aboratory

425 Advanced Immunobiology. (3) S
Cel s and tissues of immune system their structure funct on and nteract on Prerequis tes· M C 420† Two lectures, 3 hours aboratory

434 Medical Mycology. 3 S
Fung as causa agents of d seases of man, inc ud ng patho ogy and ep dem o ogy, emphasiz ng techn ques of d agnos s Prerequ s te MIC 202† or equ valent. Two lectures, 3 hours laboratory

441 Bacterial Genetics. (3) S
Mutat'on, molecular transfer mechan sms of hereditary mater al, and genet c recomb nat on in ba ter a and the r v ruses Prerequ sites M C 201† or 210† and B O 340† or approva of instructor

442 Bacterial Genetics Laboratory. (1) S
Techn ques of mutagenes s, mapp ng and stra n con str ct on Prerequis tes MIC 202† and credit or concurrent enro ment in MIC 441† Four hours abora tory

470 Systematic Bacteriology. (3 F
Class fcat on and dentif cat on of bacter a Prerequ - s tes M C 202†, 5 hours of m crob o ogy One ecture, 6 hours laboratory

481 Diagnostic Bacteriology. 3) F
B ochem ca and mmuno og cal methods for character zing pathogenic bacter a. Prerequ s tes M C 202†, CHM 231† or CHM 331†. Two ectures 3 hours abora- tory

485 Virology. 3) F
Fundamenta nature of v ruses and other ob gate intra cel ular paras tes, the r rep cat on pathogenes s eco ogy and cu t vat on Prerequ s tes· 8 hours of m cro b o ogy; CHM 331† Two ectures 3 hours laboratory

520 Selected Topics in Immunology. 3 F
Current iterature concern ng mmuno ogy, part cularly concern ng recent advances in mmunogenet cs and regu ation of mmune response Prerequisites M C 420†

560 Bacterial Physiology. (3) F
B ochem ca aspects of m crob a growth and metabo sm Enzymes of term na oxidat on nvo ved n synthes s and metabo sm of ce lu ar intermed ates Pre requ sites. 5 hours of m crob o ogy CHM 331† or equ va ent· or approva of instructor Two ectures 3 hours aboratory

581 Selected Topics in Host-Bacterial Relationships. (3 S
Pathogen c mechanisms and host responses in bac ter a d seases Prerequ s tes M C 481† or approva of the nstructor M C 420†

591 Seminar. (1 3) NR
Topics may be selected from the fo owing

(a) Mo ecu ar B o ogy	(d) Genet cs
(b V ro ogy	(e) Immuno ogy
(c Enzymo ogy	(f) Bacter al Eco ogy

Special Courses: MIC 298 484, 492 493, 494 497, 498, 499 500, 590, 592 598 599, 700 790, 791 792 799. (See pages 30 31)

Chemistry

PROFESSORS:
MUNK (PS D-102), B EBER D BROWN, P. BROWN, T. BROWN, BURGOYNE BURKE, BUSECK, CRONIN, EYR NG, FUCHS, HARRIS, JUVET, L N, L U, LUCHSINGER, MOELLER, C MOORE NAVROTSKY, O KEEFFE, PARSONS, PETT T THOMSON, WHITEHURST, YUEN, ZASLOW

ASSOCIATE PROFESSORS:
B RK GLAUNS NGER, HOLLOWAY VON DREELE

ASSISTANT PROFESSORS:
GUST, T. MOORE, ROSE

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Chemistry Consists of 45 semester hours of cred t, of which 30 must be in chemistry and 15 n close y related fields Required courses are CHM 117†, 118†, 119†, 120† (or 113†, 115†), 225†, 226†, 317†, 318†, 319†, 320† (or 331†, 332†, 335†, 336†); and 341†, 343†, 453†. Re ated courses must include PHY 111†, 112†, 113†,114†; and MAT 115†, 142†, or equiva ent or more advanced courses The remaining courses to complete the major wil be determined by the student in consultation with his her adv sor (See Degree Requ re ments, pages 56-58.)

Bachelor of Science Degree Curriculum

Chemistry Consists of 42 semester hours of credit n chem stry Required courses are CHM 117†, 118†, 119†, 120†, 225†, 226†, 317†, 318†, 319†, 320†, 421†, 422†, 441†, 442†, 444† and 453† In add tion, PHY 115†, 16†, 117†, 118†; MAT 120†, 121†, 2 2†; and one vear of German (or Russian) s required. An appropriate course n computer science is recommended The remaining chemistry courses to complete the major will be determined by the student in consultation with his her 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 will be interviewed and advised of possible preparatory work. They must contact the department to arrange for the interview in advance of registrat'on See Degree Requirements, pages 56-58.)

American Chemical Society Certification. A student who satisfactorily completes the Bach elor of Science degree program will be certified by the Department of Chemistry to the Amer can Chemical Society is having met the specif c requirements for undergradu ite professiona tra ning in chemistry

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Chemistry Option 1. Consists of 42 semester hours of credit in chemistry and related fields Required courses are: CHM 113†, 115†, 225†, 226†; 331†, 332†, 335†, 336† (or 231†, 361†), 341† (or 441†, 442†), 480† (or PSE 480† or PHY 480†); PHY 111†, 112†, 113†, 114†; and MAT 115†, 142†. The remaining courses to complete the major will be determined by the student in consultation with his her advisor.

Chemistry Option 2. Consists of 30 semester hours of chemistry, which includes all of the required chemistry courses listed in Option 1, 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

Departmental Minor Teaching Field Requirements

(Secondary Education)

Chemistry Consists of 24 semester hours of credit in chemistry. Required courses are CHM 113†, 115†; 225†, 226†; 231†, 361† (or 331†, 332†, 335†, 336†); and 341† The remaining courses to complete the minor will be determined by the student in consultation with his her advisor

Departmental Graduate Programs

The Department of Chemistry offers programs leading to the degrees of Master of Science and Doctor of Philosophy. Consult the *Gradu ate Catalog* for requirements

CHEMISTRY

CHM 101* Introductory Chemistry. 4 F S
E ements of genera chen stry Adapted to the needs of students n nurs ng home econom cs agricu ture and phys ca educat on. Recommended for Genera Stud es credit Normal y fol owed by CHM 231 Three ectures, 1 qu z 2 hours abo atory

113* General Chemistry. 4 F S SS
Pr nc p es of chem stry Adapted to the needs of stu dents n the phys ca b o og ca and earth sc ences Prerequ s te Three semester of h gh schoo a gebra or MAT 106 One year of h gh schoo chemistry ecom mended Three ectures 1 qu z 2 hours aboratory

114* General Chemistry for Engineers. 4) F S
One semester col ege chem stry w th emphas s towards eng neer ng Prerequ s tes Three semesters of h gh school algebra r MAT 106 one year of h gh school chem stry Students w thout h gh school chem stry must enro l n the CHM 113†, 116† sequence nstead of CHM 114 Three ectures, 1 quiz, 2 hours laboratory

115* General Chemistry With Qualitative Analysis. 5 F, S SS
Cont nuat on of CHM 113 Equ br um theory chem stry of meta s, nonmeta s and meta o ds, ntroduct on to organ c chem stry Laboratory nc udes qual tat ve ana ysis Prerequ s te. CHM 11 † or two years of h gh school chem stry. Three lectures 2 qu zzes 4 hours laboratory

116* General Chemistry. 4) F, S
Cont nuat on of CHM 113 Equ l br um theory, chem stry of meta s, nonmeta s and meta oids ntroduct on to

organ c chemistry Prerequ s te CHM 113† or two years of high school chem stry. Three ectures 1 quiz, 2 hours laboratory

117*, 118* General Chemistry for Majors. (3 3) F S
Unified approach to chemica bond ng, mo ecu ar struc ture, descr ptive chem stry of the e ements propert es of matter n var ous phys ca states basic thermody-namics chemica stoich ometry and chem ca analys s. Prerequ s tes M n mum of one year each of high schoo chem stry and phys cs three years of high school math emat cs Corequisites CHM 119† for CHM 117†, CHM 120† and MAT 120† for CHM 118†

119 General Chemistry Laboratory I for Majors. 1 F
Preparat on, purif cat on, and character zation of chem ca compounds; so ut on chem stry and qua tative ana ys s nvo ving organ c and norgan c mixtures ntro duct on to instruments. Pre- or corequ s te CHM 117† One conference, 2 hours aboratory

120 General Chemistry Laboratory II for Majors. (2 S
Cont nuation of CHM 119 Pre or corequ s te CHM 118† One conference 5 hours aboratory

225* Analytical Chemistry. 3) F S, SS
Pr nc p es and methods of chem ca a a ys s Pr mar y for students n agricu ture pre med c ne pre-dent stry, and med ca technology Prerequ site. CHM 115† or 116†

226* Analytical Chemistry Laboratory. (2 F S, SS
Exper ments n chem ca ana ys s Corequ s te CHM 225† One conference 5 hours aboratory.

231* Elementary Organic Chemistry. (4) F, S
Representat ve groups of organ c compounds empha-siz ng b o og cal appl cations. Adapted to students n nurs ng home ec nom cs, agr culture and phys ca edu cat on. Prerequ s te CHM 101 or 115† or 116†, or one year f h gh schoo chem stry w th grades of A or B or approva of nstructor Three ectures, 1 qu z 2 hours aboratory

261* Elementary Biochemistry. (3 F, S
Topic coverage s m ar to CHM 361 but at a eve su t ab e for students wit l m n ma backgrounds n organ c chem stry and mathemat cs Examples and i ustrations drawn from agr cu ture nutrit on and med c ne wher-ever possib e. Prerequ s te CHM 231† and math equ va ent to h gh schoo a gebra Students who have completed or are tak ng CHM 331 may not enro l

301 Chemistry and Society. 3 S
A qual tat ve survey of chem stry and ts mpact on modern techno ogy and the env ronment May not be counted toward the chem stry major.

317*, 318* Organic Chemistry for Majors. (3, 3) F S
Structures reaction mechan'sms and k netics and sys temat c syntheses of organic compounds. Prerequ s tes CHM 118† and 120†. Corequis tes. CHM 319† for CHM 317† CHM 320† for CHM 318†

319* Organic Chemistry Laboratory I for Majors. 1) F
Emphasis o mechan sms, k net cs, and products of organic react ons Pre or corequisite· CHM 317† One conference, 3 hours laboratory

320* Organic Chemistry Laboratory II for Majors. (2 S
Cont nuat on of CHM 319 Pre or corequ s te CHM 318† One conference 7 hours aboratory

331*, 332* General Organic Chemistry. (3, 3) F, S SS
Chem stry of organ'c compounds Prerequisite CHM 115† or 116† or 118† CHM 331 for 332

335*, 336* General Organic Chemistry Laboratory. (1 1) F, S SS
Organ c chem cal exper ments in separat on techn ques synthes s, analys s and dentif cat on and re at ve reac-t v ty. Corequ s tes CHM 331† for CHM 335†, CHM 332† for CHM 336† Prerequ s te CHM 335† for CHM 336† Four hours aboratory

341* Elementary Physical Chemistry. 3) F
Properties of so ds, qu ds gases so ut ons, equ br um co o da state For pre med cal b o ogy, agr cu ture, etc students. Prerequ s tes. CHM 118† or 225†, and CHM 231† or 331† and MAT 142†

343* Physical Chemistry Laboratory. 1) F
Phys ca chem ca exper ments. Corequisite. CHM 341† or 441† Three hours ab ratory.

361* Principles of Biochemistry. 3 F S SS
Structures propert es and functions of prote ns en zymes nuc e c ac ds, carbohydrates, and ipids the ut zation and synthesis of these mater a s by v ing sys tems, and the re at o sh p of these processes to energy product on and ut l zat on Prerequ s te CHM 231† 318† or 332†

367 Elementary Biochemistry Laboratory. 1) F, S, SS
Exper ments nc ude qua tat ve ana ys s of major b o ogica const tuents such as carbohydrates l p ds nucleic ac ds and proteins and measurement of en zyme act v ty Pre r coreq s te· CHM 261† 361† or approva of nstructor Three hours aboratory

392 Introduction to Research Techniques. 1 3) F S SS
nstrumental methods and ph losophy of research by actual part c pat on n chem cal research projects Pre requ s te approva of adv sor and research supervisor May be repeated for a tota of 6 cred ts

401 Chemical Literature. (1 S
The spec a nformat on too s ava ab e n brar es wh ch permit the researcher to perform an eff cient iterature search Top cs w nc ude *Chemical Abstracts Sc ence Citat on Index National Standard Reference Data Se-ries* patents, computer search serv ces and others Prerequ s te CHM 318† or 332† or approval of nstruc tor

421* Instrumental Analysis. (3 S
Pr nc ples of nstrumenta methods in chem ca ana ysis E ectroana yt cal and opt ca techn ques Prerequ s tes CHM 225† and 226† Corequ site. CHM 442†

422* Instrumental Analysis Laboratory. 1) S
Exper ments n chem ca ana ys s by e ectroanalyt ca and opt ca techn ques Corequ s te CHM 421†. Three hours aboratory

424 Separation Methods and Quantitative Organic Analysis. 3) F
Theory a d practice of gas iqu d on exchange and ge permeat on chromatography countercurrent distr b tion e ectrophores s and d st at on, qua tat ve and quant tat ve nterpretati n of IR mass and NMR spec troscopy, quantitat ve methods f organ c ana ysis v a fun t ona groups. Prerequisites CHM 318† or 332† and 442† or approva of instructor w ectures 4 hours ab rat ry

425 Chemical Analysis. (2 NR
Princ p es of chem ca equ br a separat ons, and ana yses, chemical nstr mentat on Pre- and corequ s tes CHM 341† or 441†

426* Chemical and Instrumental Analysis. 3) NR
nstrumental techniques for chem ca ana ysis method for the nterpretation of ana yt ca data Prerequ s te CHM 425†

427, 428* Chemical and Instrumental Analysis Labora-tory. (2 2) NR
C assica and nstrumenta techn ques in chem a ana yses w th emphas s on accuracy and prec s on Pre o corequ s tes CHM 425† for CHM 427† CHM 426† for CHM 428† One conference 5 hours aboratory

431 Qualitative Organic Analysis. 3 F
Systematic dent f cat on of organ c compounds Pre requisites CHM 120† or 226† and CHM 320† or 336† or approva of nstructor One ecture 6 hours labora tory

438 Polymers. 2) S
Chem stry and properties of natura and synthet c poly-mers Prerequ s te CHM 318 or 332

44], 442 General Physical Chemistry. (3 3) F S
Gases, quids so ids so ut ons equi br um, phase ru e electrochem stry thermodynam cs, atom c structure radioact v ty and co loids Prerequ s tes PHY 112† or 116† or ECE 02†, MAT 212†

444* General Physical Chemistry Laboratory. 2 S
Physical chem ca experiments Prerequis te CHM 441† One conference, 5 hours aboratory

446* Radioisotope Techniques. (3 NR
Radioact vity and detect on of nuc ear rad at ons Quan-

titat ve measurements, tracer techniques and methods used n agricu ture medic ne, ndustr a rad ochem stry and re ated f e ds For persons majoring n f e ds other than chemistry Prerequ s te. CHM 118† or 225†. Two lectures 3 hours aboratory

447* Radiochemistry. (2) F
Rad oact v ty natura and art fic a rad o sotopes nuc ear react ons iso at on of isotopes nuc ear energetics measurement of rad oact v ty tracer techn ques and other app icat ons Pre or corequ s te CHM 441†

448 Radrochemistry Laboratory. (2 F
Radiation mea urements tracer methods, quant tative dentif cat on of sotopes, and other procedures app ca b e to chem ca phys ca eng nee ng and b o og ca prob ems Corequ s te· CHM 447† One conference, 4 hours aboratory

452 Inorganic Chemistry Laboratory. (2) S
Preparation and purif cat on of typica norgan c substances emphas zing methods and techn ques Prereq u site· approva of instructor One conference 5 hours aboratory

453 Inorganic Chemistry. 3) F S
Pr nc p es and appl cat ons of norganic chem stry Prerequ s tes. CHM 341† or 441†.

461, 462 General Biochemistry. (3 3 F S
Fundamental chemistry and metabol sm of major bio og ca mater a s and the r ro e n the biochem cal processes of iv ng organ sms Prerequ s tes· CHM 318† or 332† and CHM 341† or 441† or approva of nstruc tor.

467, 468 General Biochemistry Laboratory. 2, 2 F S
The app icat on of modern chem ca and phys ca methods to b ochem ca prob ems purif cat on and character zation of b o og ca macromo ecu es quant ta t ve meas rement of enzyme act vity and properties, eva uat on of metabol c processes Corequ s tes CHM 461† with 467† 462† w th 468† One conference 5 hours aboratory

471 Solid State Chemistry. (3) S
Crysta chemistry thermodynamics and e ectrochem stry of so ids, nonsto ch ometr c compounds, diffusion and so id state reactions crysta growth and selected top cs Prerequ s te CHM 441†, or approva of nstruc tor.

480 Methods of Teaching Chemistry. (3) NR
Organ zat on and presentat on of appropr ate content of chem stry preparat o of reagents experiments, demonstrat ons, organ zat on of stock rooms, aboratories exper ence problem solv ng Prerequ s te approva of nstructor

481 Geochemistry. 3 F
Orig n and d str but on of the chem cal e ements Geo chem cal cyc es operating n the earth's atmosphere hydrosphere and l thosphere Prerequisite. CHM 341† or 441† or GLG 321 (Same as GLG 481.

482 Physical Geochemistry. (3) NR
App ications of thermodynamic and kinet c pr nc p es to geochemica processes. Prerequ s te. CHM 341† or 441† or GLG 321†. (Same as GLG 482)

485 Meteorites and Cosmochemistry. 3 NR
Chem stry and m nera ogy of meteor tes and the r re a tionsh p to the orig n of the earth so ar system and un verse Prerequ s te. CHM 481† or 482† (Same as GLG 485.)

501 Current Topics in Chemistry. ·) F, S
Prerequ s te approva of nstructor Ma, be repeated for cred t

521 Computer Interfacing to Chemical Instrumentation. 3) NR
Assemb y and mach ne language programm ng of laboratory s ze computers for data acqu s tion and on- ine, real t me contro of chem cal nstrumentat on. D gital og c and t ming considerations n hardware nterfac ng of computers. No pr or know edge of computers or e ectron cs assumed Sound knowledge of chem ca n strumentat on des rable Two ectures 4 ho rs laboratory.

523 Advanced Analytical Chemistry. 3) A
Theoret ca pr nc p es of ana yt cal chem stry Prerequ s tes CHM 225† and 442† or their equ va ents

525 Spectrochemical Methods of Analysis. (4 NR
Theoret cal and pract ca cons derat ons nvo v ng the use of optica nstruments for chemica ana ys s empha s zing em ss on and absorption spectroscopy Pre e qu s te CHM 442† Three ectures 3 hours ab ratory

526 X-Ray Methods of Analysis. (4 NR
Theoretica and pract ca cons derat ons nvolv ng the use of X ray d ffract on and spectroscopy for chem ca and structural ana yses Prerequ s te CHM 442†. Three lectures 3 hours aboratory.

527 Electrical Methods of Chemical Analysis. 4 NR
Theoret ca and pract ca cons derat ons of polarography potent ometr c, amperometric, and conductometr c t trat ons Prerequ s te CHM 442† Two ectures 6 hours aboratory.

528 Topics in Analytical Chemistry. 2-4) NR
Prerequ sites CHM 523† and approva of instructor May inc ude aboratory. May be repeated for cred t.

531 Theoretical Organic Chemistry. (3 F
Reaction mechan sms, structure eluc dat on, stereoiso mer sm conformat ona analys s. Prerequ s tes CHM 318† or 332† and 442†

532 Theoretical Organic Chemistry. 2) S
Prerequ site. CHM 531†

534 Heterocyclic Compounds. (2 NR
Chem stry of organic heterocycl c compounds conta n ing nitrogen su fur, and other hetero atoms.
Prerequisites· CHM 532†, 537†

536 Natural Products. (2) NR
Organic chem stry of such natura products as a ka o ds, stero ds, terpenes organ'c med c na s and antib otics Prerequ s tes CHM 532† 537†, and approval of nstructor May be repeated for credit

537 Organic Reactions. (3 S
Important synthet c react ons of organ c chem stry emphas z ng recent y d scovered react ons of prepara tive value Prerequis te. CHM 531†.

541 Advanced Principles of Chemistry I. (3 F
Thermodynamics and kinet cs as appl ed to various areas of chem stry Prerequ s te CHM 442†.

545 Advanced Principles of Chemistry II. 3) S
Bas c quantum theory chem ca bond ng and mo ecu ar structure. Prerequ site· CHM 442†

546 Quantum Chemistry. (3 F
Princ p es of quantum mechan cs app ied quantitat vely to problems of chem ca interest Prerequ s te· approva of nstructor.

548 Chemical Kinetics. (2) NR
Kinet c theory and rate processes. Prerequ site ap prova of nstructor

549 Topics in Physical Chemistry. 3) NR
Prerequ site approva of instructor May be repeated for credit

553 Inorganic Chemistry. (3 F
Pr nc p es of modern norgan c hemistry and their ap p cat ons over the entire per od c ystem Prerequ sites CHM 442† and CHM 453† or the r equ va ents

554 Advanced Inorganic Chemistry. 3 S
E ab rat on and extens on of the more mportant top cs of CHM 553 Prerequ site CHM 553†

556 Topics in Inorganic Chemistry. 3) NR
Prerequ sites CHM 553† and approva of nstructor May be repeated for credit

563 Biophysical Chemistry. 3) NR
Phys ca chemistry of macromo ecules espec a ly pro te ns nuc e c ac ds and po ysacchar des.
Thermodynam cs, hydrodynam cs and spectroscopy of biopolymers and the r relat on to structure Prerequ s tes CHM 462† and 442†

579 Topics in Solid State Chemistry. 2 4 NR
Prerequ s te approva of nstructor May be repeated for cred t

581 Isotope Geochemistry. (3 NR
Geochem stry and cosmochem stry of stable and rad o act ve sotopes geochrono ogy; sotope equi br a

Prerequ s te. approval of nstructor (Same as GLG 581)

582 Topics in Geochemistry and Cosmochemistry. 3) NR
Topics of current interest for students in chem stry and other fie ds Samp ng of data and thought c ncerning phase equi bria element d str bution, meteor tes, the earth and other planets Prerequ s te approva of instructor May be repeated for cred t. (Same as GLG 582

583 Phase Equilibria and Geochemical Systems. 3 NR
Study of natural react ons at h h temperatures and pressures s cate su f de and oxide equ l br a Prereq s te CHM 482† Same as GLG 583

Special Courses: CHM 298, 484, 492, 493 498 499 590 591, 592 593, 598 599 790 792, 799 See pages 30 31)

**In each of the fo owing groups credit s al owed for one course only.* CHM 101 113 or 117 CHM 114, 115 116 or 118 CHM 225 or 425 CHM 226 or 427, CHM 231, 317 or 331 CHM 261 or 361, CHM 318 or 332 CHM 319 or 335· CHM 320 or 336 CHM 341 or 441 CHM 343 or 444 CHM 421 or 426, CHM 422 or 428 CHM 446 or 447

Economics

A major in economics is offered in the College of Liberal Arts or the College of Business Administration

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Economics Consists of 45 semester hours of credit, of which 30 must be in economics and 15 in closely related fields to be approved by the advisor in consultation with the student. ECN 201, 202, 401†, 402†, MAT 141 and 226 or QBA 221 are required (See Degree Requirements, pages 56 58.)

Bachelor of Science Degree Curriculum

Economics Consists of 45-55 semester hours of credit, of which 30 must be in economics and the remainder in closely related fields to be approved by the advisor in consultation with the student. ECN 201, 202, 401†, 402†, MAT 141 and 226 or QBA 221 are required (See Degree Requirements, pages 56 58.)

Departmental Major Teaching Field Requirements

(Secondary Education)

Bachelor of Arts in Education Degree Curriculum

Economics Consists of 45 semester hours of credit including a minimum of 30 in econom ics and one course in methods of teaching economics. Remainder will be in closely related fields as approved by the advisor in consultation with the student. ECN 100, 201, 202, 401†, 402†; MAT 141 and 226 or QBA 221 are required.

Departmental Minor Teaching Field Requirements

(Secondary Education)

Economics Consists of 18 semester hours of credit ECN 100, 201, and 202 are required Remainder to be approved by the advisor in consultation with the student

Latin American Studies Emphasis. (See Interdisciplinary Studies, page 62.) Consists of the Bachelor of Arts degree requirements in Economics At least 30 upper divis on semester hours of the total program must be in Latin American content courses, including 15 hours in Economics and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required, as is the successful completion of LIA 402 Movements and Meaning n L atin America. A reading knowledge of the other language is suggested. Fulfillment of requirements is recognized by a Bache or of Arts degree with a major n Economics Latin American Studies Emphasis

Departmental Graduate Programs

The Department of Econom cs offers pro grams leading to the degrees of Master of Science and Doctor of Philosophy. Consult the *Graduate Catalog* for requ rements.

Faculty and course descriptions are listed on pages 143

English

PROFESSORS:
FISHER (LL B-504) BRACK, D ANGELO, DOEBLER, DONELSON, ERNO EVANS FERRELL GERBER, KEHL, LAMBERTS, LEVY L GHTFOOT, NEY, NILSEN SALERNO, SHAFER

ASSOCIATE PROFESSORS:
BENDER, BUCK NGHAM DUBIE ELL S, J GREEN, M. GREEN, GREENE HABERMAN HAKAC, HERMAN, JANSSEN, JOHNSON MORAN MURRAY NEBEKER, OJALA PETERSON, POWERS

ASSISTANT PROFESSORS:
BARODY, BOYER D BR NK J BRINK, BROSE, COLBY, GAGE, HELMS, NELSON, RANDALL, SANDS SHINN, SWANSON WE NGARTEN

INSTRUCTOR:
HARR S

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

English Consists of 45 semester hours of cred t, 36 of these hours must be i English, 9 h urs in a re ated field to be chosen in consu tation w th the student's departmenta adv sor Requ red co urses are ENG 200, 271 and 222, 421 or 422, 3 ? or 3 4 or 413 or 474, a course in English literature before 1660, a course n English literature between 660 and 1900, 341

or 342 or a course in American Literature before 1900. *No course may be used to satisfy more than one requirement.* At least 18 hours must be in upper division courses. (See Degree Requirements, pages 56-58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

English Consists of 42 semester hours of credit in English. Required courses are ENG 211† or 212†, 221, 222, 312 or 314 or 413, 341 or 342, 421 or 472, 471, 480†, one literary types course, one period course, and 12 hours electives, six of which must be upper division. Upper division courses in related fields may be elected with the approval of the advisor.

Departmental Minor Teaching Field Requirements

(Secondary Education)

(Recommended for Elementary Education)

English Consists of 24 semester hours of credit. Required courses are ENG 211† or 212†, 221 or 222, 341 or 342, 312 or 314, 471 or 480† and additional electives in English, with at least one elective in literature, as approved by the advisor.

Departmental Graduate Programs

The Department of English offers programs leading to the degrees of Master of Arts (with emphases in literature and language, teaching of English as a second language, linguistics, and creative writing) and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

English Skills Program. Open to international students who seek to improve their language proficiency. Instruction concentrates on developing the skills of listening, reading, speaking and writing in English. Noncredit courses only. Inquiries should be addressed to Continuing Education, ASU.

English Literature in Transition. An independent scholarly journal with an international circulation, *English Literature in Transition 1880-1920* was founded in 1957 and has had its editorial office in the ASU English Department since 1971. The journal is associated with an annual seminar held during the meetings of the Modern Language Association of America and with the Annotated Secondary Bibliography Series of book length reference works being published under the direction of Professor H. E. Gerber, the editor of *ELT*. The journal also maintains an international bibliographical file on nearly 100 English authors writing between 1880 and 1920. The English Department regularly offers several courses in the period with which the journal and related research projects deal. Ordinarily, two graduate students and an undergraduate work study student are chosen to assist the editor in the preparation of the journal from manuscript to final printing and with several major related research projects.

ENGLISH

ENG 101 First Year English. (3) F, S, SS
Composition emphasis on paragraph structure, correctness in English fundamentals, exactness and concreteness of statement, dictionary and library practice, intensive and extensive reading. Compare ENG 111.

102 First Year English. (3) F, S, SS
Expository writing emphasis on organizing and unifying long papers, improvement in style, expansion of vocabulary, introduction to word study; practice in research, including the writing of a model term paper. Intensive and extensive reading. Compare ENG 112. Prerequisite: ENG 101.

103 Introduction to Literature. 3 F, S, SS
Introduction to literature through literary types; selections taken mainly from modern writers.

104 Advanced First Year English. 3 F, S, SS
Composition, emphasizing refining writing skills, intensive reading; research papers; logic. Prerequisite: passing grade on the ENG 101 exempt on examination.

111 English for Foreign Students. 3) F
For students from non-English speaking countries who have studied English in their native countries but who require practice in the idioms of English. Intensive reading, writing and discussion. Satisfies the graduation requirement of ENG 101.

112 English for Foreign Students. 3) S
Reading on a broader scope and more emphasis on composition. Satisfies the graduation requirement of ENG 102. Prerequisite: ENG 111.

200 Critical Reading and Writing. 3) F, S
Introduction to the terminology, methods, and ends of the study of literature; practice in interpretation and evaluation of various texts.

201 World Literature. 3 F, S
The classical and medieval periods. Selections from the great literature of the world in translation and lectures on the cultural background.

202 World Literature. (3) F, S
The Renaissance and modern periods. Selections from the great literature of the world in translation and lectures on the cultural background.

204 Literature of Today. (3 F, S
Poetry, short story, novel, drama. Not for English majors. Not open to freshmen.

211 Advanced Composition. 3) F, S
Further training in organization and expression of ideas. Primarily for non-English majors. Prerequisite: ENG 102†. Two lectures, conferences arranged.

212 English Prose Style. 3) F, S
Analysis and practice of writing in various classical and modern prose styles. Prerequisites: Grade of 'B' in ENG 102†, English major or approval of advisor and instructor. Two lectures, conferences arranged.

213 Introduction to the Study of Language. (3 F, S, SS
Language as code, phonology, morphology, syntax, and the processes of language acquisition and behavior.

221 Survey of English Literature. 3) F, S, SS
Content and form of earlier English literature, including individual and national characteristics of certain authors.

222 Survey of English Literature. 3 F, S, SS
Based upon the later English literature.

300 Literary Interpretation and Evaluation. 3 NR
Practice in writing papers on literary subjects. Alternate approaches to literature and their basis in critical theory.

301 Writing for the Professions. 3 S
Advanced practice in writing and editing expository prose, primarily for preprofessional majors.

307 Utopian Literature. 3) F
Se ected works from the present to the c ass cal per od nc ud ng *Wa den Two, Walden, Utopia* and *The Republic.* Pr mar y for non-majors

311 Creative Writing. 3 F S
Writ ng aboratory Lectures and conferences deal ng w th the var ous forms of mag nat ve wr t ng Prerequ sites. ENG 211† or 212†, and approva of instructor Two ectures conferences arranged.

312 Current English Usage. (3 F S SS
Trends in the study of the Eng sh language n ts soc al sett ng

314 Modern Grammar. 3) F S
Conventiona structura and generat ve grammars

321 Introduction to Shakespeare. 3) F S SS
Shakespeare's major comed es, h stor es and traged es Not open to Eng sh majors

341 American Literature. 3 F S SS
From co on a t mes to the C vi War nc ud ng the growth of nat ona sm and the r se of the New Eng and schoo

342 American Literature. 3 F,S,SS
From Wh tman to the present nf uence of westward expans on growth of regiona sm, terature of soc a protest and post Wor d War wr t ng

345 Selected Authors or Issues. (3) NR
Sections devoted to d fferent top cs may be offered each term May be repeated for credit when top cs vary

352 Short Story. 3) F,S SS
Deve opment of the short story as a terary form ana ys s of ts techn que from the work of representat ve authors

355 History of the Drama. (3) S
Deve opment of European drama from the Greek to the Romantic Per od.

356 Biblical Backgrounds of Literature. 3) F S SS
Read ng of the O d and New Testaments emphas zing types deas and sources n l terature

358 Afro-American Literature. 3 NR
Themat c and cu tura study of the terature dea ng w th the Afro American n the U S

360 History and Art of the Film. 4 F,S
Development of the f m as an art form Techniques wh ch the f m shares w th the other arts, and those wh ch are un que to it This course may be taken by Engl sh majors for e ect ve cred t only Three ectures 4 hours aboratory

400 History of Literary Criticism. (3) S
Ma or cr t cs and cr tica tradit ons n the western wor d

411 Advanced Creative Writing. (3) F S
Prerequis te ENG 311† or approva of instructor Two lectures conferences arranged.

412 Professional Writing. (3 NR
Lectures and conferences concern ng techn ques of writ ng for publication Prerequ s te. ENG 311† or ap prova of nstructor Two ectures, conferences arranged

413 History of the English Language. 3 F S
Development of the anguage from the ear est times to the modern per od

415 Medieval Literature. (3) F
Med eval Eng sh terature in translat on from Beowulf to Malory exc us ve of Chaucer emphas z ng cu tura and nte lectua backgrounds and nc ud ng some cont nenta works.

418 Tudor Literature. 3) F
Eng sh prose and poetry 1485-1603, exclus ve of the drama

419 The Age of Donne. (3) S
Eng sh prose and poetry 1603 1660 exc us ve of M l ton and the drama

420 Renaissance Drama. 3) F
P ays of E izabethan, Jacobean and Caro ne drama- t sts, exc ud ng Shakespeare

421 Shakespeare I. (3) F,S
A se ect on of comed es h stor es and traged es nc ud ng *Midsummer Night s Dream, I Henry IV Hamlet* and *Macbeth*

422 Shakespeare II. (3) F,S
A se ection of comed es, h stories, and traged es inc ud ng *Twelfth Night King Lear The Tempest,* and *Othello.*

423 Milton. (3) F,S
Life of M lton his relation to the literary and soc a background of h s per od, and textua study of h s chief works

424 Chaucer. 3) F S
Chaucer's anguage, poetry and nte lectua back- ground

425 Romantic Poetry. (3) F
Poetry of Wordsworth Coler dge She ley, Keats Byron.

426 Victorian Poetry. (3) S
Poetry of the second half of the 19th century. Spec'a study of Tennyson Browning Arnold

427 Age of Johnson. (3) S
Ch ef wr ters movements and books dur ng Johnson s career as a dom nating terary f gure, together w th their most important relationsh ps to predecessors and fo lowers

428 Age of Dryden, Swift, and Pope. 3) F
Ch ef writers and movements in the nondramatic terature of the Restoration and ear y 18th century

430 19th Century Prose (Non-Fiction). 3) NR
Se ected works by writers such as Lamb, Car yle, Rus kin, M W l am Morris Pater and Yeats

435 19th Century American Poetry. (3) S
Themes and deve opments n Amer can poetry to 1900

439 Drama from Dryden to Sheridan. (3) S
Engl sh drama of the Restoration and 18th century espec al y cr tica theor es and socia forces affecting the stage

440 American Literature to 1815. 3) NR
Thought and expression from the t me of the f rst En gl sh speak ng co on es to 1815

441 20th Century American Drama. 3 NR
Amer can drama since Wor d War , espec a y exper menta techn ques

442 20th Century British Poetry. (3 F
Major Br t sh poets of the per od techn ques aims and s gnif cance.

443 20th Century American Poetry. (3) S
Major American poets of the period to 1945: techniques a ms and s gn f cance.

444 American Romanticism, 1830-60. 3) F
Art and ideas of major American transcendenta sts and romant cs

445 American Realism, 1860-1900. (3 S
Wr ters and nf uences that shaped the development of l terary real sm.

446 The American Novel from Dreiser to 1945. 3) F
Major American nove sts of the period. developments in theory and practice

448 20th Century British Novel. 3) F
Twent eth century Br tish nove s nce 1914

451 The Novel to Jane Austen. 3) F
From or g ns of prose fict on through the 18th century.

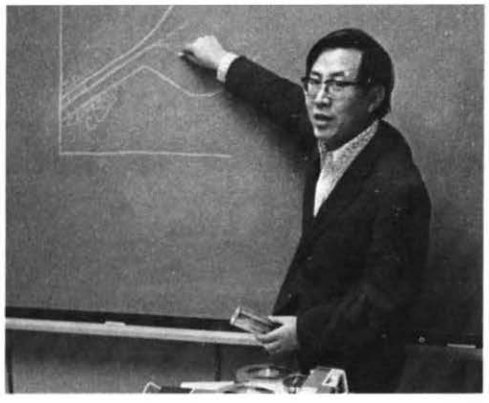
452 The 19th Century Novel. 3) S
From Scott to Conrad

453 The American Novel to Dreiser. 3 F
Sentimenta romant c rea st c and natura st c novels n Amer ca

455 The Form of Verse: Theory and Practice. 3 NR
Types history cr t c sm and schoo s of theory of metr ca form Ana ys s of yr c narrat ve and dramatic poetry Or g na verse wr t ng optiona Prerequ s te three hours of terature Two ectures c nferences ar ranged

456 Classical Backgrounds of English Literature. 3) F
Myths and egends of Greece and Rome and some of the works in wh ch they appear.

457 American Poetry Since 1945. 3) S
Major American poets of the per od deve opments in theory and pract ce



458 American Novel Since 1945. (3) S
Major novelists of the period: developments in theory and practice.

460 Western American Literature. (3) F,S
Critical examination of ideas and traditions of the literature of the western United States, including the novel.

461 Women and Literature. (3) NR
Selected topics in British, American and world literature by or about women. May be repeated for credit when topics vary.

463 European Drama from Ibsen to 1914. (3) NR
Chief continental and British dramatists of the period: the beginnings and development of realism.

464 European Drama from 1914 to the Present. (3) NR
Chief continental and British dramatists of the period, emphasizing experimental techniques.

471 Literature for Junior and Senior High School Students. (3) F,S, SS
Prose and poetry which meet the interests, desires, and capabilities of high school students. Recent literature stressed.

480 Methods of Teaching English. (3) F,S, SS
Methods of instruction, organization and presentation of appropriate content in English. Prerequisite: ENG 312 or 314 or 413.

485 Teaching of English as a Second Language. (3) F
Nature of language learning, testing, analysis of differences between two languages as a basis of instruction. Problems of cultural orientation. Prerequisite: Teaching experience or approval of the instructor.

500 Research Methods. (3) S
Methodology and resource materials for research. Analysis of criticism and scholarship, including evaluation of sources. Special sections for literature and for linguistics.

501 Introduction to Comparative Literature. (3) NR
Problems, methods, and principles, illustrated by selected critical essays and literary texts.

505 American English. (3) S
Development of the English language in America including a survey of geographical and social dialects.

507 Old English. (3) F
Elements of Old English grammar, with selected readings.

508 Beowulf. (3) S
Intensive literary and linguistic study of Beowulf. Prerequisite: ENG 507.

509 Middle English. (3) S
A study of the language, including the principal dialects with selected readings.

510 The Structure of English. (3) F
Grammatical patterns of English, particularly current linguistic approaches.

511 English Phonetics and Phonology. (3) S
Current trends in phonological theory and its basis in acoustic and articulatory phonetics.

512 The Teaching of Composition. (3) NR
Rhetoric and linguistic materials appropriate for the teaching of composition, and their application to the development of new school programs. Prerequisite: Teaching experience or approval of instructor.

513 Semantic Theory. (3) F
Various semantic models and semantic pathologies with particular attention to English.

514 Advanced Grammar. (3) S
Traditional, structural, and generative English grammars.

515 Middle English Literature. (3) F '79
English literature from the 12th through the 15th century, exclusive of Chaucer.

520 Renaissance Literature. (3) S
Poetry and prose of the English Renaissance, excluding drama.

545, 547, 548, 549: (3) NR
Selected authors or issues. May be repeated for credit.

545 Studies in English Literature.

547 Studies in American Literature.

548 Studies in English Language.

549 Studies in Comparative Literature.

550 Contemporary Comparative Literature. (3) F
Current trends in American and other literature emphasizing their significance in contemporary thought.

571 The Teaching of Literature in the Secondary School. (3) NR
Advanced methods and materials appropriate for teaching literature. Application of recent literary scholarship and criticism to the development of new school programs. Prerequisite: ENG 471 or equivalent or approval of instructor.

591 Seminar. (3) F,S
Selected topics regularly offered in the various areas of English studies.

Special Courses: ENG 294, 298, 484, 492, 493, 497, 498, 499, 580, 584, 590, 592, 593, 594, 598, 599, 790, 791, 792, 799. (See pages 30-31.)

Foreign Languages

PROFESSORS:
FLYS (LL C-411), BININGER, CARLSON, COUCH, EKMANIS, FOSTER, GROBE, HORWATH, LANDEIRA, MARTINEZ, SHEPPARD, VIRGILLO

ASSOCIATE PROFESSORS:
AHERN, CARVER, CROFT, CURRAN, HENDRICKSON, KNOWLTON, LUENOW, RADKE, SENNER, VOLEK, WOLLAM

ASSISTANT PROFESSORS:
ACEVEDO, ALARCÓN, ALEXANDER, BALDINI, BARKIN, BURTON, DWORKIN, GRUZINSKA, HOJO, LAETZ, LOSSE, RODD, SIMMONS, TIPTON, VALDIVIESO, VASQUEZ, WIXTED, WONG

INSTRUCTORS:
ABDOW, HABERMAN, SCHUBACK, TU, WILSON

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Asian Languages (Chinese/Japanese), French, German, Russian, Spanish—Consists of 45 semester hours of credit, 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 9 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, pages 56-58.)

Asian Studies Emphasis—Consists of the Bachelor of Arts degree requirements in Asian languages. In addition to the required 45 semester hours, 15 hours of Asian content courses selected with the approval of the stu-

dent's advisor must be completed Fulfillment of these requirements will be recognized on the transcript as a major in Asian Languages (Chinese Japanese) Asian Studies emphasis. (For an Asian Studies emphasis in other disciplines, see Asian Studies, page 60.)

Latin American Studies Emphasis (See Interdisciplinary Studies, page 62.) Consists of the Bachelor of Arts degree requirements in Spanish At least 30 upper division semester hours of the total program must be in Latin American content courses including 15 hours in Spanish and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required, as is the successful completion of LIA 402 Movements and Meaning in Latin America. A reading knowledge of the other language is suggested Fulfillment of requirements is recognized by a Bachelor of Arts degree with a major in Spanish Latin American Studies emphasis.

Mexican American Studies Emphasis— Consists of 45 semester hours of credit, of which 30 hours must be in Spanish 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

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Asian Languages (Chinese Japanese , French, German, Russian, Spanish Consists of 45 semester hours of credit, 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 9 hours at the 400 level or above. Specific required courses for each major area are listed in a brochure available in the department.

Departmental Minor Teaching Field Requirements

(Secondary Education)

Consists of a minimum of 24 semester hours of credit in one foreign language of which at least 18 hours must be taken above the 200 level (see departmental brochure for listing of required courses in each minor area)

Departmental Graduate Programs

The Department of Foreign Languages offers programs leading to the degrees of Master of Arts in French, German, and Spanish and the Doctor of Philosophy degree in Spanish. Consult the *Graduate Catalog* for requirements

Foreign Language Requirement and Placement

For the degree of Bachelor of Arts, the College of Liberal Arts 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, 102, 201, and 202. For important exceptions in French, Greek, and Portuguese, see statement at head of respective course descriptions Courses taken to satisfy the foreign language requirement for the B A. degree will not count toward the General Studies requirements

Students who have completed their secondary education in a school where a foreign language was the official language of instruction will be considered as having satisfied the foreign language requirement. (See page 56) Ordinarily no placement or proficiency examination is administered to students who wish to continue studying a foreign language for which high school credits have already been received Students should be guided by the following principles of equivalency:

(1) One unit (one academic year) of high school level study will be considered 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); with two years of high school study, in the third semester course (20 , etc

(2) If, however, more than one summer has intervened since the last high school course, the student will be allowed to repeat for university credit the equivalent of the last unit of high school study, *i.e.*, the student may go back one semester. For students in this category who had two units of high school study, a special review course 111) is strongly recommended

Students will not receive university credit for foreign language studies undertaken in violation of these equivalency principles.

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 departmental proficiency examination; (2) by achieving a grade of at least C in the last course of the required sequence (*e.g.*, GER 102 or 111 for the B.S in Chemistry, 202 for the B A), or (3) by achieving a grade of at least C in a course at the next higher level (*e.g.* any 300 level course for the B A.).

If college transfers are uncertain about course equivalencies, they should contact the Department of Foreign Languages.

Language Laboratory Requirement

All students enrolled in 10 , 102, 20 and 202 language courses must spend a minimum of one hour per week in the language laboratory in addition to the regular class periods

FOREIGN LANGUAGES

FLA 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).

400 Linguistics. 3) S, Staff
Surveys major theories of current linguistic study and explores their application to specific issues of English, the Romance Languages, and language teaching. Open to sophomores and juniors with approval of instructor.

420 Foreign Literature in Translation. (3) F S
For non-language majors (except in Asian languages and Russian); open to language majors as a related area course. Graduate students by permission only. No prerequisite.

a	Japanese	f	German
b	Russian	g	Italian
c)	Soviet	h	Latin
d	Chinese		Portuguese
e	French	j	Spanish
		k	Spanish American
			Brazilian
		m	Greek

480 Methods of Teaching Foreign Languages. 3 F S
Teaching of foreign languages and literatures at secondary and college levels. This course will not meet the Liberal Arts General Studies requirement for Humanities and Fine Arts. Required for admission to SED 433. Prerequisite: 12 hours of upper division courses in one foreign language.

530 Romance Linguistics. 3 NR Dworkin
Discussion and selected readings in comparative and historical linguistic problems in the development from Latin to the earliest stages of the major Romance Languages. Prerequisite: one semester of college Latin or desirable.

Special Courses: FLA 294 494 497 498 499 See pages 30-3

CHINESE

CHI 101, 102 Elementary Chinese (Mandarin). 5-5 F SS S SS
Pronunciation, grammar, elementary conversation, development of basic reading and writing skills. Five lectures, 1 hour laboratory.

201, 202 Intermediate Chinese (Mandarin). 5,5 F S
Systematic review of grammar. Development of vocabulary through reading, writing. Dr. Laura Orasky.
Prerequisite: CHI 102† or equivalent. Four lectures, 1 hour laboratory.

205 Chinese Calligraphy. 1 F S
An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required.

309, 310, 311, 312 Chinese Conversation. (2 2 2, 2) F 79 S 80 F '80 S 81
Intensive aural-oral drills towards conversational fluency in Mandarin Chinese. To be offered in rotation, with each course covering different situations and vocabulary. Prerequisite: CHI 202†.

313, 314 Advanced Chinese. (3,3 F, S
The modern language in general or specific areas depending on the student's needs or interests.
Prerequisite: CHI 202† or equivalent. Three lectures plus arranged laboratory.

321, 322 Chinese Literature. 3 3 F, S
Selected representative works of the various genres and periods. Prerequisite: CHI 202† or approval of instructor.

413, 414 Introduction to Classical Chinese. (3 3) F, S
Reading in various genres of pre-20th century wen-yen with analysis of its structural characteristics. Prerequisite: CHI 202† or the equivalent.

Special Courses: CH 294 492 493 494 499 590 See pages 30-31

FRENCH

Any two of the 200 level courses may be taken in any order or simultaneously to satisfy the Liberal Arts language requirements.

FRE 101, 102 Elementary French. (4-4) F, S, SS
Intensive aural-oral drill in class and laboratory basic grammar supplemented by simple prose readings. Not open to students with credit in FRE 111. Four lectures, 1 hour laboratory.

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 102. Four lectures, 1 hour laboratory.

201 Intermediate Grammar Review. (4) F S SS
A thorough review of French grammar including full attention to literary usage. Prerequisite: FRE 102† 111 or equivalent. Four lectures, 1 hour laboratory.

202 Intermediate Reading. 4) F S
Extensive reading in 19th and 20th century literary and cultural texts. Designed to increase the student's vocabulary and to teach prompt recognition of stylistic usages and grammatical structures. Prerequisite: FRE 102† 111 or equivalent. Four lectures, 1 hour laboratory.

203 French Conversation. 4) F S SS
Current usage in expression of ideas. Especially recommended for students who plan to travel in French-speaking countries or who desire supplementary practice in speaking, understanding before advancing to 300-level courses. Prerequisite: FRE 102† 111 or equivalent. One hour laboratory required.

311 French Conversation. (3 F S
Further practice in speaking French emphasizing current usage and promoting facility in the expression of ideas. One hour laboratory work required. Prerequisites: FRE 203†, and 201† or 202† or equivalents.

312 French Composition. 3 F S
Further practice in writing French emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: eight hours of 200 level French, including 202† or equivalents.

321, 322 French Literature. (3 3 F S
Representative masterpieces and significant movements of French literature. Prerequisite: FRE 202†, plus either FRE 203† or FRE 311† or equivalents.

410 French Phonetics and Diction. 2 F
Theory and practical application. Prerequisites: FRE 311† 312† or equivalents.

411 Advanced Spoken French. 3 F
Improvement of spoken French. Prerequisites: nine hours of 300 level French including FRE 311† or equivalents.

412 Advanced Written French. 3 S
Improvement of composition skills. Prerequisites: nine hours of 300-level French including FRE 312† or equivalents.

415 French Civilization. 3) S 81 Woodham
Political, intellectual, social, economic and artistic development of the French nation from its origins to the present. Prerequisite: six hours of upper division French.

431 French Women in Society and the Arts. 3 NR Staff
Outstanding French women who have contributed to the shaping of society and the arts from the Middle Ages to present. Prerequisite: nine hours of 300-level French including FRE 321† 322† or approval of instructor.

441 French Literature of the 17th Century. (3) F '80, Grobe
From 1600 to 1660. Prerequisite: nine hours of 300-level French including FRE 321† or approval of instructor.

442 French Literature of the 17th Century. 3 S 81 Grobe
From 1660 to 1700. Prerequisite: nine hours of 300-level French including FRE 321† or approval of instructor.

445 French Literature of the 18th Century. (3) F 80; W son, Wo am
Contribut ons of the ph losophers, development of the nove and drama. Prerequis te n ne hours of 300 evel French, ncluding FRE 321† or approva of nstructor

451 French Poetry of the 19th Century. (3) S 80, Gruz nska
From Romanticism to Parnassian poetry to Symbo sm Prerequ s te n ne hours of 300-leve French nc ud ng FRE 322†, or approva of nstructor

452 French Novel of the 19th Century. (3) F '79 Gruz nska
From Constant, Hugo, Ba zac, Stendha and Sand to Flaubert and Zo a, w th emphas s on major terary movements Prerequ s te nine hours of 300- evel French, ncluding FRE 322†, or approval of nstructor

453 Theater of the 19th Century. 3) NR Gruzinska
From Romantic drama to the Symbo st Theater Representat ve p ays of Hugo Musset, V gny, Dumas Becque, Rostand Feydeau and Mirbeau Prerequisite. nine hours of 300 evel French nc ud ng FRE 322† or approval of nstructor

461 Pre-Atomic Literature. 3) F 79, Wo lam
Representat ve authors from Proust Ma raux to Sartre, from 1900 to 1945 Prerequ s te· nine hours of 300 eve French nc ud ng FRE 322† or approva of instructor

462 Post-Atomic Literature. (3) S 80; Radke
Representat ve authors nclud ng Camus Duras and Robbe Gr et from 1945 to present Prerequ s te nine hours of 300 eve French, nc uding FRE 322† or approva of instructor

471 The Literature of Francophone Africa and the Caribbean. 3) S 81, Losse
Selected prose poetry and drama of b ack authors from Afr ca and the Car bbean Prerequ s te. nine hours of 300 eve French nc uding FRE 322† or approval of nstructor

500 Bibliography and Research Methods. (3) F Hen dr ckson
Requ red of a graduate students

510 Explication de Textes. (3 NR Staff
Detai ed ana ys s of iterary texts.

511 French Stylistics. (3) NR, Staff
Art of wr't ng terary French comparative styl st cs

515, 516 Intellectual Currents in France, from the Middle Ages Through the 20th Century. 3 3) NR Grobe
S gnif cant socia esthetic, phi osoph c and sc ent fic deas as presented by major wr ters of f ct on and non fict on

521 History of the French Language. (3) NR· Hendr ck son
Princ pa phonolog cal, morpho og ca and semant c developments of French from ts Latin or gins to the present. Prerequis te some fam iar ty with Lat n recom mended.

524 Modern French Drama. (3) NR; Radke
Representat ve dramat sts of the 19th and 20th centu ries

531 Medieval French Literature. (3 S '81, Hendr ckson
Read ngs n the epics, early drama, roman courto s and other representative terary genres of the M dd e Ages

535 French Literature of the 16th Century. (3) S 80 Losse
Readings n French Renaissance iterature w th specia attention to the humanist movement and to Rabela s, Monta gne and the P e ade

591 Seminar. 3) NR Staff
Top cs may be se ected from the fo owing

(a French L terary Crit cism
(b Corne le Mo ière and Rac ne
(c) Diderot, Vo ta re and Rousseau
d) Balzac
e) Romant c sm
f) Proust
g) Rea sm and Natura ism
h) French Ex stentia ist L terature
( ) Advanced Prob ems n French L terature
) Flaubert
(k) Stendha and Zo a

Special Courses: FRE 492 493, 494 498 499 590, 592, 598 599. (See pages 30 31.

GERMAN

GER 101, 102 Elementary German. (4-4) F S, SS
Read ng writ ng speak ng and understand ng of bas c German w th emphas s on pronunc ation and grammar. Not open to students w th cred t n GER 111 Four ec tures 1 hour aboratory

111 Fundamentals of German. 4) F S
Primarily for students w th two years of high schoo German who need rev ew to enter second year study Not open to students with credit in GER 102 Four lec tures, 1 hour laboratory

201, 202 Intermediate German. (4 4) F, S SS
Intens ve rev ew of grammar w th emphas s on the de ve opment of the sk l s of speak ng, isten ng comprehens on, reading, and wr t ng Prerequ s te GER 102† or 111 or equiva ent Four ectures, 1 hour aboratory

303, 304 Scientific German. (3 3) F S
Acqu s t on of a spec al zed vocabulary through the read ng of German scient fic publ cat ons Prerequisite GER 102†

311, 312 German Conversation. 3 3) F S
Expansion of d om through ora pract ce dea ng with contemporary art cles, essays and stories (Three hour cred t m t for majors) Prerequ s te GER 202† or equivalent.

313 German Composition. (3) S
Intens ve pract ce n writing emphas z ng sty e and grammar Prerequ s te GER 202† or equ va ent

314 Introduction to German Literature. (3) F
Beg nn ng study of German poetry drama, the novel and the *Novelle* Prerequis te· GER 202† or equ valent

321, 322 German Literature. (3 3) F S
From the begnn ng to the Enl ghtenment and from *Sturm und Drang* to the present Prerequ s te GER 314† or approva of nstructor

411 Advanced Grammar and Conversation. (3) F
Improvement of d ction and d om through ntensive oral review Prerequ s te GER 311† or 312† or equivalent

412 Advanced Grammar and Composition. (3) S
Improvement of wr t ng ab l ty Prerequ s te GER 313†.

415 German Civilization. (3) NR, Howath
Aspects of po t ca soc al and cu tura l fe of the German speak ng wor d Prerequis te any 300 leve course in German or approva of instructor

445 German Literature: Enlightenment to Classicism. (3) S 79 F 81 Senner
Major works of the iterary epochs in the 18th century Prerequ s te GER 322†

451 German Literature: Biedermeier to Naturalism. (3) S '79; Horwath
Representat ve works of prose and poetry from 1820 to 1890 Prerequ s te GER 322†

461 Contemporary German Literature. (3) NR Horwath
German wr ters since 1945 Prerequisite. GER 322†.

500 Bibliography and Research Methods. 3) S 80; Senner
Required of all graduate students

511 German Stylistics. (3) F 79, Car son
Art of wr t ng l terary German comparative styl stics

521 History of German Language. (3 F 80 Laetz
L ngu st c deve opment of German from the earl est records to the present

523 German Drama. (3) S 79; Alexander
Drama of the 19th and 20th centur es

525 German Novel. 3) NR, A exander
Special studies in the German nove .

527 The Novelle. (3) S '81; Car son Senner
Spec al stud es in the German short story.

531 Middle High German Language and Literature. (3) S '80; Laetz
Reading and d scuss on of spec mens of the M dd e High German ep cs, romances, and other iterary genres

541 Baroque. 3) F 79; Alexander
Stud es n poetry prose and drama of the 17th and ear y 18th centur es

551 Romanticism. 3) NR Car son
Treatment of ear y and ate Romant cism

555 Modern German Literature. 3 F 80 Laetz
Major works from the per od of Express on sm to 1945

591 Seminar. (3 NR, Staff
Specia top cs are concerned w th a figure theme or work in German l terature or German c stud es Top cs may be se ected from the fo low ng·

a) Goethe
b) Faust
c Sch ier
d K e st
e Kafka
f) Hesse
g) Grass and Bo l
(h German c Stud es

Special Courses: GER 492, 493 494 498 499 590 592, 598 599 See pages 30-31

GREEK

Comp etion of GRK 101 201, 301 and 302 wil sat sfy the Liberal Arts language requirements.

GRK 101 Elementary Greek. (4 F
For beg nn ng students only

201 Intermediate Greek. (4) S
Continuat on of GRK 101 Prerequ site GRK 101 or approva of nstructor

301, 302 Greek Literature. (3-3 F, S
Read gs n the masterp eces of c ass ca Greek tera ture, advanced grammar Authors read are changed each year n accordance w th needs of the class May be repeated for cred t. Prerequ s te approval of nstruc tor.

Special Courses: GRK 492 493 494 499. (See pages 30 31)

ITALIAN

ITA 101, 102 Elementary Italian. 4 4 F S
Aura ora dr c ass and aboratory and ba c gram mar supp emented by s mp e prose read gs F u e tu es 1 h ur aborat ry

201, 202 Intermediate Italian. (4-4) F S
ntens ve rev ew of the fundamenta s of ita ian gram matica structure to increase the student's abi ty in composition, trans at on and d omat c express on. Pre requ s te. TA 102† or equ va ent. Four ectures, 1 hour aboratory

311, 312 Italian Composition and Conversation. 3 3 F S
Development of wr t ng ab l ty and oral express on Pre requ site· ITA 202† or equ va ent

325 Introduction to Italian Literature. 3 S
tal an terature through the nterpretation of represen tat ve works n drama poetry and nove Prerequ te TA 312† or approva of instructor

441 Dante Alighieri: Divina Commedia. 3) NR
Cr t ca reading of the three *Cantiche Inferno, Purgato rio Parad so)* Prerequ s te ITA 325†

449 20th Century Italian Literature. (3) NR
Ma or works f gures and movements of contemporary ta ian terature Prerequ s te· TA 325†

Special Courses: TA 492 493 494 499 See pages 30 31

JAPANESE

JPN 101, 102 Elementary Japanese. 5 5 F S
Pronunc at on conversat on and structura grammar Aura ora dr . Graduated ntroduct on of bas c read ng and wr t ng ski s F ve lectures 1 hour aboratory

201, 202 Intermediate Japanese. (5 5) F S
Grammar rev ew and cont nued ora pract ce ncreased empha is n read ng and wr t ng Prerequ s te JPN 102† or eq va ent Five ectures 1 hour aboratory

205 Calligraphy. 1 F S
An ntroduct on to sty e and techniques of wr t ng Ch nese characters Kn w edge of Ch nese or Japanese s not requ red.

309, 310 Intermediate Japanese Conversation. 2 2 F S
Pract ce n current usage n express on of deas Rec ommended especia ly f r those who have not had the opportun ty to prat ce Japanese n Japan Prerequis te JPN 202†

311, 312 Advanced Japanese Conversation. (2 2) F S
ntens ve aural ora pract ce toward conversat ona f uency P erequ s te JPN 202†

313, 314 Advanced Japanese. 3 F S
Des gned to deve op sk and accuracy wr tten Japa nese Prerequ s te JPN 202† or equ va e t

321, 322 Japanese Literature. 3 3 F S
Read ngs n representat ve masterp eces f moderr t erature. Prerequ s te JPN 313† or approva f nstru t r

414 Introduction to Classical Japanese. S 81
Readings from var ous genres of pre 20th century ter ature, with ana ys s of the structure of the c assical language Prerequis te JPN 313† or approval of in structor

Special Courses: JPN 294 492 493 494, 499 590 See pages 30 31.)

LATIN

LAT 101, 102 Elementary Latin. (4 4 F S
For beginn ng students only

201, 202 Intermediate Latin. (4 4 F S
Se ected Latin iterature both c ass ca and p st class ca V rgi s *Aeneid* advanced grammar Prerequ s te LAT 102† or approva of nstructor

421, 422 Roman Literature. 3 3 F S
Read ngs n the Lat n masterp eces Authors read change each year n accordance w th needs of the c ass May be repeated for ed t Prerequ site ap prova of nstructor

Special Courses: LAT 492 493 494 499 (See pages 30-31)

PORTUGUESE

Comp et on of POR 101 201 313 and 314 w ll sat sfy the Libera Arts Language requ rements

POR 101 Elementary Portugese. 5 F
Bas c grammar w th ntens ve dr n c as and abora tory d rected toward conversat ona f uency F ve ectures 1 hour aboratory Prerequ s te one yea of Span sh French or ta ian or approva of nstructor

201 Intermediate Portuguese. 5 S
Cont nuat on of POR 101 ntens ve dr of fundamen ta s n ass and aboratory d rected toward conversat ona f uency F ve e tures 1 hour aboratory Pre equis te POR 101 or approva of n tructor

313, 314 Portuguese Composition and Conversation. 3 3 F S
Des gned t deve op skil n wr tten Portuguese and co rected ora expression Must be taken n sequence Prerequ s te POR 201† or approva of nstructor

321, 322 Luso Brazilian Literature. 3 3 F NR
Representat ve masterp eces f Portug ese and Bra z a terature from the beg nn ng t the p esent Prerequ te POR 313† app ova of nstructor

472 Luso-Brazilian Civilization. 3 NR
Lectures read ngs and d s ss on f mportant aspects of Luso Braz an c v zat on Top c from mus art fo k ore terature h st ry and po t cs Prerequis te POR 313† or appr val of nstructor

Special Courses: POR 492 493 494 499 590 See page 30- 1

RUSSIAN

RUS 101, 102 Elementary Russian. (4-4) F, S SS
Structura grammar and bas c vocabu ary. Introduction and re nforcement of aural ora reading and writ ng sk lls Four lectures, 1 hour laboratory.

201, 202 Intermediate Russian. (4-4 F SS-S,SS
Systematic rev ew of grammar. Development of vocabulary through reading, writing Dr l n aural ora sk l s Prerequ s te RUS 102† or equ va ent Four ectures 1 hour aboratory

211, 212 Basic Russian Conversation. (3 3 F S
Intens ve aura ora dr to supp ement read ng and grammatica sk s acqu red n RUS 101 102†, 201† and 202† Requ red of Russ an majors Prerequis te RUS 102†

303, 304 Scientific Russian. 3 3) F S
Acqu s t on of sc entif c vocabu ary through read ng from current Soviet sc ent fic pub cat ons Prerequ te RUS 102†

311, 312 Russian Composition and Conversation. 3-3 F S
Devel pment of wr t ng abi ty and ora express on Pre requisite RUS 202†

321, 322 Survey of Russian Literature. 3 3 F S
he ma n terary movements prom nent authors and the most s gn f cant works of prose, poetry and drama to the 1917 revo ut on. Prerequ s te RUS 202† or equ v a ent

323 Survey of Soviet Literature. 3 F S
The ma n terary movements prom nent auth rs and the most s gn f cant works of prose poetry and drama of the Sov et period 1917 to p esent). Pre equ s te RUS 202† or equ valent

411, 412 Advanced Composition and Conversation. (3 3 F S
Des gned t mprove aura discrim nat on self express on n oral and wr tten sk l s emphasiz ng vo- abu ary bu d l g Subject mater a s drawn from current Sov et publ cat ons Prerequ s te RUS 31 †

417, 418 Applied Russian Phonetics. 2 2) F 8 S '81
Genera mpr vement n the student s anguage sk s through aura ora tra ing Russ an ph nology and an ana ys s of Russ an orthography Prerequ s te RUS 312†

420 Russian Poetry. 3 NR
Deve opment of Russ an poetry fr m ts beg ings to the present nc d ng both nat ve and em gre poets T p cs n cr t c sm and the study f p et cs Prerequ s te RUS 312† r approval of nstru t r

421 Pushkin. NR
Pushkin's poetry, plays and prose fiction nclud ng *Eugene Onegin The Little Tragedies, Tales of Belkin, Queen of Spades* and *The Captain s Daughter* Prereq uisite· RUS 312† or approva of instructor

423 Dostoyevsky. 3) NR
Dostoyevsky s major works of f ction, inc ud ng *Crime and Punishment* and *Brothers Karamazov* Prerequis te. RUS 312† or approval of nstructor

424 Tolstoy. 3) NR
To stoy s major works ncluding *War and Peace* and *Anna Karenina* Prerequ s te RUS 312† or approva of nstructor

425 Chekhov. (3 NR
Chekhov s ma or works representative short stor es and major p ays nc ud ng *The Cherry Orchard* and *Three Sisters* Prerequisite RUS 312† or approva of nstructor

426 Soviet Literature. 3) NR
Themat c deve opment of Sov et terature 1917 to present) through representat ve authors and works n c ud ng Gorky B ok Mayakovsky Zamyat n O esha, Babe l f and Petrov, Sho okhov, Pasternak Yevt shen ko and So zhen tsyn Prerequ s te· RUS 312† or approva of nstructor

440 History of the Russian Language. 3 NR
Pr nc p es of h stor ca l nguist c presented through the evoiut on of the Russian anguage from Proto Indo European to the present. Read ngs of h stor ca d cu ments n Old Rus an and O d Church S avic Prerequ s te RUS 312† or approva of nstructor

441 Survey of Russian Culture. 3 NR
nterp ay of artist c, soc a and po t ca forces in the development of Russ an cu ture from the Kievan period to the present Exc us ve use of Russ an anguage s urce mater a s Prerequisite· RUS 312† or approva of nstructor

591 Seminar. 3) NR
T p cs may be se ected f m the f owing
a) Pre-19th Century Ru s an L terature
b 19th entury Russian terature
c Russ an Poetry to 1890
(d Russ an Poetry 1890 to Present
e Russ an terary Cr t c sm
(f Sov et Soc a ist Rea sm
g) C ntemporary Soviet Authors

Special Courses: RUS 492 493 494 499 59 . See pages 30 1

SPANISH

SPA 101, 102 Elementary Spanish. 4 4) F S, SS
Fundamenta s of the anguage Not open to students w th cred t in SPA 111 Four ectures, 1 hour aboratory

111 Fundamentals of Spanish. 4) F S
Pr mari y for students with two years of h gh schoo Span sh who need review to enter second year study Not open to students w th cred t n SPA 102 Four ectures 1 hour laboratory

201, 202 Intermediate Spanish. (4 4 F S SS
Continuat on of fu ndamenta s Emphasis on the deve opment of the ski s of reading, sten ng comprehens on speak ng and writ ng Prerequ s te SPA 102† r 111 Four ectures 1 hour aboratory

203, 204 Intermediate Spanish. 4 4 F-S
May be subst tuted for SPA 201, 202 by Span sh speak ng students only Emphas s on the needs of the b ngua student through composit on l te ature, con versat on and rev ew of grammar fundamenta s P erequ s te SPA 102† or 111 or p acement Four ectures 1 hour aboratory

311, 312 Spanish Conversation. 3 3 F S
Des gned pr mar y for non ma ors to promote faci ty in coherent and express ve d ct on n Span sh Prerequi s te SPA 202† or equivalent

313, 314 Spanish Conversation and Composition. (3 3 F S SS
Des gned to deve op sk l and accuracy n spoken and wr tten Span sh Required of ma or , to be taken n sequence Prerequ site. SPA 202† or equivalent

315, 316 Spanish Conversation and Composition. 3 3) F S
May be substituted for SPA 313 314 by Span sh speak ng students on y. Prerequ s te 202† or 204† or approva f nstructor

319 Spanish Business Correspondence. 3) S
The commun cat on process n b siness Emphas s on organ zat on and presentat o of clear, effective reports and etters app cab e to bus ness usage Prerequ site. SPA 314† or 316† or approva of nstructor

325 Introduction to Hispanic Literature. 3) F S
A cr t ca approach to and ana ys s of terary type poetry drama short st ry and nove Required of a majors Prerequ s te SPA 202† or 204†

412 Advanced Conversation and Composition. 3 F S
O a ai d written Span sh compos t on w th part c ar attent o given to deve op ng fluency and fac ty Re qu red f ma o s Prerequ s te SPA 314† or 316† or appr va of nstr ctor.

413 Advanced Spanish Grammar. F, S
ntens ve analys s of the Span sh ang age Req red of teaching ma ors. Prerequ s te SPA 314† r 316† or approva f nstructo

417 Spanish Phonetics and Phonology. NR Dwor k n Foste

Introduct on to the theory and practice of Spanish phonet cs and phono ogy. Prerequ site· SPA 314† or 316†.

420 Applied Spanish Linguistics. (3) F 80 Bark n, Sheppard
Lingu stic structures emphasiz ng contrastive Eng ish-Spanish structures, for the teacher of the Span sh anguage Prerequisite FLA 400 or any other ntroductory ngu st cs course

421 Spanish in the Southwest. (3) F'80 Acevedo, Mart nez
Analys s of Southwest spoken and wr tten Spanish as compared to standard Spanish Des gned for students prepar ng for b ngua b cu tura work. Prerequ s te SPA 314† or 316† or approva of nstructor

424 Masterpieces of Hispanic Literature. (3 F S
Select ons from the l terature of the H spanic world and d scuss on of ts cu tura background Required of but not l m ted to teach ng majors Prerequ s te. SPA 325†

425, 426 Spanish Literature. (3 3 F S
Survey of Spanish terature from ts beginn ng to the present Prerequ s te SPA 325†

427, 428 Spanish-American Literature. 3 3) F, S
Survey of major works figures and movements from Co onia per od to 1880 and from 1880 to present Pre requ s te SPA 325†

434 Drama of the Golden Age. 3) S 81 Bin nger Mart nez
Dramat c works of Lope de Vega, Ca derón de a Barca and the r contemporar es Prerequ s te SPA 325†

435 Cervantes El Quixote. 3) F 80 Fr edman Lan de ra
Prerequ s te SPA 325†

436 Generation of 1898. 3) F 79 F ys Vasquez
Works of Unamuno Baroja Azor n and the r contempo rar es stud ed aga nst the ideo og ca background of the turn of century n Spa n Prerequ s te SPA 325†

437 20th Century Spanish Poetry. (3 S 80, F ys Know ton
Major trends n Spanish poetry from Modern sm to present Prerequisite SPA 325†.

454 19th Century Spanish American Narrative. (3) S 80 L enow V rg to
Pr nc pa works n the novel short story, narrat ve fiction and narrat ve Gauche que poetry Prerequ s te SPA 325†

455 Spanish American Modernism. (3) S 81 Luenow V rg o
Pr nc pa works and f gures of l terary Modern sm 1880 1920 emphasis on nternat ona l terary context of the movement Prerequ s te· SPA 325†

456 20th Century Spanish American Fiction. (3) F'80; Foster, Vo ek
Major works and movements. Prerequ s te SPA 325†

457 Contemporary Spanish American Poetry. (3) F 79 Ahern
Major works and prob ems n contemporary poetry and poetics w th emphas s on Paz Parra Cardenal and new poetry s nce 1960 Prerequ site SPA 325†.

464 Mexican American Literature. (3) F Acevedo A ar cón
Representat ve l terature n Span sh and Eng ish by Mexican Amer cans, emphas z ng soc o cu tural as we l as terary va ues Prerequ s te SPA 325†

471 Civilization of the Spanish Southwest. (3 S Ace vedo, A arcón
The po itica ntel ectua soc a econom c and art st c deve opment of the Spanish speak ng peop e of the Southwest Prerequ s te SPA 314† or 316† or approva of instructor

472 Spanish-American Civilization. 3 F Curran
Growth of the nst tut ons and cu tures of Spanish Amer can peop e. Prerequ s te SPA 314† or 316† or approval of nstructor

473 Spanish Civilization. (3 S F ys, Lande ra
Po it cal, nte ectua socia econom c and art st c de ve opme t of the Span sh nation from ts or g n to the present Prerequ s te SPA 314† or 316† or approva of nstructor

500 Bibliography and Research Methods. 3) F Foster Va d vieso
Required of a graduate students

540 History of the Spanish Language. 3) S Dwork n Ma tinez
L ngu st c development of the Span sh anguage from the epoch of Vu gar Lat n to the present day

541 Spanish Language in America. (3 S 81, Aher Dworkin
The major d a ects of Span sh in the Amer cas and the r h storica socia and cultural deve opment Prerequ s te SPA 540 or approval of instructor

542 Studies in the Spanish of the Southwest. (3 S 80 Bark n
Major top cs and ssues n the Span sh of the Southwest se ected readings in current research
pub cat ons Prerequ s te FLA 400 or equ va ent

543 Structure of Spanish. 3) F 79 Dwork n, Foster
Ana ys s and discuss on w thin the framework of con temporary ngu st c theor es of selected prob ems n Span sh morphophono ogy syntax, and semantics Pre requ site FLA 400 or equivalent

545 Concepts of Literary Criticism. (3) F'80 Foster Vo ek
A ms and methods of modern iterary scho arsh p Discuss on of major theor es of terary analys s

560 Medieval Spanish Literature. 3) NR, Fr edman, Martinez
Major f gures and works of the M ddle Ages n Spain

561 Golden Age Spanish Prose Fiction. (3) NR, Fried man, Lande ra
Major figures and works of the 16th and 17th centuries w th emphasis on the picaresque nove

563 Spanish Romanticism. 3 NR Know ton
Pr nc pal f gures and works of the Span sh Romanti c sm w th emphas s on nternat ona terary context of the movement.

564 19th Century Spanish Prose Fiction. 3 NR, Vir gi o
Pr nc pa figures and works of Real sm n the 19th cen tury nove , w th emphas s on Galdós

565 20th Century Spanish Drama. 3 NR Mart nez, Vald v eso
Pr nc pa f gures and works of Span sh dramat c itera ture from the Generation of 1898 to the present

566 Generation of 1927. 3 NR F ys Knowlton
Major poets of the Generation of 1927 w th emphas s on works of Lorca Gu lén, Sa inas and A eixandre

567 Contemporary Spanish Novel. (3 NR Alarcon, Vasquez
Major works of post C v l War Span sh f ct on

570 Indigenous Literatures of Spanish America. (3) NR, Ahern
The ndigenous terary trad tions w th emphas s on Nahuat Mayan and Quechua terature through read ings n Spanish trans at ons

571 Colonial Spanish American Literature. 3) NR, Ahern, Luenow
The major figures and works from Conquest to nde pendence

572 Spanish American Drama. (3) NR Foster
Major contr but ons of Span sh Amer an drama w th emphas s on contemporary dramat sts

573 Spanish American Essay. (3 NR V rg l o
Major works of the essay with n the framework of ntel ectua h story and terary movements

574 Spanish American Vanguard Poetry. (3 NR, Ahern
Exam nat on of poet c deve opments 1920 1940 w th emphas s on Hu dobro Va lejo, Neruda and the interna tiona context of the r works

575 Contemporary Spanish American Novel. 3 NR Foster Volek
Pr ncipa nove s of the *Nueva Narrat va H spanoameri*

cana with n the context of contemporary theories of the narrative

576 Contemporary Spanish American Short Story. (3) NR; Ahern Foster
Pr nc pal short stories of the *Nueva Narrativa Hispanoamericana* w th n the context of contemporary theories of the narrative

577 Regional Spanish American Literature. (3) NR Ahern Peru) Foster Argent na and Ch le); Luenow (Mex co Vo ek Car bbean
The figures and works of ma or nationa and reg ona teratures Top cs offered on a rotat ng bas s. May be repeated for d fferent topics.

579 18th Century Hispanic Literature. 3 NR B nnger Virgi o
The iterature of the En ghtenment n Spa n and Col n a Span sh Amer a

591 Seminar. (3 NR Staff
Span sh and Span sh Amer can terary cu tura and linguist c top cs.

691 Figures and Works Seminar. 3 NR Staff
Topics may be selected from Span sh and Span sh American l teratures

Special Courses. SPA 294 298 484 492 493 494 497, 498 499 580 590, 592 594 598 599 692 799 See pages 30 31 Prerequ s te for SPA 590 approva of instructor adv sor and department cha r Secure forms n the Fore gn Languages off ce

Geography

PROFESSORS:
MARCUS (LL 605), DURRENBERGER HARING, LOUNSBURY, McTAGGART PARKER, WEIGEND

ASSOCIATE PROFESSORS:
ACKER, BRAZEL, COMEAUX MINGS, SARGENT

ASSISTANT PROFESSORS:
ALDRICH FROST, GOBER-MEYERS, GRAF, HENKEL, PASQUALETTI, ZONN

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Geography Consists of 45 semester hours of credit, of which 30 must be in geography, and the remainder of the 45 hours in approved related fields selected in consultation with the advisor. The following courses must be included in the major:

	Semester Hours
GPH 491†, or GCU 375† and GPH 371† or 372†	6
GCU 141 or 441†, and GCU 253 or 352	6
GPH 111 or 411; and GPH 211† or 212† or 312†	6-8
Total	8-20

GPH 111 serves as the prerequisite of many of the GPH courses and GCU 121 serves as the prerequisite for some of the GCU courses. The remaining 12 hours in geography and 15 hours in related disciplines are designed to promote a breadth of geographic knowledge and are to be selected in consultation with the advisor. At least 18 semester hours must be in upper division courses (See Degree Requirements, pages 56-58.)

Latin American Studies Emphasis. (See Interdisciplinary Studies, page 62.) Consists of the Bachelor of Arts degree requirements in geography. At least 30 upper division semester hours of the total program must be in Latin American content courses including 15 hours in geography and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required, as is the successful completion of LIA 402 Movements and Meaning in Latin America. A reading knowledge of the other language is suggested. Fulfillment of requirements is recognized by a Bachelor of Arts degree with a major in geography: Latin American Studies Emphasis.

Bachelor of Science Degree Curriculum

Geography Consists of 45 semester hours of credit, of which 30 must be in geography, and the remainder in approved related fields. The following courses must be included in the major:

	Semester Hours
GPH 491†, or GCU 375† and GPH 371† or 372†	6
GCU 141 or 441†, and GCU 253 or 352	6
GPH 111 or 411; and GPH 211† or 212† or 312†	6-8
Total	8-20

GPH 111 serves as the prerequisite of many of the GPH courses and GCU 121 serves as the prerequisite for some of the GCU courses. An additional 12 hours of geography and 15 hours in related fields are designed to permit a specialized program of study in geography to be selected in consultation with the advisor in view of the individual student's field of interest. At least 18 hours must be in upper division courses (See Degree Requirements, pages 56-58.)

Special Emphasis Programs Two special emphasis programs: Urban Studies and Meteorology-Climatology are available within the Bachelor of Science degree curriculum in geography.

Meteorology-Climatology Emphasis In addition to the 18-20 hours of core courses in geography, requirements include GPH 212†, 213†, 214†, 215†, 310†, 311†, 412†, 413† Required related courses are: ESE 474, 475, MAT 120†, 121†, PHY 111†, 112†, 113†, 114†. Fulfillment of program satisfies National Weather Service criteria and is recognized by a Bachelor of Science degree with a major in Geography: Meteorology-Climatology Emphasis.

Urban Studies Emphasis In addition to the 18-20 hours of core courses in geography, students are required to take the four course core of the urban studies emphasis consisting of GCU 359 or 360, 361, 357 and 444†, and at least one of the following: GCU 351, 352, 401†, 442†, 453†, and GPH 481† At least nine of the 15 hours in fields related to geog

raphy must be in urban oriented course work Fulfillment of these requirements is recognized by a bachelor's degree with a major in Geography Urban Studies Emphasis.

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Geography Consists of 45 semester hours of credit, of which a minimum of 24 must be in geography and 18 in a related teaching field or fields The following courses are required: GPH 111 or 411, GCU 121 and 480† Departmental minor teaching field requirements (Elementary and Secondary Education) consists of a minimum of 24 semester hours of credit. Courses GPH 111 or 411 and GCU 121 and 480† are required The remaining hours are to be selected in consultation with an advisor

Departmental Graduate Programs

The Department of Geography offers programs leading to the Master of Arts and Doctor of Philosophy degrees. Consult the *Graduate Catalog* for requirements

CULTURAL GEOGRAPHY

Courses which may be applied toward the General Studies requirement in social and behavioral sciences

GCU 121 World Geography. 4) F,S
Description and analysis of areas variations in social economic and political phenomena in major world regions

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

253 Introduction to Cultural and Historical Geography. (3 F,S
Cultural patterns including such phenomena as language regions and various aspects of material culture. Origins and diffusion and division of the world into cultural areas.

322 Geography of Anglo-America. 3) F
Spatial distribution of relevant physical, economic and cultural phenomena in the United States and Canada

323 Geography of Latin America. 3) F
Spatial distribution of relevant physical economic and cultural phenomena in South, Middle and Caribbean America

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

326 Geography of Asia. 3 S
Spatial distribution of relevant physical economic and cultural phenomena in Asia, excluding the U.S.S.R.

327 Geography of Africa. 3 F
Spatial distribution of relevant physical, economic and cultural phenomena in Africa

332 Geography of Australia and Oceania. (3 NR
Spatial distribution of relevant physical economic and cultural phenomena in Australia New Zealand and Pacific Islands

350 The Geography of World Crises. 3) F
Contemporary world crises viewed from a perspective of geographic concepts and techniques

351 Population Geography. 3) S
Demographic patterns spatial temporal and structural investigation of the relationship of demographic variables to cultural economic and environmental factors

352 Political Geography. 3 S
Relationship between the social physical environment and the state

357 Social Geography. 3 F
Environmental perception of individuals and groups. The spatial aspect of social and physical environments is stressed

359, 360 Cities of the World. 3 3 A
Historical development and evolution of the earth's urban patterns internal structure of selected world cities First semester Ancient Cities through 18th century second semester 19th and 20th century cities

361 Urban Geography. 3 F S
External spatial relations of cities internal city structure and spatial aspects of urban problems in various parts of the world particularly in the United States

362 Geography of Food and Famine. 3) S
Spatial distribution of relevant physical economic and cultural factors influencing production of foodstuffs Analysis of world wide production and consumption patterns.

364 Geography of Energy. 3) F
Production, transportation and consumption of energy emphasizing the electric power industry and its environmental problems

375 Introduction to Geographic Research Methods. (3 S
Scientific techniques used in geographic research Prerequisite. approval of instructor

401 Topics in Cultural, Economic and Political Geography. 1 3 F S SS Staff
Open to students qualified to pursue independent studies Prerequisite approval of instructor.

421, 423, 424, 426, 428, 430, 431, 432· Following courses concern spatial distribution of relevant physical economic and cultural phenomena in the area designated

421 Geography of Arizona and Southwestern United States. 3) F S Comeaux

423 Geography of South America (F Frost Henke Prerequisite GCU 323 or approval of instructor

424 Geography of Middle America. 3 S Frost Mings Central America Prereq site GCU 323 or approval of instructor

426 Geography of the Soviet Union. (3 S Wegend Prereq te GCU 121 or approval of instructor

428 Geography of Middle East. 3 NR Henke
The Near East emphasizing current political and economic developments Prerequisite GCU 121 or approval of instructor

430 Geography of South Asia. (3 NR McTaggart India Pakistan and Afghanistan Prerequisite GCU 326 or approval of instructor

431 Geography of the Far East. 3 NR McTaggart Japan, China Korea excluding the U S S R Prerequisite GCU 326 or approval of instructo

432 Geography of Subsaharan Africa. 3 NR Henke A regional analysis emphasizing outh of the Sahara Prerequisite GCU 327 or approval of instructor

441 Economic Geography. 3 F S Gober Meyers Mings
Spatial distribution of primary, secondary and tertiary economic and production activities Prerequisite GCU 141 or approval of instructor

442 Geography of Transportation. 3 NR Mings, Gober Meyers
Geographic analysis of world trade routes and transportation systems. Prereq site GCU 141 or 441

444 Applied Urban Geography 3 NR Sargent
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 Mings
Recreation resource measurement, analysis and development. Spatial interaction of the physical setting,

pub c needs, governmenta po cy, env ronmenta qual ty and re ated prob ems Prerequ s te six ho rs of ge graphy or approva of nstructor

455 Historical Geography of Anglo-America. (3 NR Comeaux
Chang ng geography of the Un ted States and Canada from pre Co umb an t mes to about 1900 Emphas s on evo v ng econom c patte ns Recommended for soc a stud es teachers and students f Ame can h story

461 Geographic Applications of Urban and Regional Planning. (3 NR Acker
Ph osophy of the plann ng concept nature and funct n of p ann g comm ssions and deve opment of compre hens ve p ans Prerequ s tes GCU 361 or 444† or appr va of nstructor

480 Methods of Teaching Geography. (3 S Henke Frost
Organ zat on and presentat on of appropr ate content n geography Prerequ s tes SED 311† or concurrent reg strat on and 18 hours of geography or approva of nstructor

495 Quantitative Methods in Geography. 3 S; Zonn, Braze , Gober Meyers
Statist cal techniques app ed to the ana ys s of spatia d str butions and re at onsh ps Introduct on to mode s and theory in geography Prerequis te MAT 106 or ap prova of instructor

501 Geography Colloquium. (1) NR Staff
New trends n the d sc p ne current research be ng conducted by geography students faculty and nv ted guests May be epeated for cred t

524 Geographic Area Analysis. 3 F Lounsbury
Exam nation of area deve opment w th n a spat a con text Geograph c methodo ogies assoc ated w th microana ysis of pert'nent phys cal soc al and eco omic factors Prerequ s tes 15 hours of geography and ap prova of instructor

525 Geographic Regional Analysis. 3 S Gober-Meyers
Exam nation of reg onal growth with n a spat a context Contemporary theory and methodo ogy in reg ona sc ence emphas zing appl cat on n geographic and macro land use ana ys s. Prerequ s tes 15 hours n geography and approva of instructor

526 Spatial Land Use Analysis. 3) S; Lounsbury Sar gent
Determ nat on c assif cat on and ana ys s of spat al var at ons n and use patterns Exam nat on of the pro cesses affect ng and use change Prerequ s te 15 hours of geography or approval of nstructor

529 Contemporary Geographic Thought. 3) S Marcus Gober Meyers
Comparat ve eva uation of current ph losophy concern g the nature and trends of geography Prerequ s tes· 15 hours of geography and approva of nstructor

585 Advanced Research Methods in Geography. 3) F, Brazel, Zonn
Spec a zed research techn ques and methodo og es n econom c, pol t ca or cultu a geography

591 Seminar. (3 F S SS Staff
Selected top cs n econom c po it ca or cu tura geog raphy

596 History of Geographic Thought. (3 NR, Comeaux
Deve opment of geograph c thought from Herodotus and Strabo to Humbo dt and R tter

Special Courses: GCU 492 497 498 499, 500 580 584 590, 592 594 598, 599, 600 680 683 684 690, 691 692 700 780 784 790, 791 792 799 (See pages 30 31

PHYSICAL GEOGRAPHY

Courses which may be app ed toward the Genera Stud es requ rement n sc ences and mathemat cs

GPH 111 Introduction to Physical Geography. 4 F S
Spat a a d funct onal re at onships among c mates a dforms so s water and p ants Three lectures 2 hours laboratory

205 Geographic Methods and Concepts. 3) S
The methodo og es techn q es and bas c c ncepts emp oyed n the d sc p ne Des gned for students ma jor ng n geography

210 Physical Environment. 3 F
Pr nc p es of phys ca geography re ating to env ron menta prob ems pert nent to contemporary soc ety Po ution, ma adjusted and use, resour e exp o tat on

211 Introduction to Landforms 3 S
Geograph c character st cs of major types of andforms stress ng area associat on by use of maps. Prerequ s te. GPH 111 Two ectures 3 hours aboratory

212, 213 Introduction to Meteorology I, II 3-3) A
Atmospher c processes and e ements Genera and o cal c rcu at o heat exchange and atmospheric mo sture. Students whose curr cu a require a aboratory course must a so reg ster for GPH 214† 215† Prereq u s te GPH 111 or approva of nstructor

214, 215 Introductory Meteorology Laboratory. 1 1 A ntroduct on to meteoro og ca observat ons and mea surement Numerica and cartograph c interpretat on of weather data May be taken concurrently w th or sub seq ent to GPH 212† 213†, respect ve y Two hours laboratory

271 Maps and Map Reading. 3) F
Techn ques of nterpretat on of the many types of maps map project ons and h story of mapp ng Prerequ s te GPH 111

310, 311 Synoptic Meteorology I, II. 4 4 F 80 S 81
D agnost c techniques a d synoptic forecasting. n cludes pract ca operat on of f e d stat on and techn ques of weather ana ys s Prerequ s te· GPH 212† 213† or approva of nstructor Three ectures 3 hours aboratory

317 Marine Geography. 3 F S
Spatia ana ys s of the physica character st cs and po tent a econom c and cu tura esources of the oceans Prerequ s te GPH 111 or 411, r approva f stru tor

371 Cartography. (3 F, S
Basic map drafting, grid comp ation, s mple des gn and use of cartograph c nstruments Prerequ s tes GPH 111 and 271† or approva of instructor Six hours abo ratory

372 Air Photo Interpretation. 3) S
Aeria photographs as a means of determ ning topogra phy, vegetat on and cu ture sca e, use of ndex vert cal and ob que photographs and stere scopes Prerequ s tes GPH 111, 211†

381 Geography of Natural Resources. 3) S
Nature and distr but on of natural resources and the prob ems and pr nc p es associated w th the'r use.

401 Topics in Physical Geography. 1 3) F,S SS Staff
Open to students qua f ed to pursue independent st dies P erequ s te approva of nstructor

411 Physical Geography. 3 F S, Brazel, Graf, Marcus ntroduct on to phys ography and the phys ca e ements of the env ronment Open on y to students who have not taken GPH 111

412 Physical Climatology. 3) S, Marcus, Braze
Phys ca processes of the earth atmosphere system on reg ona and g obal sca es, concepts and ana ys s of energy, momentum and mass ba ances F eld work re qu red Prerequ s te GPH 212† 213† or 310† or approva of nstructor

413 Meteorological Instruments and Measurement. (3 S '80; Braze Durrenberger
Des gn and operat on of ground base and aerolog cal weather measurement systems Col ection, reduct on storage, retrieva and ana ys s of data. Prerequ site GPH 212† 213† or approva of nstructor

414 Climatic Analysis. 3) F Durrenberger
Processes that produce var ations 'n c imate over t me and space Inc udes changes n cl mate produced by human and natura forces and nvo ves the ana ys s of cl mat c data to dent fy tempora and spat a varat ons Prerequ s te GPH 212† or approva of instructor.

433 Alpine and Arctic Environments. (3) F Marcus
Reg onal study of advantages and l m tat ons of the



natural environment upon present and future problems involving resource distribution, human activities and regional and interregional adjustments. Prerequisite: GPH 111 or approval of instructor.

481 Environmental Geography. (3) S; Graf, Pasqualetti
Problems of environmental quality including uses of spatial analysis, research design and field work in urban and rural systems. Prerequisite: approval of instructor.

491 Geographic Field Methods. (6) SS; Aldrich, Lounsbury
Field techniques including use of aerial photos, large-scale maps, fractional code system of mapping; urban and rural field analysis to be done off campus; travel fees required. Prerequisite: approval of instructor.

571 Computer Mapping and Graphics. (3) F; Aldrich
Utilization of the digital computer in analysis and mapping of geographic data. Includes plotting, surficial display, compositing and graphics. Prerequisites: GPH 371† and approval of instructor.

575 Geographic Applications of Remote Sensing. (3) S; Aldrich
Use of imaging and non-imaging methods of remote acquisition of data, including satellite sensors, airborne radar, multiband scanning, conventional photographic sensors and ground based equipment. Prerequisites: GPH 372†, GCU 585 or GPH 491†.

581 Resource Development. (3) S; Pasqualetti
Resource dynamics including the physical, economic, cultural, political and historical factors influencing production and consumption patterns. Prerequisites: GPH 381, 481† or equivalent.

585 Advanced Research Methods in Physical Geography. (3) F; Brazel, Marcus
Specialized research techniques and methodologies.

591 Seminar. (3) F,S; Staff
Selected topics in physical geography.

Special Courses: GPH 484, 492, 497, 498, 499, 500, 580, 584, 590, 592, 598, 599, 600, 680, 683, 684, 690, 691, 692, 700, 780, 784, 790, 791, 792, 799. (See pages 30-31.)

Geology

PROFESSORS:
KRINSLEY (PS F-686), BUSECK, DIETZ, GREELEY, LARIMER, LUNDIN, MOORE, PÉWÉ, RAGAN, SHERIDAN

ASSISTANT PROFESSORS:
BURT, FERRY, STOCKER, STUMP

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Geology—Consists of 45 semester hours. Courses GLG 100 or 101 or 301, 102, 310†, 321†, 335†, 336†, 423, 424† and 435† or their equivalents are required. Supporting courses required in related fields: CHM 113†, 116†; PHY 111†, 112†, 113†, 114†; MAT 118†, 226†; ZOL 350. The additional work necessary to complete the major must be taken from the departmental list of approved courses. GLG 472, 480† cannot be used to fulfill the requirements for a major. (See Degree Requirements, pages 56-58.)

Bachelor of Science Degree Curriculum

Geology—45 semester hours are required, including the following basic courses or their equivalent: GLG 100 or 101 or 301, 102, 310†, 321†, 335†, 336†, 423, 424†, 435† and an approved summer geology field course for at least six credits. Supporting courses required in related fields are CHM 113†, 116†; PHY 115†, 116† (PHY 111†, 112†, 113†, 114† are acceptable alternatives); MAT 120†, 121†; ZOL 350†. To complete the total required hours, other courses in geology or in related fields listed by the department as approved may be taken. GLG 472 and 480† cannot be used to fulfill the requirements for a major. One year of foreign language is required. French, German or Russian is strongly recommended. (See Degree Requirements, pages 56-58.)

Bachelor of Arts in Education Degree Curriculum

Departmental Teaching Major

Geology—Consists of 42 semester hours of credit of which a minimum of 30 will be in geology. The following courses in geology or their equivalents are required: GLG 100 or 101, 102, 310†, 321†, 335†, 336† 362†, or 435† and 423. Additional courses and substitutions that are necessary to complete the major will be selected from geology and closely related fields as approved by the student's advisor. Supporting courses required in related fields are: CHM 113†, 116†; PHY 111†, 112†, 113†, 114†; MAT 118†. GLG 480† is required in the professional education program.

Departmental Teaching Minor

Twenty-four semester hours will be selected from courses below. The following courses or their equivalent are recommended for a teaching minor in Geology (Earth Science): GLG 100 or 101, 102, 480†. Any of the following courses or their equivalent may be used to complete a minor in Geology (Earth Science): GLG 310†, 321†, 335†, 336, 352†, 400, 423, 424†, 435†, and 436†. Any substitutions for the above courses must be approved by the advisor.

Departmental Graduate Programs

The Department of Geology offers programs leading to the degrees of Master of Science and Doctor of Philosophy. 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 n its evo ut on and success on of l fe upon t Both GLG 100 and 101 may not be taken for cred t. Poss b e f e d tr ps.

101 Physical Geology. (4) F,S
Basic pr nc p es of geology. Geology, geochem stry and geophys cs in re ation to mater a s and processes act ng upon and w th n the earth s crust Rocks minerals weather ng earthquakes mounta n bu d ng processes volcanoes running water ground water and glac ers, Three ectures, 3 hours aboratory Some f eld tr ps dur ng aboratory, poss b e weekend f e d trips.

102 Historical Geology. (4) S
The appl cation of geolog c princ p es to the nterpreta- t on of geo ogic h story and the history of fe on earth Laboratory techn ques nvolv ng map nterpretat on, cross sect ons, and foss ls Prerequis te GLG 100 or 101 or 301. Three lectures, 3 hours aboratory. Some f e d trips during laboratory, possible weekend field tr ps

220 Rocks, Minerals and Gemstones. (3) NR
dent f cation and classif cat on of spec mens w th spe c al reference to Ar zona Poss ble weekend field trips Not open to students w th cred t n GLG 321

300 Geology of Arizona. (3) F,S
Basic and historica geology, foss ls, m ning energy resources env ronmental prob ems, landscape deve op- ment and meteor tes, cast n examp es from Ar zona Three ectures

301 Geology for Engineers. (3) NR
Phys cal geo ogy emphas zing structural geo ogy, ground water and re ation of geology to eng neer ng problems. Two lectures 3 hours aboratory. Some f e d tr ps during laboratory.

302 Man and Geologic Environment. (3) F
Geo og c hazards, prob ems of waste d sposa and land use planning, env ronmenta prob ems related to so d earth.

303 Geology of Arizona Laboratory. (1) F,S
Laboratory for GLG 300, 2 hours Weekend field trip to Grand Canyon

304 Geology of the Grand Canyon. (2) NR
Rev ew of the discovery, h story origin and geology of the Grand Canyon of the Colorado River in Arizona. S x day f eld tr p down the river (first s x days after comm- encement n May) requ red at student's expense. Fie d research and term paper on trip a so required.

310 Structural Geology. (3) S
Geologic structures and the mechan ca processes in vo ved n the r format on. Prerequ s tes GLG 101 or 301 Two ectures 3 hours aboratory Possib e field trips

321 Mineralogy. (4 F
Crysta ography crysta chem stry and crysta phys cs as appl'ed to m nera s, determ nat ve methods orig n and occurrence; hand spec men study Prerequ s tes. MAT 118†; CHM 116† or concurrent enro ment. Three lectures 3 hours aboratory Possible field trips.

335 Principles of Paleontology. 2 F
Emphas s on preservat on, growth, spec es concept, and evo ut on as demonstrated by the foss record. Prerequ s te GLG 102 or approva of nstructor Geo ogy majors must enro l concurrent y n GLG 336 Two lectures

336 Invertebrate Paleontology Laboratory. (2) F
Morpho ogy evo ution and eco ogy of foss l nverte brates w th emphas s on techniques in pa eonto ogy. Prerequ s te GLG 102 ZOL 350† Six hour aboratory

362 Geomorphology. (3) NR
Land-forms and processes which create and mod fy them Laboratory and field study of phys og aph c fea- tures Prerequisites GLG 101 310† 424† or concurrent enro ment Two ectures, 3 hours abora- tory Some f e d trips during aboratory, poss b e weekend f e d tr ps

400 Geology Colloquium. 1) F S
Presentat on of recent research by geology students facu ty and inv ted guests Required at east 3 out of 4 semesters for junior and sen or geo ogy majors May be repeated for a tota of 4 credits Prerequis te two courses in the department or appr va of instructor.

412 Geotectonics. 3) F
Or g n of cont nents and ocean bas ns. Evolution of the crust n time Drift ng sea f oor spread ng and other arge sca e movements of the earth's crust Upper man- tle processes Emphasis on current work. Prerequ s te. GLG 310†

418 Geophysics. 3) F
So d earth geophysics geomagnet sm gravity, se smo ogy, heat flow emphas z ng crust and upper mant e Prereq s tes· GLG 101 or 301, PHY 112† 114† MAT 121, or approval of nstructor Two ectures 3 hours aboratory Some f e d tr ps dur ng laboratory poss b e weekend field trips

420 Volcanology. 3) NR
D str bution of past and present volcan sm types of vo can c act v ty mechan sm of eruption form and structure of vo canoes, geochem stry of volcan c act v- ity Prerequisite. GLG 424†. Poss b e weekend f e d tr ps

423 Optical and X-ray Techniques. (2 F
Po ariz ng m croscopy opt ca crysta ography and m n era ogy ntroduct on to X-ray techniques Corequ s te GLG 321† One ecture, 3 hours aboratory

424 Petrology-Petrography. (4) S
Theoret ca and aboratory study of the orig n and c as sif cat on of igneous and metamorphic rocks Hand spec men and th n sect on study of rocks Prerequis tes. GLG 321†, 423† Three ectures, 3 h urs aboratory Possib e weekend f e d trips

435 Sedimentology. 3 F
Or gin, transport depos t on and d agenes s of sed ments and sed mentary rocks Phys ca analysis hand spec men exam nat on and nterpretat on of rocks and sed ments Prerequ tes GLG 102 321† Two lectures 3 hours laboratory Poss b e weekend f e d tr ps

436 Principles of Stratigraphy. 3) S
Sources of sed ments deposit ona env ronments and the pr nc p es n de im t ng corre at ng and nam ng of strat graphic un ts Prerequ sites GLG 102 335† 435† Three ectures Poss ble weekend f e d trips.

441 Ore Deposits. 3) NR
Or g n ccurrence structure and mineralogy of ore deposits. Prerequ s tes GLG 424† or approval of n structor Three ectures Poss ble weekend f e d trips

446 Ground Water Geology. (3 NR
Princ p es govern ng the occurrence movement qua ty classif cat on and recovery of underground water w th spec a reference to Ar zona Prerequ s te GLG 435† Poss ble f e d tr ps

462 Environmental Geology of Cold Regions. (3) NR
Geo ogica and eng neering mportance of seasona and perenn a y frozen ground permafrost) Propert es dis tr but on or g n of ce n the ground and ts app cat on to eng neer ng and and ut zation problems Prereq s tes GLG 101 435† PHY 111† and 113†, or approval of nstructor. Poss ble weekend f e d trips

472 Earth Science. (3 F,S
Princ p es of earth sc ence and their nf uence n form ng the scen c features on the surface of the earth GLG 472 cannot be taken for credit by one who has com p eted GLG 100 or 101 or the r equ va ents Possib e f e d tr ps

480 Methods of Teaching Earth Science. 3) NR
Organ zat on and presentat on of appr pr ate c ntent n earth sc ence, the E S C P aboratory approach prepa rati n f aboratory and demonstrat on mater a Prerequ s te· approva of nstructor Poss b e weekend f e d tr ps

481 Geochemistry. (3 F
Or g n and d str but on of the chem ca e ements Geo chemica cycles operating n the earth's atmosphere hydrosphere and thosphere Prerequ sites CHM 341† or 441† or G G 321† (Same as CHM 481)

482 Physical Geochemistry. 3) NR
Appl cat ons of thermodynamic and kinet c princ ples to geochem cal processes. Prerequ s te GLG 321† or CHM 341 or 417† or 441†. (Same as CHM 482)

485 Meteorites and Cosmochemistry. (3) NR
Chemistry of meteorites and their relationship to the origin of the earth, solar system and universe. Prerequisite: GLG 481† or 482†. (Same as CHM 485.)

490 Topics in Geology. (1-3) F, S, SS
Special topics in following fields: mineralogy, petrology, economic geology, geochemistry, petroleum geology, regional geology, geomorphology, geophysics, planetary geology, paleontology, stratigraphy, sedimentology, field geology and structural geology. Prerequisite: approval of instructor. May be repeated for credit

501 Geology of Arizona. (3) F, S; Stump
Basic and historical geology, fossils, mining, energy resources, environmental problems, landscape development, and meteorites, cast in examples from Arizona. Three lectures. Research paper required.

502 Geology Colloquium. (1) F, S; Staff
Presentation of recent research by geology students, faculty, and invited guests. May be repeated for a total of 4 credits. Prerequisite: two courses in the department or approval of instructor.

503 Man and Geologic Environment. (3) F; Péwé
Geological hazards, mineral and energy resources, problems of waste disposal and land-use planning, environmental problems related to solid earth.

504 Geology of the Grand Canyon. (2) S; Péwé
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 six days after commencement in May) required at student's expense. Field research and term paper on trip also required.

505 Geology of Arizona Laboratory. (1) F, S; Stump
Laboratory for GLG 501, 2 hours. Weekend field trip to the Grand Canyon.

510 Advanced Structural Geology. (3) NR; Ragan
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. Prerequisites: GLG 310†, 424† or approval of instructor. Possible field trips.

518 Applied Geophysics I. (3) NR; Stocker
Use of the refraction seismology, reflection seismology and gravity methods to determine the physical properties and structure of the subsurface. Petroleum exploration and engineering applications. Prerequisites: GLG 418†; MAT 121†. Two lectures, 3 hours laboratory. Some field trips during laboratory; possible weekend field trips.

522 Applied Geophysics II. (3) NR; Stocker
Magnetic, electromagnetic, electrical resistivity, induced polarization, self potential, and radioactivity methods applied to geologic problems and mineral exploration. Prerequisites: GLG 418†; MAT 121†. Two lectures, 3 hours laboratory. Some field trips during laboratory; possible weekend field trips.

523 Advanced Mineralogy-Crystallography. (3) S; Buseck
Crystallography, principles of X-ray and electron diffraction, defects in crystals, electron microscopy of minerals. Three lectures. Prerequisites: GLG 321† or CHM 441 or equivalent.

524 Advanced Ingeous Petrology. (3) NR; Sheridan
Theoretical and practical aspects of the genesis of igneous rocks. Study of selected suites. Modern laboratory techniques. Prerequisite: GLG 424†. Two lectures, 3 hours laboratory. Possible weekend field trips.

525 Advanced Metamorphic Petrology. (3) NR; Ferry
Theoretical and laboratory study of metamorphic rocks. Processes of contact and regional metamorphism. Advanced methods and instrumentations. Prerequisite: GLG 424†. Two lectures, 3 hours laboratory. Possible weekend field trips.

527 Geology of Carbonates. (3) NR; Staff
Physical and chemical analysis of carbonate sediments with emphasis on interpreting depositional and post-depositional history. Prerequisites: GLG 435†, and 481 or 482. Two lectures, 3 hours laboratory. Possible weekend field trips.

528 Clastic Sedimentary Environments. (3) NR; Staff
Comparison of modern and ancient sedimentary environments; evaluation of rock sequences and facies models. Research projects. Prerequisites: GLG 424†, 435†. Two lectures, 3 hours laboratory. Weekend field trips.

532 Ecological Micropaleontology. (3) NR; Lundin
Interpretation of ancient environments through the use of ostracodes, benthic foraminifera and other groups. Prerequisite: GLG 431 or approval of instructor. Two lectures, 3 hours laboratory.

561 Glacial Geology. (3) NR; Péwé
Properties, distribution and origin of glacial deposits, including principles of their stratigraphy and correlation. Environmental geology problems in glaciated regions. Prerequisite: GLG 362†. Two lectures, 3 hours laboratory. Some field trips during laboratory; possible weekend field trips.

562 Quaternary Geology. (3) NR; Péwé
Geology of the Quaternary Period in both glaciated and unglaciated areas. Stratigraphy, correlation and environmental application of Quaternary deposits. Special reference to the Southwest. Prerequisite: GLG 362†, or approval of instructor. Two lectures, 3 hours laboratory. Some field trips during laboratory; possible weekend field trips.

583 Phase Equilibria and Geochemical Systems. (3) NR; Holloway
Natural reactions at high temperatures and pressures; silicate, sulfide and oxide equilibria. Prerequisite: GLG 482. (Same as CHM 583).

591 Seminar. (1-3) F, S, SS; Staff
Topics may be selected from the following:

(a) Igneous, Metamorphic, and Sedimentary Petrology
(b) Pleistocene Environment
(c) Advanced Geophysics
(d) Structural Geology
(e) Paleoecology
(f) Advanced Stratigraphy
(g) Mineralogy and Crystallography
(h) Mineral Deposits
(i) Geochemistry
(j) Physical and Chemical Sedimentology
(k) Biostratigraphy
(l) Environmental Geology
(m) Planetary Geology
(n) Stratigraphic Micropaleontology

See related courses: ASB 541† Archaeological Pollen Analysis; BOT 490† Paleobotany.

Special Courses: GLG 484, 492, 493, 494, 498, 499, 590, 592, 593, 598, 599, 690, 691, 692, 783, 790, 791, 792, 799. (See pages 30-31.)



Health, Physical Education, Recreation, and Dance

PROFESSORS:
CHEATHAM, (PEBW 202), GISOLO, GREEY, ODENK RK, PITTMAN, RICHARDSON, STONE, TOOHEY, WEGNER

ASSOCIATE PROFESSORS:
BRYANT, BURKETT, CORDER, DEZELSKY, KRAHENBUHL, LESSARD, OLSEN, OSTERHOUDT, PACKER, PANGRAZ WELLS

ASSISTANT PROFESSORS:
ALDINI, DARST, DUNNOCK, GRIER, HALEY, JONES, LEBARRON, PIKE, REDICAN, SHIRREFFS

INSTRUCTORS:
ABRAMS, JAEGER

LECTURER:
DESJARD N

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Dance—Consists of a minimum of 45 semester hours of credit, of which the following are required: DAH 160, 380; DAN 131†, 134, 232, 234†, 261†, 262, 334, 464, or 465†; ZOL 201 or 202; PED 335†, or 340†; MHL 357. Fifteen additional hours must be in no more than two related fields and must be taken from the departmental list of approved courses. Two years of credit or equivalent in French is required.

Bachelor of Science Degree Curriculum

Health Science (Community Health Emphasis) Consists of 62-64 semester hours of credit of which 40 must be in the major. Courses HES 100, 340, 360, 361, 382, 434†, 480, 482†, and 498 are required. Related fields include ZOL 201, 202†; and one course in chemistry. Thirteen hours of health science electives and 12 hours of related field electives are selected by the student in consultation with a faculty advisor. (See Degree Requirements, pages 56 58).

Physical Education Consists of 38 semester hours of credit of which 28 must be in the major field Courses ZOL 201, 202†, and PED 170, 335†, 340†, 345†, 483†, 450† and selected physical education activity courses are required. At least 18 semester hours must be in upper division courses and the entire program must be planned in consultation with the student's advisor (See Degree Requirements, pages 56-58.)

Recreation Consists of 53 55 semester hours of credit including additional related studies. Courses REC 160, 210†, 463†, and 472† are required core courses. The remaining courses will be selected in consultation with an advisor and determined by the needs and area of pro fessional emphasis of the student Students may select one of the following areas of pro fessional emphasis: Urban Recreation, Outdoor Recreation, Commercial and Private, Recrea tion Resource Planning and Managment, and Recreation for Special Populations. Additionally 200 clock hours of recreation leadership experience are required prior to doing Senior Internship (REC 463). Students are not permitted to take additional course work during the Senior Internship placement period (See Degree Requirements, pages 56-58.)

Bachelor of Fine Arts Degree Curriculum

Dance Consists of 70 hours of credit in dance and related fields. Courses DAH 160, 380; DAN 131†, 134, 232, 234†, 261†, 262, 263†, 331, 332†, 334†, 434†, 464†, 465 and 490†; PED 335†, ZOL 201 and 202†; THP 101; MTC 107; MUP 131, 132† and 133 are required. At least 30 semester hours must be n upper division dance courses

First semester students should take: DAH 160; DAN 134 Modern and DAN 130 Ballet; ENG 101; MTC 107; SOC 101 or other General Studies

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Dance Consists of 45 semester hours of credit of which the following are required. DAH 160, 380; DAN 131†, 134, 232, 234†, 261†, 262, 263†, 334, 360, 361, 464†, 465† and 490†; PED 335†; ZOL 201 and 202† First semester students should take. DAN 134, Modern, DAN 130 Ballet and DAH 160; ENG 101; SOC 101; MHL 107 and other General Studies. At least 18 hours must be in upper division courses.

Health Science (School Health Emphas is) Consists of 38 semester hours of credit. Courses HES 100, 340, 360, 361, 382, and 480 are required. Related fields include ZOL 201 and 202†, and one course in chemistry Twelve hours of health science electives and 8 hours of related field electives are selected by the student in consultation with a faculty advi sor. At least 18 semester hours must be in upper division courses.

Physical Education Consists of 38 semester hours of credit, of which the following are required: PED 170, 335†, 340†, 345†, 376†, 450†, 480†, 483†, 498; DAN 367, EED 313; 9 hours of SED 433†. All majors must satisfy prof ciency requirements in selected sports and dance. At least 18 semester hours must be in upper division courses and the entire program must be planned with the student's advisor

Departmental Minor Teaching Field Requirements

(Secondary Education)

Dance—Consists of 24 semester hours of

credit. Courses DAN 134, 261†, 263†, 360 and 361 are required. The remaining hours are to be selected by the student in consultation with an advisor.

Health Science—Consists of 24 semester hours of credit Courses HES 100, 340, 360, 361, 382, and 480 are required An additional 6 hours of health science electives are to be se lected by the student in consultation with a health science advisor

Coaching of Athletics (Men and Women) Consists of 32 semester hours of credit Courses ZOL 201, 202†; PED 335†, 340†, 346, 383† and 486† are required; plus 9 hours from PED 291† and electives selected by the student in consultation with an advisor

Athletic Trainer's Certificate (Men and Women) Consists of 41 hours of credit. Courses PSY 112†, PGS 100; ZOL 201, 202†; HES 100, FON 141, PED 270†, 282, 335†, 340†, 383†, 485† and PED 486† are required; plus electives se ected by the student in consultation with an advisor. Note. S x (6) semester hours of credit or two years' equivalent work of 600 clock hours of internship

Departmental Graduate Programs

The Department of Health, Physical Educa tion Recre t on and Dance offers programs eading to the M ster of Science degree in Physical Education, and in Recreation, Master of Education Secondary Education (Health Science), Master of Education Secondary Education (Physica Education), Education Specialist (Physical Education), Doctor of Education (Physica Education), and Doctor of Philosophy Secondary Education (Phys c l Education) Consult the *Graduate Catalog* for requiren ents

DANCE HISTORY

DAH 160 Contemporary Dance. 2) F S
Or entat on to the f e d of dance w th part cu ar refer ence to trends

280 History and Philosophy of Dance. (2) NR
Dance from anc ent t mes to the present. Considerat on of dance as an art in re at on to other arts, primitive, preclass c and modern forms

380 Dance in Diverse Cultures. (3 S
Influence of dance n se ected cultures Requ red for dance majors

DANCE

DAN 130 Dance. (1) F, S, SS
Ba et folk modern socia square and other dance ac t v t es Three hours a week May be repeated for cred t

131 Music for Dance. (2 S
E ements of mus c mus c structures and the r relat on sh p to dance Emphas s on rhythm c ana ys s and dance accompan ment Prerequ s te MTC 100† or ap prova of nstructor

134 Technique and Theory of Modern Dance. 3) F, S
E ementary concepts of modern dance techn que De ve opment of movement qual ty and performance sk s S x hours weekly May be repeated for cred t P ace ment aud tion required Dance ma ors on y

230 Dance. (1) F S
Intermed ate evels Continuat on of DAN 130 Three hours a week. May be repeated for cred t

232 Dance Notation I. 3 F
Survey of systems of dance notat on Emphas s on ear ng of e ementary Labanotat on

234 Technique and Theory of Modern Dance. 3 F S
Intermed ate concepts of modern dance techn que. Deve opment of movement qua ty and performance sk ls Six hours weekly May be repeated for cred t P aceme t aud ti n requ red Dance majors on y

261 Fundamentals of Choreography. 2 F S
Ana ys s of theme and dramat c deas drawn from poet- ry drama mus c and other art forms for use n dance choreography Prerequ site· approva of nstructor One lecture 2 hours aboratory

262 Dance Production I. (2 F
Theory of ght ng and costuming as re ated to dance

263 Dance Production II. 2 S
Theory and pract ce of programm ng make-up scenery and sound as related to dance product on One ecture, 2 hours aboratory Prereq s te DAN 262 or approva of nstructor

330 Dance. (1 F, S
Advan ed eve s. Cont nuat n of DAN 230 Three hours a week May be repeated for cred t

331 Techniques of Improvisation. 1 F S
Creat ve exp orat on for the deve opment of spontane- ty Movement exper ences through aud tory, tact le v sua emot ona motor and other st mu . Three hours a week May be repeated for credit Prerequ site DAN 130 (Modern) or approval of instructor

332 Dance Notation II. (2) S
Intermediate study of Labanotation ntroduction to ef- fort shape analysis of movement Prerequ s te DAN 232 or equivalent.

334 Technique and Theory of Modern Dance. (3 F S
Advanced concepts of modern dance techn que. Deve opment of movement qua ity and performance sk ls S x hours weekly May be repeated for cred t Place ment audit on requ red

360 Theory and Practice of Teaching Dance. (2 F
Fo k square, socia and other dance forms Ana ys s and acqu s tion of teach ng techniques and teaching mater a s su tab e for schoo and recreat onal use One ecture 2 hours aboratory

361 Theory and Practice of Teaching Dance. 3 F
Creat ve and modern. Analys s and acqu s t on of teach ing techn ques and teach ng mater al su table for schoo and re reat ona use

367 Children's Dance. (3) F S
Theory and practice of teach g creat ve folk square and other dance forms for ch dren Des gned for dance majors and related curr culum but open to a students

371 Dance Theatre. (1) F, S
Performance n spec a y choreographed dance produ t ons Prerequ site approva of structor Three hours a week per cred t hour May be repeated for cred t

434 Technique and Theory of Modern Dance. 3 F S
Preparat on n the performance and comprehension of professiona leve modern dance techn que S x hours weekly May be repeated for cred t P acement aud t on requ red

462 Dance Stagecraft and Production. (3 A
Lighting costum ng make up, cenery and sound as re ated to dance performance May be repeated once f r cred t Prerequis tes DAN 262 263 or equ va ent

464 Choreography and Accompaniment. 2 F, S
Function of accompan ment for dance, experience n the use of percussion vo ce records p ano and se- ected nstruments n relation t the r use n choreography

465 Advanced Choreography. 3 F, S
nvest gat on and pract ce of contemporary sty es of choreography Prerequ site DAN 261 or approva of nstructor.

490 Senior Performance in Dance 2 F S
Orig na choreography for so o or gr up performance w th ana ys s and cr t que of prob ems enc untered n product on May be repeated for tota of 4 hours Pre requ s tes DAN 261† 464 or 465

530 Advanced Problems in Analysis of Dance Technique. (3 F
Theor es and pr ncip es of human anatomy and biome chan cs appl ed to ana ysis and eva uation of dance movement Prerequ s te· PED 335 or approva of n structor

531 Musical Analysis for Dance Accompaniment. (3) F
Dance accompan ment emphasiz ng improvisat on Ana ys s of exper mentat on with and pract ce n working w th composers of mus c for choreography Prerequ s tes DAN 131† 464‡ or equ va ent.

532 Dance Notation III. (3) S
Advanced study of Labanotat on Exper ences n notating and reconstruct on of Labanotation dance scores Prerequisite· DAN 332† or equ va ent.

550 Cultural Concepts of Dance. (3) F
Cu tura concepts· trends, econom c po t cal, and geograph ca forces n major eras of dance h story

560 Dance Philosophy and Criticism. (3 S
Theor es of cr t c sm esthet c exper ence n dance n re at onship to other art forms concepts of creativ ty sty e and art st c truth (ntended to ntegrate and g ve meaning to stud o sk l s)

563 Individual and Group Choreography. 3 F
Or g na choreography created f r so o and group per formance May be repeated once for cred t
Prerequ s te DAN 464 and 465† or equiva ent

570 Creative Research Project. 6) F S
Project in ieu of thes s Orig na choreography or an nvest gative study n a dance area Approva of gradu ate comm ttee required

591 Seminar. 3) NR
Top cs may be se ected f om the f ow ng·
a Dance Educat o and Adm n stration
(b F lm and Dance
c) Effort Shape

Special Courses: DAN 484 494 498 499, 590 593 598 691. (See pages 30 31

HEALTH SCIENCE

HES 100 Personal Health. F S SS
Human struggle for ach ev ng harmony between the s ow y chang ng nner env ronment and the rap d y chang g outer env ronment Some sect ons may be offered w th discussion groups Consu t schedu e of c asses

304 Human Sexual and Reproductive Health. 3) S
ssues of curr culum deve opment and program p an n ng. Des gned to prepare profess ona s to nstruct younger persons n these areas

305 Substance Abuse. (3) F
Genera propert es, princ p es of act on, and behav ora effects of psychoactive drugs Focuses on how substances affect health of humans

340 School Health. (3) F S
Basic plan of the schoo hea th program, hea th ser v ces health nstruct on and schoo hea th env ronment Ana ys s of school hea th prob ems

360 Fundamentals of Disease Control. (3) F, S, SS
Ep demio ogy of commun cable and non commun cab e d seases Disease prevent on and contro Pr mar ly for prospective hea th teachers and publ c hea th educators

361 Foundations of Health Science Education. (3) F S SS
Ana ysis of research n various d sc p nes which con tr bute to hea th educat on Pr mar y for prospective hea th teachers and pub c hea th educators

382 Introduction to Public Health. 3) F, S, SS
Pub c and community hea th is exam ned inc ud ng governmental, vo untary and commun ty agency act v ties which promote hea th among popu ations

434 Supervised Field Training. 3) F, S
Prov des opportunit es to observe and work n publ c and vo untary agenc es, e ther in preparat'on for beg n n ng eve employment or for bette understand g of nterrelat onships n commun ty hea th programs Pre requ s te 15 cred t hours n hea th science May be repeated for a tota of 6 cred ts

470 Environment and Public Health. 3) F S SS
Principles of environmenta hea th, nvolv ng manage ment of ecosystems and the r relati nship to pub c and commun ty hea th

480 Methods of Teaching Health. 3 F, S
Techn ques and mater a s for hea th nstruct on Health Educat on majors and m nors on y

482 Advanced Public Health. (3 F S
Theory and concepts of pub c hea th pract ce. Program p ann ng mp ementat on and eva uat on app ied to a d vers ty of pub c hea th pr b ems. Prerequ s te. HES 382

501 Contemporary World Health Problems. 3) F, SS
Recent discover es n med c ne eng neer g and l fe sc ences and their app cat on to persona and commu n ty hea th Ma nutrit on venerea d seases tubercu os s ma ar a eprosy, paras t a infestat ons, rad at on environmenta po ut on

502 Health Problems of the Southwest. (3) NR
Coccid idomycos s a erg es vector infestat ons d a betes among the P ma nd ans, arthrit s dysenter es rab es airborn e v ruses h stop asmos s, san tat on a r and water po ut on pestic de contamin at on of food products

503 Field Experience in Community Health. (1 6) NR
Superv sed student part cipat on in commun ty health service programs such as State and County Hea th Department, Ind an Hea th Serv ce, U. S Publ c Health Serv ce and pr vate health agenc es May be repeated for a tota of 6 credits

504 Education for Human Sexuality. 3) F
Current concepts of human sexua ty are exp ored and app ied to curr culum deve opment and program p an ning n health educat on

505 Drug Dependency: Perspectives and Approaches. (3 S
C assif cat on of mood mod fy ng substances n terms of effects Mot vat ona and soc a forces co tribut ng to the dynam cs of the prob em contro and treatment

554 Sociological Aspects of Health Education. 3 S
Medicare Med ca d, Wor d Health Organ zat on, Peace Corps the U S Pub ic Hea th Serv ce, the nner c ty and hea th and commun ty hea th serv ces

560 Curriculum Construction in Health Education. 3) S
Problems of curr cu um construct on w th respect to acquis t on of mater a s, estab shment of bas c curricu um ph osoph es appl cation of educat on princ ples, and sequence of course content

Special Courses: HES 484 494 498 499 590 591 592 593 594, 598 599 (See pages 30 31

Students who comp ete sat sfa tor y se ected HES 494 courses or HES 470 are e g b e t qua ify fo a cer t ficate of accomp shment from the Center for D sease Contro U S Department of Hea th, Educat on and We fare

PHYSICAL EDUCATION

A $5.00 t we and locker fee is requ red each semester by students using t we and l cker faci t es for physica edu at on c a ses a d ntramura activit es
Phys ca Edu at n Activity c asses PED 105 205 305 310 may not be taken for aud t

PED 105 Physical Education Activity. (1 F S SS
Beg nn ng nstruct on in adapted phys ca act v t es and a variety of sports go f, ice skat ng scuba, karate judo handba equ tat on, tenn s sw mm g we ght tra n ng gymnastics and other act v t es Three hours a week May be repeated for cred t

110 Individual and Team Sports. 1 2 F S
Sk l s strategies and know edge of se ected phys cal act vit es for prospective physica educat on teachers One ectu e one laboratory

170 Introduction to Physical Education. (3 F, S, SS
Or entat on to and exp oration of the f e d of phys ca

educat on to be taken in the freshman year. Required of students major ng n phys cal educat on

175 Occupational and Physical Therapy. (2) S
Backgrounds, purposes and functions of the profes s ons of phys cal therapy and occupat onal therapy; their re at onsh ps to hea th professions and community agenc es

205 Physical Education Activity. (1 F S SS
ntermed ate eve s. Cont nuation of PED 105 Three hours a week May be repeated for cred t.

270 Instructorship in Standard First Aid. 1) F, S
For ndividua s seek ng the Standard F rst A d Certif cate, leading to qua if cat on as a first a d nstructor Prerequ s te must be 18 years of age

290 Sports Officiating. (3) S
Ru es and mechan cs of off c at ng used n footbal basketba l, baseba and track and f e d.

291 Theory of Coaching. (2) F S
Theory of coach ng compet t ve basketbal and footba Each class meets four hours per week Phys ca educa tion majors and coaching m nors, or approval of area chair

305 Physical Education Activity. (1) F, S
Advanced eve s. Cont nuation of PED 205 Inc udes Red Cross Sen or Life Sav ng, Red Cross Water Safety nstructorsh p (Prerequ s te Current Senior Red Cross L fe Sav ng Cert f cate), and other aquat c act v t es Three hours a week May be repeated for credit

310 Collegiate Sports. (1) F, S
Cred t may be given for part c pation in compet tive sports For men and women May be repeated for a to-ta of 4 credits T me arranged Y grade only

335 Biomechanics. 3) F S SS
Kinemat cs and dynamics app ied to human movement Development of b omechan cal concepts for app ication n ana ysis and eva uat on of neuromuscu ar sk l s. Prerequisite ZOL 201.

340 Physiology of Exercise. (3) F S SS
Effects of the var ous types of exerc se upon body structure and funct on. Prerequisite ZOL 202†

345 Motor Development and Learning. (3) F S SS
Deve opment of perceptua -motor behavior from nfancy through adu thood Acquisition of neuromuscular sk s s exam ned w th references to b o ogica psycho ogica and soc a determinants Prerequis tes ZOL 201 and 202†

346 Psychology of Coaching. 3) S, SS
Pr nc ples of learning app ed to coach ng sports Psy cho og ca and soc a prob ems of coaching.

361 Physical Education in the Secondary School. 3) F, S, SS
Current trends and theor es, such as e ect ve programs, coed c asses, lega issues, contract teach ng curricu um and admin stration.

376 Physical Education for the Elementary School. (3) F S SS
Scope and va ues of phys ca educat on and movement education n the elementary schoo . Methods materials and practice n teach ng act v t es for primary, interme d ate and upper grades

382 Physical Education for the Atypical Student. 3) F, S
Hand capp ng condit ons found among students and adaptat on of exerc ses and act v t es to ndiv dua needs Open to a 1 students Prerequ site· PED 335† or nstructor s approva

383 Techniques of Athletic Training. 3) F
Screen ng and cond t on ng of athletes, prevent on care and treatment of athlet c injuries, inc udes techniques of app y ng supportive mater a s and use of therapeut c a ds Prerequ s tes ZOL 201 and 202†

410 Organization and Administration of Intramural Activities. (2) NR
Princ p es and pract ces of the organizat on of 'ntra mura programs.

450 History and Philosophy in Physical Education. (3 F S SS
H stor cal and ph losophica her tage of phys ca educa t on from early Greek soc ety to present day physica educat on emphas z ng developments in the Un ted States

480 Methods of Teaching Physical Education. (4) F S
Methods of nstruct on, organizat on and presentation of appropriate content n phys ca educat on Three ec tures 2 hours aboratory

483 Evaluation in Physical Education. (3) F S SS
Ana ysis and construct on of tests Analys s of data and nterpretat on of measurement in phys cal education programs

485 Advanced Techniques of Athletic Training. (3) S
Prob ems n med ca aspects of ath et c tra ning inc ud ng njury examination techn ques, treatment moda it es and techn ques therapeut c exerc se rehabi tat on of ath etic njur es. Budget ng and secondary schoo ad m nistration of ath et c tra ning. Prerequ s te PED 383

486 Coaching/Athletic Training Internship. (1 6 F S
Relat onsh p of theory of coach ng ath etics and or ath et c tra ning techn ques to pract ca app cat on of coach ng and or athlet c tra n ng techn ques Prerequ - s te approva by area cha r. Y grade on y.

501 Research Statistics. 3 S
Stat st ca procedures samp ing techn ques hypothes s test ng and exper menta des gns as they re ate to studies reported in research pub cat ons. To be taken prior to or concurrent w th PED 500.

505 Research Laboratory. 3 S
Advanced research techniques n use and cal bration of laboratory equ pment ut lized n cinematographic analysis card oresp ratory testing and motor earning exper mentat on

515 Facilities and Equipment in Physical Education and Recreation. (3) F, S
Pr ncip es, standards personne , des gns and equ p ment uti ized n the planning, construct on and ma ntenance of indoor/outdoor fac t es.

520 Organization and Administration of Athletics. 3 F, S SS
Managing an athletic program; f nanc ng budget po cies, stag ng and promot on of ath et c contests, schedules, trave nsurance and current athletic trends.

525 Theory of Administration in Health, Physical Education and Recreation. (3) F S, SS
Admin strative ph osoph es development of concepts re ated to processes of administrat on, types of admin-strat ve behav or, tasks and responsib l t es of the adm nistrator, eva uation of the effectiveness of adm n strat on

535 Advanced Biomechanics. 3) S SS
Stat cs, dynamics, strength of materia s and flu d dy-nam cs as app ied to human movement Current research in b omechan cs and techn ques of research.

540 Physiological Bases for Physical Activity. (3) F S, SS
mmediate and ong term adaptations to exercise w th specia reference to tra n ng and the ro e of exerc se in card o vascu ar health

542 Environmental Aspects of Human Performance. (3 S
Mechan sms of phys olog cal response of healthy hu man beings to desert, arct c mounta n and undersea environments w th emphas s on the effect of environ mental stresses upon exerc se performance

545 Motor Learning and Development. (3) F S, SS
Theor es and pr nc ples underly ng motor earn ng, per formance and deve opment. Ro e of visual and k nesthet c perception, and general and spec f c ab ities n motor learn ng and performance

546 Psychology of Coaching. (3 F, S SS
Ath etes behav or in compet t ve sports w th emphas s on persona ty and mot vat onal techniques

547 Improving Performance in Sport Skills. (3) F SS
Factors n successful motor performance n ski s used in nd vidua , dua , and team sports

550 Historical Bases of Physical Education. (3) F S SS

Golden Age of Greece, Renaissance and modern Europe. Cultural, economic and educational forces which influenced the development of physical education, dance, and athletics in the United States.

552 Philosophical Bases of Physical Education. (3) F, S, SS
Idealism, realism, naturalism, experimentalism, and existentialism as they relate to the development of physical education programs.

555 Sport and the American Society. (3) F, S, SS
Impact of sports upon the American culture, with focus on competition, economics, mythology, race relations, and the Olympic syndrome.

572 Trends and Issues in Physical Education. (3) F, S, SS
Literature, research, and practices pertaining to trends, problems and issues.

573 Curriculum Construction in Physical Education. (3) F, S, SS
Application of principles, practices, and functional philosophies of curriculum making in physical education. Prerequisite: major in physical education or teaching experience.

574 Behavioral Analysis in Sport and Physical Education. (3) SS, NR
The application of behavioral principles, practices, philosophies and research to teaching physical education and coaching athletics.

576 Physical Education for Elementary School Children. (3) S, SS
Current practices and research pertaining to elementary school physical education programs.

577 Movement Experiences for Pre-School Children. (3) SS, NR
Movement activities for pre-schoolers based on the needs and characteristics of young children.

582 Adapted Physical Education. (3) F, S, SS
Contemporary adapted, developmental, remedial and corrective physical education programs; understanding of principles, problems and recent developments in this area.

583 Principles of Evaluation in Physical Education. (3) F, S, SS
Examination of literature and research pertaining to principles for evaluating performances; statistical procedures necessary to the implementation of grading plans.

Special Courses: PED 484, 494, 498, 499, 500, 580, 584, 590, 591, 592, 593, 594, 598, 680, 683, 684, 690, 691, 692, 780, 783, 784, 790, 791, 792, 799. (See pages 30-31.)

RECREATION

REC 120 Dynamics of Play. (3) F, S
Theoretical bases of play. Factors influencing play choices and attitudes. Analysis of game structure and function.

150 Outdoor Living Skills. (3) F, S
Theories and practical skills for outdoor living. Wilderness philosophy, outdoor experience culminating in ACA certification (if desired). Overnight trips.

160 Leisure and Society. (3) F, S
Analysis of the human relationship to leisure. Historical survey of philosophical, psychological, and socioeconomic bases for development of systems that provide leisure programs.

210 Urban Leisure Systems. (3) F, S
Systematic overview of interrelated public, private and commercial urban leisure services. Prerequisite: REC 160.

330 Theory and Principles of Recreation Programming. (3) F, S
Foundations for effective program planning. Theory and principles related to varied settings and types of activity. Formal planning process. Prerequisites: REC 160†, 210†.

350 Designs for Recreation. (4) F
Design and development of leisure and recreational resources with a focus upon man and his environment.

364 Recreation for Special Populations. (3) F, S
Concepts, methods, settings involving recreational services as applied to special groups in American society; *e.g.*, youthful and adult offenders, alcoholics, drug addicts, mentally retarded, mentally ill, and physically handicapped. May include field experience.

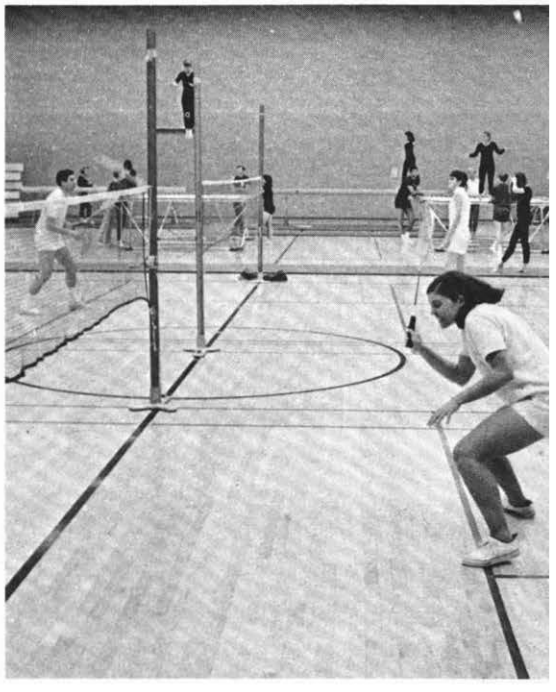
370 Outdoor Recreation Systems. (3) F
Survey of outdoor recreation resource delivery in the public sector.

463 Senior Internship. (6 or 12) F, S, SS
Supervised guided experience in selected agencies. Prerequisites: REC 330†, 472†, senior standing. Recreation majors only.

470 Camp Organization and Administration. (2) F
Organization and administration of camps. Preparation for camp management; consideration of budget, campsite and personnel.

472 Administration of Leisure Services. (3) F, S
Basic principles of administration and their application to successful administration practices. Analysis of administrative function, structure, and policies. Prerequisite: REC 330†.

540 Recreation Services for the Aged. (3) F
Recreational activities, special facilities, use of volunteers, public relations techniques, fund raising, and the dynamics of interpersonal relationships relative to the senior citizen.



552 Philosophical Foundations of Leisure. (3) F
Analysis of fundamental philosophical concepts as they relate to principles and practices of organized programs for leisure.

558 Current Issues in Recreation. (3) S
Contemporary issues and problems confronting the leisure services profession. Prerequisite: REC 552.

569 Commercial Recreation. (3) NR
Procedures in determining public needs, initiating enterprise, promoting activity, and evaluating the total project in terms of both proprietor and public.

570 Outdoor Recreation Planning. (3) F'80
Planning for administrative duties in varied recreation settings. Prerequisites: REC 370 or equivalent.

Special Courses: REC 294, 484, 494, 498, 499, 500, 580, 584, 590, 591, 592, 593, 598, 599, 691. (See pages 30-31.)

History

PROFESSORS:
KARNES (SS 204), ADAMS, BARLOW BURG, DANNENFELDT, GIFFIN, HUBBARD, KLEINFELD, MULHOLLAN, PAULSEN, TAMBS, W LSON, YOUNG

ASSOCIATE PROFESSORS:
ADELSON FOSTER, FULLINW DER, KAHN, KEARNEY LOEWENBERG, LUCKINGHAM, PHILL PS, R. D. SM TH, STOWE, TRENNERT, WARNICKE, WOOTTEN

ASSISTANT PROFESSORS:
BATALDEN CARROLL, MAC EL, MACKINNON, ROTHSCHILD, L. C SMITH, TILLMAN, WEINER

INSTRUCTOR:
DIBBERN

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

History Consists of 45 semester hours of credit of which 30 must be in history and 15 in closely related fields to be approved by the advisor in consultation with the student. At least 18 hours in history courses and six hours in the related fields must be in upper division courses. A minimum grade point average of 2.25 in the 30 hours of history courses is required. (See Degree Requirements, page 56-58.)

Latin American Studies Emphasis (See Interdisciplinary Studies, page 62) Consists of the Bachelor of Arts degree requirements in history. At least 30 upper division semester hours of the total program must be in Latin American content courses, including 15 hours in history and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required, as is the successful completion of *LIA 402 Movements and Meaning in Latin Amer ica* A reading knowledge of the other language is suggested. Fulfillment of requirements is recognized by a Bachelor of Arts degree with a major in History Latin Ameri can Studies Emphasis

Asian Studies Emphasis (See Interdisci plinary Studies, page 60.) Consists of the Bachelor of Arts degree requirements in histo ry, with the language requirement being fulfilled with an Asian language Thirty se mester hours of the total degree program must consist of Asian area courses selected with the approval of the departmental advisor. Lower division language courses may not be counted within the 30 hour requirement. Completion of this program is recognized by a Bachelor of Arts degree with a major in History Asian Studies Emphasis.

Bachelor of Science Degree Curriculum

History Consists of 60 semester hours of credit, of which 42 (including HIS 481 and 482) must be in history and 18 in closely re lated fields and quantitative studies, as approved by the advisor in consultation with the student HIS 481 and 482 are required for all degree candidates. At least 27 hours in history courses and nine hours in the related fields must be in upper division courses A minimum grade point average of 2.25 in the 42 hours of history courses is required. (See Degree Requ rements, pages 56-58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

History Consists of 42 semester hours of credit, 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 hours of credit must be taken in United States history. The remaining history and related area courses must be selected in consultation with an advisor from the Department of History A minimum grade point average of 2.25 in history courses is required for admission to practice teaching and for graduation. The course HIS 480 may *not* be counted as part of the 42 hour major requirement.

Departmental Minor Teaching Field

Bachelor of Arts in Education Degree Curriculum

History Consists of 24 hours of credit in history courses, of which at least nine must be in upper division courses. The program must include at least three hours in United States history.

Departmental Graduate Programs

The Department of History offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

HISTORY

Courses listed in pairs or triplicate may be taken in any order

HIS 100, 101, 102 Western Civilization. (3, 3, 3 F, S SS Traces or g n and development of Western man and h s nstitut ons H S 100 Anc ent World through the Midd e Ages· H S 101 Rena ssance and Reformat on through Age of En ghtenment HIS 102, French Revo ut on to the present

103, 104 The United States. 3 3) F S SS Growth of the Repub c from co onia times w th the f rst semester covering through the C v l War period and the second cont nu ng to the present day

200 Latin American Civilizations. 3 A The cu ture, econom cs and po it cs of Lat n Amer can nations *Not open to h story majors.*

294 Selected Topics in History. (3 NR A ful descr pt on of topics for any semester s ava able in the H story Department off ce. May be repeated for cred t

303, 304 American Cultural History. (3, 3) F, S, SS Cu ture n a broad connotat on nc ud ng deas, deals, the arts and socia and econom c standards. First se mester the nat on s co onial background and early

nationa period, second semester, the age of ndustria sm and modern America

305, 306 Asian Civilizations. 3 3 F S SS
The c v l zations of ndia Southeast As a Ch na and Japan F rst semester to mid 19th century, second semester s nce m d 19th century.

319 Ancient Near East and Egypt. (3 A
H story and c vi zation of the Anc'ent Near East and Egypt to the conquest by Alexander the Great

320 Ancient Greece. (3 A
H story and civ l zat on of the Greek world from the Bronze Age to the Roman conquest of the Hel en st c k ngdoms

321 Rome. 3) A
H story and c v ization of Rome from the beg nn ng of the Repub ic to the end of the Emp re

322, 323 The Middle Ages. 3, 3) A
Po it ca socio econom c and cultura deve opments of Western Europe. F rst semester, Ear y M dd e Ages second semester H gh Midd e Ages.

324, 325 Renaissance and Reformation. 3, 3) A
324 Antecedents and deve opment of the Rena ssance n ta y and ts spread to the rest of Europe 325: The Protestant and Catho c Reformat ons n the 16th century

326, 327 Early Modern Europe. (3 3 A
Socia econom c cu tura and po tical changes n 17th and 18th century Europe. F rst semester 17th century second semester 18th century

329, 330 Nineteenth Century Europe. 3 3) A
Po it ca socia econom c and nte ectua currents n Europe from Napo eon through Wor d War F rst semester, 1815 1866 second semester 1866 1918

331, 332 20th Century Europe. (3 3 A
Europe in ts world sett ng s nce World War emphas z ng maj r po it ca and soc a issues F rst semester 1914-1945· second semester 1945 to the present

336, 337 Intellectual History of Modern Europe. (3 3 A
Major po t ca , soc a , and econom c trends n Euro pean thought from the En ghtenment to the present F rst semester Enl ghtenment to m d-19th century sec ond semester, Marx sm to the present

339 Diplomatic History of Modern Europe. (3 NR
From the Congress of Vienna to the present

340, 341 Economic History of Modern Europe. 3, 3) NR
Impact of ndustr a sm upon the po t ca s cia and cu tura l fe of Europe F rst semester Rena ssance to the 19th century; second semester, 19th and 20th centur es

351, 352 England. (3 3 F S
Po t ca , econom c, and socia development of the En gl sh peop e F rst semester to the 17th century second semester 17th century to the present

362 The American Indian. (3) F
History of the American ndian w th emphas s on the government's nd an po cy and the mpact of the wh te man on tr ba cu ture

364 The Black American Experience. (3) F, S
The Afro American in American h story, thought and culture, emphasiz ng those aspects that were directly inf uenced by the r presence

367, 368 The West in American History. 3, 3) A
F rst semester, the Turner Thes s of the s gnif cance of the front er in American h story beg nn ng w th d scov ery and exp orat on and cont nuing to the per od of Texas and the Mex can War second semester the de ve opment of the front er thes s to 1890 emphas z ng Arizona and the Southwest.

370 Women in United States History. 3) A
Examinat on of l ves of prom nent Amer can women from co on a t mes to the present.

380 History of the Mexican-American. 3) A
Ro e of the Mexica -American in U S history

383, 384 Latin America. 3 3) A
First semester anc ent c v l zat on exp orers and con querors and co on a nst tut ons second semester, nat onal st c deve opment of the ndependent repub cs s nce 1825

401 American Colonial History. 3 A Burg
Po t ca , econom c soc a and cu tura history of the co on a era. Concentrates on Eng sh co on es w th some cons derat on of Span sh, French, and other co o n al regions in North Amer ca.

403 Early National Period in American History. (3 A, Burg
Po t ca soc al and econom c deve opment of the Un ted States from the Revolut on to 1828

404 The Jacksonian Era. (3 A, Loewenberg
Amer can ideals w th emphas s on equa ty n the po t - cal, soc a , and econom c l fe of the nati n, 1828 1850.

406 Civil War and Reconstruction. (3 A, Hubbard
Causes and development of the war; po tical const tu t ona , and socia ssues of Reconstruction and the r effects on post-war Amer ca.

407 Populism and Progressivism. 3 A Ph ps
Po t ca soc a econom c and ntel ectua trends in the Un ted States 1877 1918

409, 410 Recent American History. (3 3) A Kearney, Sm th
F rst semester, 1913 1932 W son an diplomacy and the F rst Wor d War, the 192 s, the orig ns of the Great Depression Hoover admin strat on; second semester 1932 1945, the New Dea , soc ety dur ng the Depres sion, Second Wor d War.

411 Contemporary America 3 F S Sm th, Foster
The Un ted States from 1945 to the present

413 Origins of the American Economy. (3 NR Foster
Amer can econom c growth from the colon a period to 1900 trade and commerce problems of s avery and agricu ture, ndustr al deve opment and the govern ment s ro e in the economic sector

414 The 20th Century American Economy. (3 NR, Foster
Amer ca as a wor d econom c power from 1900 to the present business changes and cyc es government reg ulat on agr culture, abor and the prob ems of a mature economy

415, 416 American Diplomatic History. (3 3 A, Pau sen, Mulho an W lson
American re at ons w th foreign powers First semester 1776 1898 second semester 1898 to the present

417, 418 Constitutional History of the United States. (3 3 NR, Pau sen
Or g n and deve opment of the Amer can const tut onal system F rst semester, colonial origins through Recon struct on second semester Reconstruct on to the present

419, 420 American Urban History. (3 3 A, Luck ngham F rst semester, colon a t mes to the 19th century sec ond semester 19th cent ry to the present

421 History of American Labor. 3) A Foster
Labor u ion h story, de og ca or g ns of m dern abor law and agr cu tura abor Emphas s on abor prob ems and development n the 20th century

422 Social History of American Women. 3 A Roths ch ld
Women s ro e status, and achievements in Amer ca Changes n fam y patterns and effects of mmigrat on industr a zat on, and urbanizat on

423 Recent American Intellectual History. 3) A Fu t n w der
Deve opment of soc a thought terary trends and ph osoph ca theory from 1890 to the present

424 The Hispanic Southwest. 3) NR Mac e
Deve pment of the Southwest n the Span sh and Mex can per ods to 1848

425 The American Southwest. 3 NR Trennert
Deve opment of the Southwest from 1848 to the pres ent

426 The West in the 20th Century. 3) A, Foster
Ro e of the Western states n Amer can h story since 1900 w th emphas s on pol tics the conservat on move-

ment ndustry and labor, and the chang ng ro e of ethn c m nor t es.

428 Arizona. (3) F S; Staff
Emergence of the state from early t mes to the present

430 20th Century Chicano History. 3 A Mac e
H stor ca deve opment of the Ch cano commun ty n the 20th century

431 The French Revolution and the Napoleonic Era. (3 NR Adams
Cond t ns n France before 1789 the Revo ut onary decade from 1789 to 1799 the organ zat on of France under Napo e n and the mpact of changes n France o European soc ety

433 Modern France. 3 A Adams
France s nce 1 0

434 Hitler: Man and Legend. 3 A K e nfe d
A b ograph ca approach to the German Third Reich emphas z ng nature of Naz reg me Wor d War I and h st rography

435 Modern Germany. (3 A Kle nfeld
Germany s nce 1840

437, 438 Eastern Europe and the Balkans. 3,3 A Ba ta den
Pe p es and countr es f easter and southea tern E pe n the 19th and 20th cent r es F rst semester 1800 1914 emphas z ng the Hapsburg and Ottoman Emp res second semester, 1914 to the present empha s z ng the su essor states

439 The Modern Middle East. 3) NR Ade son
mpact f the Western wor d up n M dd e Eastern gov ernme ts re g n, a d soc ety n the 19th and 20th ce tur es pr b ems of modern zat on and the ro e of the M dd e Ea t n world affairs

441 Imperial Russia. (A G ff n Bata de
Devel p nt of Russ an po t ca economic, soc a re g ous and nte ectua nst tut ons and t ad t ons from the end of the 17th century to the co apse of the tsar st autocracy n 1917

442 The Soviet Union. 3 A G ff n
An exam nat n of Sov et po t cs econom c deve op ment and f re gn re at ons from the 1917 Revo ut on to the pre ent

443 Russia and the United States. 3) A G ff n
Off c a a d un ff c a re at ns betwee Russ a and the U S ate 18th century to the present Emphas zes pe r d f ow ng the Bo shev k Revo ut on

445 Tudor England. 3) A Warn cke
Pol t a soc a econom c and u tura deve opments n 16th cent y Eng ar d

446 Stuart England. 3 A Warn cke
Po it ca soc al, economic, and cu tura developments n 17th century Eng and

447 Georgian England. (3) NR Barlow
Ma or soc a econom c, po t ca and ntel ectua trends n 18th and ear y 19th century Br ta n

449 Modern Britain. 3) A Ade son
Factors contr buting to Br tain's pos t on as the wor d's ead ng power n the 19th century and ts decl ne from that pos t on n the 20th century

450 British Constitutional History. (3 A; Warn cke
H stor ca deve opment of the const tut ona system f Great Brita n from the M dd e Ages to the present emphas z ng the growth of democracy

451 The British Empire. 3 A Ade son
Br t sh mper a sm and co n a sm n Afr ca the Amer cas As a, and the South Pac f c

456, 457 Iberian Empires. (3 3 NR, Stowe Tambs
Cu tura econom c po t ca and socia deve opment of Spa n P rtuga and the r empires F rst semester, pre h st r c beria through the Reconquest second semester the Age of D scovery through the d ssolut on of the empires

458, 459 Colonial Latin America. 3,3 A Stowe
P i t cal, econ m c, and soc a inst tuti r s dur ng H s pan c ru e n Amer ca F rst semester berian and preconquest backgrounds co on a nst tut ons of the 16th century, second semester 17th and 18th ce tury deve opments

460, 461 Spanish South America. (3 3 NR, Tambs
Po t ca econom c and soc a deve p ent of the Span sh speak ng nat ons f South Amer ca s nce nde pendence F rst semester the 19th century second semester 20th cent ry deve opme ts

463 Intellectual and Cultural History of Latin America. 3 NR Tambs
Ma n currer ts of thought the outstand ng th kers and the r mpact n 19th and 20th cent ry Lat n America Cultural and nst tut ona bas s of Lat n Amer can fe

464 The United States and Latin America. (3 A; Karnes
The Lat n Amer an strugg e for diplomat c ecognit or attempts at po t ca union part c pat on n nternat onal organ zat ons s nce 1810 and re at ns between the Un ted States and Lat n Amer ca

466, 467 Mexico. (3 3 A, Mac e Stowe
Po t ca , economic, soc a and cu tural deve opments First semester ear est t mes to 1810, second semester 1810 to the present

468 Brazil. (3 NR Tambs
D scovery conquest and settlement by the Portuguese ach even ent of ndependence r se and fa of the em p re problems and growth of the repub c to the present

470 Chinese Cultural History. (3 A T f man
Chinese thought and cu ture from Confucius to the present.

471, 472 Diplomatic History of East Asia. 3 3) NR Kahn
Fore gn re at ons of Ch na Japan, and Korea First semester Op um War to 1905 second semester, 1905 to the present

473, 474 China. (3 3 A, Tr man, MacK nnon
Pol t ca econom c soc al and cu tura history of the Ch nese people F rst semester, ear y t mes t the 19th century second semester 19th century t the present

476 Modern Southeast Asia. (3) NR MacK nnon
mper a sm and revo ut on in 19th and 20th century Southeast Asia

477, 478 Japan. (3 3 A Kahn
Pol tica econom c, soc al and cu tura h story of the Japanese peop e First semester ear y t mes to the 19th century second semester 19th century to the present

479 The Chinese Communist Movement. (3 NR, MacK nnon
Analysis of the communist movement n 20th century Ch na w th emphas s on its histor ca sett ng

480 Methods of Teaching History. 3 F Ph l ps
Methods n nstruct on, organ zat on and presentat on of the subject matter of h story and c ose y a ed f e ds

481 Quantification in History. (3) A We ner
Uses of stat stica and quantitat ve techniq es n the study of histor ca problems in p t ca ana ysis new econom c theory demography, and socia h story

482 Historical Statistics. 3 A D bbern Foster, We ne Stat st ca rout nes and computer programs app cab e to histor ca quant f cat on.

512 European Historiography. 3 A Bar ow
Methods and theories of wr ters of European h story

513 American Historiography. (3 A, Loewenberg
Meth ds and theor es of wr ters of Un ted States h s tory

514 Latin American Historiography. (3 NR Tamb
Methods and theories of wr ters of Lat n Amer can h s- tory

580 Practicum. 3) A Staff
Methods and subject matter nstruct n in h story The funct ons and respons b t es of co ege teaching Re qu red of and open on y t graduate ass stants

591 Seminar. (3 NR, Staff
May be repeated for credit. T p s may be se e ted from the fo low ng areas

(a) Un ted States History
b) European H story
(c) Eng sh H story

(d) Latin American History
(e) East Asian History

Special Courses: HIS 294, 298, 484, 492, 493, 494, 497, 498, 499, 500, 580, 584, 590, 591, 592, 593, 594, 598, 599, 790, 792, 799 (See pages 30-31)

Home Economics

PROFESSORS:
HOOVER (HEC106), BARKLEY, R. LEWIS, MONTS, MORGAN

ASSOCIATE PROFESSORS:
BAKER, STANGE, STREUFERT

ASSISTANT PROFESSORS:
CARY, CAUBLE, CREIGHTON, FLSINGER, HUNTER, JACOB, JEFFERY, LAUB, K. LEWIS, MORALES, PETERS, SCHNITTGRUND, WOOLDRIDGE

Departmental Major Requirements

The Department of Home Economics awards the Bachelor of Arts or Bachelor of Science degree upon successful completion of a four-year curriculum of 126 semester hours as prescribed on pages 56-57 under the College of Liberal Arts. Courses HEC 230 and 430† are required. Six hours of the home economics courses listed on page 5 and not within the major area of specialization may be applied to fulfill the liberal arts General Studies requirements.

Bachelor of Arts Degree Curriculum

Home Economics. Consists of 45 semester hours of credit of which 30 are in home economics and 15 in related fields; 20 semester hours of credit must be in home economics upper division. The specific courses will be determined by the student in consultation with the advisor, depending on the area of specialization. See Degree Requirements, pages 56-58.

Bachelor of Science Degree Curriculum

Home Economics. Consists of 50 semester hours of credit of which at least 20 must be in upper division home economics courses. The specific courses will be determined by the student in consultation with the advisor, depending on the area of specialization. (See Degree Requirements, pages 56-58.)

For either the B.A. or B.S. degree, students must select one of the following areas of concentration.

- Family Studies: Child Development
- Human Nutrition: Dietetics
- General Home Economics
- Home Economics Education
- Home Economics in Business with an option in one of the following: Child Development, Decorative Arts, Food and Equipment, Textiles and Clothing

When field experience is included in the curriculum to complete requirements for graduation, students should register for HEC 451, Field Experience, identifying it with the area of specialization.

American Dietetic Association requirements consist of 68 hours of approved courses leading to an internship. See chair of department for further information.

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree

Home Economics. Consists of 36 semester hours of credit in home economics. Major courses required are: TXC 123; FON 141, 142; CDE 232†; PGS 100; SOC 101; CDF 337†, FAS 331†, 357†, HLC 451†; HEE 461†, 480, 481†. Select two from HFE 153, DEH 272, 373†. General Studies courses required: DEH 172, FAS 354, CHM 130 or 131†, a mathematics course, an American history course, and a course in Arizona Constitution and American national government. Remaining credits to meet major requirements are selected in consultation with major advisor.

Center for Family Studies

The Center for Family Studies is an educational, research and service agency of the University within the College of Liberal Arts and administratively related to the Department of Home Economics. The Child Development Laboratory is an integral part of the Center. The purpose of the Center is to coordinate and develop academic and community programs which foster the understanding of family life from an interdisciplinary point of view. Policies and programs of the Center are guided by an interdepartmental advisory committee.

Departmental Graduate Programs

The Department of Home Economics offers programs leading to the degree of Master of Science. Consult the *Graduate Catalog* for requirements.

CHILD DEVELOPMENT

CDE 232 Child Development. 3 F, S.
Development from conception through late childhood. Significance of family membership. Recognition of individuality within the universal pattern of human development. Guided observations. Prerequisites: PGS 100, SOC 101.

337 Nursery School Education I. 3 F, S.
Discussion and application of methods for guiding young children in activities related to learning experiences. Observation and participation in the Child Development Laboratory. Prereq: site CDE 232†. Two lectures, 3 hours laboratory. May include field trips.

338 Nursery School Education II. 4-5 F, S.
Extensive participation in the Child Development Laboratory emphasizing program implementation and guidance of the child's behavior. Prerequisite: CDE 337† or equivalent. Application required prior to registration. One lecture, 3 hours laboratory per credit. May include field trips.

430 Family as a Learning Environment. (3) F, S
Fam ly nteract on which enhances the deve opment and growth of nfants or todd ers Part cipat on with ch d parent pa rs Prerequisite: CDE 337† or equivalent Lec ture and aboratory May repeat for a total of 6 cred ts

434 Organization and Administration of Preschools. (3) S 79
P ann ng operat on and evaluat on of programs for young ch ldren as re ated to nat onal regulations needs of the ch d, fam y and commun ty nvest gat on of exemp ary programs Prerequisite· CDE 337† or approval of instructor May inc ude f e d tr ps

531 Advanced Child Development. (3) S
Major deve opmental theor es, related research and the r application to fami y nteract on. Prerequ s te CDE 232† CED 522, or approva of nstructor

532 Behavior of Young Children. 3) F
Focus on developmenta and behav ora problems of ear y chi dhood App ication of research based pr nci p es to ch d guidance Prerequisite. 6 semester hours in upper div s on ch d deve opment courses or approva of nstructor.

DECORATIVE ARTS

DEH 171 Introduction to Decorative Arts: Cultural Influences. (3) F S
Focus on how d verse cultures have expressed them selves through the decorative arts May nclude f e d trips

172 Introduction to Decorative Arts: Basic Design. (3) F, S
E ements and princ p es of art as they re ate to des gn prob ems in our phys ca env ronment Majors on y or approva of nstructor. May nclude field trips 2 ec tures 2 hours stud o

271 Creative Textiles. (3 F
Ancient text e techniques and the r re at onship to to day s fe sty e. Creat ve exper ences n a var ety of techn ques May inc ude field tr ps One ecture, 4 hours stud o

272 Housing and Society I. (3 F S
Contemporary Amer can hous ng H storica deve op-ment as it relates to ndiv dua , fam y and commun ty we fare

371 Decorative Textiles. (3 S
nvest gation of the fabricat on and esthetic qua t es of text es Cu tura and h stor cal express on of des gn as re ated to nter ors Prerequisite DEH 171 or approva of instructor May nc ude f e d tr ps

373 Home Furnishings. 3) F S
Eva uation of furn sh ngs des gned for the home n a funct ona econom c and esthetic framework Prerequ s te. DEH 172 or approval of nstructor. TXC 223 s recommended May inc ude f e d tr ps

472 Housing and Society II. (3) F, S
Fam ly housing as affected by legis ation with app ica t on to contemporary housing

474 History of Interior Furnishings I. (3) F
The design of furnish ngs as an express on of cu ture from antiqu ty to the 20th century

475 History of Interior Furnishings II. (3) S
Des gn of furn shings as an express on of cu ture of the Amer can periods and the 20th century Prerequ s te DEH 474 or approval of nstructor.

476 Family Housing Environment. 3) F S
Soc a and psychological factors affect ng fam y hous ng Prerequ s te SOC 101 or PGS 100

477 Advanced Home Furnishings. (3 F S
The esthet c env ronment re ating to furn sh ngs n nte rior spaces inc ud ng imp ications for profess onal opportun t es. Prerequ s tes DEH 373† TXC 223 May nc ude f e d trips

572 Current Housing Issues. (3) F, S
Focuses on selected current hous ng issues, the r re a-tionsh p to and effect on the fam ly

FAMILY STUDIES

FAS 330 Personal Growth in Human Relationships. 3) F S
Personal development and behav or as related to com petency n nterpersona re ationsh ps w th n the fam y Processes of fam ly nteract on Prerequ s tes SOC 101 and PGS 100, or equ va ents

331 Family Relationships. 3) F S
ssues cha enges and opportunit es re at ng to present day fami y iving Factors nf uencing nter re at ons w th n the fami y Prerequ s te course in psycho ogy or soc ology

332 Human Sexuality. 3) F, S
Relationship of sexua ty to fam ly fe and to major so-c eta ssues Emphasis on deve oping hea thy pos t ve, and respons ve ways of ntegrat ng sexua and other aspects of human iv ng Prerequ s te PGS 100

354 Consumer Economics. 3) F S
Re at onsh p of the consumer to the economy as a de term nant of the fam ly pattern of iv ng Current co sumer prob ems and sources of protect on

357 Management in the Family. (3 F S
ntegrated nature of management a a means to rea i zat on of nd v dual uti zation of resources Focus on dec s on mak ng. Prerequ s te SOC 101 and PGS 100 or equ va ent.

430 Parent-Child Relationships. 3) F S
Needs of parents and chi dren and the dynam cs of parent ch d nteract on, centering on the years in the fam y l fe cycle through the ch ldren s e ementary school experiences Prerequ s te: CDE 232† or FAS 330† or 331†

431 Parent-Adolescent Relationships. (3) F, S
Dynam cs of the re at onsh ps between parents and ad o escents Deve opmenta character st cs of ado escence and the correspond ng adu t stage Pre requ s tes CDE 232†, FAS 331†.

435 Advanced Family Relationships. 3) F
Recent research, ssues and trends re at ng to fam ly nteraction Influence of fam y compos t on, phys cal environment, fam y patterns and va ues on fam ly dy nam cs Prerequ s te· FAS 331†

436 Conceptual Frameworks in Family Studies. 2) S
S gn f cant organ z ng approaches to study of the fam y w th part cu ar focus on the eco-system interact ona and deve opmenta frameworks App icat on to diverse ind v dua and fami y s tuat ons Prerequ s tes: FAS 330† 354 or 454 357† and CDE 232†

440 Fundamentals of Counseling. (3) F, S
Counsel ng in relat on to fam ly nteract on, attent on to commun cat on sk ls re evant to a var ety of he p ng re ationsh ps

454 Family Financial Management. (3 S
Major fam ly ncome and expend ture a ternatives n atta nment of fam y goa s

535 Family Relationships in the Middle and Later Years. 3) F
Deve opmenta processes and generat ona relat on-sh ps of the fami y n the m dd e and ater stages of the fam ly fe cyc e Prerequis tes: CDE 232†, FAS 331† or approval of nstructor

536 Family Crises and Resources. 3) F S
Spec a prob ems encountered n the fam y nd v dua and community esources for approach ng them. Pre-requ sites FAS 330†, CED 522 or equ va ent

537 Individual Development in the Family Milieu. 3) F
The fam y as a framework for human deve opment Rec proca inf uence between nd v dua and fam y de-velopment Prerequis tes CDE 232† FAS 331†

538 Approaches to Marriage and Family Counseling. 3) F, S
Methods current y used in marr age and fam y counsel ing and cons derat on of theoret ca bases underly ng the methods. Prerequ site approva of nstructor

551 Family Decision-Making. 3) S SS
nterpretat on of dec sion ssues fac ng fam ies from the perspect ve of t me change and deve opment· an ecol og ca system approach Prerequ s te. FAS 357† or approva of instructor.

554 Family Economics. (3) F
Analysis of public policy affecting family economic behavior with respect to divorce, taxation, credit, population, and other issues. Prerequisite: FAS 354 or ECN 201 or ECN 500†.

591 Seminar. (3) F, S
May be repeated for credit. Topics may be selected from the following areas: a) Consumer Education; b) Cross-Cultural Management; c) Issues of Scarce Resources; d) Values.

FOOD AND NUTRITION

FON 141 Human Nutrition. (3) F, S
Basic principles of human nutrition as they relate to health and well-being of individuals and families. Emphasis on the nutrients and factors which affect their utilization in the human body.

142 Applied Food Principles. (3) F, S
Scientific principles and nutrition related to selection, preparation and care of food. Two lectures, 3 hours laboratory.

341 Food: Management and the Consumer. (3) S
Factors affecting the food supply, consumer protection, buying and management of human and material resources. Laboratory: Planning, organizing, preparing and serving food: management of time, money and energy; consideration of nutrient needs, food quality and consumer acceptability. Prerequisites: FON 141, 142, HEE 153. Two lectures, 3 hours laboratory.

343 Institutional Food Purchasing. (3) S, SS
Food purchasing for institutions, understanding of cost factors, food laws, quality standards and basic manufacturing processes. Prerequisite: FON 341†. One lecture, 4 hours laboratory. Field trips may be taken.

344 Food System Management. (3) F
Organization administration and management of food service in hospitals and institutions. Prerequisite: FON 343†. One lecture, 4 hours laboratory. Field trips may be taken.

440, 441 Advanced Human Nutrition I, II. (3,3) F, S
First semester will emphasize human physiology through the life cycle. Second semester emphasizes metabolism of nutrients at the cellular level. Prerequisites: FON 141; ZOL 202†; CHM 332†.

442 Experimental Foods. (3) F, S
Experimental study of foods; investigation of current research. Prerequisites: FON 142, CHM 231†. Two lectures, 3 hours laboratory.

443 Child Nutrition. (3) F
Nutrition needs, practices and programs for infants, children and adolescents. Not open to nutrition and dietetic majors. Prerequisite: FON 141 or approval of instructor.

444 Diet Therapy. (3) F, S
Principles of nutritional support for prevention and treatment of disease. Prerequisite: FON 441†.

445 Quantity Food Production. (3) F, S
Standard methods of food preparation in quantity; operation of institutional equipment, menu planning for institution. Experience in quantity food service. Prerequisites: FON 141, 344†. One lecture, 6 hours laboratory. May require field trips.

446 Human Nutritional Laboratory. (4) F, S
Clinical and bio-chemical evaluation of nutritional status. Prerequisites: FON 441†, CHM 367†. CHM 119† and 120† are recommended. One lecture, 8 hours laboratory.

448 Community Nutrition. (3) S
Organization within the community for delivery of nutritional services. Methods for assessment of nutritional status of population groups. Prerequisites: FON 441†, SOC 101.

449 Geriatric Nutrition. (3) F
Nutritional needs, practices and programs for aging individuals. Prerequisite: FON 141 or approval of instructor.

462 Food and Equipment Industries. (3) F, S, SS
Organization, economics, and marketing as related to the food and equipment industries. Prerequisites: HEE 153, FON 142.

541 Recent Developments in Nutrition. (2) F
Survey of research. Prerequisite: FON 441†.

543 Vitamins and Minerals. (3) S
In depth study of specific topics in vitamins and minerals. Prerequisite: FON 441† or equivalent or approval of instructor.

548 Recent Developments in Foods. (2) S
Developments which affect the food supply. Prerequisites: FON 142, CHM 101.

HOME ECONOMICS

HEC 230 Family Environment Interaction. (3) F, S
Ecological study of the family. For home economics majors only.

430 Contemporary Issues in Home Economics. (3) F, S
Significant national and international issues and public policies affecting individual and family well being. For majors only. Prerequisite: HEC 230.

451 Field Experience. (1-3) F, S
Supervised study in the area of student's specialization (CDE, DEH, FAS, FON, HEE, TXC) in cooperation with community business institutions. Students must make



arrangements with instructor one semester in advance of enrollment. Prerequisite: completion of 60 hours and approval of instructor. For Family Management (FAS) majors, prerequisite: FAS 357. May be repeated for a total of three hours. For Textiles and Clothing (TXC) majors intern program (credit 12 hours), prerequisite: grade point average of 3.0, senior standing the semester of program participation, TXC 122, ECN 201 or 202, MKT 300.

500 Research Methods. (3) F, S
Purposes of research. Experimental design, methods of data collection, thesis proposal development.

HOME ECONOMICS EDUCATION

HEE 153 Analysis of Home Equipment. (3) F, S
Equipment for the home. Principles of construction, operation, selection and effective use of equipment. Two lectures, 2 hours laboratory. May include field trips.

453 Advanced Analysis of Home Equipment. 3) F
Current trends in home appliances Adaptations for individuals having special needs Kitchen and laboratory planning Prerequisite HEE 153 or approval of instructor Two lectures 2 hours laboratory May include field trips

461 Presentations in Home Economics. 1 3 F S
Application of demonstration principles Multimedia presentations , Development of audiovisual materials for home economics Prerequisites junior standing and approval of instructor One hour lecture 4 hours laboratory for each unit

480 Methods of Teaching Home Economics. 2 F S
Instruction organization and presentation of subject matter in home economics.

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 Open only to home economics majors or minors May include field trips

582 Program Planning and Evaluation in Home Economics. 3 F 79
Process of planning and evaluating programs Open only to home economics majors or minors

584 Current Trends of Teaching Home Economics. (3 F, S
Focus on teaching home economics related to current issues and problems facing families and society Open only to home economics majors or minors

585 Administration and Supervision of Home Economics Education. 3) F 80
Development of individuals for state, city community and college leadership roles

TEXTILES AND CLOTHING

TXC 122 Clothing and Human Behavior. 3 F S
Emphasizes cultural influences human behavior and design

123 Clothing Construction. (3 F, S
Construction processes related to fabrics and fashions study and use of commercial patterns Course may be waived on successful completion of placement test given each semester during registration week One lecture 4 hours laboratory

223 Introduction to Textiles. 3) F, S
Basic properties processing end uses and care of textile products

227 Clothing the Family. 3 S '80
Clothing needs of men, women and children at various stages of the life cycle May include field trips

321 Pattern Designing. (3) F, S
Flat patterns used to develop fundamental principles in designing and individualized garments. Prerequisites TXC 122 123 One lecture, 4 hours laboratory

323 Advanced Textiles. 3) F, S
Textile technology fiber science, dyeing, finishing, and other topics Prerequisites. TXC 223, CHM 101· CHM 231† is recommended Two lectures 2 hours laboratory May include field trips

422 Applied Dress Design. 3 S 80
Creative interpretation of dress design developed through the media of draping Prerequisites TXC 122 123 One lecture 4 hours laboratory.

423 Clothing Analysis. (3 F S
Specialized processes used with a wide variety of apparel fabrics interrelationships between fabric properties and apparel Prerequisite TXC 321† Two lectures, 2 hours laboratory May include field trips

424 History of Costume. 3 F S
Evolution of costume from ancient Egypt to present day Prerequisites. TXC 122 and ARH 100 or 300 May include field trips.

426 The Clothing and Textile Industries. (3) F S
Organization and marketing problems and practices specific to the textile and clothing industries Prerequisites TXC 122 223 ECN 201.

429 Textile Analysis 3) F S
Introduction to textile testing equipment and evaluation of data Prerequisite TXC 323† Two lectures 2 hours laboratory May include field trips

521 Experimental Textile Analysis. (3 F 80
Current textile research and methods. Individual projects relating to textile performance Prerequisite· approval of instructor May include field trip

523 Sociopsychological Aspects of Clothing. (3 S '79, SS 80
Sociopsychological theories to the selection and use of clothing Prerequisites TXC 122, SOC 101 ECN 201.

526 Clothing and Textile Economics. 3) F 79
A profile of textiles related industries, government and labor demands consumer expectations, and new products and markets Prerequisites· ECN 201 and two textile courses

Special Courses: CDE, DEH FAS FON HEE TXC 484, 494 498 499 500 580, 584 590 591, 592, 593 594, 598 599.

Liberal Arts

Interdisciplinary LIA courses offered by the College of Liberal Arts

LIA 100 University Adjustment and Survival. 2 F S
Analysis of student motivation and goals Reinforcement of language facility and study skills Use of the library Orientation to University resources and procedures Special section offered for mature women returning to higher education Fee only

101 The Use of Research Libraries 1 F,S
Interdisciplinary resources and services of the University Library, with an emphasis on research Open to freshmen and sophomores

150 Introduction to Asia. (3 S
Interdisciplinary orientation to Asian cultures and societies Also serves as an introduction to further study on Asia, especially in the social sciences and the humanities This course will be a part of programs in Asian Studies and in the Department of Humanities and Religious Studies Same as HUM 15

171, 172, The Human Event. 3 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 Honors Program Consult the Honors office for application by Liberal Studies requirements

197 Honors Seminar for Freshmen. 1 S
Enrollment restricted to members of the Honors Program.

401 The Meaning of the 20th Century. 2 3 S
A critical disciplinary attempt to identify the major intellectual and phenomenological thrusts of the contemporary world Open to juniors and seniors or by approval of the instructor

402 Movements and Meaning in Latin America. 4 NR
An interdisciplinary, transnational symposium which will investigate and integrate the various cultural, philosophical, political and economic trends in Latin America from pre Columbian times to the present Team taught by a rotating panel of Latin American artists Open to juniors seniors, and graduate students Required of all prospective Latin American Studies graduates Credit 4 hours

Special Courses: LA 294 298 492 493, 494 497, 498 499

Mass Communications

PROFESSORS:
BENNETT (STAUF 231B), BROWN, M LNER
ASSOCIATE PROFESSORS:
CRAFT, CROWDER ELL S, HOY
ASSISTANT PROFESSORS:
ITULE LANCE MOORE S LVER, SM TH

Departmental Major Requirements

Freshmen enrolling in the Department of M ss Comi unications and students transfer ring from other departments within the University must complete a minimum of 30 sen ester l ours with a minimum of 2 25 cumu ative grade average before they will be permitted to enro l in mass communications courses beyond the 100 level. These 30 semester hours must include the follow ng courses

	Se r r Hr ur
ENG 101 nd 07 or ENG 104	3 (
POS 1 or POS 3(.	3
MCO (.	3
Laboratory Sc ence	4
Genera Studi s E ect ves . .	4 1
Tot	3(

A student who has completed 30 semester hours at another institution must remove any of the preced ng course def c encies dur ng the f rst two semesters in the dep artment M ss con munications students must maintain a 2.25 cun ulative grade average to continue to enro in courses in the department.

To ensure th t students get a broad aca demic background n the bera rts, no more than 36 semester hours of mass comn unica tions may apply to the 126 semester hours requ red for graduation. At least 18 hours of mass communications, including one writ ng course, must be t ken at Arizon State Uni versity A student must make a "C" or better in all courses in the major ncluding the re quired re ated are Specific courses that may be used to fulfil the related requirement are listed in a bre chure av il ble in the dep art ment

The ournalism sequence in the Department of Mass Commun ications is accredited by the An erican Counc on Educat on for Journal ism

Bachelor of Arts Degree Curriculum

Broadcasting Consists of 45 semester hours of credit of which 30 must be in mass comn u nications and 15 in related fields Required courses are MCO 110, 200†, 201†, 332†, 335† and 402. Related courses must include one course from each of the following idvertising, economics, English, history and applied communication These courses are in addition to other degree requirements. (See Degree Re quirements, pages 56 58)

Journalism Consists of 45 semester hours of which 30 must be in mass communications and 15 in related fields. Required courses are MCO 110, 201†, 301†, 313†, 402, 413†, and 420† Related courses must include one course from each of the following: advert sing, eco nomics, English, history and applied communication These courses are in addition to other degree requirements. (See Degree Requirements, pages 56 58)

Bachelor of Science Degree Curriculum

Broadcasting Consists of 57 semester hours of credit of which 30 must be n mass communications and 27 in related fields. Required courses are MCO 110, 200†, 201†, 332†, 335† and 402 Related courses must include one course from each of the following advertising, economics, English, historv, statistics and applied communication. Related courses must include 12 hours from one academic discipline approved by the advisor and the Department Standards Committee. These courses are n addition to other degree requirements. (See Degree Requirements, pages 56-58.)

Journalism Consists of 57 semester hours of cred t of which 30 must be in mass communi cations and 27 in related fields Required courses are MCO 110, 201†, 301†, 313†, 402, 413† and 420† Related courses must include one course from each of the following advertising, economics, English, history, statistics and applied communication. Related courses must include 12 hours from one academic dis cipline approved by the advisor and the Department Standards Committee. These courses are in addition to other degree requirements. (See Degree Requirements, pages 56-58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Journalism Consists of 45 semester hours of credit Courses MCO 110, 201†, 301†, 313†, 351† and 480† are required. An additional 27 hours, including 15 hours in mass communications wi be approved by the advisor n consultation w th the student. The remaining courses may be in closely related fields.

Departmental Minor Teaching Field Requirements

Journalism Consists of 24 semester hours of credit Courses MCO 110, 201†, 301†, 313†, 351† and 480† are required. The remaining courses are to be selected in consu tation with a ournalism advisor.

MASS COMMUNICATIONS

MCO 110 Introduction to Communication. 3 F S SS Organ zat on funct on and respons b t es of the med a

and adjunct serv ces. Pr mary emphas s on newspapers, rad o te ev s on and magaz nes.

120 Media and Society. 3 F S
Ro e of newspapers magaz nes, radio, te ev s on and mot on p ctures Not open to mass commun cat ons majors

200 Fundamentals of Radio-Television. 3) F S, SS
Structure of broadcast ng in the Un ted States. h story regu at on organ zat on Re at onsh p of broadcast ng to advert s ng re earch a d government agenc es Prereq u s te MCO 110.

201 News Writing. 3) F S SS
W t ng r ews for the med a Prerequ s tes MCO 110, successfu comp et on of Engl sh prof c ency requ re ment and typ ng ab ty of 30 words per m n te One ecture 4 hours laboratory

300 Newsfilm. 3 NR
F m mak ng and f m edit ng techn ques emphas z ng v sua cont nu ty Prerequ s te MCO 335† and 351† or approva of nstructor

301 Reporting. 3) F S
Fundamentals of news gathering, nterv ewing, a d n depth report ng. Prerequ s te MCO 201† One ecture, 4 h urs abo atory

313 Introduction to Editing. 3) F S
Copyed t ng and headl ne wr ting E ectron c editing on v deo d sp ay termina s Prerequ s te MCO 301† Two ectures 2 hours aboratory

314 History of Communications. 3 F S
Amer can journa sm from ts Eng sh and co on al or g ns to the present day Development a d nf uence of newspapers magaz nes rad o te ev sion and news gather ng agenc es

315 Broadcast News. 3 F S
News pract ces of networks and oca broad ast ng sta tions Pract ce n broadcast news wr t ng report ng and ed t ng Prerequ s tes MCO 201†, 335† One ecture 4 hours aboratory

332 Broadcast Programming. (3 F S SS
Rad o and te ev sion programm ng eva uat on regu a t on and respons b it es of broadcasters Prerequ s tes MCO 200† 201†

335 Studio Techniques. 2 F S
Fundamentals of broadcast product on. ntroduces the theory techn que and operation of bas c radio and te e v s on production fac l t es Prerequisite: MCO 200†

336 Television Production. 4 F S
P ann ng, stag ng and presentat on of te evis on pro grams Prerequ s te MCO 335† Two ectures, 4 hours aboratory.

340 Magazine Writing. 3 F, S
Writ ng and market ng magaz ne art cles for pub icat on Prerequis te: MCO 301† or approval of nstructor

343 Broadcast Announcing. 3 F S
Techn ques of rad o and te evision announc ng Prereq u s tes MCO 201† 335† One ect re 4 hours aboratory

351 Photojournalism. 3 F S
Tak ng develop ng and pr nt ng p ctures for newspaper and magaz ne product on on a med a dead ne bas s Students shou d have the r own cameras. Prerequ s te MCO 201† or approva of nstructor Two ectures 3 ho rs aboratory.

401 Public Relations Techniques. (3 F S
Theory and pract ce of pub c ty pub c re at ons and re ated techn ques and procedures. Prerequ s te· MCO 201† or approva of nstructor

402 Communications Law. 3 F, S, SS
Lega aspects of the r ghts pr v eges and ob gat ons of the press rad o and te ev s on

412 Editorial Interpretation. 2) NR
The press as an nf ence on pub ic p n on The ro e of the ed toria n ana yz ng and nterpret ng cur ent events Prerequis te MCO 301†.

413 Advanced Editing. 3) F S
Manager a aspects of edit ng ncluding ayout and ty pography, story and p cture se ect on plann ng and d recting content Prerequ s te MCO 313† Two ec tures 2 hours aboratory

414 Business and Industrial Publications. (3 S
Theory and pract ce of ayout typography and des gn for magaz nes, brochures and industr al pub cat ons.

419 Public Affairs Broadcasting. 3) NR
Theory and practice in p ann ng and produc ng var ous types of pub c affa rs programs with part cular attent on to the te ev s on documentary Prerequisite. MCO 315†

420 Reporting Public Affairs. 3 F S
Instruct on and ass gnments n reporting the courts schoo s, government c ty hal , soc a prob ems and other areas nvo v ng pub c ssues Prerequ s te MCO 301†

421 News Problems. 3) S
Trends and pr b ems of the news med a emphasiz ng editor a dec s ons n the processing of news Prerequ s te n ne hours of mass commun cat ons or approva of nstructor

422 Business Reporting. (3 NR
Ana yz ng a d reporting econom c and consumer af fa rs. Prerequ s tes three hours of econom cs MCO 301†

430 International Communications. (3) F, S
Comparat ve study of commun cat on and media sys tems nformation gather ng and d ssem nat on under d fferent po it ca and cultura sy tems

431 Broadcast Writing. 3) F, S
Pr nciples and techn ques of wr t ng for radio and te ev s o Prerequ s te MCO 201†

433 Broadcast Station Operation. 3 F
Program p ann ng traff c, mus c news cont nu ty sa es and promot on. Operat ona procedures n the depart ments of a rad o or te ev's on stat on Prerequ s tes MCO 332† and approva of 'nstruct r May be repeated for cred t

435 Cable Television and Emerging Communications Systems. 3) F
Struct res and ti zat on of cab e telev s on v deo cas settes, pub c broadcasting nstruct na a d dustr a te ev s on and sate te commun cat ons Prerequ s tes MCO 332† 335†

437 Television Directing. 3 S
D rect g te ev s on programs Prerequ s te· MCO 336†. One ecture 4 hours ab ratory

450 Visual Communications. (3 NR
P cture ed t ng for the mass med a Prerequ s te· MCO 301†

451 Advanced Photojournalism. 3 F S
mag nat ve use of the camera n tak g d ff cu t photo graphs of top reproduction qua ty Prerequ s te MCO 351† Two ectures 3 hours aborat ry

452 Color Photography. (3 F S
ntroduct on to photograph c pr nc p es of co or photog raphy P nt ng and transparenc es for the mass med a Prerequ s tes· MCO 451† and approva of structor

472 Broadcast Station Management. (3) S
Organ zat on procedures and po ic es of rad o telev s on stat ons F nancia and creat ve aspects of stat on operat on. Personne and product on prob ems re at onsh p w th advert s ng agenc e . networks and sponsors. Prerequ s tes ADV 301† MCO 332†

480 Methods of Teaching Journalism. 3) F
Methods of nstruct on organ zat on and presentat on of appropr ate content in journa sm. Prerequ s te s x hours of journa ism

Special Courses: MCO 484 492, 493 494 498, 499 500 580 584 590, 591 and 592 (See pages 30 31.

Mathematics

PROFESSORS:
H. SMITH (PS A-216), ANDERSON, BUSTOZ, FELDSTEIN, GOLDSTEIN, GRACE, JACOBOWITZ, KELLY, NERING, SAVAGE, SHERMAN, L. SMITH, A. WANG, C. WANG

ASSOCIATE PROFESSORS:
BEDIENT, DRISCOLL, FRIEDMAN, HASSETT, HELTON, KUIPER, KURTZ, LEONARD, McDONALD, MOORE, NIELSON, SANSONE, STEWART, SWIMMER, WEISS, YOUNG

ASSISTANT PROFESSORS:
AICKIN, FARMER, FORD, HANSCHE, ISMAIL, KATZ, LAKE, LISKOVEC, McCARTER, McMAHON, PECK, THOMPSON

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Mathematics—Consists of 45 semester hours of which at least 31 must be in mathematics and the remaining hours in closely related fields to be approved by the advisor. The required courses in mathematics must include MAT 120†, 121†, 200†, 219†, 342†, 371† or 460†, 374† and two 400-level courses to be approved by the advisor. The department recommends a one-year sequence in some closely related field. Students who plan to attend graduate school in mathematics should consult their advisor concerning an appropriate curriculum as early as possible.

Bachelor of Science Degree Curriculum

Mathematics—Consists of 55 semester hours of which at least 40 must be in mathematics and the remaining hours in closely related fields to be approved by the advisor. The required hours must include MAT 120†, 121†, 200† and 342†. To satisfy the remaining required hours the following options are available:



General Mathematics Option. Requires MAT 219†, 371†, 372† and 374†. The remaining hours in mathematics are to be approved by the advisor and must include 9 hours at the 400-level. The department recommends a one-year sequence in some closely related field.

Computer Science Option. Requires MAT 201†, 243†, 305†, 306†, 326†, and 464† or 466†. The remaining hours in mathematics must consist of three courses selected from at least two of the following groups:

Computing Systems: MAT 405†, 406†, 407†, 408†
Numerical Analysis: MAT 464†, 465†, 467†
Probability and Statistics: MAT 421†, 422†, 423†, 425†, 427†
Theory of Computation: MAT 302†, 400†, 401†, 403†, 415†, 416†

Applied Mathematics Option. Requires 371†, 372†, 374†, 422†, 451†, 461†, 462†, 464†. PHY 115-116 also is required and the corresponding laboratory course (PHY 117-118) is strongly recommended. Students should choose additional courses from 201†, 415†, 416†, 419†, 421†, 423†, 425†, 427†, 443†, 463†, 465†, 472† and 475†.

Probability, Statistics, Operations Research Option. Requires 219†, 371†, 372†, 421† and at least two courses chosen from 422†, 423†, 425†, 427†. The remaining hours in mathematics are to be approved by the advisor and must include at least two courses. It is recommended that these courses be chosen from 201†, 422†, 423†, 425†, 427†, 464†, 465†, and 466†. A one-year sequence in a closely related field is also recommended.

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Mathematics—*Option 1.* Consists of at least 36 semester hours in mathematics. Required courses are MAT 120†, 121†, 200†, 219†, 310†, 342†, 371† or 374† or 460†, 420†, 443† and 483†. MAT 482† is required as part of the 31-hour professional education requirement, but cannot be counted as part of the 36-hour major requirement.

Mathematics—*Option 2.* This option may be exercised only in combination with Option 2 in Chemistry (page 74) or Physics (page 115). The mathematics portion of this 60-hour program consists of 30 semester hours of credit in mathematics. Required courses are MAT 120†, 121†, 219†, 310†, 342†, 371† or 374† or 460†, and 443†. A computer science course (MAT 200†) is recommended.

Departmental Minor Teaching Field Requirements

(Secondary Education)

Mathematics—Consists of at least 24 semester hours of credit. Required courses are MAT 120†, 121†, 219†, 310†, 342†, and one of 371†, 374†, 460†.

Departmental Graduate Programs

The Department of Mathematics offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

MATHEMATICS

MAT 105 The Creative Art of Mathematics. (3) F,S SS
Des gned to acqua nt students n the arts, humanit es and soc a sc ences w th the nature of modern mathe mat cs Recommended for students elect ng a s ngle mathematics course

106 Intermediate Algebra. (3 F S SS
Topics f om bas c a gebra such as near equat ons, po ynom a s factor ng exponents, roots and radica s P erequ s te mastery of one year of h gh schoo algebra as demonstrated by appr pr ate score on P acement Examination

107 Basic Computer Programming. 3 F,S SS
For nonmathemat cs majors S mp e programming an- guage t me shared commun cat on w th computers, e ementary data process g Does not sat sfy L bera Arts Genera Stud es Laboratory requirement Two ec tures, 2 hours aboratory

115 College Algebra and Trigonometry. (4 F,S SS
A p e ca cu us course on those topics n algebra and tr gonometry wh ch are essent al to the study of ana yt c geometry and ca cu us Not open to students w th cred t n MAT 117 or 118 Prerequ site three semesters of h gh school algebra or MAT 106†

117 College Algebra. (3 F,S SS
A pre ca cu us course on topics in algebra and proper- t es of e ementary fun t ons wh ch are essent a to the study of analyt c geometry and ca cu us Not open to students w th cred t n MAT 115 Prerequ s te three semesters of h gh schoo a gebra or MAT 106†

118 Plane Trigonometry. (2 F S SS
A pre ca cu us c urse on top cs n tr gonometry wh ch are essentia to the study of ana yt c geometry and ca cu us Not open to students w th cred t n MAT 115 Prereq s te MAT 117† r equ va ent

119 Finite Mathematics. (3 F S SS
Top cs from set theory probab ty and near a gebra App ications w be emphas zed Prerequ s te MA 115† or 117† or equ va ent

120 Calculus I. (5 F,S SS
Different a and integra ca cu us of e ementary func t ons t p cs from ana yt c geometry essentia to the study of ca culus Prereq s tes MAT 115† or 117† and 118† o equ va ent

121 Calculus II. 5) F S SS
Further app cat ons of ca culus part a d fferent at on m t p e ntegrals and nf n te ser es Prerequisite MAT 120† or equ valent

141 Mathematics for the Social, Life and Management Sciences. 4) F,S,SS
Set theory systems of equat ons matr x a gebra and other top cs of nterest to students n the soc a fe and management sc ences May be taught with 3 ec tures and 2 recitat ons per week or as a regu ar ecture meeting 4 hours per week. Prerequ s te MAT 106† or h gh schoo equivalent

142 Mathematical Analysis. (3 F S,SS
D fferent a and ntegra ca cu us of e ementary func t ons w th app icati ns Not open to students w th cred t n MAT 120 Prerequ s te. MAT 115† or 117† or 141† or equ va ent.

180, 181 Theory of Arithmetic. (3 3 F S,SS F,S
Number systems, tu tive geometry e ementary a ge bra and measurement as embod ed in man pu at ve mater als Recommended for prospective elementary schoo teachers Prerequ s te for MAT 181 MAT 180 or approva of nstructor.

200, 201 Introduction to Computer Science. (3-3 F S
Structured p ogramm ng concepts and techn ques, problem so v ng methodo og es, numer c and nonnu mer c a gorithms f e process ng app cat ons. MAT 200 is su tab e for nonmajors Prerequ s te for MAT 200 MAT 115† or equ valent, prerequ s te for MAT 201· MAT 200†

212 Elementary Differential Equations. (3) F,S,SS
Introduction to ord nary d fferential equat ons adapted to the needs of students n engineer ng and the sc - ences Prerequisite. MAT 121† or equ va ent.

213 Elementary Linear Algebra. (2) F S SS
ntroduct on to matr ces, systems of near equat ons, determ nants vector spaces inear transformat ons and e genvalues. Emphas zes deve opment of computa- t onal sk ls Prerequis te. MAT 115† or equ va ent

219 Finite Mathematical Structures. 3 F S
Top cs from set theory comb nator a ana ysis proba- b ty stat st cs, near algebra, near programming graph theory and stochastic processes Prerequ s te MAT 117† or equ va ent

226 Elements of Statistics. 3) F S SS
Bas c concepts and methods of stat st cs nc uding descript ve stat st cs sign ficance tests est mat on samp ing and corre at on Not open to majors n mathe matics or the physica sc ences Prerequ s te three semesters of high schoo algebra or MAT 106†

243 Discrete Mathematical Structures. 3) F
ntroduct on to latt ces graphs, Boo ean a gebras, and groups w th emphasis on topics re evant to computer sc ence Prerequ s te sophomore stand ng or approva of nstructor

260, 261 Technical Calculus I, II. 3 3 F S SS S
Ana yt c geometry different a and ntegra ca cu us of e ementary funct ons emphas z g phys cal nterpreta t on and problem so v ng Not open to students w th credit n MAT 120 Prerequ s te for MAT 260 MAT 115† or equ va ent, prerequ site for MAT 261 MAT 260† or approva of nstructor

262 Technical Calculus III. (3) S
nf nite series and different al equat ons emphas z ng physica nterpretation and prob em so v ng Prerequ s te MAT 261† or approva of nstructor.

302 Abstract Computing Machines. (3 S
Representat ons of f n te state mach nes Equ va ence and reduct on Hom ng and dist ngu sh ng exper ments Mach ne dentif cat on Mach ne decompos t ons Mem o y and nformat on oss Prerequ s te MAT 243†

305 Languages and Data Structures I. 3 F,S
Forma def nit ons of representat ve anguages data structu es such as arrays queues t ees storage a oca tion schemes nformat on b nding, run t me env ronments Prerequ s te MAT 201† or equ va ent

306 Concepts of Assembly Languages. 3 F S
Information representat ons computer organ zat on assemb y anguage programming w th emphas s on gener c faci t es techn ques, and data structures su pervisory system faci t es Prerequ s te MAT 201† or equ va ent

310 Introduction to Geometry. 3 F S
Congruence area para e sm s m ar ty and vo ume Euc idean and non Euc dean geomet y Prerequ s te MAT 121†.

326, 327 Intermediate Statistics. 3 3 F S
E ementary probab ty theory probab ity funct ons d str but on functions, po nt est mat on hypothes s test ng stat st a tests, app cations Prerequ s te for MAT 326 MAT 120† or 142† or 260† or equ va ent prerequ s te for MAT 327 MAT 326†

342 Linear Algebra. 3 F S SS
L near equat ons and matr ces vect r spaces determ nants, near mapp ngs eigenva es nner product spaces and b l near forms Prerequ s te· MAT 120†

362 Advanced Mathematics for Engineers and Scientists I. 3 F,S,SS
Comp ex numbers part a d fferent at on multiple nte gra s, vector ana ysis and Four er ser e P erequ s te MAT 121†.

363 Advanced Mathematics for Engineers and Scientists II. (3 S
Spec a funct ons omplex var ab es ntegra trans forms part a d fferent a equat ons and pr bab ty P erequ s tes· MAT 212† and 362† or equiva ent

371 Advanced Calculus I. (3) F
Cont nu ty Tay or s theorem, pa t a d fferent at on m p c t funct on theorem vectors near transformat ons and norms in R mult p e ntegra s, power ser es Pre requ s te MAT 121† P e or co requ s te MAT 342†

372 Advanced Calculus II. (3) S
Maps from R to R , ne and surface ntegra s d ver gence and Stokes theorems R² topo ogy ser es un form covergence, mproper ntegra s (Not open to students w th cred t n MAT 460) Prerequ s te MAT 371†

374 Introduction to Ordinary Differential Equations. (3 F,S
F rst order equat ons ear equations, constant coeff c ent equat ons regular s ngu ar po nts Besse s eq ation near systems ex stence and uniqueness theorems Prerequ s te MAT 121†

380 Arithmetic in the Elementary School. 3 F
H stor a numerat on systems overv ew of e ementary number theory nc ud ng primes factor zat on d v s b - ty bases modu ar systems i near congruence and cont nued fract ons Prerequ s te MAT 181† or ap prova of nstructor

381 Geometry in the Elementary Schoo . 3 S
Informa geometry in ud ng concept of ength area vo ume, s m lar ty and congruence C ass f cat on of f g ures stra ghtedge and compass construct ons mot on geometry. Prerequ s te. MAT 380† or approva of n structor

400 Computability and Unsolvability. (3 A· Peck San sone
Turing mach nes and computab l ty computable and part a computab e funct ons recurs ve sets and predi cates, recurs ve y enumerab e sets unso vab e dec s on prob ems app cati ns Prerequis tes MA 243† and 306†.

401 Theory of Formal Languages. (3 S F rd
Theory of grammar methods of syntact c ana ys s a d spec f cat on types of art fic a anguages re at onsh p between forma anguages and automata Prerequ s te MAT 243† or 342†

403 Analysis of Algorithms. 3 F Ford
Design a d ana ys s of c mputer a gor thms us ng ana ytica and emp r ca methods Forma mode s of computation complex ty measures des gn methodo o g es, recent deve opments. Prerequ s tes MAT 243† and 305†.

405 Languages and Data Structures II. (3) A Hansche
F e organ zation and management Relevant data struc- tures and anguages access methods storage dev ces w de y used a gor thms Prerequ sites MAT 305† and 306† or equ valent

406 Modern Computer Architecture. 3 F Ford
D g ta computer ntegrat on and resu t ng software con- s derat ons, dig ta ar thmet c storage dev ces and access techn ques ntercomponent commun cat on m croprogramn ng, representat ve mach ne arch tec tures P erequ s te MAT 306† or equ va ent

407 Elementary Concepts of Operating Systems. 3) S Hansche
Des gn and mp emer tat on of superv sory system com ponents. Input-output methods process management mu t programm ng systems, storage management f e systems software deve opment. Prerequ s te MAT 406† or eq va ent

408 Compiler Construction. (3 F Hansche
ntroduct on to programm ng language mp ementat on mp ementat on strateg es comp at on nterpretation translat on Major comp at on phases· ex ca analys s semant c analys s, opt m zation code generat n Pre requ s tes MAT 305† and 306† or equ va ent

410 Introductory Topology. 3 F Grace Stewart
Topo ogy of the rea numbers, equ va ence of sets transfin te nduct on Des gned to deve op the stude t s cr t cal facu t es and creat ve ab t es n mathemat cs. Prerequ s te MAT 121†

412 Projective Geometry. 3) NR Sw mmer
Project ve geometry and its re at onsh p to Euc dean and other geometr es Prerequ s te MAT 342† or 442† MAT 310† s recommended

415 Combinatorial Mathematics I. 3 F Ke y Ander s n
Permutations and comb nat ons recur ence relat ons generat ng funct ns grapl theo y and comb nator al proof techn ques Prerequ s tes MAT 121† and 342†

416 Combinatorial Mathematics II. 3 S, Anderson Ke ly
Cont nuat o of MAT 415 co s der ng s me advanced aspects of the theory as we as app cat o s Top cs to be chosen transport networks match ng theory, b ock des gns c d ng theory Po ya s count ng theory, and app cat ons t the phys ca and fe sc ences Prerequ s te· MAT 415† o approva of structor MA 443† s recommended

419 Linear Programming. 3) S Ne ng Fr edman
L near prog amming ar d the imp ex a gor tl m net work pr b ems quadratic and non near programm ng Prerequ s te MAT 120† or 142†

420 Introductory Applied Statistics. 3) F A cken Y ung Dr sco
ntroduct ry probabi ty descr pt ve stat st cs sampl ng distr but ons, parameter est mat on tests of hypothe - es ch square tests regress n ana ys s ana ys s of var ance nonparametr c tests Prerequ s te. MAT 115† or 117† or 141† or equiva ent.

421 Probability. 3 F We ss Dr sco
Laws of probab ty comb nator a ana ys s random var- ab es probab ty d stributions expectat on moment generat ng funct on transformat ons of random var a- b es centra m t theorem Prerequ s tes MAT 219† or 326† and 371† or equ va ent

422 Deterministic Operations Research. 3 F, Fried man, Weiss
Determ n st c inventory theory near programming transportat on and networks determ n st c dynam c programm ng sequenc ng and schedul ng, bas c nonl near programm ng search prob ems Prerequ s tes MAT 121† and 342†

423 Stochastic Operations Research. (3 S Fr edman, We ss
Pr bab l st c inventory theory ba ic queue ng theory dec s on theory probab i stic dynam c programm ng, dec s on prob ems on sem Markov cha ns basic sto chast c programm ng Pre equ s te MAT 421†

425 Stochastic Processes 3 S We ss McDona d
Markov cha ns stat onary distr but ons pure imp pro ces es second rder processes and other top cs n stochast c processes Prerequ s tes· MAT 421† and 342† or 442†

427 Mathematical Statistics. 3 S Drisco Young A ck n
L m t ng d str but ons nterva est mat on po nt est ma t n suff c ent statist cs, tests of hypotheses Prerequ te MAT 421†

431 Foundations of Mathematics. 3) A Sansone
Top cs f om mathemat ca og c and set theory. May be repeated for cred t w th approva of instructor Prere qu s te MAT 342† or approva of instructor

442 Advanced Linear Algebra. 3 F,S; Ner ng Moore
Deeper and more abstract study of the top cs n MAT 342 nva ant s bspaces can n ca f rms and mat ces near programm ng, dua spaces bi near and q adrat c forms and mu t near a gebra Prerequ s te MAT 342† r equ va e t.

443 Abstract Algebra. 3 F,S SS, Moore Ke y Leon ard
ntroduct n to the most important a gebra c structures nc ud ng groups ngs ntegra doma ns and f e ds. Prerequ s te MAT 342† or approval of nst ctor

444 Topics in Abstract Algebra. 3 NR, Ke y Leonard Moore
May be repeated for cred t w th approva of instructor Prerequ s te MAT 443†.

445 Theory of Numbers. (3 S Leonard Anderson
Pr me numbers un que fa tor zat on theorem congru ences D ophant ne equat o s pr m t ve roots q adrat c rec proc ty theorem. Prerequ s te. MAT 342† or 442†

451 Mathematical Modeling. (3 A, Hassett McDona d, He tor
An n depth study of one or more mat en at ca models wh ch occur n the phys ca or b o og cal sc ences, May be repeated for cred t w th approva of nst uctor Pre

requis tes MAT 212† or 374†, and 213† or 342† or approval of nstructor

460 Applied Real Analysis. 3) F,S, Kuiper, C. Wang
Vectors, curv near coord nates, Jacob ans mpl c t funct on theorem ne and surface ntegra s, Green's, Stokes and d vergence theorems Not open to stu dents w th cred t n MAT 372). Prerequ s tes MAT 212†, and 213† or 342†

461 Applied Complex Analysis. 3 A McCarter C. Wang
Ana yt c funct ons comp ex ntegrati n Tay or and Laurent ser es res due theorem conformal mapp ng and harmo c funct ons Prerequis te MAT 121†.

462 Partial Differential Equations. (3 A, Kuiper
Second orde part a d fferent a equat ons emphas z ng Laplace wave and d ffusion equations, solutions by the methods of character stics separati n f var ables and integral tra nsforms Prerequisite. MAT 212† or 374†

463 Transform Theory and Operational Methods. 3 A· McCarter McDona d
Four er Lap ace and other transforms app cations to boundary va ue prob ems genera zed funct ons and modern operat ona mathe at cs. Prerequ s te ap prova of nstructor

464 Numerical Analysis I. 3 F N e s n Fe dste n
The ry and methods for numer ca so ut on of a gebra c and tra scendenta equat ons terat ve methods ap proximat on, quadrature, so tion of d fferent a equat ons Those seek ng a meth ds survey course shou d take MAT 466 Prerequ s tes MAT 200† or equ va ent, and 342† and 371† or approva of nstruc tor

465 Numerical Analysis II. (3 S, N e son Fe dste n
Cont nuation of MAT 464 Prerequ s te MAT 464†

466 Applied Computational Methods. 3) F S N e son Fe dste n
Numer ca methods for. quadrature d fferentia equa tions roots of nonl near equat ons nterpo at on approx mat on l near equat ons, float ng-po nt ar thme tic, roundoff error Pre equ s tes MAT 121† 200†, or equiva ent

467 Computer Arithmetic. (3) S Feldste n N e son
Number systems, hardware software ar thmet c over f ow, s gn f cance round ng mu t p e prec s on automat c error contro mpact on languages, arch tec tures robust programm ng, software deve opment Prerequ s tes· MAT 200† or equ va ent and 466† or approval of nstructor

472 Intermediate Real Analysis. 3) NR, We ss Mc Dona d Kurtz
ntroduct on to the Lebesgue ntegra metric spaces normed spaces, f xed po nt theorems, orthogona bas es, Four er ser es Prerequ s tes MAT 342† or 442† and 372† or approval of nstructor.

475 Differential Equations. 3 S Sherman
Asymptot c behavior of so ut ons of l near and non near ord nary d fferent al equat ons stabi ty Sturm L uv e prob ems boundary va ue problems s ngu ar po nt behav or of autonomous systems Prerequ s te MAT 374† or equ va ent

480 Mathematics in the Upper-Elementary Grades. 3) F Sm th, Bed ent
An introduct on to probab ty and stat st cs nclud ng open ended data gathering and process ng counting techn ques samp ng strateg es est mat n and dec sion mak ng Prerequ s te MAT 81† or approval of nstructor

481 Mathematics in the Upper-Elementary Grades. 3 S Sm th Bed e t
E ementary funct ons and the r app cat ons A thorough nvest gation of some of the a gor thms of bas c arith metic. Prerequ s te MAT 480† or approva of nstructor

482 Methods of Teaching Mathematics in Secondary School 3 F SS . Smith Bed ent
Exam nat on of secondary schoo curr cu ar mater a ana ys s of nstruct ona dev ces Teach ng strateg es eva uat ve techn q es d agnos s and remediat on and prob em so v ng Prerequ s te appr va of nstructor

483 Mathematics in the Secondary School. 3) S SS Bed ent Sm th
Top cs n geometry number theory a gebra, and anal ysis Emphas s on un fy ng pr nc p es Prerequ site MAT 310† or 412† or approva of instructor.

485 History of Mathematics. 3 S Bedient
Top cs from the h story of the or g n and deve opment of mathemat ca deas Prerequ s te MAT 121

501 Programming for Graduate Research. 3) A Dr s co N e son Stewart
ntroducto y course for graduate research computing. Subroutine and program brar es for mathemat ca and stat st ca prob ems batch and t meshar ng env ron ments data fi es programm ng for specia dev ces such as d gita p otters, off ne equ pment Two lectures 2 hours aboratory

504 Computer Performance Evaluation. 3) S Ford
Top cs in computer system measurement and eva ua t on hardware software monitors work oad character zat on program behav or, adapt ve schedu ing, s mu at on mode s, measurement nterpretat on Prerequisite. MAT 407† or equiva ent.

507 Operating System Theory. 3) F· Hansche
Forma methods appl ed to control of concurrent pro cesses determ n st c and probab st c schedu ng auxi ary storage paged storage a ocat on mu t programmed memory management Prerequ s tes. MAT 326† and 407†, or equ va ent

508 Advanced Compiler Construction. 3) S Hansche
Forma parsing strateg es, opt m zat on techn ques se f comp ng comp ers comp er writ ng systems extens bi ty and transportabi ty cons derat ons, recent deve opments Prerequis te MAT 408† or equ va ent

509 Topics in Computer Science. 3 NR Ford Hansche
Prerequ s te approva of nstructor May be repeated for cred t w th approval of instructor

510, 511 Point Set Topology. 3 3 F S Grace Ander son Stewart
Topolog cal spaces metr c space compactness con nectedness ca propert es product and dec mposit on spaces mapp ngs over ng propert es, separat on properties Prerequ s te MAT 371† or 410† or approva of nstructor

524, 525 Advanced Probability. 3 3 NR We ss
Measure theoret c fo ndations of probab l ty d str bu t n funct ons and character st c fun t ons law of arge numbers and centra l m t theorems cond t ona proba b t es mart ngales and top c n stochast c proces es Prerequ s tes. MAT 421† and 571† r approva of n structor

526, 527 Theory of Statistical Linear Models. 3 3 F S Young Dr sco A ck n
Mu t norma d str but on distribut on of quadrat c forms fu and non-fu rank mode s general zed nvers es unba anced data, variance omponents large samp e theory Prerequ sites MAT 427†, and know edge of matr x a gebra

528 Topics in Stochastic Processes. (3 NR; We ss Prerequ s te approva of nstructor May be repeated for credit w th approva of nstructor

529 Topics in Statistics. (3 A D s ro A ck n Young Prerequ s te· approva of nstructor May be repeated for cred t with approva of nstructor

530 Applied Regression Analysis. 3 F Dr sco l A ck n
Method of least squares simp e and mu t p e near re gress on po ynom a regress on ana ys s of residua s, dummy variables, mode bu d ng Prerequ site MAT 420† or equiva ent

531 Applied Analysis of Variance. (3 S, Aickin, Young
Factorial des gns balanced and unba anced data fixed and random effects random zed b ocks at n squares, analys s of covariance, mu t ple compar sons Prerequ s te MAT 420† or equ valent

532 Applied Nonparametic Statistics. 3 F Driscol Young
One samp e tests, tests of two r more re ated or nde pe dent samp es measures of corre at on, tests of

trend and dependence Prerequisite· MAT 420† or equiva ent

533 Applied Multivariate Analysis. (3 S Young
D scrim nant analys s pr ncipa components, factor ana ys s c uster ana ys s canon ca corre at on Prereq u s te MAT 420† or equ va ent.

534 Applied Discrete Data Analysis. 3) S A ck n
Mode s for d screte and count data measures of asso- c at on g- inear and reg ess on mode s for continge cy tab es Prerequ s te MAT 420† or equ va ent

543, 544 Abstract Algebra. (3-3 F,S, Moore acobo- w tz
Groups, modules r ngs and fields Golo s theory homo gica a gebra, representat on theory Prerequ s te MAT 444† or approva of nstructor

549 Topics in Algebra. 3 NR Jacobow tz Moore
Prerequ s te approva of nstructor May be epeated for cred t w th approva f nstructor

550, 551 Methods of Mathematical Physics. 3 3 F S, A Wang
Matrices orthogonal funct ons, nteg a equat ons cal culus of variat ons e genva ue prob ems perturbation methods, boundary va ue problems Prerequ s tes MAT 342† and 372† or 461† or approval of nstructor May be repeated for cred t w th approva of nstructor

552, 553 Tensor Analysis. 3 3) F,S Sw mme
A gebra and ca culus of tensors and d fferent a forms, appl cations to geometry and var ous branches of ap p ed mathemat cs Prerequ s tes MAT 342† and 371† or 460† or approva of nstructor

564, 565 Advanced Numerical Analysis. (3 3) NR, Fe d- stein N e son
F n te d fference equat ons orthogona po ynom als quadrature approx mat on and ntegrat on theory numer ca solut on of d fferent a equat ons, numer ca near a gebra Prerequisite MAT 464† or approva of nstructor May be repeated for cred t w th approval of instructor

569 Topics in Analysis. 3 NR McDonald A Wang
Prerequ s te approva of nstructor May be repeated for cred t w th approva of nstructor.

570, 571 Real Analysis. 3 3 F,S, We ss, McDona d, Kurtz
Lebesgue ntegration se ected funct on spaces, d fferent at on, abstract measure theory elements of funct ona ana ys s. Prerequ s te MAT 372† or approva of nstructor

572, 573 Complex Analysis. (3 3) F S Go dstein, C. Wang
Ana yt c funct ons ser es and product representat ons, ent re and meromorph c functions, norma fami es R emann mapp ng theorem harmon c funct ons, R e- mann surfaces Prerequisite. MAT 371† or approva of nstructor

574, 575 Theory of Ordinary Differential Equations. 3 3) NR Sherman
Systen s ex stence proofs singular ties, asymptot c behav or of solut ons boundedness of so ut ons, e gen va ues and eigenfunct ons, perturbat on theory. Prerequis te MAT 372† or approva of instructor

576, 577 Theory of Partial Differential Equations. (3 3 NR Ku per
Ex stence and un queness theorems, boundary va ue and n tia va ue prob ems character st cs, Green s funct ons max mum pr nciple d str but ons, and weak solut ons Prerequ site. know edge of Lebesgue integra- t on or approva of nstructor

578, 579 Functional Analysis. 3 3) NR McDonald
Loca ly convex normed and H bert spaces L near op- erators spectra theory and appl cat on to class ca ana ys s Prerequisite. MAT 472† or 571† or approva of nstructor

582 Modern Mathematics for Teachers. (3 A, Bedient
Theory of sets, rea number system, transf n te numbers and other selected top cs. Prerequisite approva of n structor.

583 Abstract Algebra for Teachers. (3) A Bed ent
Postulat ona approach to a gebra e ementary mathe matica systems nc ud ng groups and f e ds Prerequ site. approva of instructor

584 Teaching College Mathematics. 3) A Sm th, Be dient, Farmer
Methods and earning diff cu ties in the teach ng of n structiona ower d v s on co ege mathemat cs courses Prerequisite approval of nstructor

585 Modern Geometry for Teachers. 3) A· Bed ent
Euc dean, projective and non Euc idean geometries. Prerequ s te approva of nstructor

587, 588 Analysis for Teachers. 3 3 NR Bed ent
Subject matter n mathematics appropr ate for acce er ated programs n secondary schools ncluding analyt c geometry and ca cu us Prerequ s te. approva of n structor

591 Seminar. 2 3 NR
Top cs may be se ected from the fo low ng.

(a Ana ys s (McDona d Goldste n Bustoz
(b App ed Mathemat cs A Wang Katz, Kuiper)
(c) Probab ty (We ss
(d) Topo ogy (Grace, Farmer)
(e) A gebra (Jacobow tz Moore Leonard
f Mathemat cal Stat stics (Young Dr scol Aickin)
g) Mathemat ca Log c (Sansone)
(h) Numer cal Ana ys s Fe dste n N e son)
) Computer Science Ford, Hansche
Mathemat cs Education Smith Bed ent
k) Comb nator a Mathemat cs (Anderson Kel y)
( ) Operat ons Research Fr edman Nering

Special Courses. MAT 294, 298 492, 493 494, 498 499, 590, 592 594, 598 599, 792, 799 See pages 30 31

Military Science

(Army ROTC)

PROFESSOR:
LACY (MAIN 240)

ASSISTANT PROFESSORS:
BROUGHAM, GES N, PERREAULT, SCOTT
SPARKS

Purpose. The Department of Military Sci ence curriculum consists of the Basic Course (MIS 101, 102, 201, and 202) and the Ad vanced Course (MIS 301, 302, 401, and 402) The goal of this professional education is to prepare selected students with leadership po tenti al to be comm ssioned Army officers within the national defense structure of the United States. Specific objectives include pro viding students an understanding of the nature and operations of the U.S. Army; developing the leadership and managerial potential of the students; developing students' abilities to think creatively, to speak and write effectively; and to provide the student with an appreciation of the requ rements for national security. Upon successful completion of the advanced course, each student will receive a commission in the United States Army Reserve. Active duty po- sitions are available upon graduation from the University.

Appointments as Second Lieutenants in the Regular Army are available to outstanding students who desire a career in the military service.

General Qualifications. Male or female students entering Army ROTC must (1) be a citizen of the United States (noncitizens may enroll but must obtain citizenship prior to commissioning), (2) be of sound physical condition, (3) be at least 17 years of age for entrance into the Advanced Course and be able to complete all commissioning requirements prior to age 28. Students with prior active military service or previous high school ROTC may be given credit for all or a part of the Basic Course.

Qualifications for Admittance to the Advanced Course. (1) Successful completion of the Basic Course for the student in the four year ROTC program. For the student in the two year program, selection for and successful completion of the six week basic summer camp. (2) Passing of the ROTC Qualifying Examination. (3) Passing the Army physical examination. (4) Attainment of a minimum cumulative grade point average of 2.0 ("C") for the first two years of college work and maintenance of that minimum during the period when enrolled in the Advanced Course.

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 8 semester hours credit for the four semesters of study. Upon satisfying the requirements stated above, they enter the Advanced Course where they will earn 10 semester hours of credit for the four semesters of study. In addition, students will attend a six week advanced summer camp at an Army post between their junior and senior years. Upon successful completion of the Advanced Course and requirements for a degree, they are commissioned as Second Lieutenants in the United States Army Reserve.

Two-Year Program. Students must have two academic years of college work remaining, either at the undergraduate or graduate level, or a combination of the two. This program is open to all students with the exception of three and four year scholarship winners (see scholarships). Students seeking enrollment in the two year program should make application during the spring semester of the year in which they desire to enter the program. High school students should apply during their senior year of high school. They must pass the ROTC Qualifying Examination, and the Army physical examination. After successfully completing a six-week basic summer camp at an Army post (normally conducted during June and July), students may enroll in the Advanced Course. They then follow the same program and meet the same requirements as stated for Advanced Course students in the four year program.

Pay and Allowances. Advanced Course students receive $100 per month for the 20 months of enrollment in the Advanced Course. The student also receives one half the pay of a second lieutenant during his 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 enter the two year program will receive the pay of an Army recruit during attendance at the basic summer camp as well as the current mileage rate for travel to and from the camp.

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, tuition and books, and provide $100 per month subsistence allowance while the scholarship is in effect. A scholarship for four years is available to freshmen who will enter the four-year program. Applications must be submitted in accordance with a schedule furnished high school counselors. Selection is made on a nation wide basis. Scholarships are available for three-, two-, and one year periods commencing with the sophomore, junior and senior year of ROTC, respectively. Applications are open to all students in good standing with the University, selection is made by an interview board composed of University faculty members and Army officers in the ROTC detachment. Four and three year scholarship winners are not eligible for the two year program. Acceptance of any of the four scholarship programs requires a service commitment to serve in the active Army for a period of four years after commissioning.

Active Duty Requirements. Graduates of Army ROTC may spend from three months to three years of active duty depending on U.S. Army Reserve options. Scholarship students have a four year commitment. A delay from call to active duty for up to four years is available to outstanding students who desire to earn a graduate or a professional degree.

Graduate and Professional Studies Programs. 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, dentistry, veterinary medicine, osteopathy, religious studies, legal studies, pharmacy or specialized fields of medicine.

MILITARY SCIENCE

MIS 101 Basic Military Science. 2 F, SS
Organization and mission of the Army, the military and American society, introduction to military leadership, theory, situational, contingency approach to basic problems in small unit leadership. One lecture, 1 hour Leadership Practical Application (101L).

102 Basic Military Science. 2) S, SS
Learning theories and principles of instruction, development of instructor knowledge, skills, and attitude, instructional aids, student presentations. One lecture, 1 hour Leadership Practical Application 102L.



201 Basic Military Science. (2) F, SS
Interdisciplinary approach to leadership and management of small groups and individuals; resource management in small unit operations; functions and responsibilities of junior military leaders and effective techniques for decision making. One lecture, 1 hour Leadership Practical Application (201L).

202 Basic Military Science. (2) S, SS
Military geography, land navigation, use of military maps and orienteering; includes field training exercises and development of U.S. military traditions and leadership exercises. One lecture, 1 hour Leadership Practical Application (202L).

301 Advanced Military Science. (3) F, S
Theory, organization, and dynamics of the individual soldier and military units in combat operations; small unit offensive tactics. Prerequisites: MIS 201† and 202†, or equivalent. Three lectures-conferences, 1½ hours of Leadership Practical Application, one three-day field trip, one-day field trip.

302 Advanced Military Science. (3) F, S
Theory and dynamics of military units in combat operations; small unit defensive operations; command and staff organization and relationships; additional duties of career officers; roles of the branches of the Army. Prerequisites: MIS 201† and 202†, or equivalent. Three lectures-conferences, 1½ hours Leadership Practical Application, one three-day field trip; one one-day field trip.

401 Advanced Military Science. (2) F
The military legal system; evolution of the U.S. Army; selected campaigns and leaders through the Spanish American war; opposing strategies; objectives, attitudes, relationships to changing social, economic, political and military institutions. Prerequisites: MIS 301† and 302†. Two lectures-conferences, 1 hour Leadership Practical Application, 3-day field trip.

402 Advanced Military Science. (2) S
Selected campaigns and leaders from 1917 to the present; U.S. position in the contemporary world and its impact on military command and management; career planning and personal affairs. Prerequisites: MIS 301† and 302†. Two lectures, 1 hour Leadership Practical Application, 3-day field trip.

Philosophy

PROFESSORS:
ARNER, CARNEY

ASSOCIATE PROFESSORS:
HUMPHREY (PS A-521), GIESCHEN, GULESERIAN

ASSISTANT PROFESSORS:
CREATH, FITCH, HOWELLS, VOTICHENKO, WHITE

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Philosophy—The major in philosophy consists of 45 semester hours of credit. Thirty-six hours must be in philosophy, including 30 upper division hours, and 9 hours in related fields to be determined by the student in consultation with an advisor. Required courses are PHI 113, 301, 302, 305; 312 or 314; 316 or 317; and at least two 400-level courses. Students planning to do graduate work in philosophy should consult an advisor in order to select appropriate 400-level courses. A minimum 2.0 grade average is necessary for all courses fulfilling the major requirements. (See Degree Requirements, pages 56-58.)

Departmental Graduate Programs

The Department of Philosophy offers programs leading to the degree of Master of Arts that will prepare 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 some basic philosophical problems concerning man, his values, and the nature of ultimate reality. Not open to students who have taken PHI 300.

103 Principles of Sound Reasoning. (3) F, S, SS
Fallacies, traditional logic of the syllogism, elementary parts of symbolic logic, inductive logic and other related topics.

111 Introduction to Ethics. (3) F, S, SS
Obligation, goodness, justice, morality and their relations to utility, moral reasoning, punishment, and social structure.

113 Introduction to Mathematical Logic. (3) F, S
Symbolic techniques emphasizing deductions and proofs in the propositional and first and second order predicate calculi. Either axiomatic or natural deduction systems may be used.

300 Existence, Knowledge and Value. (3) F, S, SS
A critical philosophical examination of man and society, God, the foundations of knowledge, and the nature of morality. Not open to students who have taken PHI 101.

301 History of Ancient Philosophy. (3) F
History of western philosophy from its beginnings through the Hellenistic period.

302 History of Modern Philosophy. (3) S
History of western philosophy from the Renaissance through Kant.

303 Contemporary Analytic Philosophy. (3) F
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.

304 Existentialism and Phenomenology. (3) S
An introduction to this movement through a study of its major figures, e.g., Kierkegaard, Dostoevsky, Nietzsche, Husserl, Heidegger, Buber, Sartre, Camus, Merleau-Ponty, Binswanger, May, Frankl, and Ricouer.

305 Ethics. (3) F, S
Investigation of moral conduct focusing on such concepts as goodness, rightness, duty, and justice; examination of theories such as deontologism, utilitarianism, formalism, relativism, and egoism, in which these concepts occur.

306 Applied Ethics. (3) F, S, SS
Philosophical techniques are used to elucidate such vital moral issues as sexual perversion, civil disobedience, abortion, punishment, violence and pacifism, suicide, and euthanasia.

307 Philosophy of Law. (3) S
The nature and source of law and its relation to morality. Legal rights, legal enforcement of morals, civil disobedience, liability and responsibility, punishment, judicial reasoning, justice, property, differences between theories of natural and positive law.

308 Philosophy of Art. (3) S
Central problems in philosophy of art, *e.g.*, the nature of a work of art, modern and traditional theories of art,

esthet c percept or a d exper ence ob ect v ty and re at v ty n art cr t c sm

309 Social and Political Philosophy. 3 F S
A ternat ve pr nc p e and ethods re evant t prob ems f uman ass c at on and c nf ct st ce and power freed m and qua ty aut nomy and order are d s u ed

310 Political Ideologies 3 S
Pr n p es under ng democracy s c a sm commu sn anarch sm and fasc m C a s c and modern author onsu ted *e g* P at A st t e Mach ave H bbes Hege L ke M Marx Lenr Bakun n So re ar d Ma u e

311 Philosophy n Literature. 3 F S SS
The Oreste a The D v r e C n edy M by D ck The Tr and *The F r Quartets* nt odu e ph os ph a p ob en s h as the nature f o a g dnes a d man s e at or to the wor d and otl er men

312 Theory of Knowledge 3 S SS
T e nat re o r e and n ts of hu r a k w edge T eor e of t th *a pr or* ncept and know edge emp r a oncepts and k now edge pe cept or nduc t n kn w edge f the exte a w r d

313 Symbolic Logic. 3 S
Met ds f e en er ta y mather nat a g c F r t rder pred ate ca cu us dent ty de cr pt n re at o s nd es and c n etere s w be ons de ed P e requ te PH 103 r 11 o equ va e r t

314 Philosophy of Science 3 S
The stru t re and u t f at on of s ent f theo e ex p anat or a d t e y ha ge The r e f ob e vat r a d aws t e et a c epts and ent t e reduct p ab ty r f rn t on space ar d t e a d ca sa t

315 Philosophy of Language S
P b em pe ta n t the nature f anguage mea g refer e truth def n t or ana yt c ty tra atab ty syn n my and co tr but ns of co tem p ra y ngu st cs

316 Metaphysics. F S
vest gat or nto the rea appea a ce v rea ty per ept n rea m s dea sm n ater a m vs mer ta sm t e ept of m nd and pe s ubstance un ver a pace and t me causat n

317 Philosophy of Mind. 3 S
Nat e f nsc s e s The n n sen e v ew f n nd and percept behav or m mater a s dua m phen n ena n se f kn w edge know edge of otl er m nd

318 Ph losophy of Religion. 3 F S S
Natu e and st f cat n f re g us be ef Argu e ts for the ex sten e of God myst c sm the st c and pa th e st n ept n f God and creat n

319 Indian Philosophy. (3 F
Se ections from the *Upan shads* and the *Gita* and of rep eser tat ve orthodox and heterodox ndian schoo nc ud ng the Carvaka Ja n Nyaya Yoga and Vedanta

320 Buddhist Philosophy 3 S
The ph s ph c express on f the pr nc pa S ther and Norther Buddh st schoo s beg nn ng w th Thera vada ar d nc u d ng Madhyam ca Va rayana and Zen

325 Philosophy of Social Science. 3 F
Ph o opt ca prob em urr und ng the a ms str cture and n ethod of theor es n the s a sc ences

330 Theory of Value. 3 4 per t p c F S
Top n et estl et cs o soc a ph o ophy uct as sted PH 305 310 n *Schedu e of C asses* t t e fo w r g cou rse n mbe nd cates top c covered De cr pt n of cour e mater a s ava ab e n the de p rtmenta ff ce May be repeated f r cred t unde d fferent t t e

340 Topics n Metaphysics and Epistemology. 3 4 per top c F S
Metaphys a ep ten c og a r hst r ca t p s a e exam ned s ch as sted n PH 312 319 but more c n centrated n *Schedu e of C asses* t t e f w ng c ur e umber nd ates t p covered Desc pt on of course mate a ava ab e the departme ta off e May be epeated f r ed t un fer d ffe er t t t e

401 Rationalism. 3 F
Exam nat on f Des artes Sp n za Ma ebranche e b n z Br ad B a hard and Ch t on Prereq te one our e fr a am g PH 302 312 315 316 31 4 o a y PH 4 0 eve ourse

402 Empiricism 3 S
Exam nes o e r more ph ophers such a Baco H bbes Locke Hutcheson Shafte bury But er Berke ey Hume Re d M Carnap, Ayer Prerequ s te one co rse f om among PH 3 2 312 31 316 31 340 r a y PH 40 - eve ur e

403 German Idealism. F
Exam nes ne r n ore ph opher s ch a Kant F hte Sc e g Hege Schopenhauer and N etz che Prereq s te o e cou r e fr m am ng PH 302 312 315 316 17 340 or a y PH 400 eve c urse

404 Phenomenology. 3 S
Meth d ogy f s cl ph o p ers a Bre tan Me n g H s er He degger Sart e and Mer ea P nty Pre eq te o e e f m am g PH 303 04 12 315 316 31 34 o any PH 40 eve o r e

405 Pragmatism 3 F
Exam nes su h ph s pher as Pe ce Jame Dewey Sch er Lew s Mead Ca nap Prerequ s te r e course fr n among PH 30 303 312 314 315 316 317 34 r any PH 4 0 eve co r e

406 Philosophical Figures and Movements. (3 F, S
Deta ed study of one or two prom nent ph losophers *e g* Kant or of a moveme t *e g* a ent skept sm See *Schedu e of Classes* for name of phi osopher r movement May be repeated f r cred t f r d fferent ph osophers and m vements. Prereq te approva of nstructor

494 Special Topics. 1 4 F S
In *S hedu e of C asses* t t e fo ow g course number nd cates top c covered Descr pt n f co rse mater a s s ava ab e the departmenta off ce Prerequ s te approva of nstru tor

498 Pro-Seminar. (1 3 F S
Concentrated ana ys s of ph soph ca top cs or of the w rks of a part cu ar a tho Prereq s te approva f structor

591 Seminar. 1 3 F S
op c may be se ected fr m the fo ow ng
a Theory of Kn w edge
b Soc a and M a Ph osoph
c Metap ys s and Log
d H story of Ph os phy

Special Courses PH 484 492 49 497 499 590 592 598 599 See pages 30 31

Physics

PROFESSORS:
WORK PS F 470), COW EY, HANSON, HESTENES JACOB KEVANE, KYRALA, LU MUNCH, N GAM RAWLS, ROY, SNYDER, STONER STROJN K, T LLERY, WALKER

ASSOCIATE PROFESSORS:
ACHARYA, AHMADZADEH, BENIN, KAUFMANN, PAGE STARRFIELD, VOSS

ASSISTANT PROFESSORS:
AANNESTAD, LAWSON, LINDSAY MARZKE, SPENCE

Departmental Major Requirements

Bachelor of Science Degree Curriculum

Physics *Opti n No. 1* Des gned for stu dents who wish to pursue physics at the bachelor or graduate degree level, this option consists of 45 semester hours of credit Re

quired courses are PHY 115†, 116†, 117†, 118†, 321†, 322†, 331†, 332†, 333†, 334†, 441†, 461†, and 465† Additional courses in physics and other related fie ds will be selected with the approval of the advisor. Related courses will include MAT 120†, 121†, and 212†, 213† or 374†, 342†. One year of credit in college level French, German or Russian is strongly recommended, particularly for the student who intends to pursue a graduate de gree in physics

Physics *Option No. 2.* An interdisciplinary program designed for students who wish to obtain an undergraduate physics preparation for entry into other professions or graduate programs. Required are 54 semester hours of credit, at least 30 of which are in physics (PHY) courses including PHY 115†, 116†, 117†, 118†, 321†, 331†, 333† and 461† The remaining courses will be selected from physics and an area of concentration as approved by the student's advisor. Examples of possible areas of concentration are astronomy, physical chen istry, appl ed n athematics, geophysics, biological physics, philosophy of science, scien tific journalism, etc , as well as pre medical and pre law programs. Related courses will necessarily include MAT 120†, 121†, and 212†, 213† or 342†, 374† One year of credit in a college level foreign language is strongly recommended for the student who wishes to pursue graduate stud es in a discipline which has a foreign language requirement.

Astronomy. The astronomy faculty is a sub group of the Physics Department It offers both General Studies courses in astronomy to the University community and astronomy and astrophysics courses for the science major. Although an undergraduate major in astron omy is not available, a physics major who takes all the upper divis on AST courses will have sufficient preparation for entrance into a graduate school in astronomy.

Science Education. Forma ly attached to the Physics Department, the science education faculty has primary responsibility for activities related to the teaching of science at the ele mentary and secondary level, particularly those which cut across the boundaries of the individual sciences Members of this group, with the cooperation of faculty members of the various science departments, in addition to offering formal courses and supervising gen eral science requirements in the various degree programs for teachers, maintain a science education materials center and the Arizona Portal School Program Other facilities in clude a planetarium used both for formal instruction and as a resource for schools in the area

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

General Science Consists of 42 semester hours of credit Required courses are CHM 113†, 231†; PHY 111†, 112†, 113†, 114†; BOT 100; ZOL 110, GLG 472, AST 321; PSE 460† or 480. Electives must be approved by the general science ma or advisor.

Physics *Option No. 1* Consists of 40 semes ter hours of credit. Required courses are PHY 111†, 112†, 113†, 114† (or 115†, 116†, 117†, 118†), 321†, 331†, PHY 460† or 36 †; PHY 463† (2 hours). An additional nine hours in upper division physics (PHY) or physical science PHS) courses will be approved by the advisor in consultation with the student. Re maining courses to complete the major may be in physics and or closely related fields, subject to the approval of the advisor.

Physics *Option No 2* A student may elect this option in conjunction with either mathe matics or chemistry majors. The physics portion of this program consists of 30 semester hours, with the following courses required PHY 111†, 112†, 113†, 114† (or 115†, 116†, 117†, 118†), 321†, 331†, PHY 460† or 361†; PHY 463† (2 hours) The remaining courses to complete the 30 hours may be in physics and or closely related fields, subject to the approval of the physics advisor.

Departmental Minor Teaching Field Requirements

Physics Consists of 24 semester hours of credit Required courses are PHY 111†, 112†, 113†, 114† or 115†, 116†, 117†, 118†); PHY 460 or 361†; one hour of PHY 463† Remaining hours to complete the m nor are selected from courses in physics, astronomy (upper di vision), and physical sciences (upper division) approved by the physics advisor

General Science Consists of 24 semester hours of credit. Required courses are MAT 117†, CHM 101 or 113†; PHY 101† (or 111†, 112†, 113†, 114†); AST 121 or 321, BOT 100; ZOL 100; GLG 100 or 472. Remaining hours are selected with the approval of the minor field advisor

Physical Science Consists of 24 semester hours of credit. Required courses are MAT 117, CHM 101 or 113†; PHY 101† (or 111†, 112†, 113†, 114†); AST 121 (or 321, 322), GLG 100 or 472 Electives must be approved by the physical science minor advisor.

Departmental Graduate Programs

The Department of Physics offers programs leading to the degrees of Master of Science and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements The Department has administrative responsibil ty for the inter departmental program leading to the Master of Natural Sciences degree.

Physics Department General Studies Courses for Non-Majors

All PHY, AST and PHS courses satisfy the General Studies science and mathematics requirement. The following courses presume no prior background in mathematics beyond high school algebra and geometry.

Physics. PHY 101

Astronomy: AST 121, 125, 321, 322

Physical Science. PHS 110, 361, 362, 370, 375, 380, 410, 411, 412, 413

PHYSICS

PHY 101 Introduction to Physics. (4 F S
Emphasizes applications to fields in the modern world understanding of elementary algebra is presumed. Three lectures 1 recitation 2 hours laboratory

111, 112 General Physics. (3 3 F S SS
Noncalculus treatment of the principles of physics for nonphysics majors. Students whose curriculum requires a laboratory course must also register for PHY 113†, 114† Prerequisite trigonometry. Three lectures 1 recitation

113, 114 General Physics Laboratory. 1 1 F S SS
Elementary experiments in physics. May be taken concurrently with or subsequent to PHY 111†, 112† respectively. Two hours laboratory

115, 116 University Physics 4 4 F S
Principles of physics using calculus. Prerequisite: Concurrent enrollment MAT 120†, 121† respectively. For physics laboratory at this level enrollment in PHY 117†, 118† Four lectures 1 recitation

117, 118 University Physics Laboratory 1 1 F S
Introductory experiments in measurement and techniques in physics. Prerequisite: Credit or concurrent enrollment in PHY 115†, 116† Two hours laboratory

251 Waves. 2 NR
Vibrations and wave phenomena with applications to acoustics and optics. Propagation reflection refraction interference and diffraction. Prerequisite: PHY 116† or ECE 202†

321 Newtonian Mechanics. 4 F
Vector calculus. Kinematics and dynamics of particles. Conservative and central forces. Dynamics of charged particle. Many particle systems. The two body problem and collisions. Rigid body dynamics. Motion in noninertial reference frames. Prerequisites: PHY 116† MAT 121† concurrent enrollment in MAT 212† and MAT 213† or equivalent

322 Analytical Mechanics. 4) S
Lagrange's and Hamilton's equations. Constraints. Coupled oscillators. Elements of continuum mechanics, elasticity and hydrodynamics. Prerequisite: PHY 321†

331 Electricity and Magnetism. (4) F
Vector fields and vector calculus. Electrostatic fields. Conductors and capacitors. Currents of charge. Ohm's law charge conservation. Circuit theory. Magnetic fields and the Lorentz force. Electromagnetic induction. Fields in matter. Displacement current. Maxwell's equations. Prerequisites: PHY 116† MAT 212† and 213†, or equivalent

332 Electromagnetic Fields. 4) S
Maxwell's equations. Scalar and vector potentials. Laplace's equation and boundary value problems. Magnetostatics. Electromagnetic waves propagation in media reflection and refraction. Prerequisite: PHY 331†

333 Intermediate Physics Laboratory I. 2 F S
Experiments selected in consultation with instructor to suit the student's needs and interests. Outside effort toward planning the experimental approach and writing reports is expected. Prerequisites: PHY 117† 118† 321† (or concurrent enrollment) Three hours laboratory

334 Intermediate Physics Laboratory II. (2 F, S
Continuation of PHY 333. Prerequisite PHY 333† Three hours laboratory

351 Optics. 3 F 80
Matrix methods in geometrical optics. Interferometry partial coherence. Selective absorbers. Fresnel and Fraunhofer diffraction. Fourier transforms spectroscopy. Prerequisites: PHY 116† MAT 121†

361 Modern Physics. 3 NR
Special relativity and introductory quantum theory with applications drawn from atomic nuclear and solid state physics. Prerequisite: PHY 116† or ECE 203†

401, 402 Mathematical Methods in Physics. 3 F S
Elements of vector calculus. Complex variables. Ordinary and partial differential equations, integral transforms. Special functions, determinants matrices probability and statistics. Prerequisites: MAT 212† and MAT 213† PHY 321†

434 Circuit Theory and Electronics. 4 NR
Network theory. Characteristics of nonlinear elements vacuum tubes and transistors. Basic circuits and their applications in physical measurements. Prerequisites PHY 331† 334† Three lectures 3 hours laboratory

441 Statistical and Thermal Physics 3 F
Statistical and experimental basis of heat temperature and entropy. Mechanical and statistical basis of the laws of thermodynamics. Applications of macroscopic thermodynamics. Phase equilibrium. Prerequisites PHY 321† 331†.

442 Statistical and Thermal Physics II. (3 S
Principles and applications of statistical mechanics. Quantum statistics of ideal gases and simple solids. Equilibrium of phases and chemical species. Transport theory. Irreversible processes and fluctuations. Prerequisite: PHY 441†

452 Advanced Optics. 3 S 81
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. X ray electron and optical diffraction. Prerequisites PHY 331†, 351† PHY 401† 402† recommended

453 Optics Physical Measurements. 2 NR
Experimental techniques and theory of optical measurements. Extra laboratory practice in the planning of experiments organization and presentation of results. Prerequisite PHY 334† or concurrent enrollment) Three hours laboratory

460 Elements of Atomic Physics. 3 F
Electron and atomic physics. Designed for teachers and students not majoring in physics. Prerequisite. one year of college physics

461 Modern Physics. 4 S
Specific relativity origin of quantum theory the nuclear atom elementary particles. Introductory quantum mechanics atomic and molecular spectra. Prerequisites PHY 321† 331† MAT 212† and 213†

462 Nuclear Physics. 3 F
Static properties of nuclei natural radioactivity, induced radioactivity, nuclear reactions, nuclear models and energy levels mesons and hyperons. Interaction of photons and electrons with matter. Prerequisite PHY 461†

463 Physical Measurements. 1 S
Experiments in mechanics and heat, electricity and magnetism optics and modern physics. Designed for teachers and students not majoring in physics. Prerequisite PHY 112† Three hours laboratory. May be repeated for a maximum of 3 hours credit

465 Advanced Physics Laboratory I. 2 F S
Continuation of PHY 333 334 at a more advanced level. Prerequisites PHY 333† 334† 331† or concurrent enrollment Three hours laboratory

466 Advanced Physics Laboratory II. 1 3 F S
Continuation of PHY 465 Prerequisites PHY 465† 461† May be repeated for credit

471 Quantum Mechanics. (3 F
Wave mechanics, Schrödinger equation barrier problems operators and eigenfunctions harmonic oscillator

one e e tron atoms Prerequisites PHY 322† 461† or approva of nstructor

472 Quantum Mechanics. 3 S
Matr x mechanics, a gu ar momentum perturbat on theory, scatter ng theory. Prerequ s te PH 461† or approval of nstructor

480 Methods of Teaching Physics. 3) S
Eva uat on of var ous approaches to the teach ng of h gh schoo physics P eparation of demonstrat ons ar d exper ments O gan zat on of a aboratory De gned for secondary schoo phys cs teachers Prerequ s te ap pr va of nstruct r

481 Solid State Physics. 3 S
Structure e ast c propert es and dy am s of crysta s e ectron mot ons n crysta s under app ed fields. Pre requis te PHY 471†

495 Project Research. 1 3 F S
Superv sed project n exper r enta phys cs Prerequ s te four hours se ected from PHY 333† 334† 453† and 465† May be repeated for cred t *Note approval of faculty member under whose direct on the work is to be done mu t be obta ned before registrat on*

501, 502 Methods of Theoretical Physics. (3 3 F S
Provides mathemat ca foundat ons for graduate stu dents bas c and app ed phys cs Comp ex var ables vector spaces operators, matr ces ord nary d fferentia equat ons ntegra equat ons and transforms and spe- c a funct ons May ncl de add t ona top cs Prerequ s tes. PHY 401†, 402† or approva of nstructor

503 Physical Applications of Group Theory. 3 NR
Fu damenta s and app cat ons of the theory of f n te and co t nuous groups as they occur n phys cs At m ic mo ecu ar sol d state and e eme tary part c e phys cs Prerequ s te approval of nstructor

510, 511 Astrogeophysics. 3 3 F S
Phys ca propert es of the structures and systems of the un verse from the ga ax es and stars to the nter ors of the p anets Prerequ s tes· PHY 322† 332† or approva of nstructor

521 Classical Mechanics. 3 F
Var at na pr nc p es Lagrange s and Ham ton s equa t s r g d body mot on can n ca transformat ons Hami ton Jacob theory Prerequis te PHY 321†

522 Advanced Topics in Classical Mechanics. 3 S
Cont nuum mechan cs e ements of hydrodynam cs e ast c ty theory spec a re at v ty Prerequ s te PHY 322† 521†

523 Relativity. (3 NR
Spec a and genera theories of re at vity. Prerequ s tes PHY 522† 532† or approva of nstructor

531 Advanced Electricity and Magnetism. 3 F
Electrostatics and magnetostat cs Potentia theory theory of const tut ve re at ons Maxwel s eq at ons The wave equat on p ane e ectromagnet c waves cav t es and wave gu des Prerequ s te PHY 331† or approval of nstructor

532 Electrodynamics. 3 S
Spec a theory of re at v ty covar ant formu at on of e ectromagnet c nteract ons nhomogeneous wave equat ons L enard W echert potent a s radiat on f e ds teract ons of cha ged part c es and e ectromagnet c waves scatter ng d pers on Prerequ s tes PHY 332† 531† r approva of nstructor

541 Statistical Physics. 3 F
Probab ty theory and pr nc p es of stat st ca nference Eva uat ng exper menta data foundat o s of stat stica mechan cs Ge era aws of the thermodynam cs from m croscop c theories Calcu at on of spe f c properties of bu k matter P erequis tes PHY 441† 471† 442† des rable

542 Advanced Topics in Statistical and Thermal Physics. 3 S
Theory of rrevers b e pr cesses Onsager recip oc ty aws fluctuat on d ss pat on theorem re axat on and transp rt processes n f u ds and p asmas L ouv e equat o the BBGKY h erarchy of d str bution functions, k net c theory, hydrodynam cs from many body theory phase changes and equi bri m ferromagnet sm Pre requ s te PHY 541†

551 X-Ray and Electron Diffraction. (3 S
Fresne and Fraunhofer d ffract on n ntegra formula t on. D ffract on of X rays and neutrons by crysta att ces Structures of so ds inc ud ng crysta structure ana ys s Theory and techn ques of e ectron microscopy d ffraction of crysta l ne noncrysta l ne spec mens Prerequ sites PHY 451† 481† or approva of nstructor

561, 562 Nuclear Physics. 3 3 F S
Two nuc eo nteract on C eb ch Gord n coeff c ents nternuc eon force meson theory a d h gh energy scatter ng nuc ear bind ng energy nuc ear mode s trans t on probab ty est mates nuc ear react ons beta decay Prerequ s tes PHY 462† 576† or approva of nstructor

564 Molecular Spectra and Structure 3 NR
Mo ecu ar spectra from the v ewpo nt of quantum me chan cs nc ud ng the ana ys s of e ectron c v brat ona and rotat ona spectra of po yatom c mo ecu es and the use of group theory to s mpl fy the ca cu at ons. Prereq u s te PHY 471†

568 Elementary Particle Physics. 3) NR
C ass f cat on of part cles, phenomeno ogy of strong e ectromagnetic and weak nteract ons cross sect ons decay rates· sotop c sp n and h gher symmet es struc ture of react on amp tudes Prerequ s te· PHY 577†

569 Elementary Particle Theory. 3 NR
Theoret ca mode s for strong electromagnet c and weak nteract ons· analyt c-S-matr x dispers on re a t ons current algebras med um a d h gh energy m de s Pre equ s te PHY 568†

576, 577 Quantum Theory. 3 3) F S
Abstract approach to quantum mechanics n H bert space observab es and their correspond ng operators e genstates a d e genva ues quantum dynam cs· ap prox mat on methods, systems of dent ca partic e angu ar momentum and group representat n theory co s on proce ses relat v st c quantum theory Prereq u s tes PHY 471† 522†

578, 579 Relativistic Quantum Theory. 3 3 F, S
Re at v stic one part c e equat ons, Klein Gordon equa t on Dirac equat on, second quant zat on theory of scatter ng S matr x Feynman d agrams quantum e ec trodynam cs renorma zat n pro edures Prerequ s te PHY 577†

581 Solid State Physics. 3 F
Quantum theory f sol ds nc uding phonons att ce spec f c heats band structure mode s Ferm surfaces, therma expans on p asmons electron phonon nterac t ons and scatter ng by att e defects Prerequ s tes PHY 481† 472† 576† or concurrent enro ment

582 Solid State Physics. 3 S
E ements of transport theory therma conduct on e ec tr n c conduction n meta s mob l ty in sem c nductors Ha effect, magnetores stance and se ected t p cs of current research. Prerequ s te PHY 581†

595 Current Physics Literature. 1 NR
Week y sem nar to ntroduce the graduate student to current act vity n phys cs through the contemporary t erature May be repeated for cred t.

ASTRONOMY

AST 121 20th Century Astronomy. 3 F S SS
Earth as a p anet the so ar system stars ga ax es and cosmo ogy. ntended for nonscience majors Three ec tures bservatory and planetar um exper ence

125 Introduction to Observational Astronomy. 1 F, S
Astronom ca observat ons and experiments Use of the te es ope w i be stressed Photograph c and p anetar um exper ence Even ng meetings. May be taken concurrent y w th or subsequent to AST 121 321 Two hours laboratory

321 Discovering the Solar System. (3 F, SS
H story f astronomy astron m ca nstruments, coordi nate systems p anets, sun and format on of the so ar system Prerequ s te e ementary a gebra Three ec tures observatory and p anetar um exper ence

322 Stars and the Universe. 3) S
D stance methods used in astronomy, stellar structure and evolution, nterstel ar med um ga axies, and cos mology Prerequ site· e ementary a gebra Three ectures, observatory and planetarium exper ence

325 Intermediate Observational Astronomy. (1 NR
Cont nuat on of AST 125 Observat ons w th te escopes, and use of photography n astronomy. Even ng meet ngs Prerequ s te AST 125 May be taken concurrent y w th or subseque t to AST 321 or 322 Two hours abo ratory

351 The Solar System. 3) F'79, F 80
Spher ca and grav tat ona astronomy p anets comets or g n of the so ar system Prereq s tes PHY 116† MAT 212† and 213†.

352 Stellar Astronomy. 3) S 80
Ste ar d stance sca es photoe ectr c photometry nter ste ar matter, ste ar dynam cs b nar es var ab e stars ga ax es and cosmo ogy Prerequ s tes PHY 116† MAT 212† and 213†

421 Stellar Astrophysics. 3) F 81
The phys cs of ste ar atmospheres dent f cat on of ste ar spect a ste ar struct re and ev ut on. Prerequ s tes PHY 321† MAT 212† a d 213†

422 Interstellar Astrophysics. 3 S 80
Phy c f the ter te ar medium gas and dust c ouds nterste ar mo ecu es gaseou nebu ae magnet c f e ds, cosm c rays Prereq s tes PHY 321† MAT 212† and 213†

PHYSICAL SCIENCE

PHS 110 Physical Universe. 4 F S
The u ver e as a 1 t stars so ar sy tem earth and at ms Nat re f matte ar d energy Three e tures 2 h ur at ratory

361, 362 Science and Man 2 2 F S
Effect por man f h s techno og ca c v zat n and c ns derat n of rece it advar ces n b th pure and ap p ed ph s ca s ence PHS 361 me han cs e e tromag et c rad at r ar d a tr nomy PHS 362 ge ogy chen try and u ear e ergy Co rses may be taken e ther der

370 Ideas of Physics. 1 3 NR
Re at o h p f phys ca or epts t t er areas of kn w edge Re ent offer ngs have beer 1 bas con cept n phy re at v ty omp emer tar ty u erta nty etc 2 cu e t t p cs f e ear h and pub c te est 3 n ethods fo deve op g and a sess new dea ee *Sched e of C as es* a d co f Phy s Depart e t f r u re t t t es a d sect ona ffe ngs May be epeated for red t

375 The Energy Cr sis. 2 3 F S
Current problems n energy resources, product on consumption and conservation No phys cs or mathematics prerequ s tes Students reg stered for 3 hours wi part c pate in a d scuss on group as we as attend lectures

380 Strategy and Tactics in Science. (2 3 NR
Bas c p nc p es and procedures for construct ng sc en t f c mode s Conservati n symmetry and causa ty pr nc p es só ation contro and est mat on of var a b es Examp es from sc ence and app cat on to everyday s tuat ons

410 Origins of the Physical Sciences. 3 NR
Or g ns of astronomy chem stry phys cs and mathematics in the cu ture f Mesopotan a, Egypt Ch na and nd a

411 Development of the Physical Sciences. NR
He le ist c mathemat cs phys cs chem stry and astr n omy Arab and the phys ca s e ce the r ro e spread ng the phys ca c ence t Europe The deve opment f the phy ca s iences n Europe unt the t me f Newton

412 Concepts of Modern Physics 3 NR
Fo upper d v or nor phys cs ma ors n porta t con ceptua advan e f phy cs during the 20th century Spec a and ger era re at v ty quantum theory, e eme - tary part c e phys cs astrophys cs c smo gy. No p ys cs or mathe at cs prerequ s tes May be taken f r hon r cred t

413 The Social Impact of Modern Physics. (3 NR
Technolog a and soc a ss es ra sed by deve pn ents phy cs dur r g the 20th centu y nu ea ene gy as ers sem conductors nuc eon weapona y, etc Prerequ s te PHS 412 May be taken f r honors cred t

SCIENCE EDUCATION

PSE 220 Physical Science for the Elementary Teacher. F S SS
Phys a en e oncepts and pro e es based on re ent e ementary schoo sc ence edu at n curr cu a Mu t be taken n seq e e PSE 2 0, 221 Three day f e d study

221 Biolog cal Science for the Elementary Teacher. 3 F S SS
B o ogy and earth sc ence concept and pr es es ba ed on recent e ementary sch o sc en e educat on cu ri a Must be taken n seque e PSE 22 221 hree day f e d study

460 Science in the Junior High School. 3 NR
mp tant sc er ce areas su tab e fo the un r h gh s o Re ent deve pments curr cu a aboratory techr ques and pr ces es of sc er ce are stressed

480 Methods of Teaching Physical Science. 3 NR
Methods of nstruct n organ zat o a d presentat on of appropriate top cs in phys ca sc ence Prerequ s tes SED 311 15 hours of phys ca sc ence or approva of instructor

Special Courses: PHY PHS AST PSE 294, 298 484 492 493, 494 497 498 499 500, 580 584, 590 591, 592, 594 598 599 700 780 783 784 790, 791 792 799 (See pages 30 31)

Political Science

PROFESSORS:
McGOWAN SS 410), AL SKY HINK, HOLMES, JO, KAM NSKY, MASON, PEEK, R CE, SCHWADA, S MON WH TE

ASSOCIATE PROFESSORS:
BERMAN, DALGLE SH, McGAW, READER, WATSON WOLF, YOUNGBLOOD

ASSISTANT PROFESSORS:
BOWEN, COATE, DAGGER KEATING, LAMPERT MERR LL NECHEMIAS, STOOKEY WALKER

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Political Science Consists of 45 semester hours of cred t of wh ch 30 must be in polit cal sc e ice and 15 n closely re ated fie ds to be appr ved by t e idvisor in consult t on w th the studer t One course is requ red from e ch of f ur fields 110 or 300 n American po t es, 150 or 160 r comp rative pol ties and nter rational re ations, 101, 440, 441, 442, 443, 444, or 445 in pol tical the ry, and 301, 40 , 431, 436, 437, or a course in pc itical behavior approved by the head ur derg ad uate idvisor At east 15 hours in pol tica sc ence must be selected fr m courses in the POS 400 series Courses POS 3 , 330 a d 360 n ay not be counted t ward a maj r in polit ca sc ence

Studer ts wh o m or in political sc ence must h ve a 2 0 average for al courses which co n t toward the ma or Upper divis on

courses which 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, pages 56-58.)

Latin American Studies Combined Degree Program. (See Interdisciplinary Studies, page 62) Consists of the Bachelor of Arts degree requirements in political science. At least 30 upper division semester hours of the total program must be in Latin American content courses including 15 hours in political science and 15 in other disciplines. A reading knowledge of Spanish or Portuguese is required, as is the successful completion of *LIA 402 Movements and Meaning in Latin America.* A reading knowledge of the other language is suggested. Fulfillment of requirements is recognized by a Bachelor of Arts degree with a major in Political Science - Latin American Studies Emphasis.

Asian Studies Emphasis (see Interdisciplinary Studies, page 60) Consists of the Bachelor of Arts degree requirements in political science plus a minimum of two years of Chinese or Japanese. Thirty semester hours of the total degree program must consist of Asian Studies courses selected with the approval of the advisor. Fulfillment of these requirements will be recognized by a Bachelor of Arts degree with a major in Political Science - Asian Studies Emphasis.

Bachelor of Science Degree Curriculum

Political Science Consists of 51 semester hours of credit of which 36 must be in political science and 15 in closely related fields to be approved by the advisor in consultation with the student. One course is required from each of four fields: 110 or 300 in American politics; 150 or 160 in comparative politics and international relations; 100, 440, 441, 442, 443, 444, or 445 in political theory, and 301, 401, 431, 436, 437, or a course in political behavior approved by the head undergraduate advisor. At least 2 hours in political science must be selected from courses in the POS 400 series. Courses POS 311, 330 and 360 may not be counted toward a major in political science.

Students who major in political science must have a 2.0 average for all courses which count toward the major. Upper division courses which 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, pages 56-58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Political Science Consists of 45 semester hours of credit, 30 of which must be in political science and 15 in closely related fields. Six courses are required: 110 or 300, 150 or 160, 101, 440, 441, 442, 443, 444, or 445, 301, 401, 431, 436, 437, or a course in political behavior approved by the head undergraduate advisor, 411; and 480. Courses POS 311, 330 or 360 may not be counted toward a major in political science.

Students who major in political science must have a 2.0 average for all courses which count toward the major. Upper division courses which 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.

Departmental Minor Teaching Field Requirements

Political Science Consists of 24 semester hours of credit in political science courses. Five courses are required: 110 or 300; 150 or 160; 101, 440, 441, 442, 443, 444, or 445; 301, 401, 431, 436, 437, or a course in political behavior approved by the head undergraduate advisor, and 411. POS 311 may not be counted toward a teaching minor in political science.

Students who minor in political science must have a 2.0 average for all courses which count toward the minor. Upper division courses which count toward the minor must have "C" grades or better, no more than one "D" grade in a lower division course may be counted in the major.

Departmental Graduate Programs

The Department of Political Science offers programs leading to the degrees Master of Arts and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

POLITICAL SCIENCE

Note: POS 101, 110, 120, 150, 160, 170 have some sections offered with discussions groups. Consult current *Schedule of Classes.*

POS 101 Political Ideologies. (3 F, S)
Leading political ideas and belief systems, *e.g.* Marxism, liberalism, conservatism, theories of democracy and alternative futures.

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 101 or 300.

120 Political Issues and Public Policy. 3) F, S
Contemporary social problems and political issues, particularly development of public policy.

150 Comparative Government. 3 F, S
Political institutions and processes in selected foreign countries or regions, strengths and weaknesses of contemporary political systems, political development.

160 Global Politics. (3 F, S)
The nature of contemporary world politics through the study of both general theoretical topics and specific geographical areas.

170 Public Law. (3 F, S)
Principal concepts, institutions, classifications and func-

t ons of aw The role of the ourts and the mpact of jud c a dec s on mak ng on soc a change

300 American National Government. (3 F, S
Powers functions and agents of Amer can po t ca n-st tut ons Meets the federal government requ rement fo teacher certif cat on Not open to students w th cred t for POS 110

301 Empirical Political Inquiry. 3) A
L gic of po t ca inquiry ncluding research prob ems concepts hypotheses theor es measurement data c ect on and ana ys

311 Arizona Constitution and Government. 2) A
C nst tut on and government of the State of Ar zona Not open to student hav ng cred t for POS 411 Meets the Ar zona government requ rement for teacher cert f cat on May not be counted for the ma or teach ng major or m nor n po t ca sc ence

330 Current Issues in National Politics. (3 A
Ma or s ues fac ng nat ona governments n the domes t c f e d May not be c unted for the ma r or the teach ng major n po t ca sc ence

360 Current Issues in International Politics. 3 A
An ana ys s of major current prob ems n wor d po t c May n t be counted for the major or the teach ng ma or n pol t ca sc ence

401 Political Statistics. 3 A
Ba c concepts n stat st cs as they fac tate the de sc pt o expla at on and predict on of soc a and po t ca phenomena

410 Urban Government and Politics. 3 A
Po t cs and adm n strat on of c ty and town gove nment the Un ted States Prob ems forms and services of c ty government

411 State Government. 3 A
Major prob ems of state gove nment nc ud ng const tut ona revis on gove nmenta reorgan zat on eg s at ve apport onment and other matters espec a y Ar zona governme t Meets the Ar zona requ ement for teacher cert f cat on

412 Metropolitan Government and Politics. (3 A
Po t ca p ce s n the metropo s w th an exam nat o of governmenta organ zations and dec s on-making structures

413 Legislative Process. 3) A
Lawmak ng process fo wed selected egis ative bod es, compos t n of membersh p organ zat on, powers mpact of nterna and externa forces on eg slat on

414 The American Presidency. 3) A
Off ce ro e and power of the Amer can Pres dency n the Amer can po t ca system

420 Introduction to Public Administration. 3) A
Role of the adm n strator n the po t cal process with an examinat on of the bas c concepts of bureaucracy

422 Politics of Bureaucracy. (3 A
Bureaucracy as a po t ca entity interna dynam cs of pub c agenc es the re at onsh p between publ c agen c es and other po t ca entities.

423 Politics of Budgeting. 3) A
The po cy proce s n budget ng strateg es used to fluence this process and recent reforms n pub c budget ng

424 Regulatory Politics (3 A
Deve opmer t and mp ementat on of governmenta po c es regu at ng bus ness a t v ty *e g* ant trust consumer and env ronmenta protect on and abor re a-t ons

425 Public Policy Development. 3 A
Re at onsh ps between po cy deve opment and adm n s trat ve proce ses as affe ted by the var ous ro es of leg s at ve bod es execut ve and adm n strative agen c es

426 Elements of Public Policy. 3) A
Each sect on may cover one of the fo ow ng top cs consumer protect on, natura res urces cr m nal jus t ce env ronmenta protect on, sc ence and techno gy or theor es of pub c po cy May be repeated for cred t when top cs vary

430 American Political Parties. 3) A
Deve opment of the Amer can party system Party or gan zat on and funct ons

431 Public Opinion and Propaganda. 3 A
Format on express on a d fluence of d v dua and organ zed op n on on po t a inst tut ons

433 Pressure Groups. 3 A
Aims techn ques a d nf uence of nterest groups n Amer can po t cs

434 Comparative Politics. 3 A
Po t ca part es pressure groups e ect ons, egislators and execut ves studied from a cross nat ona perspec t ve Effect on po t cs of d ffere ces n po tica cu ture and sty e and soc o-eco om c attr butes

435 Modernization and Political Change. 3 A
Po t ca and soc a prob ems assoc ated with modern zat on Emp r ca focus on o e or more deve oping reg ons

436 Electoral Behavior. (3 A
Vot ng behav or and the att tudes percept ns and ac t v t es of the c t zenry n the po t ca process

437 Political Socialization. 3) A
Process by which nd v dua s acqu re po tica y re evant nformation values att tudes, and behav or, conse quences of soc a zat on for soc ety and the elat onsh p between persona ty and pol t cs

438 Revolution and the Social System. 3) A
Causes and consequences of revo ut on dent fcat on of system c structures and nst tut on conducive to rad ca and moderate patterns of c nf ct resolution.

439 Minority Group Politics in America. (3 A
Ro e of m nor ty groups in Amer can po t cs

440 History of Political Philosophy I. 3 A
Western pol t cal ph osophers and the r theor es to the 17th century.

441 History of Political Philosophy II 3 A
Western p t ca phi osophers and the r theor es from the 17th to the 20th century

442 American Political Thought 3 A
Po t ca theories and movements from the colonia pe r od to the present.

443 Contemporary Analytical Philosophy. 3 A
The thought of representat ve anth opo og ca , econom-c p t ca psycholog ca and soc g ca contributors *e g* Ma nowsk , Keynes Dah S Areud Weber, Par sons to the study of po tics

444 Contemporary Normative Philosophy. 3 A
The thought of some lead ng contemporary po t ca ph osophers (*e g* Camus Sart e Strauss Marcuse Oakeshott

445 East Asian Political Thought. 3 A
Contemporary po t cal deas and theor es n East As a and the mpact of Western nc ud ng Marx st thought on the revo utionary process of Ch na

448 Government and Politics of East Asia. (3 A
A comparat ve ana ys s of the po t ca modern zat n expe ences f Ch na and Japan, foc s ng on the r d f fe ng rea t ons to the West

449 Parliamentary Government and Politics. 3) A
Examines such par amentary ystem as Great Br tain, Ire and Canada Austra ia and New Zea and.

450 Government and Politics of the Soviet Union. 3 A
Descr pt on and comparative ana ys s of Soviet govern ment and nst tut ons. Appra sal of the Soviet econom c system and incent ves, and of the mach nery for contro of the pe p e

451 Governments and Politics of Eastern Europe. 3 A
Modern zat on mu t -ethn c ty, e t sm, bureaucracy, re g onal sm and r va ry in East Europe

452 Governments and Politics of China. (3) A
Background of the Communist revo ut on, po t ca pro cesses and deve opmenta problems n Ch na fro n a comparative perspective

453 Governments and Politics of South America. (3) A
Governme ta nst tut ons, po t ca processes and de ve opmental prob ems of the South American states

454 Government and Politics of Mexico. (3) A
Mexican federal, state and local governmental institutions.

455 Governments and Politics of Central America and the Caribbean. (3) A
Governmental institutions, political processes and developmental problems of the nation-states and dependent areas of Central America and the Caribbean.

456 Governments and Politics of Western Europe. (3) A
Structures and behavior of governmental institutions and political processes in selected countries of Western Europe.

457 Governments and Politics of Central Europe. (3) A
Structures and behavior of governmental institutions and political processes in Central Europe; East German, Swiss, West German and Austrian systems.

458 Governments and Politics of South and Southeast Asia. (3) A
Political background, governmental institutions, political dynamics and developmental problems of South and Southeast Asian nations.

459 Governments and Politics of Africa. (3) A
Governmental institutions and processes of politics south of the Sahara.

460 World Politics. (3) A
Theoretical examination of one or more aspects of international politics, *e.g.*, foreign policy, negotiations, alliances, crises, wars, international systems.

461 American Foreign Policy. (3) A
United States in world affairs; foreign policy since World War I. Techniques in formulating American foreign policies.

462 International Relations of the Communist World. (3) A
Nature and objectives of foreign policy of the Communist camp, emphasizing Soviet foreign policy and the Sino-Soviet conflict.

463 Inter-American Relations. (3) A
Diplomatic relations among the Latin American states. Development of U.S. foreign policy toward Latin America.

464 American Defense Policy. (3) A
Problems and issues of the organization and control of the defense establishment of the U.S.

465 International and Regional Organizations. (3) A
Theory, development and practices of international and supranational organizations.

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.

468 Comparative Asian Foreign Policies. (3) A
Foreign policies of the Asian states emphasizing their security relations and movements toward regionalism.

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.

471 Constitutional Law I. (3) A
Development of the United States 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.

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.

473 Judicial Decision-Making. (3) A
Relationship of political culture, institutional roles and personal attributes and attitudes to judicial decision-making.

474 International Law.(3) A
Law of the nations as developed by custom and agreement and as exhibited in decisions of international and national tribunals.

480 Methods of Teaching Government. (3) A
Methods of instruction, organization and presentation of subject matter in political science. Prerequisites: SED 311† or concurrently, and 15 hours in political science or approval of instructor.

494 Special Topics in Political Science. (3) A
Chosen from the various fields of political science.

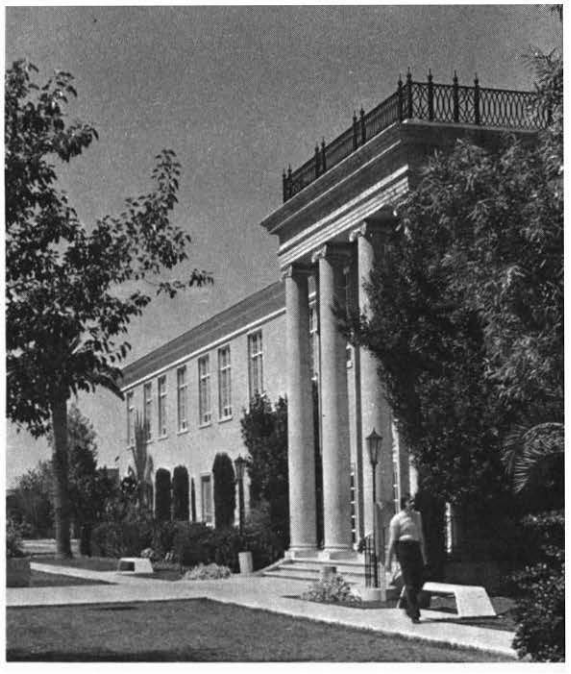
498 Pro-Seminar. (3) A
Small group study and research for advanced students within their major area. Prerequisite: major in the department or approval of instructor.

500 Research Methods. (3) A
Issues and logic of empirical research including concepts, hypotheses, theories, research design, data collection and analysis.

510 American Government. (3) A
Analysis of forms, processes, and institutions of American government.

520 Public Policy and Administration. (3) A
Literature survey regarding the development, implementation and effects of public policy. Attention given to policy making models, administrative decision-making, impact of public policies, and policy evaluation.

540 Political Theory. (3) A
Major political theorists, political philosophies and perennial topics in the history of political thought.



550 Comparative Government. (3) A
Major theoretical approaches and models used in cross-national analysis of political institutions and processes.

560 International Relations. (3) A
Major themes, approaches, and research concerns in the international relations literature. Trends in contemporary international relations, decision-making models, foreign policy theory, and international systems analysis.

570 Public Law. (3) A
Readings and analysis in public law, including administrative law, comparative law, constitutional law, jurisprudence, and the legal process.

591 Seminar. (3) S
Research projects may be selected for investigation from the following areas:

(a) American Government
(b) Public Policy and Administration
(c) Political Theory
(d) Comparative Government
(e) International Relations
(f) Public Law
(g) Methodology

598 Special Topics Course. (3) A
Various areas of political science.

792 Research. (3) F, S
Projects in various areas of political science. Required of all, and open only to, doctoral students.

Special Courses: POS 492, 493, 499, 590, 592, 599, 790, 799. (See pages 30-31.)

Psychology

The doctoral program of the Department of Psychology in clinical psychology is accredited by the American Psychological Association.

PROFESSORS:
K LLEEN (PYB-237C) BRAUN, GOODSTE N, HAYGOOD, JONES LANYON, L NDER MEYERSON, REICH, VESTRE

ASSOCIATE PROFESSORS:
BARDRICK, BRAVER CHART ER, CIALDIN , FEHR LESHOWITZ LEV NE, LINDHOLM, MILLER, PARK NSON ROSSI

ASSISTANT PROFESSORS:
BARRERA EISENBERG, GLANZMAN, HOMA, SADALLA, SANDLER, SOMERVILLE ZAUTRA, ZEISS

INSTRUCTOR:
RITCH E

Departmental Major Requirements

Bachelor of Arts Degree Curriculum

Psychology Consists of 4S semester hours, of wh ch 27 must be in psychology and 18 in related courses to be approved by the advisor in consult tion with the student. Required courses n psychology are PGS 100, PSY 230†, 290†, one course from among PGS 315†, 341†, 350†; one course from among PSY 323†, 324† or 325†, and it least two more upper div sion courses Requ red related courses are MAT 117† and 119†, or their equiva ents, which students are encouraged to complete early in their college careers. (See Degree Requirements, pages 56 58)

Bachelor of Science Degree Curriculum

Psychology Consists of at least 51 semester l ours, of which 30 must be n psycho ogy and a r in mum of 21 hours in related courses to be selected by the student in consultation with the adv sor Required courses in psychology are PGS 100, PSY 230† and 290†; one course from among PGS 3 5†, 341†, 350†; one course from among PSY 323†, 324†, or 325†, and it least two more upper d vision courses. Required re ated courses are MAT 117† and 119†, or their equivalents, two semesters of physics, chem stry geology or astronomy, and two semesters of biology, zoology, physiology, or microbiology. (See Degree Requirements, pages 56 5S)

Departmental Minor Teaching Field Requirements

(Secondary Education)

Consists of 24 sen ester hours of credit taken in considerat on of the prerequisites listed for courses.

Departmental Graduate Programs

The Departmer t of Psycho ogy offers pro grams lead ng to the degree of Doctor of Ph losophy Consult the *Graduate Catalog* for requirements

PSYCHOLOGY (PGS)

Courses wh ch may be app ied toward Genera Stud es requ rement n soc a and behav ora sc ences

PGS 100 Introduction to Psychology. (3 F S, SS
Ma'or areas of theory and research n psychology Par t c pat on in department sponsored research or an educat ona y equ va ent a ternat ve act v ty s equ red

270 Psychology of Adjustment. 3 F S SS
Princ p es of menta health adjustment, conf ct stress and cop ng processes der ved from c n ca and exper menta research Prerequ s te PGS 100

306 Environmental Psychology. 3) F S SS
Concepts and research strateg es n the study of behav o n interaction w th phys ca env ronment
Pre equ s te PGS 100

310 Social Psychology and Mental Health. (3 F S
Soc al and cu tura nfl ences on menta hea th and ness emphas z ng current ssues and re ated research Prerequ s te. PGS 100

315 Personality Theory and Research. 3 F S SS
Def nit on and descr ption of persona ity n terms of theoret cal and methodolog cal approaches. Prerequ s te PGS 100.

331 Sexual Identification. (3) NR
Theor es and research n the deve opment of sexua dent f cation, concepts of fem nin ty and mascu nity, socia ro es and att tudes Prerequ s te PGS 100

332 Human Sexual Behavior (3 F S
Sexua deve opment variat ons and dev at ons n sexua behavior and sexua d sorders Prerequ s te PGS 100

341 Developmental Psychology. 3 F S
Behav or deve opment ana yzed n terms of psycho og ca pr nc p es. Current research n h man devel pment Prerequ s te PGS 100

350 Social Psychology. (3 F, S SS
Human soc a behavior nc ud ng such concepts as ag gress o attract o co form ty groups he ping, person percept on and persuasi n Prerequ s te PGS 100

371 Psychological Testing. 3 S
Method and theory of psycho og ca test i g various types of psycho og ca tests cons deration of eth ca soc a and ega aspects of test ng Prerequ s tes PGS 100 PSY 230 or approval of nstructo

414 History of Psychology. 3 F S
H stor cal development of psycho gy from ts ph o soph ca beg nn ngs to the present P e equ s te. PGS 100

426 Clinical Psychology. (3) F S
C n cal psycho ogy as a sc ence and profe s on H stor ca deve opment methods of nterv ewing and assessment and methods of therapeut c ntervent on Prerequ s te sen or status or approva of nstructor

427 Psychology of Aging. (3 NR
Behav ora att tud nal, and emotiona phenomena asso c ated w th matur ty and o d age ana ys s both of the pos t ve ab t es and resources wh ch may be reta ned as we as the stresses f dy ng death and gr ef Pre requ s te PGS 100

430 Industrial Psychology. (3 F S SS
Psycho og ca contribut ons to the understand ng of o gan zat ons and management systems mot vat on and wo k performance, human factors n systems de s gn and eva uation and personne se ect on and test ng Prerequ s te. PGS 100

441 Cognitive Development. 3 F S
Exper menta and theoret ca l terature n ch ld deve op ment and behav or Prerequ s te. PGS 341†

442 Life Span Development. 3) NR
Methods and f d ngs of recent stud es of the deve op ment growth and prob ems of ado escents and adu ts w th mp cat ons for ed cat on Prerequ site PGS 341†

443 Psychology of Exceptional Children. 3 F

Behav or of ch dren c assed as except ona n re at on to the prob ems of assessment treatment and educa- t on Mental def ciency hab t disturban es speech d sorders earn ng disab l t es psychophys olog cal dis- orders Prerequis te PGS 341† or approva of nstructor

444 Directed Child Study. (1 3) F S SS
Superv sed experience with ch ldren n the pre schoo program of the Ch ld Study Laborat ry Prerequis tes CDE 232† or PGS 341† and approva of nstructor May be repeated for a tota of 9 cred ts

451 Experimental Social Psychology. 3 NR
Des gn conduct ana ys s and report of exper menta nvest gat ns of soc a psycholog cal phenomena Pre requ s tes PSY 29 † and PGS 350†

458 Group Dynamics. (3 F
Theor es and methods of g oup eadersh p group effec tivene s comm n cat on w th groups and relat ons between groups and ndiv dua members Prerequ s te PGS 350†

459 Attitudes and Attitude Change. 3 S
Concept of att tude Rev ew f theory and research n c ud ng techn ques of measurement Ana ys s of att tude change at both mass and ind v dua eve s Persuasive c mmun cat on ba ance models cogn t ve perceptua and mot vat ona determ nants Prerequ s te PGS 350†

466 Abnormal Psychology. 3 F S SS
H stor cal and current def n t ons, theory, and research concern ng abnorma behav or Major categor es of psychopatho ogy nc uding re ated treatment ap- proaches Prerequ s te PGS 100

Special Courses: PGS 494 498 584 590 592 599 700, 790 791 792, 799 (See pages 30 31.

PSYCHOLOGY (PSY)

Courses which may be appl ed toward the General Studies requ rement in sciences and mathematics

PSY 112 Experimental Analysis of Behavior. (4 F, S
Basic pr nc ples of behav or ana ys s, w th emphasis on the control and mod f cat on of human behav or Course is self-paced, inc udes a aboratory.

230 Introduction to Statistics. 3) F, S, SS
Basic concepts n descr ptive and nferential stat stics emphas z ng app ications to psychology Prerequ s te PGS 100; MAT 117† s recommended

290 Experimental Psychology. (4 F S
Planning, execution analys s and report ng of behav iora exper ments L terature procedures and instruments n representative areas of psycholog cal research. Requ red for psycho ogy majors Prerequ s te PSY 230† or equ va ent Three ectures 3 hours laboratory

323 Sensation and Perception. 4) F S
Under y ng processes of vis on audit on and the other senses App ication of current research and theory n a aboratory env ronment Prerequisite. PSY 290† or ap- proval of the instructor Three ectures 3 hours aboratory.

324 Learning and Memory. (3) F, S
Processes under y ng nformat on storage and retrieval, nc ud ng d fferent k nds of memory forgett ng, depth of process ng and contro processes Prerequ s te PSY 290† or approva of instructor

325 Physiological Psychology. (3 F S SS
Re at onsh ps of phys o og ca processes to behav or Emphas s is on nervous system funct oning Prerequi sites PGS 100 or two courses n b o og ca sc ence, preferab y both, PSY 290† or approva of nstructor

330 Statistical Methods. 3) S
Advanced app ication of stat st cs to psycho ogy H gh y recommended for students nterested n attend ng graduate schoo Prerequisite. PSY 230† Three ec- tures, 1 hour aboratory

399 Independent Study. (1 3 F S SS
Des gn and execut on of or gina research projects un- der facu ty supervis on Prerequ s te approva of nstructor. May be repeated for a total of 9 hours

420 Radical Behaviorism. (3 S
Research appl cat ons and ph osophy of the contro of human and animal behav or from the Sk nner an perspect ve. Prerequ s te PSY 112 or 290†

423 Animal Behavior. (3) NR
Genera ity of behav ora laws throughout the an ma kingdom as we as behavior patterns specif c to differ ent spec es Prerequ s te: upper d v s on stand ng

425 Biological Bases of Behavior. (3 NR
Cr t ca study of phys o ogica psychology bra n mecha- n sms underlying motivat on earning, etc Prerequisite. PSY 325† Two lectures, 2 hours aboratory

426 Neuroanatomy. (4) S
Structure and funct on of mammal an brain nclud ng sheep bra n d ssect on Prerequ s te upper division stand ng Three lectures, 3 hours aboratory

434 Cognitive Psychology. (3 F
The human organism as a processor of nformat on from perception to cogn t on abstract concepts, se- mant c memory attent on and mental magery Prerequis te approva of nstructor

490 Course Programming. (2) F, S, SS
Superv sed exper ence in the deve opment and adm nis tration of programmed instruction Des gned for students who proctor se f paced or persona ized courses May be repeated for a total of 4 cred ts.

498 Pro-Seminar. (3) F S
Offer ngs w l be se ected from top cs of current interest in psycho ogy

501 Supervised Teaching. (4) F
Exper ence in and exam nation of perspectives on teach ng undergraduate psychology Prerequ s tes graduate stand ng n Psycho ogy and approva of n- structor

505 Theoretical Foundations of Social Psychology. 3) S
Ma or research top cs and parad gms n soc a psycho ogy Systemat c deve opments n theory and research Gro p pr ce ses att tude formati n and change and s c a percept on Prerequ s te approva of nstru tor

506 Survey of Research in Environmental Psychology. 3 F
Major top s and parad gms n the study of man env ronment re at o sh ps

507 Research Methods in Environmental Psychology. 3 S
Techn que of invest gat on n enviro me ta psychol ogy Prerequisite app ova of instructor

512 Advanced Learning. 3 NR
P nc p es and theo es of earn ng emphas z ng re sea ch iterature

514 History of Psychology. 3 F
H stor a deve opment f psycho ogy as a sc en e an a profess on from ts ph osoph ca beg n ng to con temporary times nc ud ng cur ent ssues Prerequ s te PGS 100

520 Advanced Experimental Analysis of Behavior. (3) NR
Contemporary resea ch te at re n the exper menta ana ys s of behav or Prerequ s te PSY 420†.

522 Methods and Instrumentation in Psychological Research. 3 NR
E ect onic and e ectromechan cal nstrumentat on n psycho g ca research nci ding tra ng the pr gramm ng and use of rea t me c mputers. Prerequ s te approva of nstructor

524 Advanced Physiological Psychology. 3) NR
Contr butions of phys o og ca processes and bra n funct on to fundamenta behav oral processes

528 Sensation and Perception 3) NR
Pr nc p es of sensory and perceptua p ocesses, empha s z ng research l terature

529 Correlation and Psychometric Theory. (3 S
Pr nc p es of corre at ona techn ques nc ud ng regres s on and mu t p e co relat on Psychometr c theory nclud ng re abi ty and val d ty

530 Intermediate Statistics. (3) F
Continuation of PSY 529. Psychological statistics, emphasizing the analysis of variance and the design of experiments.

534 Information Processing. (3) S
Processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used.

535 Cognitive Processes. (3) NR
Theoretical/empirical treatment of the human organism as a processor of information, including abstraction, memory structure, problem solving, and thinking.

540 Advanced Developmental Psychology. (3) NR
Theory and methodology pertaining to the study of children, emphasizing research findings and their implications. Prerequisite: admission to Psychology Ph.D. program or approval of instructor.

550, 551 Advanced Social Psychology. (3, 3) F, S
Theory and research concerning interpersonal perception, decision-making, attitude formation and change, group processes, social motivation, and interaction processes. Prerequisite: PSY 505† or approval of instructor.

553 Social Influence. (3) NR
Research literature relevant to attitude formation and change, conformity, obedience, power, compliance and altruism. Prerequisites: PSY 550†, 551†, or approval of instructor.

555 Research Methods in Social Psychology. (3) S
Review of research techniques. Laboratory and field research analyzed; applications to specific topics. Prerequisite: approval of instructor; PSY 505†.

556 Social Perception. (3) NR
Attribution theory, attraction, cognitive organization, impression formation, social judgment, scaling procedures for social stimuli. Prerequisites: PSY 550†, 551†, or approval of instructor.

558 Interpersonal Processes. (3) NR
One or more topics chosen from: empathy, modeling, vicarious processes, contagion, group phenomena, social communication, behavior exchange. Prerequisites: PSY 550†, 551†, or approval of instructor.

564, 565 Somatopsychology. (3, 3) F, S
Theory and research in the psychological aspects of chronic illness, physical disability, and mental retardation.

569 Advanced Study of Personality. (3) NR
Personality as a theoretical concept in psychology, including definitional problems, behavioral and traditional approaches, the measurement of personality, and current research issues. Prerequisite: approval of instructor.

571 Intellectual Assessment. (3) F
Theory and research on assessment of intelligence and the development of intelligence tests. Supervised practice in a self-paced instructional format. Prerequisite: admission to clinical Ph.D. program or approval of instructor.

572 Personality Assessment. (3) S
Theory and research on assessment of personality and psychopathology and construction of personality assessment instruments. Supervised practice in a self-paced instructional format. Prerequisite: admission to clinical Ph.D. program or approval of instructor.

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 approval of instructor.

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 approval of instructor.

575 Behavior Therapy. (3) F
Theory and research relating to the use of behavior therapy in modifying abnormal behavior. Structured practice. Prerequisite: admission to the clinical Ph.D. program or approval of instructor.

576, 577 Clinical Practicum. (3, 3) F, S
Supervised experience in development of professional skills in clinical psychology including the application of assessment procedures, psychotherapy, and behavior therapy techniques with children and adults, and consultation. Prerequisite: admission to clinical Ph.D. program.

579, 580 Community Psychology Practicum. (3, 3) F, S
Supervised experience in conceptualizing, conducting and evaluating psychological interventions to promote well-being in community settings. Advanced theory and research as relevant. Prerequisite: advanced standing in psychology Ph.D. program or approval of instructor.

581 Advanced Clinical Assessment. (3) NR
Theory and methodology pertaining to the study of children, emphasizing research findings and their implications. Prerequisite: advanced standing in clinical Ph.D. program or approval of instructor.

582 Community Psychology. (3) SS
Community systems, intervention techniques, consultation models, history and current status of community mental health movement, conceptualization of the roles of community psychologists in social system intervention. Prerequisite: advanced standing in Psychology Ph.D. program or approval of instructor.

583 Child Psychopathology. (3) NR
Major theories and research related to the development of deviant behaviors in children, including some supervised experience in child assessment. Prerequisites: PSY 571†, 572†, or approval of instructor.

584 Advanced Treatment Methods. (3) NR
Advanced theory, research, and techniques of psychological treatment methods. Prerequisites: PSY 576†, 577†, and approval of instructor.

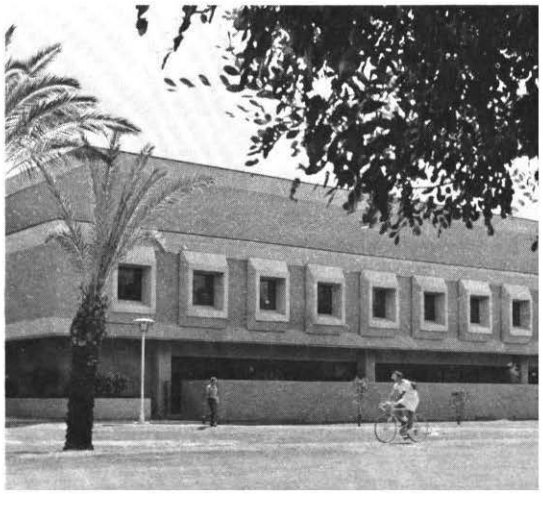
586, 587 Advanced Clinical Practicum. (3, 3) F, S
Supervised experience directed toward the development of specialized professional skills in clinical psychology in one of the following areas (individual psychotherapy, group therapy, marital therapy, family therapy, or child psychotherapy). Prerequisites: PSY 576†, 577†, and approval of instructor.

588 Consultation Methods. (3) NR
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 approval of instructor.

589 Social Learning (3) NR
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 approval of instructor.

591 Seminar. (3) F, S, SS

Special Courses: PSY 484, 494, 584, 590, 592, 599, 700, 790, 791, 792, 799. (See pages 30-31.)



Center for Public Affairs

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The Center for Pub ic Affairs l is been est ib-lished as a separate ac idem c un t located w thin the Col ege of L iberal Arts. Its b asic aims arc l to offer a gr aduate educatic n program ncluding the Master of Publ c Ad min stration degree and mid career education, (? to n a nta n a research program designed tc dent fy prob er s, produce iformation and propose s olutions to major pub c prob er s, 3 to pr vide a higl level of public serv ce in rel tt on to governn ental needs in the State of Ar zon a

PAF 500 Research Methods. 3) F S, Ha O Su van Karn g
Approaches and tech que f r the gather ng of data n pub c adm n st at o for survey research and methodo ogy Var ous data ana ys s methods Prerequ s te PAF 5 1 o forma educat o a backgr u d n stat st c

501 Statistics in Administration. 3 F Becker
App cat on of stat t ca methods t prob ems n f r ance personne survey and p ann ng Prerequ s te POS 301 or MAT 226† or eq va ent

502 Computers in Administration. 3 NR Karn g
Exper ence n use of omputer techno ogy f r pub c ad n trat on prob em solv ng

503 Organizational Theory. 3 F S Ma k n, Henry
Organ zat ona theor es and c rrent research emphas s w th app at on to pub adm n st at ve rgar zat o

504 Comparative Administration. 3 NR Staff
L teratu e on c mparat ve pub c adm strat on theory Bureau ra es and the r mpact o the po t ca deve op mer t process Se ected nat o s w be stud ed

505 Intergovernmental Relations. 3) F S O Sul van Ha DeBo ske
Evo ut on growth, present status and character stics of the U S federa system of government Federa state e at on state- oca re at ons, reg ona sm counc s of government nterstate cooperat on gra ts n a d and revenue shar ng

506 Regional Cooperation, Programs and Associations. 3 F DeBo ske
nter and ntrastate reg ona po tica and admin st at ve cooperat ve dev ces and bod e

507 Bureaucracy and Public Affairs. 3 F Henry
Pub c adm n strat on cover ng pub c eth cs rgan za t on theory per nne b dget ng systen s ana y and cr t ca pub c po cy s ues

510 Governmental Budgeting. 3 F S Sackton
Lega soc a econom and po t ca nature of govern menta budget and the budgetary process Theor es and soc a c n equence of budget dec s on mak ng and pract es of budget contro

511 Governmental Finance Management. 3 F Sack to
Source of fund ng management of funds and debts a d genera pattern of expend tures n states o int es c t es and d str cts

512 Public Affairs Economics. 3 F Becker
Ro e f e onom cs n p b c affa w th examp es from t ansportat on urba form R o Sa ad project h u ng and use f ood co tro growth aspect of energy eco nom cs

520 Public Management. 3 F S Staff
The ma ageme it process n government and pub c agenc es w th empha s on the execut ve eadersh p w th the p b c sector

521 Public Personnel Management. 3 S Mank n
H story of the c v serv ce recru tment e ect o pos t on ar d wage c a f at on mot vat ona ana ys s product v ty pub u ion sn and eth cs n the pub c erv ce

522 Public Labor Relations 3 F Mank n
R se of pub c n n sm manage a p cy towa d u oni m co f t reso ut on mpact of un o sm on budgets personne po c es ar d p b po cy

523 Public Information Systems. 3 F Ha
Systen ana ys s co cepts and theo y a app ed to adm r strat on A te nat ve modes of nfo mat o rga zat n and the r pact n pub c dec s n mak ng

524 Community Conflict Resolution. 3 F Ha
te d c p ary approach t understa d ng the dyna c f c mmun ty c nf ct Strateg c c ns derat o s n po cy des gr ar d advo acy potent a reaction to c n f ct Re evant mode s and researcl f r d ngs generated by both case stud es and comparative methods

525 Public Program Management. (3 NR Staff
Goverr menta serv ce pr gramm ng f rmu at ng f nanc ng operat ng eva uat ng and report ng Ana ys s of nteragency re at nsh ps an the ro e and co duct of research n the programm ng process

530 Management of Urban Government. (3 F Staff
Adm n strat ve pract ces and behav or within the urban po t cal adm n strat ve env ronment Fu ct ona areas such a c t zen pa t pat on urban p ann g urba tra sportat o and the conf cts between urban p t cs and adm trative eff c en y

531 Comparative Urban Administration. NR Staff
Deve opment of urban governments w th d fferent c tura soc a and p t ca mi eu C t es w th n deve op ng countr es a we as in the deve oped co ntr es of Eu rope and North America

532 Urban Planning Administration. 3 F Eribe
H stor ca and present day uses of urb n p ann ng and procedures for ts mp ementat o Ba c pr nc p es and pract es

533 Politics of Urban Planning. 3 F Er bes
Urban p ann ng po y ssues frequent y faced by oca state and federa government Cons de at on of the e at on h ps between t e po t ca eader the p ofess na p ann e and the c tizen

535 The City and County Manager. (3 NR Staff
The manage s o e and e r e n the diffe ng form of adm n strat ve, eg s at ve and commu ty ectors

540 Public Policy Analysis. 3 S Er bes
Theo es wh ch attempt to exp a n pub ic po cy f rmu a t n App cat n of s c a sc ence to pol cy ssues

541 Topics in Public Policy Analysis. (3 F S Staff
May be repeated for cred t T p s may be offe ed from t e fo ow ng a Ag ng b Art c Educat on Po cy d Env onmenta Pub c P cy e Hea th f Nat ona Pub c P cy g Pub c Safety h Rec eat n, T a sportat o j We fare

542 Science, Technology and Public Affairs. 3 NR Staff
The r f uence f sc er ce and techn o y on g vernme ta po cy mak ng sc ent sts as adm n trat r a d adv sors g vernmer ta p y mak g fo sc ence and techn gy governme t as a sponsor of resear h and deve opmer t

543 Public Management of Land. 3 NR, Be ke
Exte t bas s procedure and co eq ence of a d managen ent by age c es f tede a tate and ca governments

544 Preparation of Reports in Public Administration 3 NR Sackt n
ntens ve pra t e n wr tten and ra presentat of

reports to conferences covered w th prob ems n pub c adm nistrati n V sua a d techn ques

591 Seminar. 3 F, S· Staff
Top cs may be se ected from the fol ow ng (a) Genera Pub c Adm strat o b Publ c F ance Adm r stra tion c Pub c Management d rban Affa rs and Urban P ann ng e P bl c Pol cy Ana ysis

Special Graduate Courses. PAF 580 584 590 592 594 598 599 See pages 30 31

Sociology

PROFESSORS:
LINDSTROM (SS 321 ANDERSON, AXELROD FARBER, GORDON HOULT HUDSON MAYER, OWEN SEBALD

ASSOCIATE PROFESSORS:
HARDERT, J M. JOHNSON, NAGASAWA, PFUHL, WH TAM

ASSISTANT PROFESSORS:
ALTHEIDE COBAS, GOGEL, LANER, SNOW SULLIVAN WEITZ

Departmental Major Requirements

Bachelor of Arts and Bachelor of Science Degree Curricula

Sociology Depart ment requ r re nents are the sa ne for the Bachel r of Arts and for the B chelor of Se ence degrees see the College of Liber Arts section of th s catalog fo the additi nal requ rements for B A nd B S degrees. The department al requirement for either degree consists of 45 semester hours of credit of wh ch 30 n ust be in sociology nd 15 in c osely re ated fields t be approved by the advisor n consultation with tl e student The 30 hours must nclude SOC 1(or 301, 390†, 391†, 483† or 485† or 486† nd one course fr m at east three of the f ow ng f ve areas nst tut on al forms and processes, demography and ecology, socia prob c ns, soc al rganiza tion and socia psychology details availab e in the dep artment off ce . At least 18 semester hours must be n upper div sion courses (See Degree Requirements, pages 56 58.)

Departmental Major Teaching Field Requirements

Bachelor of Arts in Education Degree Curriculum

Sociology Consists of 63 semester hours o' cred t of which 30 hours must be in sociology and are exactly those courses required for the Bachelor c Arts or B ac l e c r of Science de gree in sociol gy. Of the rem ining hours, two groups of 2 hours e ch and one o 6 hours are genera y taken n re ated social sciences plus SED 480†

Departmental Minor Teaching Field Requirements

(Secondary Education)

Sociology Consists of 24 semester hours of cred t, at east s x of wh ich will be upper divi s or SOC 101 or 301 is required The remain ng ? hours must be approved by the soci l ogy advisor n consultation with the stu dent, and must nc ude at east one course from at c ast three of the fol owing five areas nstitutiona for ns and processes, demography and eco ogy, s oci l problems, soc a organ za tion and social psycho ogy (details avai able in the dep artment office)

Special Emphasis Program

Public Safety Emphasis A public safety emphasis is available for law enforcement and fire fighting personnel in either the Bachelor of Arts or Bachelor of Science major in sociol ogy The 30 hours must consist of SOC 340†, 360†, 440†, 446†, 449†, and SWU 470† in add tion to SOC 101, 390†, 391†, 483† or 486† or 485†. Applicable courses taken out side the Department of Sociology may be used to meet the requirement of 15 hours in closely related fields approved by the advisor in con sultation with the student. Upon graduation, those successfully complet'ng the program will receive recognition by a statement on the stu dent's tr nscript.

Departmental Graduate Programs

The Department of Sociology offers programs leading to the degrees of Master of Arts and Doctor of Philosophy Consult the *Graduate Catalog* for requirements.

SOCIOLOGY

SOC 101 Introductory Sociology. 3 F S, SS
Fundamenta s of sociology organ zat on of human groups and society processes of nteract o and soc a change Not open to students who have cred t for SOC 301 Two hours ecture one hour aboratory

251 American Society. 3 S
Systemat c analys s of the maj r nst tut ons of econ om c act v ty, pol t ca structure sc ence educat on and re gion n contemporary Amer ca Prerequ s te SOC 101

301 Principles of Sociology. 3 F, S SS
ntens ve and cr t ca ana ys s of the concepts of soc o ogy Not open to students who have cred t for SOC 101

305 Courtship and Marriage. 3 F S SS
A functiona approach to marr age courtsh p engage ment marita ad stment

332 The Modern City. 3 F, S
Growth character st cs and prob em of the modern c ty Prerequ s te SOC 101 or 301.

333 Population Problems. 3 F,S SS
Theor es of popu at on change b rths deaths m gra t on popu at on pol c es Prerequ s te SOC 101 or 301

340 Sociology of Deviant Behavior. 3 F S SS
Introduct on to and analysis of dev ant behavior De n eation of the soc o og cal and soc a psycholog ca factors which g ve r se to dev ant behav or such as su c de drug add ct on homosexua ity, prost tut on etc Prerequis te SOC 101 or 301

341 Modern Social Problems. 3 F S SS
Race re ations poverty unemp oyment and other cur- rent ssues.

351 Industrial Sociology. (3) S
Soc a and cultural ana ys s of ndustry Occupat o a roles status and soc a part c pat on of workers Pre requ s te SOC 101 or 301.

352 Social Change. (3 F S
Patterns of soc a change res stance to cha ge and change produc ng agenc es and processes Prerequ site. SOC 101 or 301

360 The Social System and the Individual. 3 F S
nteract on patterns between the soc ocu tura order and ind v dua s soc al zat n process norms, ro es and statuses, co ect ve behav or Prerequ s te SOC 101 or 301

362 Sociology of Adolescence. 3 F S
Cu tura va ues and the soc a processes that he p ex p ain the deve opment of the phenomenon of modern ado escence nc ud ng nvest gat on of ad escent sub cu tures and cross cu tura eferences Prerequ s te SOC 101 or 301

365 The Sociology of Mass Communication. (3 F S
A s c o g cal exp orat on of the ma or mass med a as a commun cat ve process n Amer can soc ety

390 Social Statistics. 3 F S SS
App cat on of stat st ca methods to research prob ems n soc o ogy, prob ems of sca e construct on measure of centra tendency and va ab ty s mp e re at onsh p stat st c samp ng and presentation of data Prerequ s tes SOC 101 or 301 and MAT 106†, or ts equiva ent or pass g a prof c ency exam nat on to be adm n stered by the Department of Socio ogy

391 Sociological Research. 3 F S SS
Methods of soc o og ca research nc ud ng the f nda menta assumpt ons underly ng research and some pract ca exper ence n research design, data co ect on techn ques and data ana ys s Prerequ tes SOC 101 or 301, 390† r approva of nstructor

392 Practicum in Survey Research I. 3 F
Prov des practica exper ence n conduct ng a s gn f ca t resear h pr ject survey des gn quest onna re constru t on samp ng, data c ect ng cod ng and pre- m nary data pro ess ng Prerequ s te SOC 391† or approva of nstr ctor

393 Practicum in Survey Research II. 3 S
Cont nuat on of SOC 392 Prov des pract ca exper en e n ana ys s and report ng survey data Prerequ s te SOC 392†

401 Comparative Sociology. 3) F Cobas
Cross cu tura study of bas c s c a n t tutions meth - do ogy of cr ss cu tura research case st dies of three or four d fferent societ es concentrat ng on one other than the Un ted States Prerequ s tes s x hours in soc o ogy nc ud ng SOC 101 r 301 or ASB 102 or approva of structor

410 Sociology of Religion. 3 S, Owen
nte re at onsh p of cu tu e soc ety and re g r re g a d soc a strat f cat on, re g on and econom c and po tica nst tut ons soc a change and re g n Emphas s on Amer can s c ety and nst tut ons Prerequ s tes s x hours n s c o ogy nc ud ng SOC 101 or 3 1 or ap prova of nstructor

415 The Family. (3 F, S SS Farber Hudson
The fam y cons dered from the nst tutiona v ewpoint ts h stor ca deve opment and ts adaptat on to a chang ng cu ture the fam y system n many cu tures P erequ s tes s x hours n soc o ogy nc ud ng SOC 101 or 301 or approval of nstructor.

416 Marriage Problems in Contemporary Society. 3 S Hudson
Mar ta and fam y prob ems n today s soc ety from the v ewpo nt of persona and cu tura ad ustment Prereq u s tes s x hours n soc o ogy n ud ng SOC 101 or 301 or approva of nstructor

432 Human Ecology. 3 F S Su van
Patterns and aws of soc eties adjustments to the phys ca env ro ment, d str but on of commun t es and nst tut ons Prerequ s tes· s x hours n soc o ogy nc ud ng SOC 101 or 301, or approva of nstructor

433 Demography. 3 S L ndstrom Su van
Sc ence of popu at on ana ysis prob ems n measure ments of the s ze composit on and changes in popu at on Prerequ s tes s x hours n soc o ogy nc ud ng SOC 101 or 301, or appr va of nstructor

440 Racial and Ethnic Minorities. 3 F S SS Gordon
Prob em of m nor t es n the U ted State a d n other rac a y and ethn ca y heter geneous soc et es Eva ua t on of theor es of prejudice and of research dea ng w th d sc m nat on desegregat on and ass m at on Prerequ s tes s x hours n s cr gy nc ud ng SOC 101 or 301, r approva of r structor

446 Sociology of Crime. 3) F Pfuh
The process of cr m na zat on exp or ng the behav or of the def i ers of cr me and the behav o of those def ned as cr m na s Prerequ tes SOC 101 or 301 and 340† or approva of nstructo

448 Social Gerontology. (3 S Laner
Soc a aspects of ag ng status and ro e of the e der y and re ated pr b ems persona and soc eta ad ustmen t to o d age and u tura var at ons n v ewpo nt Prerequ s te SOC 101 r 301 r approva of nstruct r

449 Sociology of Law. 3 S Pfuh
Exam nat on of aw as an nst tut on ts orig n opera tions and consequences Emphas s on contemporary ega ssues and pr b ems Prerequ s te SOC 446† r approva of nstructor

452 Sociology of Complex Organizations. 3 F Ander s
Soc o og ca stud es of gover n e t agenc es ndustr a f rn s abor un ons m tary estab shn ents and other arge sca e gan zat ons Prerequ s tes s x hours n soc o ogy nc ud ng SOC 101 or 01 or approval of - structo

453 Social Class and Stratification. 3 S Staff
Soc a c asses and the function of these group ngs n a soc ety Prerequ s tes s x hours in soc ology nc ud ng SOC 101 or 301 or approva f nstructor.

454 The Afro American in Modern Society. 3 S Staff
Soc a and cu tura her tage of B ack Amer cans ach evements and current trends. Prerequ s te ap prova of nstructor

455 Collective Behavior. 3 S, Ande son Gordon
Soc a ca ses and consequences f such non nst tut ona zed forms of behav or as crowds cu ts pub cs soc a movements and revo ut on Prerequ s tes s x h urs n soc o ogy nc ud ng SOC 101 or 301 or approva of nstructor

456 Political Sociology. 3 S Cobas
Soc a factors assoc ated w th voting behav or the na ture and structure of the e ectorate and po t ca parties and the nature of nat ona and nternat ona power str cture

462 Social Control. (3 F Staff
S gn f cance of soc a contro in soc ety, and the var ous methods used by ind v dua and groups to contro th ers Prerequ s te SOC 360† or appr va of nstructor

483 History of Social Thought. 3 S, SS Owen
Socia thought n human culture Background of modern soc o ogy Pre equ s tes s x hours n s c o ogy nc ud ng SOC 101 or 301 r approva of nstructor

485 Sociology of Knowledge. 3 F Snow
Re at o sh p between soc a condit o ns and the deve opment of know edge n moder s c ety Prerequis te SOC 101 or 301 or approva of nstructor

486 Contemporary Theory. 3) S Goge ohnson
Contemp rary ssues and cr ses n soc a theory w th a r f cus on part cu ar theor sts deol g ca factors n theory ph o ophica s ues the nature of theory a d t re at onsh p w th methodo ogy Prerequ s te SOC 101 or 3 1 or approva f stru tor

498 Pro-Seminar. 3 F S Staff
Top cs to be se ected

500 Research Methods: Problems of Measurement. 3 S Staff
Log ca and ph osoph ca prob en s of measuremer t Sca ng methods Ur d mens onal sca es a d the r mu t d mens ona gene a zat o tem ana ys s and c uste ng techn ques Factor a a ys s Computer appl cat ons to rea data Prerequ s te SOC 391† or appr va of structor

501, 502 Practicum in Survey Research. 3 3 F S Axe rod
A one year resear h pract c m n survey f e d work ar a y and rep rt g n the Phoen x Area Study Pre requ s te SOC 391†

505 Social Statistics II-Quantitative Methods. 3) F SS, Staff
Probab ty samp ng ana ysis of var ance mu t p e and pa t a egress n and ana ys s of covar ance Prerequ - s te SOC 390† o eq i va ent

507 Computer Application in Sociology. 3 S Staff
App cat ons of compute s to data ana ys and theory constr t or n soci gy Prerequ s tes SOC 505 and 532 or approva of nstructor

515 Studies of the Family. (3 S Farber
C rrent deve opments n the study of ma age a d the fam y Pre equ s te approva of nstructor

532 Studies in Ecology and Demography. 3 S Mayer
Current terature n eco ogy and dem graphy, group a d nd v dua pro ects Prerequ s te approva of n structor

585 Development of Sociology. 3 F Hardert Farber
A graduate eve r e tat on to soc o ogy as a scho arly d scip ne and an emp r ca sc ence emphas z ng 19th and early 20th century scho ar Prerequisite approva of nstructor

586 Philosophical Issues in Social Theory. 3 S Naga sawa Farbe
Ph osoph cal ssues re ated t the deve opme t of a emp r ca sc ence of human and soc a phenomena Pre requ s te. approva of nst uctor

591 Seminar. 3) F S· Staff
Top c may be se ected from the fo owing.

a) Co lect ve Behav or
b Comp ex Organ za t ons
c Dev ant Behav r
d Ethn c G oups
e Sma Groups
f Soc a Organ zat on
(g) Socia Problems Theory
h) Soc a Psycho ogy
Socia Strat f cat on
j Soc ology as an Academic D sc p ne

595 Methodological Issues in Sociology. 3 S Farber Nagasawa
Bas c methodo ogica ssues n the app cat on of sc en t f c methods to the study of human soc al fe Emphas s on mited number of ma or works w th con trast ng approaches to ssues. Prerequ s te SOC 391† or appr va of nstructor

Special Courses. SOC 298 484, 492 493 494, 497 499 590 592 599 700, 780, 791 799 See pages 30 31

Zoology

PROFESSORS:
ALVARADO (LS C 226), BENDER, BERTKE, CAZIER, COLE, DOANE, GERKING HADLEY, LANDERS, MINCKLEY PATTERSON RASMUSSEN, WOOLF

ASSOCIATE PROFESSORS:
ALCOCK, CHURCH, CLOTH ER, FISHER, FOUQUETTE, GOLDSTE N, HASBROUCK, HAZEL, JUSTUS, McGAUGHEY, OHMART

ASSISTANT PROFESSORS:
BEISWANGER, COLLINS, FORSYTH, RUTOWSK , SM TH WALSBERG

LECTURER:
MILSTEIN

Departmental Major Requirements

The Department offers course work in the ecological, systematic, physiological, genetic, morphological, developmental and behavioral areas of zoology. Organ sms are studied at the molecular, cellular, individual and population levels of organization. Majors are expected to attain a basic knowledge in e ch of these areas and levels.

Bachelor of Science Degree Curriculum

Zoology Consists of a minimum of 67 hours, of which 34 must be in the major. Required major courses are BIO 101, 102†, 320†, 340†, 445†; ZOL 280†, 360†; BIO 430† or ZOL 330†; ZOL 270† or ZOL 350† or ENT 300† Required supplementary courses are CHM 113, 115†, and either of the following chemis try sequences CHM 331†, 332†, 335†, 336†; or 231†, 261†; MAT 115†, 142†, *or* MAT 120†, 121†; MAT 200 or ASE 226, PHY 111†, 112†, 113†, 114† One year of a foreign language or equivalent competence

Wildlife Biology Two options are avail b e Tl e *Wildlife Management Option* consists of a ninimum of 89 hours, of wh cl 65 n ust be in tl e major Required *ma or urses* are: BIO 101, 102† 217†, 320†, 340†, 4 5†, ZOI 270†, 411†, 412†, ENT 300†, BOT 370†, 420†, BAS 460†; I R A 36 † or 370†, p us a m n muri of four courses ron the fo ow r g ZOI 413†, 4 4†, 420 , 424 , 471†, 472†, 474†, GI G 101 , FR A 325†, 326† Required *supplement l courses* are CHM 13, CHM 115† or 116†, CHM 231†, MAT 15†, 142 ; COM 300† r 311†; MAT 20 or ASE 226† Students p inin to enter graduate school sh uld substit ite CHM 331 , 332†, 335†, 336† for CHM 231 and shou d take PHY 11†, 1 2†, 1 3†, 114†

The *Fisheries Manage nent Option* consists of a m n mum of 2 h ours, of wh ch 45 must be in tl e n ajor Required major courses are BIO 1 1, 102†, 217†, 320†, 340†, 415 , 426†, 427†, ZOI 270†, 350†, 360†, 413† 473† Requ red *supplemental courses* are CHM 113, CHM 115† or 116†, CHM 231†, MAT 115†, 42†, PHY 11†, 112†, 113†, 114† Students plann ng to enter gradu te scho l sh u d substitute CHM 331†, 332†, 335† 336† for CHM 231

Entomology Consists of a mi mum of 37 hours n the major. Requ red courses are BIO 10 , 10 †, 320†, 340†, 445†; ZOL 280†, 360†, ENT 300†, 420†, 430†, 551†. Requ red supple entary co rses are CHM 113, 115†, 121†, and either of the fol owing chemistry sequences, CHM 331†, 332†, 335† and 336† *or* CHM 231† and 261†, ASE 226†; MAT 115, 142† *or* 120†, 121†, PHY 111†, 12†, 113†, 114†, one year of a ore gn l nguage (See Degree Requirements, pages 56 58)

Departmental Graduate Program

The Depart nent o Zoology offers programs leading to the degrees of M ister of Science

and Doctor of Phi osophy. Consu t the *Gradu ate Catalog* for requirements.

BIOLOGY

BIO 100 The Living World. 4) F S SS
Pr ncip es of b o o y Not offe ed fo c ed t to st dents wh have had advan ed b gy h gh choo Cannot be used f r maj r cred t n the b o og a sc ences Three h urs e t re 2 h urs ab ratory

101, 102 Biological Principles and Processes. 4, 4 S
B g a n epts empha n fundamenta pr n p es and the terp a of stru ture a d f nct n at the m ec u ar ce u a rgan sma and p pu at r eve of orga r zat n Fo ajor n b g ca c er ces and pre profess o a studer ts hea th re ated c er ces (B O 101 s a prerequ s te for B O 102 Three hours ect re hours aborat ry

217 Introduct on to Fisheries and Wild ife Management. 3 F
Managen e t f f sher es and terrest a w d fe empha z ng ma ageme t of ec systems Des g ed fo pr pect ve W d fe b o g t Prerequ s te semes te ho rs of b og a sc ences

218 History of Medicine. 1 F
Deve pment of med ca c ncept

300 Natural History of Arizona. 3 F
P ant and an ma c mm r t es of Ar zo a Cannot be used f r ma or cred t n the b o g ca sc e ces Prereq u s te un or tand ng

310 Special Prob ems and Techniques. 1 3 F S
Qua f ed u dergrad ates may r vest gate a spec f b o og ca prob em under th e d rect o of a fa u ty member Prerequ s tes conference w th the facu ty member and appr va of the prob em by the facu ty me ber and departmenta cha May be repeated f r a tota of 6 cred ts

320 Fundamentals of Ecology. (° F S SS
Organ zat n funct on ng and deve pment f e o og ca systems energy f ow b oge chem ca cyc ng env ronmenta re at o s popu at on dynam cs Prereq r s tes B O 102† approva f nstructor

330 Ecology and Conservation. 3 F
E og ca and b o g ca n epts of conservat on u ed to understand man made ec og ca prob ems Ca not be used f r majo cred t n the b o og ca sc ences

340 General Genetics. 4 F S SS
Sc ence of hered ty and var at n Prerequ te B O 102† Three h urs ecture 1 hour rec tat on.

415 Biometry. 4 F
Stat st ca methods app ed to b o og ca prob ems n c ud g des gn of exper ments est mat on tests of s gn f cance a a ys s of varia ce regress on cor e a t n h sq a e and b oas ay Does r ot sat sfy aborat ry requ rement for the bera Arts Ge era Stud es program. Prerequ s te MAT 142† or equ va ent Two hours lecture 6 hours aborat ry

424 Ana ysis of Ecosystems 3 S
Ecos stems emphas z ng prod ct o resp rat o and dec mpos t on. Prerequ s te sen or or graduate sta d g BOT 420† and ZO 425† r equ va ents

425 Laboratory Ecosystem Analysis. 1 S
Methods of ana yz r g energy f w and nutr e t cy g Pre eq tes BOT 4 4† a d ZO 425† r equ a ent hree l ou s aboratory

426 Limnology. F
Dy am cs of and water tres ng the nterre at ons of c mat c geo og ca t pog aph a phys a and chem ca fa tors w th spe a reference to aquat c fe Prerequ s tes CHM 113, ZOL 350†

427 Limnology Laboratory. 1 F
Th ee hours ab rator P e equ tes B O 4 6† or ap prova of nstructor

428 Biogeography. 3 F
Deve p enta h story of the wor d' phys a and e v r nmenta character st s and t e e at or sh ps and nf uences o r the patterns and s g f cance of w r d p ant and an ma d str but o s of the pa t a d present Prereq s te f r h rs of b o ogy r appr va f n stru tor

429 Advanced Limnology. 3 S
Rece t terature deve pments, methods and mno g ca the ry f e d and ab rat ry app at on t ome part cu ar top c mn logy Prerequ s te B O 426†

430 Concepts in Developmental Biology. 3 S
C rrent concepts and exper menta meth ds nv v g d fferent at n a d b synthet a t v t e f e and orga sm w th examp es fr m m cr rgan s p ants and an ma s Prerequ s te B O 10 † or eq va ent

432 Biochemical Cytology. 3 S
Ce u ar funct s and chem str based on the ma ro m ecu ar organ zat n f ce u ar c mp nents empha s z ng the use f ana yt ca pr ced res s ch as ce fract r at n u trastruct ra rad oautography and cyt chem st y Prerequ s tes BOT 36 † or ZOL 36 † eq va ent HM 231† or 331† o equ va ent

441 Cytogenetics. 3 F
Chro os ma ba s of nher tance. Prerequ s te B O 340†

442 Cytogenetics Laboratory. (F
M croscop c ana ys s of me os s m tos and aberrant ce d v s n Prerequ s tes or c current y B O 441† and graduate status Fou hours aboratory

443 Molecular Genetics. 3) F
Nat re and funct n of the gene Prerequ tes B O 340† and a cour e n organ c chem str

445 Organic Evolution. 3 F
Processes of adapt ve change a d spec at on n popu a t o s Prerequ s te B O 340† or ZOL 241

464 Photobiology. 3 S
Pr n p es under y ng the effects f ght n g wtl de e pme t and behav o of p a t an ma s, and m c o organ s s P ereq tes 12 h r of c urses n fe ence CHM 231† or 1†

480 Methods of Teaching Biology. 3 F S
Meth ds of n tr ct exper mentat o rgan zat on and pre e tat n of appr pr ate ontent n b o o y Pre req r tes e the SED 311† or c c rrent enr ment n SED 11† and 20 hours n the b o og ca s ence Two h ir e ture 2 h urs aboratory

512 Transmission Electron Microscopy. 4) F S
Theory use and methods of prepar ng b o og ca mater a s for transm ss o e ectron m croscopy Prerequisite. approva of nstruct r. Mater a fee Two ectures 6 hours ab ratory

515 Scanning Electron Microscopy. 2) NR SS
Theory and use of scann ng e ectron m croscope for bi og ca mater a s Intens ve five week m n course. Prerequ site. approva of instru tor. Mater a s fee Th ee hours e ture 6 hours lab ratory

520 Biology of the Desert. (2 S
Factors affect ng p ant and an ma fe n the desert re g ons and adaptat ons of the organ sms to these factors. Prerequ s te 10 hours of biolog ca sc ences or approva of nstructor

526 Quantitative Ecology. 3 S
Samp ng strateg es spat al pattern ana ys s species d vers ty c ass f cation and app cat ons of mu t variate techniques to eco ogy Prerequ s tes: one course n ecology, BIO 415† or equ va ent. Two hours ecture 3 hours aboratory

Special Courses: B O 492, 493 494, 497, 498 499, 500, 590 591 592 598 599 See pages 30 31

ENTOMOLOGY

ENT 300 General Entomology. 4 F S
Form, act v t es and c ass f cat on of nsects. Prerequ s tes B O 102† Three hours ecture, 3 hours laborato y

400 Aquatic Insects. 3) S
Systemat cs and eco ogy of aquat c nsects Prerequ - s te ENT 300†.

411 Applied Entomology. 4) S
Econom c mportance, ife h story and hab ts of harmful

and benef c a ınsects Methods of sampl ng nsect pop u at ons Prerequ s te ENT 300† or approva of ınstruct r Two hours lecture 4 hours aboratory or f e d work

420 Insect Ecology. 3) F
nterre at ons of nsects and the r env ronments Prereq u s tes B O 320† and ENT 300†

424 Medical Entomology. 3) S
dent f cat oı , eco ogy l fe h stor es and host paras te re at o sh ps of nsects of med ca and veter nary ımpor tance Prerequ s te ENT 300† or approva of ınstructor wo hours ecture 3 hours ab ratory

430 Insect Morphology. 4) F 80
Morpho ogy of typ ca nsects nc ding both externa and nterna st ıcture Prerequ s te EN 300† wo hours ecture 6 hours aboratory

551 Systematic Entomology. (4 S
C ass f cat on of nse ts taxonom c categor es and pro cedures bib ı graphıca methods nomenc ature museum pract ces Prerequ s te ENT 300† Two hours ect re 6 ho rs laboratory

Special Courses: ENT 590 592 599 (See pages 30 31)

ZOOLOGY

ZOL 110 Contemporary Zoology. 4 F, S
Top cs emphas zıng soc a ly re evant problems Cannot be used for major cred t n the b o ogıca sc ences Three hours ecture 3 hours ab ratory

201 Human Anatomy-Physıology. 4 F S SS
Structure and dynamıcs of the human mechan sm Cannot be used for major cred t n the Department of Zo ogy Three hours ecture 3 ho rs aboratory.

202 Human Anatomy-Physıology. (4 F S SS
Co t nuat on of ZOL 201 Cann t be used for major cred t n the Department of Zoo ogy Prerequ s te ZOL 201 or approva of nstructor h ee hours ecture 3 hours aboratory

241 Human Genetics. 3 F, S, SS
Human heredity and varıat on emphasız ng med ca and popu at n genet cs.

270 Vertebrate Zoology. 4 F S
Character st cs c ass f cat on evo ut on and natura his tory of the major groups of vertebrate an mals Prerequ s te BIO 102† Three hou s ecture 3 hours laboratо y

280 Introductory Animal Behavıor. 3) F
Evo ut onary, ge et c phys ol g cal and ecolog ca bases of an ma behav or Prerequ site B O 102† or equ va ent

300 Biogenetics of Man. 4 S
Concept of ec gy, hered ty and ev ut n and the mportance ın human affa rs Cannot be used for major red t n the b o og ca sc ences

311 Animal Microtechnique. 3 F
Zoof g ca m crotechn que nc ding the preparat on for m c osc p exam nat on of an n a structures t s ues, ce ls and who e mounts Prereq s te B O 10 †. S x hours aborat ry

330 Vertebrate Developmental Anatomy. (5 F
Ont genet c seq ence of morpho gy comparat ve anat y and evo ut onary trends of organ system of vertebrate Prerequ s tes B O 102† or equ va ent. Three hours ecture, two 3 hou laborato e

350 Comparative Invertebrate Zoology. 4 S
Cha acte st cs fe cyc es adaptat na b gy a d ev t or f nve teb ate an ma Prerequ tes B O 102† or app ova of n t ucto Three hours e ture 3 h ırs ab ratory

360 Basic Physıology. 4 F S
Phy og ca echan sms of the h gher vertebrate Prerequ tes BIO 10 † and a cour e n organ hem stry hree h urs ecture hours aboratory

411, 412 Wildlife Management I, II. 4 4 F S
Pr n p es, pract ces and techn ques of w d fe ma age me nt P erequ s tes for ZO 411 B O 7†, 320† ZOL 471†, 472† or approva of str ıct r Prerequ s te f r ZOL 412 ZOL 411† Three hours e ture 3 ho ır ab ratory r f e d tr ps weekend f e d tr ps

413 Fisheries Management I. (4 F
P nc p es and the ry of f sher es management Prereq u s te 10 hour of b ogy Three hours ect re 3 hours ab rat ry or f e d tr p weeke d f e d tr p

414 Fisheries Management II. 4 S
Pract ces a d techn ques f f sher es ma age e t Pre requ s te ZO 413† Two h urs ecture 6 hour ab rat ry or f eld tr ps weekend f e d tr ps

420 Field Zoology. (6 SS
F e d tech ques and exper ence n c ect o and p ep arat on of z og a spec mens One week f preparat n and four weeks n the f e d Prerequ s tes 2 ho r ın b o og ca sc ences and approva of nst uc tor

424 Parasitology. (4 F S
Morpho gy phys o ogy and ıfe h stor es of an ma par as tes therapeut c c ntro a d host paras te re at onsh ps Pre equ s te B O 102† hree ho s ec ture 3 h rs ab ratory

425 Animal Ecology. (3 F
nterre at ons of a ı ma s and the r env ı ment Pre requ te B O 3 0†

427 Animal Ecology Laboratory. 1 F
Tl ree ho rs f e d a d aborat ry Weekend f e d t ps Pre equ tes BIO 320† ZOL 471† r 472† and con rent enro lment ın ZOL 425† r approva of nstruct r

432 Animal Cytology. 3 F
Structu e and funct on of the ce based upon u tras tructura rgan zat on Prerequ s te B O 102†

433 Animal Histology. (4) S
M crosc p c st dy of an ma t ssues Prerequıs tes B O 102† or appr va f nstructo Tw h urs e ture 4 f ours ab rato y

453 Protozoology. (3 S
Systemat cs and bı gy of p otoz a Prerequ s te. B O 102† w h rs ectu e 3 ho ı s ab atory

460 Comparative Physıology. 4 S 80
The a ays s of f ıncti n n verteb ate and verte brates emphas z ng evo ut onary trei d n phys o og ca systems Prereq ı s te ZO 36 † or equ va ent Three ho r ecture, 3 hours ab rat ry

468 Advanced Physıology. 4 S
Deta ed treatment of vertebrate organ system f nct o s emphas z ng ntegrat ve mecha sms Pre eq s te ZOL 36 † r equ va ent Three hours ecture 3 ho rs abora tory

469 Cellular Physıology. 4 F
Emphas z ng the mo ecu ar bas s fo ce tr cture and fu ct on P erequ s tes. ZOL 36 † organ c chem st y Three hours ectu e 3 ho rs ab ratory

471 Ornithology. (3) S
Natura h st ry and f eld study of b ds, emphas z ng Ar zona spec es Prerequ s te ZOL 270† or appr va f nstru tor Two ho r e t re 3 h urs aboratory Week end f e d tr ps

472 Mammalogy. 4 F S
C ass f cat on st cture hab ts eco ogy and d str bu t on of mamma s emphas z ng No th Amer can f rm Prereq s te ZOL 27 † or app va f nstru tor Three hours ecture 3 ho rs abo atory f e d tr p Weekend f e d tr ps

473 Ichthyology. 3 S
Systemat cs and b o ogy of recent and extinct f shes Prereq s tes ZO 270† 425† o approva of str ıct r Two ho rs lect re 3 hours aborat y or f e d tr p. Weekend f e d tr p requ red

474 Herpetology. 3 S
Systemat cs and b o ogy of recent and ext nct rept e a d amph b ans Pre equ s te Z L 270† Two h urs ect re 3 hours aborat ry or f e d t p

481 Laboratory ın Animal Behavıor. 3 S
Exper menta and f e d tud es of an ma behav or de scr pt on and quant fi at on of an ma behav or terpretat on of behav or with n an evo ut onary frame work Prerequ s te ZOL 280 One ho ecture 6 hou aboratory

515 Populations: Evolutionary Genetics. (3) F
Mathematical models in the description and analysis of the genetics of populations. Prerequisites: BIO 320†, 415†, and 445†, or approval of instructor.

516 Populations: Evolutionary Ecology. (3) S
Principles of population biology and community ecology within an evolutionary framework. Prerequisites: MAT 142† or BIO 415†, 320†, ZOL 515†. Two hours lecture, 2 hours recitation.

532 Developmental Genetics. (3) S
Genetic approaches to the analysis of development during the life cycle of eukaryotic organisms; role of genes in the unfolding of the differentiated phenotype. Prerequisite: BIO 443†.

540 Chromosome Techniques. (2) NR
Prerequisite: approval of instructor. Six hours laboratory.

565 Advanced Parasitology. (3) NR
Historical and analytical approach to the treatment of selected areas in the body of knowledge relating to parasites and parasitism. Prerequisite: ZOL 424†.

566 Environmental Physiology. (3) F
Physiological responses and adaptations of animals to various aspects of the physical environment. Prerequisites: ZOL 360†; BIO 320†.

Special Courses: ZOL 294, 484, 492, 493, 494, 497, 498, 499, 590, 591, 592, 594, 598, 599, 790, 791, 792, 799. (See pages 30-31.)



College of Business Administration

Glenn D. Overman, D.B.A.
Dean

Purpose

The primary objective of the College of Business Administration 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 in a democracy, (2) a mastery of basic business tools and skills and an 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 45 percent of his work in general education and other nonbusiness courses and 45 percent in courses offered by the College of Business Administration, with the remaining 10 percent selected from either area by the student in consultation with his/her 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 administration. Both the undergraduate and graduate programs of the College of Business Administration 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. Election to Beta Gamma Sigma is the highest scholastic honor a student in business administration can earn.

In addition to the regular degree curricula, other programs of study in the College are designed to meet special needs. Preparation for the teaching of business, office and distributive education subjects in secondary schools is offered in cooperation with the College of Education. Evening and extension 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 of instruction offered by the College of Business Administration are organized into groups in order that a related sequence may be established for the various subject fields.

For administrative purposes, these fields are organized into the following departments: Accounting, Administrative Services, Economics, Finance, Management, Marketing, Quantitative Systems.

The Center for Health Services Administration offers a master's degree program designed to prepare qualified individuals who seek careers as administrators of hospitals and other health care organizations.

The Bureau of Business and Economic Research is organized to help business meet the challenges of an increasingly complex economic and technical environment. In cooperation with faculty and students, government agencies, and the business community, it conducts and sponsors research projects. By functioning as the focus of the research and dissemination process in the College of Business Administration, the Bureau provides support for faculty research, opportunities for publication by faculty and advanced graduate students, and information for use by the business community.

The Center for Executive Development serves the needs of the community with continuing education programs designed for businessmen and is open to government officials and the general public.

The Dean's Advisory Council, a group of 27 distinguished Arizona business and profes-

sional leaders, provides liaison between the College and the business community The Council meets regularly throughout the year with administrators, faculty and students to make recommendations as to how the College can be of greatest assistance in meeting community needs.

Degrees

Bachelor's Degrees. The College of Business Administration awards the Bachelor of Science degree upon successful completion of a four-year curriculum of 126 semester hours as prescribed below Students may select one of the following 13 fields of specialization.

- Accounting
- Administrative Services
- Advertising
- Computer Information Systems
- Economics
- Finance
- General Business Administration
- Insurance
- Management
- Marketing
- Quantitative Business Analysis
- Real Estate
- Transportation

Lower division students who wish to qualify to teach business, office and distributive education subjects at the secondary and post secondary levels should major in pre secondary education Upper division students should major in secondary education with a subject matter in business This curriculum leads to the Bachelor of Arts in Education degree and certification for teaching business, office and distributive education subjects in Arizona schools. Courses to meet University and professional education requirements for this program are listed under the secondary curriculum section of the College of Education. Required business courses may be found on page 135.

Master's Degrees. The Master of Business Administration degree, the Master of Health Services Administration degree, the Master of Accountancy, and the Master of Science degree in Economics are awarded upon successful completion of programs detailed in the *Graduate Catalog*

Master of Business Administration Degree: A general program designed to meet the needs of students who seek broad, integrated graduate course work in the various functional fields of business. The program of study emphasizes the managerial responsibility of policy-formulation, problem solving and decision making. Students with undergraduate backgrounds in general education or technical sciences as well as those with bachelor's degrees in business administration, will find the program well suited to their needs Students without prior courses in business administration must complete approximately two years of study while those with an undergraduate degree in business administration may complete requirements in one calendar year.

Master of Health Services Administration Degree: A program designed to prepare qualified individuals for careers as administrators of hospitals and other health services organizations This preparation is carried out by providing the students selected theories, tools and techniques the understanding, analysis, and application of which are essential for effective health services administration

Master of Accountancy: A specialized program emphasizing preparation for public accounting and college teaching, with sufficient flexibility to include courses in managerial, tax and governmental accounting, as well as in allied fields.

Master of Science Degree in Economics: 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.

Doctoral Degrees

Doctor of Business Administration Degree. The objectives of the Doctor of Business Administration (D.B.A.) program are to prepare individuals for faculty positions in university or collegiate schools of business, and to prepare individuals for positions in business or government where the required educational background is doctoral level study The D.B.A. degree program is designed to provide a broad study of the interrelated areas of business administration and a high degree of professional competence in three fields of specialization

The degree is granted upon the completion of an approved program of graduate study, successful completion of comprehensive written and oral examinations, and submission of an acceptable original research project presented in a dissertation

Doctor of Philosophy Degree in Economics. The degree is awarded upon 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, successful completion of comprehensive written and

oral examinations, and submission of an acceptable original research project presented in a dissertation.

Curriculum

Bachelor of Science in Business Administration. Students seeking a Bachelor of Science degree in the College of Business Administration must satisfactorily complete a curriculum of 126 semester hours as indicated below:

	Semester Hours
General Studies Requirements	57
Business Administration Core Curriculum	33
Field of Specialization	24
Electives	12
Total	126

General Studies Requirements. All students in the College of Business Administration are required to complete a total of 57 semester hours in General Studies courses. Courses of a specialized, vocational, technical, or professional nature may not be taken for General Studies credit.

Only certain approved courses from the departmental offerings listed below may be taken to satisfy the requirements in each of these areas. These specific courses are enumerated in *Policy Statement 57* of the College of Business Administration. Students, in consultation with their advisors, *must select all General Studies courses from this list.* Any exceptions must be approved by the Office of Academic Advisement of the College of Business Administration *prior to enrollment in the course.*

Specific courses from the following departmental offerings may be taken to obtain the designated *minimum* number of semester hours required in each of the following areas:

Humanities and Fine Arts ..... 8 sem. hrs.
Architecture (APH courses only), art, speech and theatre, English, foreign languages, humanities, music, philosophy.



Behavioral and Social Sciences ..... 15 sem. hrs.
Anthropology, cultural geography, economics (ECN 201 and 202 *required*), education, engineering, technology, health education, history, home economics, mass communications, political science, psychology (PGS courses only), sociology.

Science and Mathematics ..... 8 sem. hrs.
Biology, microbiology, botany, chemistry, engineering, agriculture, geology, mathematics (MAT 141 or more advanced course *required*), physical geography, physics, psychology (PSY courses only), zoology.

Other General Courses
Additional general courses which provide breadth and cultural background must be taken to bring the student's total General Studies credits up to the 57 hour minimum. (See *Policy Statement 57*) All students must complete ENG 101 and 102 (First-Year English), and one of the following speech courses: COM 100, 300, 305, or 405– as part of the General Studies requirement.

Total General Studies Courses ..... 57 sem. hrs.

Business Administration Core Requirements. In order to obtain an understanding of fundamentals of business operation and to develop a broad business background, every student seeking a Bachelor of Science degree in the College of Business Administration must complete the following courses:

			Semester Hours
ADS	101	Elements of Business Enterprise	3
ACC	101	Elementary Accounting	3
ACC	102	Elementary Accounting	3
QBA	221	Statistical Analysis	3
QBA	222	Quantitative Information Systems	3
ADS	233	Business Communication	3
ADS	305	Business Law	3
FIN	300	Fundamentals of Finance	3
MGT	301	Principles of Management	3
MKT	300	Principles of Marketing	3
MGT	463	Business Policies	3
		Total	33

Field of Specialization Requirements

A field of specialization consists of a pattern of 24 semester hours in related courses falling primarily within a given subject field. Fields of specialization are available in accounting, administrative services, advertising, computer information systems, economics, finance, general business administration, insurance, management, marketing, quantitative business analysis, real estate, and transportation.

Accounting. This field of specialization includes the essential academic training 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 any of the numerous accounting positions offered in federal, state and local governments; and (4) those planning to operate their own businesses.

A field of specialization in accounting shall consist of a minimum of 24 semester hours. The following 21 hours must be included:

			Sem Hr
ACC	201	ntermediate Account ng	3
ACC	202	Intermediate Account ng	3
ACC	33	Cost Account ng	3
ACC	351	ncon e Tax Acc ur t ng	3
ACC	353	Advanced Account i g	3
ACC	481	Aud ting Th cory nd Practice	3
CIS	302	Electronic Data Processing	3

To complete the field of specialization, the student, with the approval of his advisor, shall select one additional 400 level accounting course

Note All accounting majors must complete MAT 142 Mathematical Analysis or the equivalent, as part of the program.

Administrative Services. The course work in this major area is designed to prepare students for careers in one of the following: office management, records management, secretarial admin stration, and business education.

The field in administrative services shall consist of a minimum of 24 semester hours. The following 15 hours must be included

			Sem Hr
OFA	351	P inciples of O ce M inagemer t	3
OFA	432	Records M gem nt	3
ADS	46	The ry f Adm in str t ve Con t ur cat on	3
ADS	431	Business Report W r t ng	3
CIS	3 2	Elect n Da a Pro essing	3

To complete the field of specialization, the student, in consultation with his advisor, shall select 9 additional hours of course work from business and economics related to the areas described below.

Office Management. This area of emphasis is intended to prepare students for careers in office management and administrative services.

Records Management. This area of emphasis is intended to prepare students for careers in records management and administration

Secretarial Administration. This area of emphasis is intended to prepare students for careers as administrative secretaries.

Business Education. This area of emphasis is intended to prepare students who wish to teach business, office, or distributive education subjects in secondary schools. (Lower division students enroll in the College of Business Administration as pre-secondary business education majors Upper division students enroll in the College of Education)

A student in business education must complete the Business Administration core and ECN 201 and 202 A teaching minor consists of 24 semester hours of credit in business (OFA 201 is required). The remaining courses to complete the major or minor must be selected in consultation with a Business Education advisor.

The Department of Administrative Services participates in programs leading to the degrees of Master of Education, Doctor of Education, and Doctor of Philosophy, Secondary Education. Consult the *Graduate Catalog* for requirements.

Special Programs

Bilingual Secretarial. (French, German, Russian, Spanish). This degree program is offered jointly by the Department of Foreign Languages and the Department of Administrative Services. Students interested in this program should consult the Chair, Department of Foreign Languages.

Non degree Secretarial. These programs are developed for students who do not plan to graduate. Students must be regularly enrolled and must meet University entrance requirements. See an advisor in the Administrative Services Department for further information.

Paralegal. This program prepares students for careers as aides to lawyers, trust officers, escrow officers, agents, and brokers in private, governmental and industrial practice

Advertising. Use of the mass communications media for conveying ideas and information to customers, employees, stockholders and the general public is an essential part of modern business operation This field of specialization offers students an opportunity to prepare for careers in advertising, public relations and related activities dealing with mass communications Employment opportunities include positions with advertising agencies, retail stores, manufacturing firms, newspapers and broadcasting stations.

A field of specialization in advertising shall consist of a minimum of 24 semester hours. The following 18 hours must be included:

			Sem Hr
ADV	301	Advertising Principles	3
ADV	311	Advertising Creative Strategy I	3
ADV	312	Advertising Creative Strategy II	3
ADV	317	Advertising Media	3
ADV	453	Advertising Campaign Problems	3
ADV	46	Advertising Management	3

To complete the field of specialization, the student, in consultation with his advisor, shall select 6 hours or more from the following group

			Sem Hr
MK	3 2	ntr du t n t Market g Man e ent	3
MKT	304	Buyer Be av or	3
MKT	310	P in p es of Se n	3

MKT	32	Principles of Retailing	3
MKT	325	Public Relations in Business	3
MKT	451	Marketing Intelligence	3

Computer Information Systems. This field involves the evaluation of internal and external organizational data in order to develop and maintain computerized systems that produce information for planning and control decisions. Special emphasis is placed on the analysis, configuration programming, and data base aspects of the design and implementation of a computer information system. The course work given below prepares the student for a career in computer information systems and also enables the student to continue in specialized areas such as systems analysis, COBOL or FORTRAN programming, business simulation, or computer science.

A field of specialization in computer information systems shall consist of a minimum of 24 hours. The following 21 hours must be included:

			Semester Hours
CIS		Business Programming	3
CIS	3	Electronic Data Processing	3
CIS	42	Programming Systems	3
CIS	4	Systems Structuring	3
CIS	42	Business Information Systems	3
ACC	44	Accounting Information Systems	3
MGS	365	Management Systems Science	
ADS	4	Electronic Administrative Communications	3

To complete the field of specialization, the student shall select 3 hours from upper division courses approved in advance by the student's adviser.

Note: All Computer Information Systems majors must complete MAT 142 Mathematical Analysis or the equivalent as part of the program.

Economics. The study of economics affords an opportunity for the student to acquire a general knowledge of the operation of business and economic systems. This knowledge provides a sound basis for successful business ownership and control. Specialized courses are included to develop ability in the use of the tools of economic theory and analysis. Such tools are essential for graduates who wish to qualify for government or business positions requiring formal training in economics.

The field of specialization in economics shall consist of a minimum of 24 semester hours. The following 6 hours must be included.

			Semester Hours
ECN	411	Intermediate Price Analysis	3
ECN	412	Economics of Income and Employment	3

To complete the field of specialization, the student, with the approval of his adviser, shall select 18 additional hours of course work from among the upper division courses offered by the Department of Economics and from selected courses offered by the College of Business Administration.

Finance. Courses in finance provide students with an introduction to financial institutions, instruments and markets, and with an opportunity for increased understanding of the management problems of acquiring, allocating and managing funds.

A field of specialization in finance shall consist of a minimum of 24 semester hours. The following 18 hours must be included:

			Semester Hours
FIN	331	Financial Institutions	3
FIN	361	Managerial Finance	3
FIN	421	Securities Investment	3
FIN	426	Investment Management	3
FIN	431	Financial Markets	3
FIN	461	Financial Management Cases	3

To complete the field of specialization, the student, in consultation with his advisor, shall select 6 additional hours of course work from among the upper division courses offred in the College of Business Administration.

General Business Administration. Offering the opportunity for a broad survey of all phases of business operation, this program is particularly suitable for (1) those students who are planning to operate their own businesses and who seek a broad business background, (2) those who are preparing for jobs in which specialization is taught after employment, and (3) those who desire a general business background at the undergraduate level prior to taking more specialized graduate work.

A minimum of 24 semester hours in economics and business administration courses is required. One course from each of four departments in the College of Business Administration must be included in the student's program, selected from the following:

Accounting

ACC	201	Intermediate Accounting
ACC	33	Cost Accounting
ACC	35	Income Tax Accounting

Administrative Services

ADS	306	Business Law
ADS	461	Theory of Administrative Communication
OFA	35	Principles of Office Management

Economics

ECN	30	Money and Banking
ECN	32	Labor Economics
ECN	341	Public Finance

Finance

FIN	421	Securities Investment

INS 251 Principles of Insurance
REA 251 Real Estate Principles

Management

MGT 311 Personnel Management
MGT 331 Production and Operations Management
MGT 434 Social Responsibilities of Management

Marketing

ADV 301 Advertising Principles
MKT 332 Introduction to Marketing Management
TRA 301 Principles of Transportation

Quantitative Systems

CIS 302 Electronic Data Processing
CIS 402 Programming Systems
QBA 322 Managerial Statistics

Students may elect additional courses from the above list, subject to the limitations stated below.

The remaining 12 hours necessary to complete the field may be selected from upper division (or a limited number of lower division) courses in the College of Business Administration, subject to the approval of an advisor. A maximum of 12 hours in one subject area may be included. No more than 6 hours of course work from INS 251, REA 251, ACC 201, and ACC 202 may be included.

Insurance. Academic preparation for professional work in insurance sales, adjustment, management and underwriting is offered through this program. A field of specialization in insurance shall consist of a minimum of 24 semester hours. The following 15 hours must be included:

			Semester Hours
INS	251	Principles of Insurance	3
INS	321	Life and Health Insurance	3
INS	331	Property Insurance: Principles and Coverage	3
INS	431	Insurance Law	3
INS	432	Social Insurance	3

To complete the field of specialization, the student, in consultation with his advisor, shall select 9 additional hours of course work from among the upper division courses offered in the College of Business Administration. REA 251, Real Estate Principles, may be included.

Management. The management function includes the planning, organizing, motivating and controlling of business operations. It deals with both human elements and material or physical factors. Through selection of courses, as outlined below, the student may place his major emphasis on personnel management, production management or the broad aspects of management philosophy and practice. A field of specialization in management shall consist of a minimum of 24 semester hours. The following 15 hours must be included:

			Semester Hours
MGT	311	Personnel Management	3
MGT	331	Production and Operations Management	3
MGT	368	Management Systems	3
MGT	434	Social Responsibilities of Management	3
MGT	452	Organizational Behavior: Concepts	3

The remainder of the required courses shall be selected by the student in consultation with his advisor.

Those students planning careers in Personnel Management shall select at least 6 semester hours from:

			Semester Hours
MGT	413	Wage and Salary Management	3
MGT	422	Training and Development	3
MGT	423	Industrial Relations and Collective Bargaining	3

Three additional semester hours must be selected from among the courses listed above or from among other courses offered by the Department of Management or approved in advance by the Chair.

Those students planning careers in production and operations management shall select at least 6 semester hours from:

			Semester Hours
MGT	335	Materials Management	3
MGT	352	Purchasing	3
MGT	432	Materials Management	3

Three additional semester hours must be selected from among the courses listed above or from among other courses offered by the Department of Management or approved in advance by the Chair.

Students planning careers in general management must select 9 hours from among the following:

			Semester Hours
MGT	433	Managerial Decision Making	3
MGT	450	International Management	3

(either or both) and choose one course from the three specified under personnel and/or choose one course from the three specified under production. Any exceptions to the above options must be approved in advance by the Chair of the Department of Management.

Marketing. Study in the field of marketing involves analysis of the ways business firms plan, organize, administer and control their resources to achieve marketing objectives. Focus is placed on market forces, growth and survival of firms in competitive markets, and the marketing strategy and tactics of the firm. Through proper selection of courses, a student may prepare for a career in (1) general marketing administration, (2) selling and sales management, (3) promotion management, (4)

retail merchandising and management, (5) market research and planning, (6) industrial marketing or (7) international marketing.

A field of specialization in marketing shall consist of a minimum of 24 semester hours. The following 12 hours must be included.

MK		Student Marketing Management	3
MK	4	Buyer Behavior	3
MK	45	Marketing Research	3
MKT	4	Marketing Decision Making	3

To complete the field of specialization the student, in consultation with his advisor, shall select hours from courses offered in marketing, advertising, and transportation or courses approved in advance by the Department of Marketing.

Quantitative Business Analysis. Quantitative business analysis is the process of evaluating both external and internal data to produce decision guidelines for managerial action. Model development and both statistical and mathematical analysis provide the foundations for data evaluation. This field of specialization prepares students for professional opportunities in applied statistics, management science and operations research.

The field of specialization in quantitative business analysis shall consist of a minimum of 24 semester hours. The following 18 hours must be included.

QBA	42	Multivariate Statistics	3
QBA	43	Operations Research	3
QBA	47	Advanced Business Forecasting Studies	3
QBA	48	Topics in Applied Statistics	3
CIS	3	Business Data Processing	3
CIS	4	Systems Analysis	3

To complete the field of specialization, the student shall select 6 hours from upper division courses in QBA special topics in the areas of applied business forecasting and sampling techniques in business. Prior approval of the student's advisor is required.

Note: All Quantitative Business Analysis majors must complete MAT 142, Mathematical Analysis or the equivalent as part of the program.

Real Estate. Courses in real estate are designed to acquaint students with the basic information, knowledge and practices pertaining to real property and the real estate business. This field of specialization is the academic foundation for careers in various aspects of real estate work: sales, acquisition and development, taxation, management of property, title searching and legal work, appraisal and finance.

A field of specialization in real estate shall consist of a minimum of 24 semester hours. The following 12 hours must be included:

RLA		Real Estate Principles	3
RLA	3	Real Estate Finance	3
RLA	4	Real Estate Appraisal	3
RLA	4	Real Estate Law	3

To complete the field of specialization, the student, in consultation with his advisor, shall select an additional 12 hours of upper division business administration and/or economics courses (INS 251, Principles of Insurance, may be included). These courses must have the prior approval of the student's advisor.

Transportation. The program in transportation covers all modes of transportation of passengers and freight and the special problems associated with each mode in urban, national and international transportation. Emphasis is on management of transportation organizations, government transportation policy and regulation of carriers, and the efficient use of transportation services by business management within the framework of the physical distribution management approach. Students are prepared for employment by carriers, businesses, and government agencies.

A field of specialization in transportation shall consist of a minimum of 24 semester hours. The following 15 hours must be included.

TRA	31	Principles of Transportation	3
TRA	445	Physical Distribution Management	3
TRA	46	Highway Transportation	3
TRA	461	Air Transportation	3
TRA	463	International Transportation	3

To complete the field of specialization, the student, in consultation with his advisor, shall select 9 or more hours from the following:

CIS	302	Electronic Data Processing	3
ECN	32	Labor Economics	3
ECN	330	International Economics	3
ECN	451	Economics Problems	3
ECN	453	Government and Business	3
MGT	355	Purchasing	3
MGT	437	Materials Management	3
MKT	331	International Business	3
MKT	434	Industrial Marketing	3
MK	435	International Marketing	3
MKT	444	Marketing Channels	3
TRA	305	Urban Transportation	3
TRA	462	Problems in Transport	3

Elective Courses. Sufficient elective courses are to be selected by the student to complete the total of 126 semester hours required for graduation.

Honors Program. Students with outstanding academic records may be admitted to the Honors Program by application to the Honors Council of the College of Business Administration. This program provides an opportunity for students with exceptional ability to select an academic program to meet their individual needs. Although the general curriculum requirements must be completed, considerable opportunity is given for independent study under the discretion of an Honors advisor. A thesis or an equivalent creative project is required for graduation

For further details regarding the Honors Program, see the University Honors Program description on page 58 or consult the Office of the Dean of the College of Business Administration

Credit-No Credit. Students majoring in Business Administration may not include among the credits required for graduation any courses taken at this University on a credit no credit basis. Students with majors in the College of Liberal Arts may register for credit-no credit in courses offered by the Department of Economics, subject to conditions imposed by the College of Liberal Arts.

General Regulations. Each student enrolling in the College of Business Administration will be assigned an advisor upon the basis of the subject matter field in which he she is primarily interested The student should follow the sequence of courses suggested in the four-year curriculum outline and the recommendations of his advisor in completing the prescribed background and tool courses in preparation for the subsequent professional program.

All students in the College of Business Administration must attain a minimum cumulative grade point index of 1.75 at the end of the freshman year

The Professional Program. The third and fourth years constitute the professional program of the undergraduate curriculum.

For admission to the professional program, the student must have completed:

1 At least 60 semester hours with a minimum cumulative grade point index of 2.25;

2 All Business Administration core curriculum courses numbered below 300 and ECN 201, 202, Principles of Economics, with a minimum cumulative grade point index of 2.00;

3. At least 32 semester hours in General Studies and other cultural background courses, including ECN 201 and 202.

Failure to meet the requirements for admission to the professional program will result in the student's becoming ineligible to enroll for 300 and 400 level courses in the College of Business Administration.

To be accepted for credit as part of the professional program in Business Administration, all courses transferred from other institutions must carry prerequisites similar to those of the courses they are replacing at Arizona State University

Graduation Requirements. In addition to completion of the pattern of courses outlined on page 134, to be eligible for the Bachelor of Science degree in the College of Business Administration, a student must fulfill the following requirements:

1 Have completed at least 30 semester hours, including 24 in professional business courses (numbered 300 or above), after admission to the professional program

2 Have attained a cumulative grade point index of 2.00 or higher;

(a) for all business courses taken at this University; and

(b) for all courses comprising his or her field of specialization taken at this University.

For computational purposes, the College of Business Administration averages D and E grades received in upper division business courses taken at Arizona State University into the student's grade point index in the College. A student may, by formal application to the Registrar, request that a grade of D or E in lower division courses not be included in his or her College index after the course has been repeated in residence with a passing grade and prior to completion of the student's first baccalaureate degree

3. 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

Any exception to the above requirements must be approved by the Standards Committee of the College of Business Administration

Transfer Credit. Students planning to take their first two years of work at a community college or at 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 1 through 299 at the three Arizona universities. *A maximum of 30 hours of business and economics courses from community colleges will be accepted toward a bachelor's degree in business administration*

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 (field of specialization) The introductory course in business law will be

accepted as an exception to this policy, but only lower division credit will be 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 which are not taught in the colleges of business at any one of the three State universities will not be 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 will be accepted only from AACSB-accredited schools

The following general pattern of courses is recommended for students completing their first two years' work in a community college and who plan to transfer to Arizona State University without loss of credit.

Pre professional Courses	2 Hours
Accounting	6
Economics	6
Statistics and Quantitative Information Systems	6
Lower Division Business Electives	9
General Studies	33 37 Hours
English	
Mathematics	
Science	
Humanities	
Social Sciences	

Suggested Four-Year Curriculum Outline

FIRST YEAR

	Semester Hours
ADS 10	3
QBA 22	3
LNG 101 102	6
MAT 142 or other approved mathematics course	4
Humanities, Fine Arts	3
Behavioral and Social Sciences	6
Science or additional Mathematics	3 5
Electives	3 5
	31 35

SECOND YEAR

ACC 211, 212	6
ECN 211, 212	6
QBA 225	3
ADS 233	3
COM 100, 330, 305 or 415	3
Science and Mathematics	3
General Studies	5
	3

THIRD YEAR

MKT 330	3
MGT 301	3
ADS 315	3
FIN 300	3
Behavioral and Social Sciences	6
Field Specialization and Electives	14
	32

FOURTH YEAR

MGT 463	3
Field of Specialization and Electives	28
	31

Note Students registering in the accounting field of specialization should enroll in ACC 101 and 102 the first year, postponing science or electives until later in the program In some other fields of specialization, students should schedule beginning courses in their field during the sophomore year, postponing one of the General Studies courses until later The student should consult his advisor for details of the course sequence in the field of specialization

International Business. Students who wish to pursue an interest in international business as a supplementary part of their studies should note the extensive offerings available through the College of Business Administration While a field of specialization is not offered, it is possible to select a wide variety of courses, either as electives or as part of the field when applicable, from the following courses.

International courses currently available are as follows.

MKT	333	International Business
MKT	435	International Marketing
MGT	459	International Management
TRA	463	International Transportation
ECN	311	Economic Development
ECN	331	Comparative Economic Systems
ECN	336	International Economics
ECN	436	Soviet and East European Economies
ECN	471	Latin American Economies
ECN	485	International Monetary Economics

Students should consult with their advisors for assistance in coordinating these international offerings with their regular program of studies in the College of Business Administration.

Mexican-American Business Administration Undergraduate Emphasis. The objective of this program is to provide educational opportunities for Mexican Americans and other interested students who are preparing for leadership positions in local, regional, national and international firms.

The student may enroll in any field of specialization offered by the College of Business Administration. The candidate's degree in Business Administration, combined with directed linguistic and cultural studies, will provide the student with a unique educational experience and a broad background in the lib



eral arts and in business. Interested students should contact the Director of Student Advisement in the College of Business Administration.

Pre-Law Studies. Pre-law students may pursue a program of study in the College of Business Administration. 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 students should communicate with the dean of the law school they hope to attend and plan a program to meet the requirements of that school. Most law schools, including Arizona State University, 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 prior to entering law school may follow any field of specialization in the College of Business Administration. Many pre-law students find it desirable to major in General Business Administration. This gives the student a broad background for the study of law. Within the College of Business Administration are faculty members who are lawyers and who serve as advisors for students desiring a pre-law general business adminstration major.

Accounting

PROFESSORS:
PETERSEN (BA 223A), FRITZEMEYER, HUIZINGH, L. F. IMDIEKE, R. E. SMITH, TIDWELL, WILKINSON

ASSOCIATE PROFESSORS:
BARON, DAVISON, FLAHERTY, HARIED, HUNTINGTON, McKENZIE, ROWLEY, SANDERS, WYNDELTS

ASSISTANT PROFESSORS:
BARNETT, BOYD, CHAN, FAZZI, HARKINS, JOHNSON, PANY, PITT, RENEAU, SCHWARTZ

ACC 101 Elementary Accounting. (3) F, S, SS
Theory and practice of accounting applicable to the accumulation, external reporting and external uses of financial accounting information.

102 Elementary Accounting. (3) F, S, SS
Selection and analysis of accounting information for internal use by management. Prerequisite: ACC 101.

201 Intermediate Accounting. (3) F, S, SS
Accounting theory and practice applicable to determination of asset values and related problems of income determination. Prerequisite: ACC 102.

202 Intermediate Accounting. (3) F, S, SS
Accounting theory and practice applicable to liabilities and owner's equity. Special problem areas related to income determination and financial reporting. Prerequisite: ACC 201.

300 Survey of Accounting. (3) NR
Financial and managerial accounting emphasizing the uses of accounting information. Not open to students in the College of Business Administration.

301 Management Uses of Accounting. (3) NR
The development, purpose and implications of cost accounting systems. Uses of accounting information for managerial decision-making, budgeting, and control. Restricted to nonaccounting majors. Prerequisite: ACC 102.

315 Financial Statement Analysis. (3) NR
Analytical methods applied to financial statements for the guidance of management and investors. Designed primarily for nonaccounting majors. Prerequisite: ACC 102.

331 Cost Accounting. (3) F, S, SS
Cost accumulation for inventory pricing and income determination. Cost behavior concepts for planning and control. Job order and process cost systems, standard costs and budgeting. Prerequisite: ACC 102.

351 Income Tax Accounting. (3) F, S, SS
Federal income taxation of individuals, partnerships and corporations. Basic tax planning and research methods. Prerequisite: ACC 102.

383 Advanced Accounting. (3) F, S, SS
Accounting theory applicable to partnerships, branches, business combinations and governmental units. Prerequisite: ACC 202.

432 Advanced Cost Accounting. (3) F, S, SS; Chan, Johnson, McKenzie, Rowley
Decision-making, planning and control, including capital budgeting and applications of operations research and statistics. Prerequisite: ACC 331.

447 Accounting Information Systems. (3) F, S; Reneau, Wilkinson
Information systems requirements and data sources relative to the total integrated system of the firm, emphasizing system analysis and design, internal controls and computer processing. Prerequisites: ACC 331 and CIS 302.

452 Advanced Taxation. (3) F, S, SS; Boyd, Davison, Tidwell, Wyndelts
Problems of business and fiduciary income taxation; estate and gift transfer tax; tax research. Prerequisite: ACC 351.

475 Accounting in Public-Sector Organizations. (3) F, S; Baron, Chan
Principles of accounting and reporting, budgeting, and financial control systems applied in governmental units and other not-for-profit organizations. Prerequisite: ACC 301 or 331.

481 Auditing Theory and Practice. (3) F, S, SS; Staff
Concepts, standards and methods in audit judgment formulation, internal control evaluation and program planning. Auditing procedures and sampling techniques. Ethical and legal responsibilities in auditing. Prerequisite: ACC 383.

495 Contemporary Accounting Theory. (3) F, S, SS; Staff
Theory of financial accounting and reporting requirements for profit oriented enterprises. Prerequisite: ACC 383.

500 Accounting Survey and Analysis. (3) F, S, SS; Staff
Basic accounting concepts and procedures. Determination of periodic income. Preparation and interpretation of financial statements. Open only to students without previous credit in accounting.

501 Managerial Accounting. 3) F S SS; Staff
Use of accounting data n the manager a dec s on mak ng process and n the ana ysis and control of bus - ness operat ons Prerequ s te ACC 500 or equivalent.

511 Tax Planning for Management. (3) F S Boyd, Wynde ts
Econom c mp cat ons of se ected manageme t dec s ons involv ng app ication of federa ncome tax aws Recognition of tax hazards and tax sav ngs. Prerequ site ACC 501.

521 Tax Research. (3 F S Boyd Davison T dwe
Tax research source mater a s and techn ques App ca- t on to bus ess and nvestment dec s ons. Prerequ s te ACC 351.

541 Managerial Accounting Controls. (3 F S John son Row ey
mpact of nterna reporting systems on organizat onal dec s ons and human behav or Des gn mp ementation and evaluat on prob ems Prerequ s te ACC 331 or 501.

551 Advanced Accounting Theory. (3 F S SS Staff
Genera y accepted account ng theor es and pr ncip es

582 Auditing Theory and Practice. (3 S Haried, Pany
Function and responsib l ty of the aud tor n modern soc'ety. Advanced top cs n audit ng theory and meth- ods. Contemporary ssues n audit ng Prerequ site. ACC 481

585 Analytical Methods in Accounting. 3) F S Mc Kenz e Row ey
App icat on of quant tat ve techniques to account ng prob ems Prerequis tes ACC 501 and QBA 501 or eq valents

586 Problems in Financial Accounting. (3) S, Hu z ngh md eke Petersen
Prob ems n controvers al areas Externa reporting requ rements for se ected ndustr es Inf uence of gov ernment regulat on

587 Computerized Accounting Systems. (3) S Reneau W kinson
Des gn insta ation and eva uat on of computer based account ng information systems. Models that use ac count ng data and quant tat ve techn ques to a d n ana ys s p ann ng and contro Prerequisite: ACC 447

591 Seminar in Selected Accounting Topics. 3) F S SS Staff

791 Doctoral Seminar in Accounting. (3) F, S; Chan F aherty

Special Courses: ACC 484 492, 493, 494 497, 498 499, 590 592, 593 598, 599 690 692, 700 790 792, 799 (See pages 30 31.)

Administrative Services

PROFESSORS:
BOGGS (IRSH 3D), BATY, GRYDER, NMAN, C. B. SMITH, TATE

ASSOCIATE PROFESSORS:
BOHLMAN, HENN NGTON, JACKS, OLNEY RADER A B. SMITH, TOOTLE, WILSON, WUNSCH

ASSISTANT PROFESSORS:
ARANDA, CH LDERS, DUNDAS, HURSTON HUTT, J. H. IMDIEKE, JENN NGS, LEONARD, LEWIS LYNCH, MURRANKA, NYGAARD, OBER RE SS, SWA N, VAN HOOK

LECTURER:
FULLMER

ADMINISTRATIVE SERVICES

ADS 101 Elements of Business Enterprise. (3 F S SS
Bus ness enterpr se as an 'ntegra part of American so ciety Emphasis on soc a , poi tica ega and eth ca cons derat ons

233 Business Communication. 3) F S SS
Theories of nterpersona processes and mot vat ona systems as re ated to effect ve commun cat on Directed pract ce on recurr ng types of organ zat ona commun cat ons

305 Business Law. (3 F S SS
The ega env ronment of bus ness Jud cia procedures contracts, torts and agency aw

306 Business Law. (3 F S, SS
Lega aspects of corporat ons, partnersh ps sa es ne- got ab e nstruments property secured transact ons, bankruptcy and surance. Prerequ s te ADS 305

307 Business and the Legal Environment. 3) F, S, SS
The Amer can ega system. Contemporary egal prob- ems of the modern bus ness.

401 Small Business Administration. 3) F, S, SS Aran da, Hutt
App ication of bus ness princ p es by the sma entrepre- neur

431 Business Report Writing. (3) F, S, SS nman
Organ zation and preparation of reports used n bus - ness Prerequ s te· ADS 233

451 Business Research Methods. 3) F S; Smith, A.B
Nature and purpose of research Prerequisite: QBA 222

461 Theory of Administrative Communication. 3) F S, SS Leonard
Intrapersonal, nterpersonal and adm nistrat ve commu n cat on

500 Legal Environment of Business. (3 F S, SS O - ney, Bohlman
Pub c and pr vate aspects of the aw and contemporary legal prob ems. Not open to those who have rece ved cred t n ADS 305 or equ va ent

501 Business Research Methods. 3) F S SS Sm th, C. B Wunsch Lynch
Se ection des gn and comp et on of a bus ness or - ented research project.

591 Seminar: Professional Report Writing. (3 F S, Tate

700 Research Methods. (3) S Boggs

Special Courses: ADS 484 492, 493 494, 497 498 499 590, 591, 592, 593 594 598, 599, 690, 692, 700, 790 792, 799. (See pages 30 31)

BUSINESS EDUCATION

BUE 401 Vocational Education in American Schools. (3) NR Wunsch
Bas c pr nc p es and ph losoph es of vocationa educa t on.

480 Teaching Business, Office and Distributive Education Subjects. (4) F S Gryder
Organ zat on and presentat on of appropr ate content for these subject areas n the secondary school.

491 Organization and Management of Cooperative Programs. (3) A Hutt
Work study programs for business occupat ons in h gh schoo s and commun ty co eges.

501 Foundations of Business Education. (3 A Boggs H story, phi osophy principles and object ves of bus ness education.

503 Tests and Measurements in Business Education. (3) A Ober
Construction administrat on and evaluat on of tests n bus ness subjects

505 Current Literature in Business Education. (3) A· Gryder
Cr tica ana yses genera izat ons and trends.

506 Data Processing for Teachers. 3) A, Huston
Electron c data process ng equ pment and computer programm ng

511 Improving Instruction in Secretarial Subjects. (3) A, Gryder

Modern methodo ogy n teach ng typewriting, shorthand and off ce educat on courses

513 Improving Instruction in Accounting and Basic Business Subjects. (3) A, VanHook
Modern methodo ogy in teach ng account ng and basic bus ness courses

515 Observation and Work Experience. (3) A Mur ranka
Observation and or part c pation n bus ness.

521 Education for Business in the Community College. (3) A Murranka
Curricu um instruction and art cu at on w th secondary schoo s and co eg ate inst tut ons.

591 Seminar. (3) A, Boggs Gryder, Hutt, Murranka
Top cs such as the fo ow ng w be offered·

(a) Gu dance for Bus ness Educat on

(b) Ana ysis of Research n Bus ness Educat on

(c) Adm nistration and Supervision n Bus ness Education

d) nd vidua 'zed Progress on

(e) Consumer Education

594 Study Conference or Workshop. 3) A Boggs Gryder, Hutt, Murranka

791 Doctoral Seminar in Business Education. (3) A Boggs

Special Courses: BUE 484, 492, 493 494, 497 498 499, 590 592, 593, 598 599, 690, 692 700, 790 792 799. (See pages 30 31)

OFFICE ADMINISTRATION

OFA 101 Basic Typewriting. (2) F, S, SS
Bas c typewr tten commun cations nd v dua progres sion.

113 Shorthand. 3) F, S
Basic shorthand pr nciples nd v dua progress on

201 Advanced Typewriting. (3 F S SS
Advanced typewritten commun cations ndiv dual pro gress on. Prerequ s te: OFA 101.

214 Shorthand. (3) F, S
ntermed ate shorthand dictat on and transcr pt on In div dua progress on Prerequ site· OFA 113.

312 Transcription. (3 F, S
Advanced shorthand d ctat on and transcr ption ndi v dua progress on. Prerequis te OFA 214.

331 Secretarial Administration. (3 F S
Role of the profess ona secretary n fac l tating mana gerial funct ons.

344 Office Services. (3) F, S
Serv ces re ated to off ce systems. Prerequ s te OFA 201.

351 Principles of Office Management. (3) F S
Re ationsh p of the off ce funct on to the business enter pr se.

432 Records Management. (3 F, S, Tate
Organ zat on and management of records systems

591 Seminar in Selected Office Administration Topics. (3) NR Boggs

Special Courses: OFA 484 492, 493 494 497 498 499 590, 592, 593, 594 598, 599 (See pages 30-31)

Economics

PROFESSORS:
BOND J COCHRAN
GOODING, GREENWOOD, KNOX
METCALF, PLANTZ

ASSOCIATE PROFESSORS:
AMACHER, (BA 319A), BOYES BRADA
BURGESS, CHALMERS, COX, DeSERPA,
HOGAN, M. JACKSON, KAUFMAN, K NGSTON,
LADMAN, LOWE
McPHETERS, WINKELMAN

ASSISTANT PROFESSORS:
DUFFY, HAPPEL, HILL,
KNOER, LAYMAN
McDOWELL SCHLAGENHAUF

ECN 100 Development of the American Economic System. (3 F, S
Ana yt ca treatment of the evolut'on of the Amer can economy. ntroduct on to econom c institut ons n the Un ted States

201 Principles of Economics. (3) F, S, SS
Bas c macroeconomic ana ysis. Econom c nstitutions and factors determin ng income eve s, pr ce leve s, and employment eve s.

202 Principles of Economics. 3) F, S, SS
Basic m croeconom c ana ys s Theory of exchange and product on, ncluding the theory of the f rm.

301 Money and Banking. (3) F, S SS
Functions of money. Monetary systems, credit func tions, bank ng pract ces and central banking pol cy Prerequ's te ECN 201.

304 Contemporary Macroeconomic Issues. (3) F, S SS
Macroeconom c pr nciples app ed to current prob ems of econom c po cy, e g. inf at on unemp oyment, gross nat ona product (GNP forecast ng Prerequ s te ECN 201

305 Contemporary Microeconomic Issues. (3) F S, SS
Microeconom c pr nciples app ed to current problems of econom c pol cy, e g po ution, crime, poverty Pre requisite ECN 202

311 Economic Development. (3) F
Theor es of economic growth and deve opment Role of cap ta formation, techno ogica nnovat on popu ation and resource development in econom c growth Prereq u s te ECN 201 or 202

321 Labor Economics. 3) F, S
Histor ca and theoret ca ana ys s of ab r prob ems and labor relat ons Labor force wage theories and pract ces. Emp oyment and unemployment. Govern ment regu at ons Prerequ s te ECN 202

322 Economics of Human Resources. (3) F, S
Theory and measurement of human cap ta Manpower po 'cy for education tra n ng and job matching in the context of effic ent market a ocation Prerequ s te ECN 202

331 Comparative Economic Systems. (3 F
Econom c theor es and pract ces of cap tal sm, soc al ism communism and fasc sm Prerequis te ECN 201

336 International Economics. (3) F S
The comparative advantage doctr ne, nc uding prac t ces under vary ng commercia po cy approaches The econom c mpact of nternationa d sequi br um Pre requ s tes: ECN 201 and 202

341 Public Finance. (3 F S
Pub c goods external t es vot ng mode s, publ c ex pend tures taxat on and budget formation w th emphas s on the federa government. Prerequ s te ECN 202

361 Soviet and East European Economics. (3 S
Econom c deve opment dur ng the twent eth century Ana ysis of contemporary nst tut ons and problems Prerequisite· ECN 201

371 Latin American Economics. (3) S
Lat n American econom c deve opment and current s sues n the reg on. Prerequ site. ECN 201 or 202

401 Intermediate Price Analysis. (3) F S SS; Knoer, H I DeSerpa
Role of the price system n organiz ng economic act vity under vary ng degrees of compet t on. Prerequ s tes: ECN 201 and 202

402 Economics of Income and Employment. (3) F, S, SS; Boyes, Schlagenhauf
Determinants of aggregate levels of employment, output and income of an economy. Prerequisites: ECN 201 and 202.

408 Mathematical Economics. (3) F; DeSerpa
Integration of economic analysis and mathematical methods into a comprehensive body of knowledge within contemporary economic theory. Prerequisite: ECN 401.

421 Economics of State and Local Government. (3) S; Amacher, Duffy
Financing state and local governments emphasizing budgeting, factors affecting expenditures, tax structures and fiscal capacity, and intergovernmental financial relations. Prerequisite: ECN 202.

441 History of Economic Thought. (3) F; Winkelman
Development of economic doctrines, theories of mercantilism, physiocracy, classicism, neoclassicism, Marxism and contemporary economics. Prerequisites: ECN 201 and 202.

451 Economics of Public Utilities. (3) S; Farris
Economic, legislative and administrative problems in the regulation of public utility rates and service standards. Public utility costs, pricing policies, rates, plant utilization, competition. Prerequisite: ECN 201 or 202.

453 Government and Business. (3) F, S; Cox, Knox
Development of public policies toward business. Antitrust activity. Economic effects of government policies. Prerequisite: ECN 202.

473 Urban Economics. (3) F, S; Greenwood, Duffy
Models of urban growth and intra-urban location. The demand for and supply of urban public goods and services. Prerequisites: ECN 201 and 202.

488 International Monetary Economics. (3) F, S; Bond
History, theory and policy of international monetary economics. Various international monetary systems and their effects on the domestic and international economic activity of participating countries. Prerequisite: ECN 201.

500 Fundamentals of Economic Analysis. (3) F, S, SS; Amacher, Lowe
Microeconomic and macroeconomic analysis. Price and output determination in various market structures. Functional distribution of income. Theory of income and employment. Open only to students without previous credit in economics.

501 Managerial Economics. (3) F, S, SS; Happel, Lowe, Plantz
Management problems from an economic point of view. Includes the application of economic analysis to decision-making in various areas of business policy development.

503 International Economic Theory. (3) A; Gooding
Economic theory as it applies to international trade, the balance of payments, economic integration, factor movements, international imbalances and international trade policies of the developed and less-developed countries.

505 Monetary Policy. (3) A; Cochran
Determinants of the money supply and the level of interest rates. Federal Reserve policy and the effectiveness of central banking policy.

506 Monetary Theory. (3) A; Kaufman
Traditional and post-Keynesian monetary theory, interest rate determination, the demand and supply of money.

511 Macroeconomic Analysis I. (3) A; Boyes, Schlagenhauf
The nation's income, output, employment and general price level. Examination of current theoretical and empirical research and policy problems.

512 Microeconomic Analysis I. (3) A; DeSerpa, Hill
Theory of exchange, production, resource use and pricing in capitalistic and mixed systems.

513 Macroeconomic Analysis II. (3) A; Boyes, Schlagenhauf
Advanced topics in macroeconomics. Emphasis on applied macroeconomic models. Prerequisite: ECN 511.

514 Microeconomic Analysis II. (3) A; DeSerpa
Advanced topics in microeconomics. Emphasis on general equilibrium, welfare economics, and production and capital theory. Prerequisite: ECN 512.

521 Manpower Economics. (3) A; Burgess
Human capital theory and applications to factors such as education, training, earnings, discrimination and job search. Analysis of labor markets and manpower policy.

522 Human Resource Economics. (3) A; Kingston
Analysis of labor supply and human resources. Manpower policy and program evaluation techniques. Prerequisite: ECN 521.

531 Economic Systems and Organizations. (3) A; Jackson
Philosophical foundations of major economic systems and of properties of principal system models. Comparison of alternative institutions and system components of contemporary economies.

537 American Economic Growth. (3) A; Winkelman
Growth of the American economy within the framework of economic theory. Development and interactions of institutions and technology to meet the changing needs of the economy.



541 Development of Economic Analysis. (3) A; Winkelman
Historical development of economic theory. Emphasis on the development of economic analysis from preclassical economics through Keynes.

553 Industrial Organization and Public Policy. (3) A; Knox, Cox
Application of market theory to contemporary industrial organization, emphasizing oligopoly. Structure, conduct and performance in industrial markets. Recent developments in antitrust policies.

555 Public Sector Economics. (3) A; Amacher
Economics of collective action, public spending, and taxation. Impact of central governmental activity on resource allocation and income distribution.

570 Economics of Developing Nations. (3) A; Ladman
Economic problems, issues and policy decisions facing the lesser developed nations of the world.

572 Regional Economics. (3) A; Chalmers
Introduction to export-base, input-output, linear programming, simulation, and econometric modeling as tools of regional analysis.

573 Urban Economics. (3) A; Greenwood
Models of urban growth and intra-urban location, the urban public sector, and cost-benefit analysis as a tool of urban analysis. Prerequisite: ECN 473.

580 Econometrics I. (3) F; Schlagenhauf
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) S; Schlagenhauf
Advanced topics in econometrics. Emphasis on extending the simple linear model and on simultaneous relationships. Prerequisite: ECN 580.

591 Seminar in Selected Economics Topics. (3) A; Staff

791 Doctoral Seminar in Economics. (3) A; Staff

Special Courses: ECN 484, 492, 493, 494, 497, 498, 499, 590, 592, 593, 598, 599, 690, 692, 700, 790, 792, 799. (See pages 30-31.)

Finance

PROFESSORS:
POE (BA 267A), AP LADO, DAUTEN, STEVENSON, TENNEY
ASSOCIATE PROFESSORS:
MYLER, O CONNELL, W LT
ASSISTANT PROFESSORS:
D ANDERSON, BUTLER CESTA J. M. DAVIS GALLINGER, KUDLA, MOREHART, PEAVY, PETERSON, TRENNEPOHL

FINANCE

FIN 203 Personal Finance. (3 F S
Financia prob ems and nst tutions affect ng nd v dua s borrow ng saving nsurance and nvestment May be taken by students n the Co lege of Bus ness Adm n s trat on for e ective credit only

300 Fundamentals of Finance. (3 F, S, SS
Management prob ems of acqu r ng a ocat ng and con tro ng use of funds in the bus ness enterpr se.
Prerequ s tes ACC 102 and ECN 202

331 Financial Institutions. (3 F S SS
Bank ng, sav ngs, nsurance mortgage and other f an c al nstitut ons. Analys s of the r functions Prerequ's'te· ECN 201.

361 Managerial Finance. 3 F S
Cap ta budget ng, everage d v dend and growth prob lems Prerequ s te F N 300

421 Securities Investment. (3 F S SS; Peavy Steven son, W t
he env ronment and process of secur ties nvestment, and the appraisa of security va ue Prerequis te: F N 300

426 Investment Management. (3) F S Cesta, Trenne pohl
Pr nc ples of portfol o management. nvestment se ec tion and tim ng techn ques Prerequ site. F N 421 or approva of instructor

431 Financial Markets. (3 F, S Ap ado
Asset l ab ity and cap tal management in f nanc a nst tut ons nf uence of market factors Current problems and issues Prerqu s tes. FIN 300 and 331

461 Financial Management Cases. 3 F, S, Kudla, Ste-venson
Prerequ s te· F N 361

500 Finance Fundamentals. (3) F, S; Anderson, Peavy, Trennepoh
Funct ons and nf uence of financ al nst tutions Theory and pract ce of f nancial management Prerequisite· ACC 102 or 500 or equ valent Not open to students w th cred t n F N 300 or equ valent

521 Security Analysis. 3) F, W t
Pr nc p es and techn ques of apprais ng debt and equ ty secur t es Prerequ s te ACC 500 or equ va ent Not open to students who have had F N 421.

526 Portfolio Management. 3 S Cesta Trennepoh
Theory and techn ques of portfol o va uat on and man agement Prerequ s te FIN 421 or 521

531 Capital Markets and Institutions. (3 A, Api ado
Recent theoretica and operat ona deve opments n econom c sectors affect ng cap ta markets and nstitu t ons Prerequisite· F N 500 or equ va ent

561 Financial Management. 3) F S SS Anderson, Ga nger, Poe
Acqu s t on al ocat on and management of funds w th n the bus ness enterprise F nanc a goals funds f ows cap ta budget ng and f nanc ng strateg es Prerequ s te· F N 500 and ACC 501.

571 Advanced Financial Management. 3) F 80 Ander son, Kud a
Recommended for doctora students

572 Advanced Financial Institutions and Markets. 3 S 80 Ap ado
Recommended for doctora students

573 Advanced Investments. (3 F 79, S 81 Cesta Trennepohl
Recommended for doctora students.

591 Seminar in Selected Finance Topics. 3) F; Ander-son

791 Doctoral Seminar in Finance. (3) NR, Staff

Special Courses: F N 484 492 493 494, 497 498 499, 590, 592 593 598, 599 690, 692, 700, 790 792, 799 See pages 30 31)

INSURANCE

INS 251 Principles of Insurance. (3) F S SS
Coverages ava lable buy ng methods procedures in sett ng c a ms nsurance compan es and vocationa opportunit es.

321 Life and Health Insurance. 3) F S
Types of contracts, functions of var ous contracts company organizat on rate mak ng se ection of r sks and other home off ce operat ons Governmenta super v s on of fe insurance compan es Prerequ s te NS 251.

331 Property Insurance Principles and Coverage. 3 F S
Po c es and pr nc p es of f re and casua ty nsurance For students plann ng careers in agency or home office work or for a fundamental know edge of nsurance for bus ness Prerequ s te NS 251

425 Current Problems in Insurance. 3) S Morehart, O Conne Tenney
Major problems and issues n the nsurance industry Prerequ'site. 9 hours of nsurance

431 Insurance Law. 3) F Tenney
Lega concepts and doctr nes app cable to the fie d of nsurance Prerequ s te 6 hours of nsurance.

451 Social Insurance. 3) F S· Morehart, O Connel Tenney
nsurance coverages prov ded by state and federal gov ernments. soc a secur ty unemp oyment nsurance workmen's compensat on and other soc a or govern menta nsurance p ans.

461 Estate Planning. 3) F, S Staff
Use of l fe nsurance w th w s trusts and bus ness buy sel agreements Needs approach to estate p ann ng

591 Seminar in Selected Insurance Topics. (3 NR Staff

Special Courses: NS 484 492 493 494, 497, 498, 499 590 592 593, 598, 599 See pages 30 31.

REAL ESTATE

REA 251 Real Estate Principles. 3) F S SS
Regu at ons, p act ces ega aspects and profess ona eth cs of the rea estate business Prerequ s te. ECN 202

302 Real Estate Management. (3 F S
Management of res dences, apartments and commer c a properties Cons derat on of profess ona standards, methods of bus ness promot on eas ng nsur ng and ma ntain ng propert es as an agent of the owners Pre requ s te REA 251

331 Real Estate Finance. 3) F S
Sources and ava ab ty of funds Management serv c ng and repayment of oans Prerequis te REA 251

401 Real Estate Appraisal. (3) F S Dav s
Factors affecting the va ue of real estate Theory and pract ce of appra s ng and preparat on of the appra sa report Techn ques n appra sa s. Prerequ s te REA 251

411 Real Estate Law. 3 F S SS Staff
Lega pract ces as they app y to the rea estate fie d and to the f e ds of t t es, mortgages end ng and trust work.

441 Real Estate Land Development. 3 F, S, Myler
Ne ghborhood and c ty growth Mun c pa p ann ng and

zoning. Development of res dentia commerc al, industr a , and spec al purpose properties. Prerequis te REA 251.

456 Real Estate Investments. (3) F, S; Butler
nvestment potentia as affected by market cond tions and governmental po cies. Prerequisite: REA 401

461 Current Real Estate Problems. (3) S· My er Peter son
Recent deve opments in the f e ds of rea estate f nance taxation, zon ng p anning governmenta regu at ons and government ass stance programs. Prerequ site. REA 251.

591 Seminar in Selected Real Estate Topics. (3) NR Staff

Special Courses: REA 484 492, 493 494 497, 498, 499, 590, 592 593, 598, 599. (See pages 30 31)

Health Services Administration

PROFESSOR:
EVELAND (BA 352B)
ASSISTANT PROFESSORS:
HAI, W LLIAMS

HSA 501 Health Care Organization. (3) F, S, Ha
Structure organ zation and function of contemporary hea th care de ivery systems, w th emphasis on health serv ce components the r evolution chang ng character st cs, interre at onsh ps, and imp cat ons for the future

504 Community Health Care Perspectives. (3) F Hai
Nature anguage and concepts of the med ca process including a cr t ca exam nat on of commun ty hea th serv ces w th n a health plann ng framework

520 Hospital Structure and Policy. (3) S· W l ams
Health care nstitut ons with focus on hosp ta manager a structure and po 'cy Funct onal relationsh ps among the adm n strat on govern ng bodies, med ca staffs and related elements Prerequ s te. HSA 501

522 Hospital Administrative Organization and Practices. (3) F Wi iams
nterna hospita organ zat on and functions analys s of manageria and c in ca services their re at onsh ps, prob ems and pract ces Prerequ s te HSA 501.

532 Financial Management of Health Services. (3) S, W l ams
Acqu s t on, al ocat on and management of f nancia resources w th n the health care enterpr se. Budget adm'nistration, cost ana ysis f nanc ng strateg es and internal controls Prerequ sites· HSA 520 and 522.

542 Health Care Jurisprudence. (3) F, S, Dundas
Lega aspects of health care de ivery and the r impl ca t ons for hosp ta and health serv ces admin stration Cons derat ons of lega sensitiv ty respons bil ty and vu nerab ity for the hosp ta adm n strator

591 Integrative Seminar Contemporary Issues. (3) F, S; Eveland
Current pol c es, prob ems and controvers es across the broad spectrum of hea th serv ces admin stration Leg s at ve deve opments, soc a and po t ca mpacts of pub c pol cy, educat ona programs hea th manpower perspect ves.

n addition top cs such as the fo ow ng wi be of fered

(a) Comparative Hea th Care Systems

(b) Hea th nformat on and Records Systems

(c Econom cs of Hea th Serv ces Plann ng

(d) Hospita Commun ty Re at ons

(e) Hea th Care nsurance Concepts

593 Applied Project. 3) F, S, SS Eve and
Assignment to a hosp tal or other hea th care organiza t on for an approved, superv sed exper ence n the ref nement of hea th-re ated manager a ski s Emphas s s on fu l range of exposure to management of both adm n strative and c in ca e ements

Special Courses: HSA 590, 592 598, 599. (See pages 30 31)

Management

PROFESSORS:
FEARON (BA 367E), K. DAV S, HEIER, NSKEEP RE F, REUTER, SCHABACKER, TINGEY, WERTHER, WHITE
ASSOCIATE PROFESSORS:
BASSFORD, D COCHRAN, COOK, KREITNER MENDLESON, RUCH, J. W WALKER, WEIHRICH
ASSISTANT PROFESSORS:
BOHLANDER, BRENENSTUHL, CLEMENT, DECKER HEID, KUR, MOORHEAD, RECK SH PPER, WOLFE

MGT 301 Principles of Management. (3) F S, SS
Plann'ng organ zing, and contro ing human and other resources for the effective and eff c ent accomp 'shment of organ zat ona objectives

311 Personnel Management. (3) F S, SS
Manpower plann'ng staff ng tra n ng and deve opment compensation appra sal and abor re ations. Prerequi s te MGT 301

331 Production and Operations Management. (3) F, S, SS
Use of resources in produc ng goods and services Concepts of p ann ng schedu ng and contro ing pro duct ve activ t es and physical resources. Prerequ site MGT 301

335 Methods Management. (3 F, S
Theory and pract ce n work design, methods mprove ment and work measurement Re at onship of att tudes and productiv ty Prerequ s te MGT 301

355 Purchasing. (3) F, S
Pract ces and problems confront ng the purchas ng manager, nc ud ng sources of supp y market nforma t on materia spec f cat on and nspection, control records 'nventories, stores and purchase budgets. Pre requ s tes MKT 300 and MGT 301

368 Management Systems. (3 F, S, SS
Systems theory and management funct ons bas c too s for systems analys s, organizationa systems design systems appl cat on n recent bus ness pract ces systems s mu at on Prerequisite: MGT 301

413 Wage and Salary Management. (3) F, S; Bohlander nskeep, Wo fe
nstal at on and admin strat on of a comp ete wage and sa ary program Includes object ves, po c es organiza t on, control job eva uation wage surveys and methods of obta ning acceptance of an ntegrated program. Pre requ s te MGT 311

422 Training and Development. (3 F, S C ement, Kre tner
Learn ng theory or entat on and basic level tra n ng management deve opment, resource mater a s and methods Prerequ s te MGT 311

423 Industrial Relations and Collective Bargaining. (3 F S Boh ander Werther
Processes and procedures of co lect ve barga ning Scope and negot at on of un on contracts

432 Materials Management. (3) F S; Fearon, He d, Reck
Analys s and manageria ntegration of the mater a f ow process with n an organization nc ud ng mater a s research and standards purchas ng product on and inventory contro warehousing and mater a s movement Prerequ s te MGT 331

433 Managerial Decision-Making. (3) F, S, SS; Decker, Ruch
Decision-making concepts, methods and approaches and their application to business problems. Managerial understanding and uses of quantitative decision-making tools. Participation in a management simulation. Prerequisite: MGT 301.

434 Social Responsibility of Management. (3) F, S, SS; Davis, Kreitner, Kur
Relationship of business to the social system and its total environment. Criteria for appraising the social responsibility of management decisions. Role of managers as agents of organizational and social change. Prerequisite: MGT 301.

451 Organizational Behavior Concepts. (3) F, S, SS; Bassford, Davis, Kreitner, Mendleson, Shipper, White
Human aspects of business, as distinguished from economic and technical aspects, and how they influence efficiency, morale and management practice. Prerequisite: MGT 301.

452 Organizational Behavior Applications. (3) F; Bassford, Mendleson
The complex set of behavioral forces and relationships that influence organizational effectiveness. Intervention strategies and application skills. Prerequisite: MGT 451.

459 International Management. (3) F, S; Brenenstuhl, Tingey, Weihrich
Management concepts and practices of multinational and foreign firms. Objectives, strategies, policies and organizational structures of enterprises operating in various social, economic, political and cultural environments. Prerequisite: MGT 301.

463 Business Policies. (3) F, S, SS
Policy formulation and administration of the total organization, including integrative analysis and strategic planning. Prerequisite: Completion of 90 hours, including all other Business Administration core requirements.

500 Fundamentals of Management. (3) F, S, SS; Brenenstuhl, Kreitner, Schabacker, Weihrich
Managerial functions. Performance models. Environmental constraints. Operations and personnel functions. Not open to students who have earned credit in MGT 301 or equivalent.

501 Managerial Concepts. (3) F, S, SS; Bassford, Fearon, Heier, Inskeep, Schabacker, Weihrich
Analysis of current administrative philosophy and practices, and their historical foundations. Integration of an organization from the point of view of an administrator. Prerequisite: MGT 301.

503 Organizational Behavior. (3) F, S, SS; Bassford, Mendleson, Kreitner, White
Development of effective work groups in business. Analysis of cases in organizational relationships. Group dynamics, effects of change and informal organization.

520 Problems in Personnel Management. (3) S, SS; Cook, Inskeep, Walker
Selecting, developing, maintaining and utilizing a competent labor force. Case studies of personnel problems. Preparation of a written personnel program.

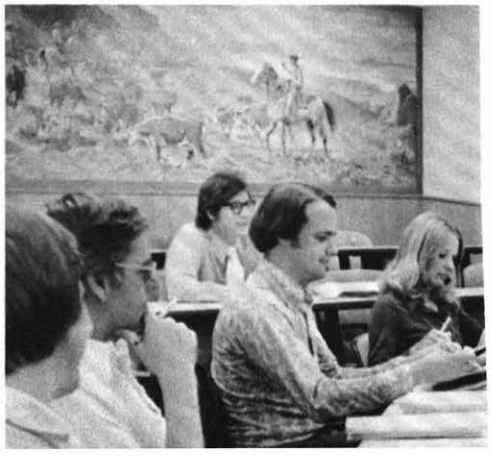
522 Labor Relations and Public Policy. (3) F; Bohlander, Werther, White
Development of state and federal legislation. Analysis of recent decisions of courts and labor boards. The legal rights and duties of employers, unions and the public.

532 Materials and Purchasing Management. (3) S; Fearon, Reck
Analysis of the incoming flow of materials and the economic environment in which the materials acquisition and allocation functions operate.

581 Management of Production. (3) F, SS; Reuter, Ruch
Analysis of the production function from a managerial point of view. Conceptual foundations, analysis of major problems and decision processes.

591 Seminar. (3) F, S, SS; Staff
Topics such as the following will be offered:

(a) Business Policy
(b) Managerial Planning and Control
(c) Business and Society
(d) The Management Audit
(e) Research and Development Management
(f) International Management
(g) History of Management Thought
(h) Comparative Administration
(i) Business Simulation



791 Doctoral Seminar in Management. (3) S; Davis, Fearon, Reif

Special Courses: MGT 484, 492, 493, 494, 497, 498, 499, 500, 590, 592, 593, 598, 599, 690, 692, 700, 790, 792, 799. (See pages 30-31.)

Marketing

PROFESSORS:
ROWE (BA 323E), S.W. BROWN, FARRIS, GWINNER, GROSSMAN, HARRIS, OSTROM, OVERMAN, SCHMIDT, ZACHER

ASSOCIATE PROFESSORS:
BESSOM, DANIEL, GOURLEY, D. JACKSON, PATTI, SCHLACTER, SHROCK, B. J. WALKER

ASSISTANT PROFESSORS:
STUTTS, TAPIA, VANCE

ADVERTISING

ADV 301 Advertising Principles. (3) F, S, SS
Advertising as a communications tool in marketing and business management. Creative methods, survey of media, measurements of effectiveness, and coordination with other aspects of the sales and promotional program. Not open to students with credit in MKT 412. Prerequisite: MKT 300 or MCO 110.

311 Advertising Creative Strategy I. (3) F, S
Preparation of advertising for print and broadcast use. Creative strategy, the communication process, and development of advertising messages. Prerequisite: ADV 301. Two hours lecture, 2 hours laboratory.

312 Advertising Creative Strategy II. (3) F, S
Continuation of ADV 311. Production of film and videotape commercials for television; mechanical production of printed advertising. Prerequisite: ADV 311. Two hours lecture, 2 hours laboratory.

371 Advertising Media. (3) F, S
Characteristics and use of broadcast and printed media. Relationship of media to markets. Audience measurement and analysis. Media scheduling. Prerequisite: ADV 301. Lecture and laboratory.

453 Advertising Campaign Problems. (3) S; Patti, Stutts
Planning and executing the advertising campaign including research, budget, media and evaluation. Prerequisites: ADV 311 and 371. Lecture and laboratory.

461 Advertising Management. (3) F, S Patt
Admin strat on of the complete advert s ng program Market ng m x, budgeting, med a strategy measurement of effect veness coord nation with other promot ona act v t es. Use of the advertis ng agency. Prerequ s tes ADV 301 MKT 300 and ADV 371 or MKT 451

Special Courses: ADV 484 492, 493 494, 497 498, 499 See pages 30 31

MARKETING

MKT 300 Principles of Marketing. 3 F, S SS
Ro e and pr cess of market ng n the society and econ omy The market ng system emphasiz ng external env ronments on marketing management Prerequisite. ECN 202 or approval of nstructor

302 Introduction to Marketing Management. 3 F S SS
Market ng concepts, funct ons and nst tut ons w th spec a emphas s on product pric ng promot on and d str but on management Prerequ s te MKT 300

304 Buyer Behavior. 3) F S SS
Behav ora concepts n the ana ys s of buyer behav or and n market ng strategy formu ation Prerequ site. MKT 300

310 Principles of Selling. 3 F S SS
Bas c pr nc p es underlying the sa es pr cess and the r pract ca app ication to sales s tuat ons Econom c, so c o og ca and p ycho ogica re at onsh ps in the market p ace, app ed to sa es of ndustr a and consumer goods a d ntang bles.

321 Principles of Retailing. 3 F S SS
Ro e of reta ng n marketing. Locat on buying, promotion organ zat on personne and contr n a reta enterpr se Prerequ s te MKT 300

325 Public Relations in Business. 3 F, S SS
Ro e of publ c re at ons n bus ness government and soc a inst tut ons, emphas z ng po cy formulat on

331 International Business. 3) F S
Mu t d sc p nary ana ys s of ide og es cu tures po t cs econom cs socia va ues and nstitut ons as they re ate to operat ons of the nternationa f rm Prerequ - s te ECN 202 or approva of nstruct r

411 Sales Management. 3 F, S Harr s Jacks n
App cat on of management concepts to the adm n strat on of the sa es operat on Prerequ s te MKT 300

412 Marketing Communications. 3 F, S, SS Staff
The commun cat on process as t re ates to the promo t onal act v t e of the f rm from a behav ora po nt of v ew Prerequ s tes MKT 302 and 304

424 Retailing Management. (3) S Grossman, Schmidt, Wa ker
Problems of reta ing management inc ud ng functions w th n various nstitut ons and reta ng of commod t es Prerequ s te MKT 321

434 Industrial Marketing. (3) F, Harris
Strateg es for market ng products and serv ces to n dustria commerc a and governmenta markets. Chang ng industry and market structures Prerequ s te MKT 300

435 International Marketing. 3) F Bessom Tap a
The Un ted States' position n wor d trade Market ng strategy formu ation by ndividua firms to serve fore gn markets and to adapt to var at ons factors affect ng foreign marketing efforts Prerequ s te MKT 300

444 Marketing Channels. 3) S Wa ker
D str but on channe s used by f rms engaged n marketng and manufactur ng Strateg es for market ng channels management Re at onsh ps among market ng ntermed ar es Prerequ s te MKT 300

451 Marketing Intelligence. 3) F S SS, Staff
ntegrated treatment of the trad t onal and dec on theo y app oaches to market ng research and ana ys s of env ronmenta fact rs affect ng n arket ng dec s ons n the f rm. Prerequ s te QBA 221 or approva of stru tor

460 Marketing Decision-Making. 3) F S SS Staff
Dec s on making by the marketing execut ve ntegra tion of a l elements of the market ng program Prerequ s te 12 ho rs of advanced courses n market ng nc ud ng MKT 302

500 Fundamentals of Marketing. 3) F S SS, Staff
Market ng systems, concepts, nst tut ons and funct ons emphas zing the strateg c adaptat on f the firm to chang ng env ronmenta cond t ons Not open to stu dents who have earned cred t n MKT 300

501 Marketing Management. (3 F S SS· Staff
Market ng prob ems from the management po nt of view

502 Public Relations 3 NR; Staff
A system approach to manager a pub c re at ons em phas zing the relat onsh p of the organizat on to ts environment

520 Marketing and the Behavioral Sciences. 3) S Coney, Sch acter
Concepts and theor es from the behav oral sciences as they re ate to market ng strategy formu at on

522 Marketing Information. 3) F Coney Gour ey
Market ng research market ng nformat on systems and modern quant tat ve techn ques n market ng dec s on mak ng Prerequ s te MKT 501

563 Marketing Strategy. (3) NR Bessom, Gour ey, Ostrom
Concepts and techn ques n deve op ng the f rm's tota market ng strategy Prerequ s te MKT 501.

591 Seminar. (3) NR; Staff
Top cs such as the fol ow ng w be offered
(a Product Strategy
(b) Price Strategy
(c Channe Strategy
(d) Promotion Strategy
(e) nternat ona Business
f Market ng n a Chang ng Env ronment
g Market ng n Mu t nat onal Operat ons

791 Doctoral Seminar in Marketing. 3 S Staff

Special Courses: MKT 484 492, 493 494 497, 498, 499 590, 592 593 598, 599 690 692, 700, 790, 792 799 See pages 30 31)

TRANSPORTATION

TRA 301 Principles of Transportation. 3 F S SS
Bus ness practices of rail motor a r, water and pipe ne carr ers and industr al sh ppers nc ud ng the nf uence of econom c pr nc p es government regulat on and public pol cy

305 Urban Transportation. (3) F
Econom c soc al pol t cal and busine s aspects of pas senger transportat on Pub c po cy and government a d to urban transportat on deve opment

445 Physical Distribution Management. (3) F S Danie , Shrock
Management of the phys ca d str but on function of the business enterpr se. Prerequ s te TRA 301

460 Highway Transportation. (3) F; Shrock
H ghway systems of the U.S Pr vate and for h re opera t ons and management of freight and passenger motor carr age. Pub ic pol cy and regu at on by federa state and loca governments Prerequ site TRA 301

461 Air Transportation. (3 F, S Cochran
Economic and bus ness aspects of commerc al a r transportat on rate mak ng, government contro and ass stance to air ne operat ons Routes and serv ces, equipment and operat ons nterre at onsh ps w th c m pet ng modes of transportat on Prerequis te TRA 301

462 Problems in Transportation. 3 S Farris
Current prob ems of transportat on po cy, phys ca d s tr bution and ogistics and carrier management Prerequis te· TRA 301

463 International Transportation. 3) S Dan e
The movement of goods between fore gn countr es n nternat ona bus ness routes, rates costs operat on,



administration and regulation of international air and maritime transportation agencies. Prerequisite: TRA 301.

541 National Transportation Policy. (3) NR; Daniel, Farris
Public policy alternatives and problems in the transportation industry; interrelationships of competing transportation modes; relationships of public investment to private operation.

545 Business Logistics. (3) NR; Daniel, Shrock
Planning and control of the physical supply and distribution components of the firm's logistics system.

Special Courses: TRA 484, 492, 493, 494, 497, 498, 499, 590, 591, 592, 593, 598, 599, 700, 790, 792, 799. (See pages 30-31.)

Quantitative Systems

PROFESSORS:
PHILIPPAKIS (BA 297B), HERSHAUER, KAZMIER, McCREADY

ASSOCIATE PROFESSORS:
ECK, HUSTON, MILLER, POHL, WOOD

ASSISTANT PROFESSORS:
ANDER, BACA, BROOKS, BURDICK, HAKIM, KAKAR, O'LEARY, VERDINI

COMPUTER INFORMATION SYSTEMS

CIS 201 Business Programming. (3) F, S, SS
Computer analysis of business data. Flowcharting, computer programming, and use of software for business applications.

302 Electronic Data Processing. (3) F, S, SS
Basic computer systems concepts. Introduction to data files, storage, and processing. Uses of COBOL and other suitable languages.

402 Programming Systems. (3) F, S; Baca, Huston, Philippakis
Data structures and file processing using COBOL and other high-level languages. Overview of software concepts and recent developments. Prerequisite: CIS 302.

407 System Simulation. (3) F, S; O'Leary, Miller, Verdini
Development and analysis of systems models through computer simulation. Prerequisite: CIS 201 or equivalent.

420 Business Information Systems. (3) F, S; Miller, Philippakis
Application of systems concepts for producing information to be used in business decision-making. Cases and projects will incorporate current digital computer data base hardware and software technology. Prerequisite: CIS 402.

502 Computer Information Systems. (3) F, S; Baca, Huston, Wood
Electronic data processing systems for administrative applications. Computer hardware, software, and FORTRAN and COBOL programming languages.

510 Systems Models and Simulation. (3) F; Hershauer, Miller
Design of computer-based decision systems. Simulation as a research and decision-making tool. Prerequisites: QBA 221 and FORTRAN programming.

591 Seminar in Selected Computer Information Topics. (3) NR; Staff

Special Courses: CIS 484, 492, 493, 494, 497, 498, 499, 590, 592, 593, 598, 599. (See pages 30-31.)

QUANTITATIVE BUSINESS ANALYSIS

QBA 221 Statistical Analysis. (3) F, S, SS
Methods of statistical description. Application of probability theory and statistical inference in business. Prerequisite: MAT 141 or equivalent.

222 Quantitative Information Systems. (3) F, S, SS
Application of quantitative methods in business. Decision systems for production, marketing, finance and management. Use of standard computer programs. Prerequisite: QBA 221 or equivalent.

322 Managerial Statistics. (3) F, S
Applications of probability and statistical inference to business decisions. Decision theory and Bayesian inference. Prerequisite: QBA 221.

391 Operations Research. (3) F, S
Application of quantitative techniques in business organizations, such as the simplex method of linear programming, inventory models, games and strategies and simulation. Prerequisite: QBA 221.

422 Advanced Business and Economic Statistics. (3) F, S; Ander, Burdick, Kakar
Application of multivariate analysis, including regression and correlation techniques, to business and economic problems. Time series analysis. Prerequisite: QBA 322 or graduate standing.

450 Decision Analysis Applications. (3) S; Hershauer, Hakim
Integration of quantitative techniques for the analysis and solution of managerial problems. Use of computer library programs for implementation of standard analytical techniques. Prerequisites: CIS 201, QBA 322 and 391.

500 Statistical Analysis. (3) F, S; Baca, O'Leary, Kazmier
Basic statistical measures. Probability concepts. Statistical inference. Not open to students with previous background in statistics in business or other social sciences. Prerequisite: MAT 141 or equivalent.

501 Fundamentals of Quantitative Analysis. (3) F; Hakim
Basic mathematical concepts and methods underlying quantitative analysis. Emphasis on interpretation and application rather than theorems and mathematical proofs. Model building, set theory, functional relationships, matrix algebra, differentiation and integration.

522 Quantitative Methods for Business. (3) F, S, SS; Brooks, Eck, Wood
Statistical and optimization concepts and methods for use in decision making. Prerequisite: QBA 500.

523 Quantitative Models in Decision-Making. (3) F, S; Eck, Verdini, Hakim
Application of basic mathematical concepts to quantitative models, such as linear programming, nonlinear programming and stochastic processes. Prerequisite: MAT 142 or QBA 501.

524 Nonparametric Statistics. (3) S; Ander, Kakar
Nonparametric statistical tests for location, dispersion, trend, association, correlation, and goodness-of-fit. Nonmetric scaling techniques. Prerequisite: QBA 500 or equivalent.

525 Experimental Design. (3) S, F; Ander, Burdick, Pohl
Analysis of variance and experimental design with emphasis on business research. Multiple regression and correlation. Nonparametric techniques. Prerequisites: QBA 500 and 501.

591 Seminar in Selected Quantitative Business Topics. (3) NR; Staff

791 Doctoral Seminar in Quantitative Business Analysis. (3) NR; Eck, Hershauer

Special Courses: QBA 484, 492, 493, 494, 497, 498, 499, 590, 592, 593, 598, 599, 690, 692, 700, 790, 792, 799. (See pages 30-31.)

College of Education

Robert T. Stout, Ph.D.
Dean

Purpose

The central purpose of the College of Education is to provide initial preparation and continuing education to teachers and other professional personnel engaged in the educational programs of schools, colleges, and other public and private agencies. This is accomplished primarily through direct relationships between the teaching faculty and their students.

Other purposes corollary to this are:

1. To contribute to the body of professional knowledge in the field of education through research, the development of educational theory, and innovation and experimentation in educational method and organization.
2. To offer leadership beyond the campus through the dissemination of information and ideas and through cooperative involvement with other agencies engaged in education.
3. To provide services to other agencies engaged in education in such manner as to promote improved educational practice throughout a widening sphere of influence.

Organization

The College of Education is organized on the basis of the following eight departments. The departmental structure provides opportunity for the faculty to organize specializations in subject fields and concentrations in a wide variety of both teacher education and graduate programs.

Elementary Education
Reading Education

Secondary Education
Safety Education
Educational Foundations
Social and Philosophical Foundations

Counselor Education

Educational Administration and Supervision

Higher and Adult Education

Educational Psychology

Educational Technology and Library Science
Educational Technology
Instructional Media
Library Science

Special Education
American Indian Education

Several bureaus, centers and special laboratories directly complement the academic programs of the College. These include the Arizona Educational Information System; Bureau of Educational Research and Services; Center for Adolescent Research, Evaluation and Service; Center for Indian Education; Center for Multicultural Education; Counselor Training Center; Education Copy Service; Instructional Resources Laboratory; Office of Bilingual Education; Office of Student Services; I.D. Payne Laboratory; Professional Field Experiences, Psychological Assessment Laboratory; Reading Center Clinic; Southwest Regional Center for Community Education Development; Special Education Testing Clinic; and University Testing Services.

Degrees

Bachelor of Arts in Education Degree. Several undergraduate programs are available leading to the degree Bachelor of Arts in Education which require a minimum of 126 semester hours of credit. Each of these programs is designed to prepare the student for work in some particular educational area.

Master's Degree. Students may enroll in either the Master of Education or the Master of Arts degree program. Each program consists of 30-42 semester hours of study, depending

upon given departmental requirements. The Master of Arts programs emphasize research competencies; each specifically requires a thesis and 12 semester hours of research credit, including six hours of credit for the thesis. The Master of Education programs stress development and extension of professional competencies; none requires a thesis. For specific reference to these programs, see Graduate College section in this catalog.

Master of Counseling Degree. A first-level professional degree, Master of Counseling, is awarded upon the satisfactory completion of a two year (60 semester hours) program of approved graduate studies. This program provides for a core of required professional studies supported by related disciplines, and for two professional specialization options. The Practitioner Option provides thorough professional preparation for counseling in a variety of school and community settings. The Research Option is well suited as preparation for future doctoral study. With teacher certification, either option prepares the student for school counselor certification in Arizona and other states. For further information regarding admission and courses of study, contact the Department of Counselor Education.

Education Specialist Degree. The degree Education Specialist is awarded for satisfactory completion of the Specialist program of graduate studies. For specific reference to this degree, see Graduate College section in this catalog.

Doctor of Education Degree. The degree Doctor of Education is awarded for satisfactory completion of the doctoral program of graduate studies. For specific reference to this degree, see Graduate College section in this catalog.

Doctor of Philosophy Degree. The degree Doctor of Philosophy is awarded for satisfactory completion of this doctoral program of graduate studies. For specific reference to this degree, see Graduate College section of this catalog.

Graduation and Certification Requirements

Admission to Undergraduate Programs

Undergraduate students at Arizona State University may apply for admission to the College of Education during the second semester of their sophomore year. Students transferring from outside institutions need not make separate application for admission to the College of Education inasmuch as they will be routinely admitted at the time of admission to the University, provided they meet admission criteria.

Candidates for admission must meet the following minimum requirements.

1. Possess a 2.25 cumulative GPA or higher. (If a candidate has completed course work at Arizona State University, the GPA is based on ASU work only, ignoring the effect of grades at another institution.)
2. Have junior standing (defined here as a minimum of 56 semester hours.)
3. If deemed necessary by the College, take selected physical and psychological examinations.
4. Complete those course requirements which have been established as prerequisites for entrance to the College of Education.

The College of Education reserves the right to deny admission to those applicants who fail to fulfill the aforementioned requirements.

During the freshman and sophomore years, the student planning admission to the College of Education at the end of the second year will register as follows.

1. If interested in teaching in the secondary school, he/she will enroll in the appropriate college for the first two years and will list the proposed teaching field as the major, followed in parentheses by the term "Pre-Secondary." Examples are shown in the box to indicate specifically how this will be accomplished.

   The College in which the student is enrolled will assign an advisor from the appropriate major department in cooperation with the College of Education.
2. If interested in teaching in the elementary school, the student will register in the College of Liberal Arts but will list his/her major as "Pre-Elementary Education." Such students will be assigned an advisor from the College of Education as soon as the major is listed even though they will not be admitted to the College of Education until they have completed the first two years of study.

College	*Teaching Field*	*Major First Two Years*
Liberal Arts	English	English (Pre-Secondary)
Fine Arts	Instrumental Music	Instrumental Music (Pre-Secondary)
Business Administration	Business	Business (Pre-Secondary)
Engineering and Applied Sciences	Industrial Arts	Industrial Arts (Pre-Secondary)

3. Freshmen and sophomores interested in teaching in a special education setting will register in the College of Liberal Arts but will list their major as "Pre-Special Education." Such students will be assigned an advisor from the College of Education as soon as the major is listed even though they will not be admitted to the College of Education until they have completed the first two years of study.
4. If interested in the Selected Studies in Education Program, the student will register in the College of Liberal Arts but will list the major as "No Preference." Such students will be assigned an advisor from the College of Liberal Arts until such time as their proposed plan of studies is officially approved. Upon receipt of approval of their selected studies plan, students will be assigned to a special advisor in the College of Education even though they will not be admitted to the College until they have completed the first two years of study.

Retention and Disqualification

1. A student must maintain a cumulative grade point average of 2.00 (C) or better to remain in good standing. Any student whose cumulative grade average is below the required index may be placed on academic probation. Once a student is on academic probation, he she remains in that status until the grade point index reaches the retention level, 2.00, or he she is disqualified from the University. Unless the Standards Committee acts otherwise, a student with a deficient grade point index is placed on probation for a minimum of one semester prior to being subject to disqualification.
2. A student must also maintain sound physical and mental health. A student who appears to lack the degree of physical and mental health necessary to function successfully as a teacher may be required to take a medical examination and make the results available to the Standards Committee of the College of Education. The responsibility for reviewing and determining the qualification of students whose behavior and or performance are in question is vested in the Standards Committee. The Committee's decision may require the dismissal or disqualification of a student from the College.
3. Any student who has earned the number of semester hours required for graduation, but has not achieved the 2.00 index required for graduation, is subject to disqualification.
4. A disqualified student who desires to be reinstated may submit an application for reinstatement. A disqualified student normally will not be reinstated until at least one semester has elapsed from the date of disqualification. The burden of establishing fitness is on the disqualified student, who may be required to take aptitude tests and submit to other examinations before being readmitted.
5. While students are subject to the general retention policy, they are evaluated in the College on broader criteria than mere academic average. Students are reviewed for evidence of competency for teaching and are continuously evaluated as they progress in the program. Prospective teacher candidates who do not meet the established criteria are counseled in an effort to guide them toward a program that is compatible with their interests and abilities.

Degree Requirements. Each candidate for graduation in a degree curriculum leading to Bachelor of Arts in Education degree is required to complete an approved program of 126 semester hours with a cumulative grade point index of 2.00 or above for: 1) All courses taken while a student at the University; (2) All courses included in his major teaching field; (3) And all professional education courses.

Standards for graduation also include (1) quality of scholarship, (2) personal and social fitness for the teaching profession, (3) mental and physical health, and 4) understanding of and the ability to work with students.

Specific requirements in addition to the above are available from the departments offering the particular program.

Each candidate must file a written application for graduation acceptable to the College of Education Standards Committee and receive a recommendation for graduation from the faculty of the College of Education. In addition, graduation from the approved teacher education program in the College of Education is tantamount to full certification. Only those individuals who have met the requirements under "admission" and "retention" as set forth in the preceding sections and who meet all of the college and state requirements for certification will be recommended for certification.

General Studies. A minimum of 39 semester hours (51 semester hours in Elementary Education) of General Studies plus the University English requirement must be completed before the student is eligible for graduation in any of the undergraduate curricula offered by the College of Education. It is anticipated that heavy emphasis will be placed on these requirements during the first two years of study before formal admission to the College of Education. The following minimum requirements exclusive of Education courses indicate the general nature of the distribution which must be met as the student completes this basic requirement:

1. A minimum of 8 semester hours (9 semester hours in Elementary Education) credit in the Humanities and Fine Arts (exclusive of freshman English),
2. A minimum of 8 semester hours (9 semester hours in Elementary Education) credit in the social and behavioral sciences, including a course in general psychology and a course in United States history.
3. A minimum of 8 semester hours (9 semester hours in Elementary Education) credit in sciences and mathematics, including one course in science and one course in mathematics

The student should consult with his advisor for specific recommendations or requirements within the area of General Studies in order to build an acceptable pattern of courses and to be qualified for admission to and graduation from the College of Education.

4. Courses in Arizona and federal constitutions are requirements for certification.

Certification. The College of Education is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary, secondary, and special education teachers and school service personnel. Students who successfully complete the teacher education curricula planned by the College of Education are recommended to the Director of Certification, Arizona State Department of Education, for the appropriate Arizona certificate and are eligible for certification in all states participating in the NCATE reciprocity practice.

Certification as a professional teacher should not be equated with a teaching position assignment. Both present and immediate future trends in teaching opportunities suggest increased competition for available teaching positions.

For further information concerning certification, students should contact the Office of Student Services in the College of Education.

Student Teaching

Students must be admitted to the College of Education's approved teacher education program and have completed the appropriate prerequisites to be eligible for admission to student teaching.

Undergraduate students in the Elementary Education and/or Special Education curricula must be approved for student teaching by their advisors and the Director of Professional Field Experiences. Undergraduates in the Secondary Education curriculum must be approved for student teaching by the major department coordinator of student teaching, and the Director of Professional Field Experiences. Graduate students must be approved by the same University divisions as undergraduates to student teach.

Application. Students who apply for Student Teaching must have completed at least 12 semester hours of course work within the last three years at Arizona State University.

Application to student teaching must be made at the Professional Field Experience Office. Applications for the appropriate semester of Student Teaching will be distributed and received; for Spring semester between September 15 and October 5; for Summer Session between December 15 and January 15; for Fall semester between March 1 and April 1.

The stations available for summer student teaching assignments are quite limited and assignment will be made on a first come basis. Only those students who have completed all degree and certification requirements will be assigned summer student teaching. No student should plan to meet this requirement during the summer. A lack of stations and refusal of some departments to allow summer student teaching mitigate against all but a few students.

Students who apply for student teaching after the deadlines named above may not be assigned to student teaching until the next spring or fall semester.

Requirements. Students admitted to student teaching must have a cumulative index of 2.25 or better and 90 semester hours of college credit. The cumulative index in the Teaching Major shall be at least 2.00 (some majors may require a higher index for entry into student teaching).

The completion date of the last education methods course must be within two years of the beginning date of student teaching to be accepted as meeting the prerequisites.

Students in the Elementary Education curriculum, whose programs permit, devote their full time to student teaching all day in the cooperating schools. Others teach in the cooperating schools for one half day for one semester. In either case, student teaching occurs during the first or second semester of the senior year for elementary education students.

Students who are preparing for secondary certification teach for one-half school day for one semester during the first or second semester of the senior year. Secondary students may devote all day to student teaching when their programs and major departments permit them to do so.

The student's course load is limited to 16 semester hours during the semester in which he/she is teaching. Student teachers are required to attend seminars conducted by the College Supervisor. Seminar time is arranged by each supervisor and is an integral part of the student teaching experience. Student teachers are not permitted to take part in activities that interfere with their student teaching conferences, seminars or other activi

ties related to teaching in the cooperating school.

Cooperating Schools Available. Excellent schools and school systems cooperate with the College of Education in the supervision of student teachers. Each of the schools presents its own particular type of organization and problems so that the student may receive experience in many types of work from the kindergarten through high school. Student teachers are required to adhere to the calendar, rules, regulations, and philosophy of the school in which they are accepted to student teach. Each student teacher is under direct guidance of a cooperating teacher, a college supervisor and the Director of Field Experiences.

Student Teaching Waiver. Students who have been employed and supervised by state-certified personnel in accredited private, public, parochial, or Indian schools may apply to the Director of Professional Field Experiences, College of Education, for waiver of the student teaching requirement. Substitute teaching experience is not acceptable as a replacement for student teaching. Waiver of student teaching in the required grade level may be granted by the Director of Professional Field Experiences, when the student meets all requirements for Arizona State University Institutional Endorsement for Certification. Waiver of this requirement in no way changes the total number of semester hours required for graduation or for establishing residence.

Regular teaching experience in the required grade level of two year's duration within the past five years may be considered sufficient to waive part or all of the student teaching requirement. Regular teaching experience in the required grade level of one year's duration within the past five years may be considered sufficient to waive three semester hours of student teaching. Regular teaching experience in the required grade level prior to the past five years will be evaluated at one-half the rate established above for the waiver of the student teaching requirements. Experience further removed than 10 years will not be considered. The required grade level is described as follows: elementary level includes kindergarten through eighth grade; secondary level includes grades seven through twelve.

Forms are provided for superintendent(s) or principal(s) to verify for the Director of Professional Field Experiences the student's employment, date of employment, grades and/or subjects taught, and his/her success as a teacher. This information is evaluated to determine waiver eligibility of the applicant.

Students who have met the full student teaching requirements of another college for teacher education which is accredited by the National Council for Accreditation of Teacher Education may petition through the College of Education Standards Committee to have their student teaching experience requirements interpreted as fully met.

Honors Program. An Honors Program is available within the College of Education for the exceptional student. It is administered by the Standards Committee which serves as an Honors Council.

Credit-No Credit Grades. Students in the College of Education may participate in the Credit-No Credit (CR-NC) program of the College of Liberal Arts described on page 58. However, no course taken for Credit-No Credit may be counted toward the student's major or minor teaching field requirements or other required academic specialization.

Bachelor of Arts in Education

Elementary Education Curriculum. The Elementary Education curriculum offers professional education courses designed to prepare students to teach all levels of the elementary school.



This curriculum leads to the degree of Bachelor of Arts in Education and to certification for teaching in the kindergarten and grades one through eight. It is also intended to help students who are planning to work with children in other situations.

To enroll in Elementary Education, the student must have reached junior year status (defined here as a minimum of 56 hours) and must have a cumulative grade point average of at least 2.25, and must demonstrate appropriate levels in reading, spelling, written composition and mathematics.

Major. The major in this field is elementary education.

Concentration. All elementary education majors must complete a program of concentration consisting of 27 semester hours. Listings of courses appropriate for various concentrations may be obtained from the department office. Courses in the concentration must be approved by the student's advisor.

General Pattern. A program of 126 approved semester hours is required. This is divided as follows:

	Semester Hours
General Studies*	51
For specific courses, see General Studies listings on pages 36-37	
Humanities and Fine Arts	9
Behavioral and Social Sciences	9
Sciences and Mathematics	9
General Studies Electives	24
Freshman English	6
Elementary Professional Education	42
Concentration	27
Total	126

*Requirements for State certification:

United States and Arizona Constitution	3
United States History	3
General Psychology (may be included in the General Studies field of behavioral and Social Science)	3

Advising. Advisors in this curriculum have check sheets with recommended and required courses for each year of work. These check sheets contain patterns of course work appropriately related to the age level of pupils with whom the student as a teacher will want to work. The check sheets also contain recommendations for General Studies electives and concentration. It is necessary for students to consult advisors in this curriculum in order to insure the best possible program of education This is particularly important in as much as the advisor must sign the checkout sheet for graduation which indicates that an approved program of course work has been developed.

Professional Education Options

Campus Based. Students may take all the courses required in professional education on campus, with the exception of student teaching. To provide for students' areas of interest, two student teaching options are provided: Option A, student teaching in one school; Option B, student teaching in two schools having differing cultural, ethnic, and socio economic characteristics

Field Based. Students may take most of the courses required in professional education at field based sites established in the metropolitan area. During their junior year, students at the field based sites divide their time between interning in elementary school classrooms and taking college courses. Students devote one full semester during their senior year to student teaching at the same site where they earlier interned.

Secondary Education Curriculum. This curriculum prepares students for teaching in the secondary school. Majors and minors are completed in the teaching fields desired. The curriculum has considerable flexibility for those who wish to pursue specialized work in addition to the regular expectations for teaching. This curriculum leads to the degree of Bachelor of Arts in Education and to the certification for teaching in the secondary school (grades seven through twelve). For admission to the Secondary Education curriculum, a student must have earned a minimum of 56 semester hours with a grade point average of at least 2.25.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

	Semester Hours
General Studies*	39
For details see pages 36-37.	
Freshman English	3 6
Major Teaching Field (required)	36-42
Minor Teaching Field (optional	24
Professional Education	25
Reading (RDG 467, 480)	3
United States and Arizona Constitution*	3 5
United States History*	3
General Psychology*	3
Science* (1 course)	
Mathematics* 1 course	

*United States and Arizona Constitution, U S history, general psychology, science, and mathematics, which are required for state certification, may be included in the General Studies requirement.

Advisors in this curriculum have check sheets with recommended courses for each year of work. The check sheets include recommendations for electives. Students should consult advisors in this curriculum in order to insure the best possible program This is necessary for the following reasons: (1) An advisor signs the graduation checkout sheet for that student (2) Check sheets are revised each year on the basis of refinements which are incorporated into the program. (3) Check sheets offer excellent opportunity for the student to keep a record of his progress throughout the curriculum

Teaching Fields. Students in the secondary curriculum are required to complete a program of preparation in a major teaching field This program consists of 36 to 42 semester hours of course work determined by the academic department The fields of music, art, physical education, industrial education, and business, office and distributive education require special certification. In these fields the program may consist of more than 42 semester hours A minimum of 18 semester hours of work in the major teaching field should be at the upper division level. Courses approved by the advisor may be used to satisfy General Studies requirements as well as the requirements of a major teaching field. A composite social studies major consisting of 60 semester hours is available for those desiring broader preparation in social studies It consists of at least 30 hours of one social science or history,

p us 12 semester hours in each of two other re ated social sciences or psychology and 6 semester hours in another related fie d. In cer tain other related areas 't is possible to become prepared to teach in two fie ds through completion of a 60 semester hour pr ogram Information about the specific op t ons ava lable may be obtained t the Off ce of Student Services of the College of Educa tion or the college offering the program.

Opportunity s also available for st idents to complete a progr m of prep r tion in a min r teaching f e d consisting of 24 semester hours of course work determ ned by the cadem e dep rtment

In many instances emp oyment opportuni ties requ re teaching in more than one field It s strong y recommended that students add to their profess onal versatility by comp eting a program in e minor teaching fie d, a program n E le nentary Educat on leading to dua certi fic tion at both the elementary and second ry sch oo evels, or a progr m le ading to certi f- cation n Special Education Students shou d at east make a substantia beginning toward preparat on in a second teaching field The N rth Central Association requires that a teacher have preparation consisting of not less th n 24 sen ester l ours of cred t in s spec fic f eld ir order to teach in tl at field in an ac cred ted secondary school. Considerable atten t on should be given to the select on of teaching combinations. Information regarding th s m y be obt ined from the student's advi- sor, the Office of Student Services, or the Dep rtment of Second ry Educat on

Ma or and minor teaching f e ds under the secondary curriculum approved by the College of Education, leading to the degree of Bache or of Arts in Educ ation, are offered in the departments of the College of Liberal Arts, the Col ege of Business Administration, the College of Engineering and Applied Sciences and the College of Fine Arts Consult the appropriate departments for statements of these requirements.

Major Teaching Fields Available

Art	Geology
Biological Sciences	German
Business, Office and Distributive Education	Health Science
Chemistry	History
Chinese	Home Economics
Choral Music	Humanities
Communications	Industrial Arts
Communication Arts	Instrumental Music
Dance	Journalism
Economics	Mathematics
Engineering Sciences	Physical Education
English	Physics
French	Political Science
General Science	Russian
Geography	Social Studies
	Spanish
	Theatre

Minor Teaching Fields Available. In addition to minors in the above fields, the following minors are available:

Anthropology	Metals
Athletic Coaching	Photography
Drafting	Physical Science
Driver Training and Safety Education	Portuguese
Electronics	Psychology
Elementary Education	Reading
Graphic Arts	Sociology
Industrial Design	Special Education
Latin	Transportation and Power
Library Science	Woods

Other minors can be developed for individual students with the approval of the chair of the Secondary Education Department, the chair of the department in which the minor is developed, and the College of Education Standards Committee.

Professional Education Options Available

Option A:

Professional Education. In addition to the courses listed under other requirements, all students registered under this option of the secondary curriculum are required to take 25 semester hours of work in Education, plus two courses in the teaching of Reading. The following must be included. SED 310 (or EDF 200), EDP 310, Education Elective, SED 311, 411, Methods of Teaching in the Major Teaching Field, RDG 467, 480 and SED 433

Option B:

An on site program stressing the integration of the content of professional education and participation in schools is also available to students who wish to select it. A team approach to instruction, involving University faculty and public school personnel is used. Students interested in this option should obtain materials and information from the Secondary Education Department

Professional Education. In addition to the courses listed under other requirements, all students registered under this option of the secondary curriculum are required to take 25 semester hours of work in Education, plus two courses in the teaching of Reading. The following must be included: SED 400, 401, Methods of Teaching in the Major Teaching Field, RDG 467, 480, SED 433 and 434.

It should be emphasized that this program requires courses during specific semesters of the junior and senior years and that some of them must be taken concurrently. Students should apply to the Department of Secondary Education for Option B during the semester prior to enrollment in this sequence of courses.

Special Education Curriculum. This curriculum provides professional education courses and experiences designed to prepare students to teach mildly handicapped children and adolescents with learning and or behavior problems. This curriculum leads to a Bachelor of Arts in Education degree and to certification for teaching the mentally handicapped, emotionally handicapped, or learning disabled in grades K-12.

To enroll in Special Education, the student *must have reached junior status defined here as a minimum of 56 hours* and must have a cumulative grade point average of at least 2.25

Major The major in this field is Special Education

Supplementary Requirements All Special Education majors must complete 27-30 semester hours of supplementary course requirements Most of this course work is necessary for certification in the state of Arizona and provides a strong background in regular education.

Related Areas of Study. An additional 18 semester hours is required in related areas of study to give the students a breadth of preparation and experience beyond their major. Appropriate courses may be used to satisfy general education requirements as well as the requirements for the related area of study. However, such courses must be approved by the student's advisor.

General Pattern. A program of 126 approved semester hours is required. The credit hours are divided as follows:

	Semester Hours
Freshman English	3-6
General Studies*	39
Assessment Semester	3
Special Education	30
Supplementary Requirements	27
Related Areas of Study	18
Electives	3-6
Total	126

*United States and Arizona Constitution and U S History, which are requirements for state teacher certification, may be included in the General Studies field of behavioral and social sciences.

Advisors in this curriculum have check sheets with recommended and required courses for each year of work These check sheets contain appropriate patterns of course work for the area of exceptionality in which the student as a teacher will want to work. The check sheets also contain recommendations for electives It is necessary for students to consult advisors in this curriculum in order to ensure the best possible program of training This is particularly important inasmuch as the advisor must sign the check-out sheet for graduation which indicates that an approved program of course work has been developed

Recommended Minor in Special Education. Majors in Secondary Education, in consultation with their advisors, may select the following 24 semester hour minor in Special Education

Required. SPE 311

Additional semester hours recommended. SPE 312, 436, 461, 488; MCE 446

Electives. SPE 320, 321, 438, 462, 489, MCE 447, 448

This minor does not meet Arizona certification requirements for teaching in Special Education, and does not include provisions for student teaching in Special Education.

Recommended Concentration in Special Education. Majors in Elementary Education, in consultation with their advisors, may select the following concentration in Special Education which emphasizes mental retardation, emotional disturbance, or learning disabilities.

Required SPE 311, 401, 402, 403, 465 and MCE 446 plus SPE 312 and 321, or 436 and 438, or 461 and 462

This concentration meets basic Arizona certification requirements for teaching in the Special Education area emphasized.

Master's Degree Program for Teachers of Exceptional Children. Graduate students in Special Education may pursue masters' degrees with emphasis in the gifted, mildly handicapped, multi-cultural handicapped, and severely multiply handicapped. Students who plan to enrol in one of these programs should complete a major or minor in Special Education as part of their undergraduate programs

The graduate level programs of the Department of Special Education are currently under revision Persons interested in these programs should contact the department directly or consult the supplement to the *General* and *Graduate Catalogs*.

Selected Studies in Education Curriculum. This program is designed for undergraduate students who are interested in the field of education but do not intend to become public school teachers Students may wish to prepare for a variety of positions outside as well as inside educational institutions. These may be with government agencies, religious organizations, foundations, business and industry, or in private, early childhood, or higher education, and even in public elementary or secondary schools, although not usually in a formal classroom setting.

The program offers the opportunity for such students to develop individualized curriculum plans tailored to their particular needs and interests. It provides an alternative to the regular program of the College of Education Any undergraduate student in the College of Education may present a Selected Studies in Education plan. The plan must be developed

in close consultation with a faculty advisor in the College of Education and must have the endorsement of the Undergraduate Standards Committee of the College To be approved, a Selected Studies in Education plan must demonstrate that it is significantly different from established programs at the University in both intent and content.

Interested students should obtain application forms and other pertinent materials from the Office of Student Services, ED B-2 (Payne Hall).

Special Programs of Teacher Preparation. Several areas of concentration are available on the undergraduate level in connection with any of the undergraduate curricula. These are available as a sequence of courses to be taken in addition to the regular requirements of the undergraduate curriculum.

Library Science. Students desiring endorsement as a school librarian (K 12) must complete the requirements for teacher certification and a program approved by the Department of Educational Technology and Library Science Undergraduates will complete the library science minor which consists of 24 semester hours, including 15 hours of prescribed library science courses, an approved elective in Library Science or Instructional Media, and 6 hours of student teaching in the school library. Students may also select library science as a field of specialization at the graduate level.

Teaching American Indian Children. Students pursuing a major teaching field in elementary education may, with the approval of their advisor, elect to take a special sequence preparatory to the teaching of American Indian children. This is appropriate for those who will have only a few Indian children in a classroom, or for those who will have a classroom composed only of Indian children. Such students shall be required to complete satisfactorily the basic elementary program.

Students pursuing a major teaching field in secondary education may also take this special training for teaching American Indian children. Such students shall be required to complete satisfactorily the basic secondary major.

Students interested in pursuing an Indian Education concentration in conjunction with their elementary or secondary education program should confer with faculty from the Center for Indian Education and faculty from their department. Indian Education, Elementary, and Secondary Education faculty have curriculum check sheets which will assist the students to plan their program in Indian Education. This concentration is normally a 27 semester hour sequence.

Center for Multicultural Education

The Center is in the process of developing, in cooperation with departments, a variety of concentrations that will enable prospective and practicing teachers to preserve the integrity of the American cultures within a framework of diversity. The Center's first goal is to legitimize history and contributions of American ethnic groups to American society Its second goal is to provide cooperative and effective experiences to help educators become sensitive to cultural differences and educational barriers. Its third goal is to develop effective methods and techniques of multicultural and bilingual education.

The Center aims, therefore, to provide experiences that enable prospective and practicing teachers to

1. Gain an understanding of the value and significance of multicultural education in American society.
2. Gain greater appreciation of the contributions ethnic groups have made to American society.
3. Develop the ability to analyze historical and societal factors that have affected the education of ethnic groups.
4. Understand the educational problems that concern ethnic groups
5 Better understand how to relate effectively with children from different cultural and language backgrounds.
6 Develop practical knowledge and skills that will help them in teaching culturally and linguistically different children.

The Center develops and coordinates academic offerings in the following areas: (1) undergraduate studies for prospective teachers; (2) graduate studies for students seeking advanced degrees; and (3) in service education studies for practicing teachers

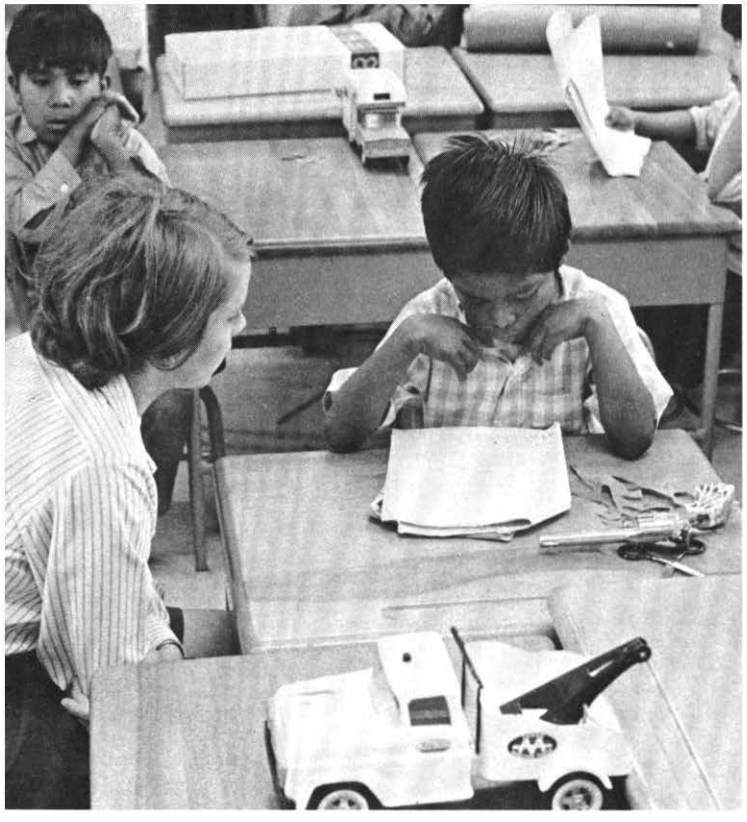
The content of the academic offerings is comprised of Multicultural Education, Indian Education and Bilingual Education

Undergraduate Studies for Prospective Teachers

One credit modules and three credit courses are offered by all departments in the College of Education The studies are designed to develop understanding of the educational problems and issues related to cultural pluralism in American society. They are primarily directed toward advanced pre service teachers However, they may also be taken for credit by graduate students and in-service teachers who wish to develop their knowledge and skills for working with children from diverse cultural backgrounds.

These studies, grouped by disciplinary topical orientation, are:

Philosophical Issues. Social and Philosophical Meanings of Cultural Pluralism.



Historical Perspectives. Interdisciplinary Perspectives on the Mexican American; The American Indian and Education.

General and Cross-Cultural Foundations. Culture, Ethnocentrism and Education; Language and Culture; Bilingual Education in a Cross-Cultural Perspective.

Cultural Studies. The Mexican American Child; Culture and Value Concepts of American Indians; Public Education and the Mexican American in the Southwest; Indian Education; Problems of Teachers of Indian Students.

Psychological Foundations. Human Relations Skills in Multicultural Education; Psychological Issues in Multicultural Education; The School Psychologist and the Bilingual Child; Guidance for the Indian Student.

Social Foundations. Teaching the Culturally Diverse Child; Alienation and Education; The Courts, Cultural Pluralism and Education; Educational Practices and Minorities; Parent Involvement in Bilingual/Multicultural Education; Minority Women; Educational Applications in Anthropology (Indian Education).

Curriculum, Materials, and Methods. Analysis of Textbooks and Materials for Multicultural Education; Children's and Adolescents' Literature for Mexican American Studies; Theory and Research in Bilingual Education; Introduction to Bilingual Education; Reading—Teaching Bilinguals; Content Areas - Teaching Bilinguals; Communication Arts - Teaching Bilinguals; Linguistics for the Classroom Teacher; Library Services and Materials for Minority Children and Adolescents; Methods of Teaching Indian Children; Curriculum and Practices for Indian Education. Education and Evaluation of Bilingual/Multicultural Handicapped Children; Methods of Teaching Bilingual/Multicultural Handicapped Children.

Observation and Practicum. Observation and Participation in Multicultural School and Community Settings; Student Teaching in Bilingual-Multicultural School Settings; Directed Studies in Bilingual Education.

Students may enroll in as many courses as they wish and apply credit earned as electives to their respective departmental specializations.

Students seeking the State of Arizona Department of Education *Bilingual Endorsement Certificate* must obtain a teaching certificate and complete 15 semester hours in:

1. Cultural Studies; 2. Methodology; and attain proficiency in 3. Language.
(a) Proficiency in the second language must be verified by the foreign language department of a regionally or nationally accredited institution. (b) Proficiency in English as a second language must be verified by the language department of a regionally or nationally accredited institution.

Elementary Education

PROFESSORS
BITTER, DOYLE, MALONE, MANNING, MOYER, O'BEIRNE, PODLICH, RALSTON, RAY, SILVAROLI, STROM, WALLEN, YAMAMOTO

ASSOCIATE PROFESSORS
SCHALL (ED B-225), ANDERSON, CHRISTINE, ENGELHARDT, GREATHOUSE, HARDT, JACOBS, KAMINS, KNAUPP, STALEY

ASSISTANT PROFESSORS
COHEN, EDELSKY, EEDS-KNIEP, HUDELSON, KNIEP, PETERSON, SEARFOSS, STEERE, WALKER

LECTURER
INGRAHAM

ELEMENTARY EDUCATION

EED 311 Social Studies in Early Childhood Education.* (3) F, S, SS
Development of democratic living in all areas of the curriculum. Objectives, unit planning, problem solving, selection of content, scope and sequence, construction of instructional material and resources. Experiences with children.

312 Nursery-Kindergarten Education.* (3) F, S, SS
Considers all aspects of curriculum. Philosophy, principles, practices, problems and evaluation in the integrated experience program.

313 Child Development.* (3) F, S, SS
Principles underlying the total development of the child during the pre-school and elementary school years with observations in a variety of settings. Enhancement and understanding of the child in the physical, intellectual, social, and emotional areas of development. Discussion sessions may be scheduled.

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 program and materials and evaluating children's learning. Prerequisite: PSE 220 and 221 or equivalents.

322 Communication Arts in Early Childhood Education.* (3) F S, SS
Factors affect ng language deve opment. Sett ng cond t ons for learn ng in istening speaking read ng and wr ting Prof c ency in handwr ting and spe ing requ red. Prerequ s te ENG 213 or equiva ent

333 Communication Arts in the Elementary School.* 3) F, S SS
Factors affect ng anguage growth Setting cond tions for earn ng to teach sten ng speak ng and wr t ng sk l s Emphas s on m ddle and upper grades. Profi c ency in handwr't ng and spel ng requ red. Prerequ site· ENG 213 or equ va ent

344 Elementary Curriculum.* 3 F, S, SS
Program of the emerg g e ementary schoo . Pr nc p es pract ces and prob ems. nterre at onsh ps and syn thes s

355 Social Studies in the Elementary School.* (3) F, S, SS
The core funct on of soc a stud es scope and se quence un t organ zat n methods of nstruction mater a s and resources for earn g

366 Observation and Participation. (3) F, S, SS
Students observe and work d rect y w th eleme tary ch dren n a c assr om s tuation nc udes a cr t ca eva uat on of the student exper ences. Y grade on y

380 The Teaching of Mathematics in the Elementary School.* 3) F, S SS
A beg nning cou se 'n methods and materia s used Laboratory exper ences with curr cu um mater a s. Pre requ s te. MAT 180, ts equivalent r successfu comp et on of a mathemat cs prof ciency exam nat on

411 Early Childhood Education.* (3 F, S, SS, Moyer Staff
Pr ip es exper ments research stud es and recent trends as factors related to the educat on of ch ldren through seven years of age Prerequ site. EED 312

434 Creative Communication in the Elementary School. (3 S Scha
Cons ders creativ ty n c mmun cat on at kindergarten through the eighth grade leve s, def n ng the creative process and exp or ng programs Speak ng and wr t ng experiences des gned to deve op prof'c ency n creat ve commun cation Prerequ s tes EED 322 or 333 or ap prova of nstructor.

478 Student Teaching in the Elementary School 3-15 F, S, SS Staff
Re at onsh p of theory and methods of teach ng the pract ce of teach ng pract ce n guidance, measu ement of extra curr cu ar act v ties and c assroom manage ment procedures Prerequ s te: 27 semester hours of the core n major f e d and adm ttance to e ementary teacher education curricu um.

Option A. Student teaches in one school at a chosen grade eve Y grade only

Option B Mu t p e Opportun t es in Student Teach ng Program Student teaches n two schools of d ffer ng cu tural ethn c and soc o economic character stics Exper ence is p anned at two d fferent grade eve s Y grade on y

511 Elementary Curriculum Development. 3) F, S, SS Mann ng Ma one O Beirne
Approaches to curr cu um change ana ys s of typ ca curricu um prob ems strateg es and procedures n m- prov ng current programs Prerequ site EED 344 or eq va ent

513 Child Development. (3 F S, SS Doyle Great house Strom Yamamoto
Cont nuing ana ys s of p nc p es theor es and research concern ng the e ementary sch ol ch d and his devel opment An ntegrated approach to the study and fac itat on of who esome educat onal and psycho og ca deve opment

522 Developmental Social Experiences in Early Childhood Education. 3) NR Moyer
Mate a s techn ques, esthet c express on, creat ve ac t v t es and va ues n the ntegrated curr cu um Prerequ s te EED 311 or equ vale t

525 Communication Arts in Early Childhood Education. 3) S Ede sky, Scha
Pr b ems and trends of current programs and ora an- guage devel pment. Effort to br ng together anguage acqu s t on find ngs w th educat ona pract ces Oppor- tun ty for self d rected ear ng study Prerequ s te EED 322 or equ va ent.

526 Communication Arts in the Elementary School. 3) F S; Peterson Scha
A cr t cal exam nat on of anguage arts curricu um and teach ng pract ces n the e ementary schoo with a sur vey of approaches to teach ng var ous forms of wr tten compos ti n ora expression, and stening Opportun t es for self d rected study.

527 Mathematics in Early Childhood Education. (3 F Knaupp
Theory and pract ce in the use of man pu at ve mater a s for teach ng mathemat cs to preschoo and pr mary grade ch dren Prerequ s te EED 380 or equ va ent.

528 Social Studies in the Elementary School. (3 F Kn ep Pod ch
Problems and trends of current prog ams Deve opment of a ba anced and articulated program of socia studies Prerequ s te EED 355 or equ valent

529 Science in the Elementary School. (3) F, S; Staley, Staff
Prob ems and trends of current programs Deve opment of a balanced and articulated sc ence program Prereq u s te: EED 320 or equ valent.

530 Outdoor Education. (3 S SS; Sta ey Staff
Use of var ous outdoor sett ngs as aborator es for classroom re ated experience, study, observation inqu - ry, research and recreat on.

537 Mathematics in the Elementary School. (3 F S, SS, Bitter Kamins Knaupp
Contemporary mathemat cs programs used n e emen tary schoo s Content, mater als, and approaches to nstruct on Prerequ s te EED 380 or equiva ent

544 Play Education. 3 F, S, Strom
Conf cting theor es of p ay and the educat ona imp ica- t ons of each n a curr cu um A pract ca app cat on in the lower levels of the elementary school

555 Modern Practices in Early Childhood Education. 3) F, S, Moyer
Trends and pract ces nstruct ona and resource ma ter a s methods and techn ques n ear y ch dhood educat on Prerequis tes EED 312 r equiva ent

581 Diagnosis and Remediation in Mathematics. (3 F S SS; Enge hardt
Spec f c sk ls n d agnos ng treat ng ch dren s earn ng diff cu t es in mathematics Inc udes pract cum exper ences n test adm n strat on and treat ng spec fic diff cu t es

585 Contemporary Issues in Elementary Education. 3 S, SS Mann ng
Des gned to deve op understanding of a broad range of contemporary human st c ssues and to ass st st dents in estab sh ng an nformed, profess ona v ew. Prerequ s te. EED 511 or equ va ent

Special Courses: EED 294 298 492 493 494 497, 498 499 580 583 584 590 591, 592 593, 594 598 599 680 683 684 690, 691, 692 693 700, 780 783 784 790 791 792 799

READING EDUCATION

RDG 314 The Teaching of Reading.* 3 F S, SS
For e ementary teachers- n tra n g a med at mprov ng c assroom read'ng pr grams and pract ces Required course prov des bas c teacher sk , eva uat on c a s room environments and reading methods Discuss on sessions may be scheduled Prerequ s te ENG 213 or equiva ent

*Laboratory and off-campus experiences may be included n courses marked w th an asterisk

315 Decoding in Reading.* (3) F, S, SS
A comparative ana ysis of phonet c and l nguist c inter-pretat ons of the sounds and structures of Eng sh. Requ red course emphas zes how sounds (grapheme phoneme correspondences) are re ated to the decod ng process D scuss on sess ons may be schedu ed Pre requ site RDG 314

456 Diagnosis of Reading Problems. (3) F S Thomas
Acqua nts the teacher n tra n ng w th diagnost c proce dures in reading C n c methods and materia s wi be presented w th mod f'cat ons for ch dren w th learn'ng d sab l t es Prerequ tes: RDG 314 and 315

467 Reading in the Content Areas: Secondary. (2 F, S, SS; P ercey, Staff
ntroduces read'ng procedures n subject matter f e ds Emphasis content read ng princ p es and methodology nc ud ng decod ng Requ red for Secondary Educat on ma ors To be taken concurrent y w th Secondary Read ng Pract cum RDG 480) and e ther SED 310 or 400 or Student Teach ng SED 433

480 Practicum: Secondary Reading. (1) F, S, Thomas
Prov des for pract ca appl cation of content reading principles in an on s te secondary schoo setting Re quired for Secondary Educat on majors. To be taken concurrently w th RDG 467 dur ng the student s profes s ona f e d exper ence semester see RDG 467)

481 Practicum: Elementary Reading.* (3 F S Ander son
Teachers n tra ning work d rectly w th students who are d sab ed n read ng Techniques emp oyed n treat ng d sab l t es Requ red for Elementary Education majors Prerequisite. RDG 314.

505 Developmental Reading. 3) F S SS Anderson, S varo
For c assroom and spec a read ng teachers Specif c profess ona sk ls n decod ng comprehens on and eva uat on Recommended for spec a reading endorse ment stamp. Prerequisite. Teach ng cert ficate

507 Reading in the Secondary School. 3) F S SS Thomas Edwards
Acqua nts c assroom teachers w th techn ques for eff c ent read ng, vocabu ary deve opment and readab ty procedures. Prerequ s te Teach ng ce tif cate

533 Reading-Teaching Bilingual Students.* (3 S F, SS Hude son Staff
Acquaints teachers with theory and pract ce in second language acqu s t on and with strateg es for develop ng word recogn t on and comprehension n nat ve language and second language read ng (Span sh Engl sh empha sis).

544 Resource Specialist and the Content Area Teacher. (3) S; P ercey
For read ng consu tants teachers and majors nterested n the role of reading teacher as a resource person to content area teachers Prerequ s tes. RDG 507, 556 and 550 or 557

550 Directed Experiences in Reading. (3) F, S SS Staff
Practicum experience ut l zing diagnost c and nstruc t on techn ques of the c assroom for correct ve read ng remed at on. Part cipants tutor ass gned students twice a week Prerequ s te RDG 505 or instruct r s approva Laboratory sect ons

556 Diagnostic and Treatment Procedures in Reading. (3) F S SS, Jacobs, Staff
Basic and spec a ized d agnostic and nstruct on tech niques for corrective and c in ca reading remed at on Recommended for spec a read ng endorsement stamp. Prerequ s te RDG 505.

557 Reading Clinic Experience. (3) F, S; Staff
Practicum exper ence ut z ng spec al zed d agn st c and nstruction techniques for c in cal read ng remedia-t on Part c pants tutor ass gned students tw ce a week Recommended for spec al reading endorsement stamp. Prerequ s te RDG 556 or approva of instructor Labo ratory sect ons

580 Practicum: Supervision of Reading Instruction. 3) F Jacobs
Practicum exper ence observ ng and supervis ng read ng nstruct on Part cipants superv se exper enced teachers who are tutor ng students w th correct ve read-ing prob ems Recommended for spec a reading endorsement stamp. Prerequisite RDG 557 or nstruc tor s approva

581 Individualizing Reading Instruction. (3) F, S, SS; Eeds-Kn ep
Acquaints exper enced teachers with indiv dual zed read ng programs Lectures visua a ds and demonstra t ons shou d enab e experienced teachers to concep tua ze the rat onale and pract ce of these programs

630 Research in Reading. 3 F, Searfoss
For advanced graduate students nterested n app ied research problems l terature of read ng nstruction and major ssues re ated to reading research Approva of instructor required

Special Courses: RDG 294, 298 492, 493, 494 497, 498 499, 580, 583 584, 590, 591 592, 593, 594 598, 599 680 683, 684 690, 691, 692 693 700 780 783, 784 790 791 792 799

Secondary Education

Including Safety Education, Educational Foundations and Social and Philosophical Foundations

PROFESSORS:
JOHN E BELL (ED 409), ARMSTRONG BAUMANN JAMES W. BELL, BELOK, COOK, EDWARDS, FRAS ER FULLERTON, GR FFITH, HAGGERSON, HOOVER, KIESOW, McGRATH M TCHELL, MOULTON, PIERCEY, ROVER, SHAFER, SVOBODA

ASSOCIATE PROFESSORS:
APPLETON BROOK CHASEY CUMMINGS, METHA, WAMACKS, WURSTER

ASSISTANT PROFESSORS:
MANERA, B PARRISH, W. PARRISH, THOMAS STAHL

SECONDARY EDUCATION

SED 310 The Secondary School. (3 F S SS
Devel pment of secondary educati n n Amer ca; ob servat on and work with secondary schoo pup s may be requ red. Spec a d scuss on sess ons may be sched u ed Prerequ s te Adm ss on to a Secondary Teacher Educat on program.

311 Principles and Curricula of Secondary Schools. 3) F S SS
Pr nc p es, purposes organ zation and curr cula of sec ondary schoo s. Prerequisite. EDP 310 and SED 310

400 (On-Site Program) Observation and Participation. (7) F S
Observat on and work w th secondary schoo pup s n c assroom s tuat ons, part cipation n week y sem nars Prerequisites. Adm ssion to Secondary Teacher Educa tion and on site programs Y grade on y

401 (On-Site Program) Methods, Curricula and Prob-lems in Secondary Education. (7 F S
Methods of teach ng and eva at ng pr nciples and cur r cu a spec a problems n secondary education Prerequ s te SED 400

411 Teaching and Evaluating in Secondary Schools. (3-4) F, S, SS
Procedures methods techn ques and nstruments of

teach ng and evaluating n secondary schoo s Prerequ site SED 311

433 Student Teaching in the Secondary Schools. 3 12 F S, SS
The pract ce of teach ng The re at onsh p of theory and pract ce n teach ng Prerequ s tes SED 411 and Spe c al Methods or SED 401 and Spec a Methods (Concurrent e ro ment n SED 434 requ red for stu dents n On-S te Program Y grade on y

434 (On-Site Program) Seminar. 2 F S SS
Ana ys s and synthes s of on s te exper ences w th pro fess ona education team members. Prerequ s tes· SED 401 and concurrent enro ment n SED 433. Y grade on y.

444 The Junior High School. (3 NR
Purpo es organ zat on curr cu a and students of the junior h gh schoo . May be taken n eu of SED 311 by th se prepar ng for junior h gh teach ng Prerequ s tes EDP 310 and SED 310

480 Special Methods of Teaching Social Studies. (3 F, S
terd sc p nary approaches product on and co tect on of materia Prerequisite. SED 311.

522 Secondary School Curriculum Development. (3 F, S, SS
Soc a processes, ssues pr ncip es, patterns and pro cedures n cu r cu um deve opment Prerequ s te· SED 433

533 Improving Instruction in Secondary Schools. 3) F, S, SS
Ana yses f procedures, n ethods techn ques and ex per ments n teach ng n secondary schoo s Pre equ s te. SED 433.

555 Student Activities in Secondary Schools. 3) NR
Deve opment, purposes and pr nc p es of student act v t es n secondary sch ols Prerequ s te. SED 433

566 Evaluating Secondary School Programs. 3 NR
Deve opment of eva uat ve cr ter a for secondary schoo programs Prerequ s te SED 433

577 Issues and Trends in Secondary Education. 3 F SS
Ana yses of ay and professiona reports; prob ems and issues n Amer can se ondary educat on Prerequ s te SED 433

588 Human Relations in the Secondary Schools. (3 S, SS
Prob ems n human re at ons nherent n the nteract on of pup s, teachers admin strators non profess ona staff and aymen Prerequ's'te· SED 433

711 Secondary Curriculum Development. 3 S, SS
Theor es and processes of deve op ng curr culum eva uation of research Prerequisites SED 433, 522 or equ va ent

722 Improvement of Instruction in the Secondary School. 3) F SS
Eva uat on of the research ssues and theor es re ated to the mprovement of nstruct on Prerequisites SED 433 533

Special Courses: SED 294, 298 492, 493 494 497 498, 499 580, 583 584 590, 591 592 593, 594 598, 599, 680 683 684, 690 691, 692 693, 780 783 784 790 791, 792 799.

SAFETY EDUCATION

SAE 466 Safety Education. 3 F S SS
Safety educat on in h me school and p ace of emp oy ment.

477 Driver and Traffic Safety Education, I. (3) F, SS
Preparat' n for teach ng the c assroom phase of dr ver educat on n the secondary school. Prerequ s tes. Val d operator's license and SAE 466 COE on y

478 Driver and Traffic Safety Education, II. 3) S SS
Preparat on for teach ng beh nd the whee phase of dr ver educat on. S mu ation nc uded Prerequ s te. Va d operator s cense and SAE 477. COE on y.

487 Organization and Administration of Driver and Safety Education Programs. 3 A
Curr cu um, organ zat on, and adm nistrat on of pro grams n safety educat on W nc ude field tr ps to v s t nearby programs Pre equ s te SAE 477

488 Transportation Safety Systems and Programs. 3) NR
Systems prob ems, ssues, and trends of transportat on systems. Prerequ s te. SAE 466

Special Courses: SAE 492, 493 494, 497 498, 499 580 583 584 590 591, 592 593, 594 598, 599

EDUCATIONAL FOUNDATIONS

EDF 111 Exploration of Education. (3 F, S
Educat on as an nstrument n the deve opment of the ndiv dua and soc ety its sign ficance as an Amer can nst tut on

200 Self-Assessment for Teaching. 1 6) F S
Instruct ona and f e d experiences to he p students de term ne whether or not they want to become teachers

333 Basic Issues in Education. (3 F, S
Imp rtant contemporary soc o ph osoph cal ssues educators face analys s and prob em so v ng

422 Group Dynamics and Education. 3 F S
Theory and use of group processes to fac tate human interact on and earning.

445 Education for Survival. (3) A
Causes extent, and seriousness of env ronmental deg radat on Po lution resource dep et on energy, overpopulation, conservation

500 Educational Research. (3) F S SS
Introductory course n the analys s product on, and use of educat ona research in the f e d

Special Courses: EDF 294, 298 492 493 494, 497 498, 499 580, 583, 584, 590 591, 592 593, 594 598, 599, 600 680, 683 684, 690 691, 692 693, 780 783, 784, 790 791, 792 799

MULTICULTURAL EDUCATION

See offer ngs under MCE isting on pages 161 MCE EED) and 168 MCE, SPE and Educat onal Foundat ons SED)

SOCIAL AND PHILOSOPHICAL FOUNDATIONS

SPF 411 History of American Education. (3) F
Soc a conditions deas and nst tut ons wh ch formed Amer can education

422 Educational Sociology. (3 S
Schoo s as agents of soc a zat on and as soc al sys tems.

511 School and Society. 3 F, S SS
Interre at onsh p of school and soc ety and the ro e of educat n n soc al change.

515 Education of Women. 3) F, S
Ana ys s of ro es and status of women educat ona pract ces and a ternat ves

520 Cultural Pluralism and Education. (3) NR
Ph osoph c ana ysis of the concept of cu tura p ural sm and its soc a mp cat ons for Amer can educat on

533 Comparative Education in the Western World. 3 F
Educat ona pract ces and trad t ons n the ead ng na t ons of Europe and the Sov et Un on

534 Education and Change: Developing Nations. (3 S
Educat on as econom c and socio po t'ca change agent in Afr ca As a, the M dd e East and Latin Amer ica

544 Philosophical Foundations of Education. 3) F S, SS
Theories of education n ancient med eva , and modern classical and contemporary ph losoph es

555 Educational Classics. 3) NR
n-depth study of se ected educat ona c ass cs

566 History of Education. (3) F S SS
Development of educational nst tut ons and deas n the Western Wor d from ancient t mes to the 20th century.

711 Social and Historical Foundations of Education. (3) S SS

Problems of Amer can educat on and the r soc o h storical context

Special Courses: SPF 298, 492, 493, 494, 497, 498 499, 580 583, 584, 590 591, 592 593, 594 598 599 680, 683 684 690, 691 692, 693 780, 783 784 790, 791, 792 799

Counselor Education

The doctoral programs of the Department of Counselor Education are approved in counseling psychology by the American Psychological Association.

PROFESSORS:
SNYDER (ED B 401A), BLACKHAM, BLAESSER, CAB ANCA DAANE, GUINOUARD, HAMM HEIMANN, McWH RTER, NOBLE

ASSOCIATE PROFESSORS:
CHRIST ANSEN, CHURCHILL, CUMM NGS GROSS, MAZEN M LLER R PLEY, SHELL

ASSISTANT PROFESSOR:
ROBINSON

CED 512 Introduction to the Helping Relationship. (3 F, S SS
ntroduction to the sk l s used in the help ng profess o ns and an examination of the sett ngs n wh ch they occur

522 Personality Development. 3) F, S, SS
nteract on of affective and cognit ve factors n person al ty deve opment at different age eve s. Var ous persona ty theor es examined

523 Psychological Tests. 3) F S, SS
Standard zed tests n the study of the ndiv dua w th emphasis on test score nterpretat on n counse ng.

534 Occupations and Careers. (3) F, S, SS
The wor d of work, career deve opment educat on and tra n ng for occupat ona entry and mob ty

545 Analysis of the Individual. (3) F S SS
Theory and methods commonly used n study ng the nd vidua Observat ona methods d agnostic nter- v ews, structured and sem -structured methods for assess ng persona ity. Prerequisite or corequ s te. CED 522.

567 Group Procedures. (3 F S SS
Factors determ n ng nteract on effect veness and mor a e n sma groups Techniques of observation assessment and eadersh p.

577 Counseling. (3) F S SS
Princ p es and app cation of counsel ng with part cu ar emphas s on counse ing theor es Prerequ s tes. CED 512, 523, 534 545, 567 and admiss on to M.C. or CED doctora degree program.

612, 613 Child Counseling. (3 3 S
App ications of counsel ng theory n work ng w th chi d ren n cl n cs and elementary schools Pract cum ntegrated with d dactic nstruct on Prerequ s te or co requ s te CED 680 and approval of nstructor.

622 Group Counseling. 3) F, S, SS
Theor es and methodo ogies used in group counse ing Prerequ site· CED 577

634 Organizational Development and Planned Change. (3) F S
Organizat onal nd v dua dynam cs theory ana ysis techniques and consu tation ntervention strateg es used in organ zat onal deve opment Field consultat on projects. Prerequ s te. CED 567 and 577

644 Psychology of Careers. (3) F, S
Structural and deve opmenta theor es of occupat onal cho ce The role of counse ng n the development of a career. Prerequ s te or corequ s te CED 577

655 Student Development Programs in Higher Education. (3 F
Emerg ng conceptua mode s of student deve opment Overv ew of student personnel and student affa rs pro- grams in commun ty co eges four year col eges and un vers t es Observat on on campuses

656 The American College Student. (3) S
Needs and character st cs of post secondary students and the nature of student deve opment nteract on of students w th the educat ona env ronment, student cu tures and student nf uence on instructiona pract ces and outcomes

666 Comparative Theories of Personality. 3) F
Comparative ana ys s of persona ity theor es n re ation to counse ing pract ces Prerequ s tes: CED 522 577.

667 Patterns of Behavior Disorders. (3) F, S
Persona ty and/or emot ona d sturbances in ado es cents and adu ts Etiology and dynam cs of pr mary behavior disorders neurot c cop ng styles, persona ty d sorders and var ous types of affect ve disorders Pre requ s te CED 577.

670 Behavioral Counseling. 3) S
Theory, procedures and appl cat ons of behavior modif cation and therapy in work ng w th chi dren parents and adu t cl ents n schoo cl n c and nstitut ona set- t ngs D dact c nstruction, ana ysis of nd vidua and group problems and d rected exper ences Prerequ - sites. CED 680 and approva of nstructor.

672 Marriage and Family Counseling I. (3 F S
Theoretica positions and therapeut c approaches to marr'age and fam ly counsel ng Emphas s on systems communication model ut l z ng co counse ng Practi cum required and ntegrated with d dact c instruct on Prerequ s tes. CED 567 or 622 and 680 with approva of nstructor.

673 Marriage and Family Counseling II. (3 S
Advanced analys s and app cat on of systems commu n cation counsel ng Focus on mar ta and sexua counsel ng Practicum recommended Prerequ s tes CED 672 and approva of nstructor.

677 Advanced Counseling. (3) S
Counse ng systems and theories and the r pract cal app ication in case management, comparat ve case ana ys s Prerequisite CED 577

681 Supervised Practice. (3) F, S
Superv sed exper ences n schoo s or community agen c es Prerequ s tes CED 680 and approva of nstructor

Special Courses: CED 494, 498 499, 500 580, 583, 584, 590 591 592 593, 594 598, 599 600 680, 683 684, 690 691 692 693 700 780, 783 784 790, 791 792 799

Educational Administration and Supervision

(Member, University Council for Educational Administration)

PROFESSORS:
NORTON (ED 107A), DEEVER, HUNNICUTT, METOS, STOUT, WOOTTON

ASSOCIATE PROFESSORS:
FARRAR, LEVAN, WEBB

ASSISTANT PROFESSORS:
DRAKE, MILLER, WALKER

RESEARCH ASSOCIATE:
PADDOCK

EDUCATIONAL ADMINISTRATION

EDA 411 The Teacher and the Administration of Schools. (3) NR

Introduction to educational administration for teachers. Considers legal organizational bases of schools. Teachers' roles in school administration included.

511 School Law. (3) F, S, SS
Constitutional, statutory and case law that relates to all school personnel, pupils, the school district and other governmental units. Contracts, dismissals, tenure, retirement, pupil injuries, liability of personnel and district, school district boundary changes, bonding.

524 Theory and Application of Educational Administration. (3) F, S, 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 Educational Administration. (6) F, S, SS
Interrelations between problems of educational administration and interdisciplinary social sciences. Communications skills, morale, authority and perception through the case approach. Education's relationship to the economy, futurist sociology, comparative and changing value systems. Activities include computer simulation laboratory and off-campus exercise.

526 Instructional Supervision. (3) F, S, SS
Administering curriculum improvement, in-service education, evaluating and improving teaching competence; principal's instructional responsibilities.

527 Managerial Functions in School Administration. (3) S, SS
Relates to the work of the central district office staff and the school principal. Use of human resources, property management, and organization and management of time.

538 Administration of the Community School. (3) F, S, SS
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, S, SS
School budget procedures, accounting, revenues, state and county finance and problems relating to financing public education.

548 Community Relations in Education. (3) F, S, SS
Administrative factors of primary importance in developing community involvement in public schools. Emphasis on theory and skill of school system and individual communication.

549 Programming and Financing Community Education. (3) S, SS
In-depth investigation of component programs effective as a vehicle for community education in area schools; plans which help schools change; models for funding community education. Prerequisite: EDA 538 or approval of instructor.

555 Educational Facility Planning. (3) F, SS
School building needs, educational planning for facilities, responsibilities of architects, duties of contractors, equipping and furnishing of school buildings.

568 Role and Responsibility of Supervising Teacher. (3) NR
Experiences and content for those planning to become supervisors of student teaching in teacher-education programs. In-service training for those in student teaching.

571 School Business Management. (3) F, SS
Purchasing, budgeting, accounting, payroll management, auditing, financial reporting, insurance and administration of nonteaching personnel and services.

573 School Personnel Administration. (3) F, S, SS
Organization for personnel services; development of policy to govern selection, orientation, placement, remuneration, transfers, separations, and development of morale among instructional and noninstructional personnel.

576 The School Principalship. (3) F, S, SS
Problem and laboratory approaches used to provide application of administrative activities of elementary and secondary schools.

634 Instructional Leadership. (3) S, SS
Curricular practices and processes used by instructional leaders who plan, organize and coordinate the professional activities in elementary and secondary schools. Prerequisite: EDA 526.

658 Problems and Issues in Administering Community Education. (3) F
Provides community educators with an understanding and skill in school law, plant management, personnel administration, business practice, school legislation, community education history, research and utilization of local resources. Prerequisites: EDA 548 and 549.

673 School Personnel Administration: Issues and Problems. (3) NR
Conceptual framework for school personnel administration, role relationships of the school personnel administrator, staff participation in policy making, allocating human resources in the school system. Prerequisite: EDA 573 or approval of the instructor.

675 Federal, State and County Education Programs. (3) NR



Function and responsibilities of school administrators relating to federal financial aid to schools, and of state departments of education and county or other intermediate districts in educational programs.

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: approval of instructor.

679 Administration of Special Programs in Education. (3) NR
For personnel administering special educational services; responsibilities of superintendents, principals, supervisors, and directors for special education, student personnel, audiovisual, library science and others.

711 Administrative Leadership. (3) F '79, SS '80
Emphasis on research in leadership; application of research findings to administrative and supervisory functions in educational endeavors. Prerequisites: 30 semester hours in Educational Administration; admission to doctorate.

722 Administration of Instructional Improvement. (3) F '79, SS '79, S '80
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 doctorate.

733 Administrative Management. (3) S, SS '79
Recent research relating to school management. School finance, law, buildings, transportation, food services and supply management. Prerequisites: 30 semester hours in Educational Administration; admission to doctorate.

Special Courses. EDA 494, 498 499 580, 583 584, 590 591 592, 593, 594, 598, 599, 680, 683 684, 690 691 692 693, 700 780, 783, 784, 790, 791 792, 799 (See pages 30 31)

NOTE: *A laboratory is maintained in the Southwest Regional Center for Community Education Development covering materials and practices in the field of Community Education The use of the laboratory may be scheduled with the secretary in Room 108 Farmer Education Building*

Higher and Adult Education

PROFESSORS:
RICHARDSON (ED105F) FENSKE
ASSOCIATE PROFESSORS:
AXFORD, BOGART, ROSSMAN
ASSISTANT PROFESSOR:
OKUN

HIGHER EDUCATION

HED 522 Introduction to Higher Education. (3) F, S, Fenske
ntroduct on and or entat on to the broad field of h gher educat on

533 The Community-Junior College. 3) F S, SS B gart
H story, funct ons, organ zat o and current ssues Meets A zona commun ty co ege course requirement for certif cat on

611 Curriculum and Methods of Instruction in Post Secondary Education. (3) F, SS· Bogart
Curr cu um deve opment nstruct onal organ zation and improvement f nstruct on n two and four year co eges Micro teaching. Prerequisite HED 522 or 533 or approval of nstructor

644 Financing Higher Education. (3 S R chardson
Publ c and private funding of post secondary educat on ssues re ated to cost benef t tu t on and student f nanc a d nst tut ona p ann ng budgeting and f nanc a management. Prerequ s te HED 522, 533 or approva of instructor.

689 Administration of Higher Education. 3 F R chardson
Theory and practice n co lege governance inc ud ng decis on mak ng communicat on and nst tut ona re search Prerequ s te HED 522 533 or approva of instructor

Special Graduate Courses: HED 580 591, 683 684, 690 692, 693 784, 790 791 792, 799

Note: *Seminars covering such topics as current issues higher education and the law institutional advancement and support 'nst tutional research, and collective bar ga ning are offered period cally*

ADULT EDUCATION

AED 511 Introduction to Adult Education. (3 F SS Axford
H stor ca development, core content and pr nc pal areas of app cation f adu t educat on are covered

512 Program Planning in Adult Education. (3 S SS, Rossman
Stresses the andragog ca approach to planning programs for adults Stress s on a redef n tion of the ro e of the program planner and fac l tator

522 Educating the Middle-Aged and Older Persons. 3) S; Okum
Educat ona cons derati ns and methods ut l zed n each of the pr nc pa age group ngs f adu ts

525 Characteristics of Adult Learners. 3 F SS, Okun
Character st cs of adu ts re evant to the nstruct ona process mpl cat ons f r educat on of adu ts.

555 Adult Basic Education. 3 F Rossman
Stresses the ro e of the teacher, student and programs n adu t bas c education Cons derat on is a so g ven to h gh school equ va ency and other simi ar y re ated areas

566 International Adult Education. 3) NR, Axford
Rev ew and compar son of various adu t ed cat oi pro grams and fac ties n se ected countr es

664 Community Service, Extension and Continuing Education. 3) F, Axford
Object ves, organizat on and pract ces of post-secondary programs of cont nu ng educat on comm n ty and publ c serv ce and extens on Prerequisite AED 511 or HED 522 or 533

733 Research in Higher and Adult Education. (3) F S, Okun
Designs and research methodo ogies used n study of h gher and adult educat on Must be comp eted before subm ss on of d ssertat on pre p oposa Prerequ s tes Complet on of 9 hours of AED or HED and EDP 552

Special Graduate Courses: AED 580 591 683 684, 690, 692 693, 784, 790 791, 792 799.

Note: *Seminars covering such topics as adult basic education materials administration trends and staff development are offered periodically*

Educational Psychology

PROFESSORS:
FRY (ED B 301A), GAFFNEY, GR NDER, HELMSTADTER, KERR, SATTLER, VAN WAGENEN
ASSOCIATE PROFESSORS:
HARR S, KULHAVY, NELSEN
ASSISTANT PROFESSORS:
BETZ, CARROLL KRUS, MEYER STOCK
VISITING ASSISTANT PROFESSOR:
HAR NG

EDP 310 Educational Psychology. 1 6) F S SS
Human behavior n ed cat ona situat ons presented through nstruct ona modu es. Students may re enro for cred t to a tota of s x hours

454 Introduction to Measurement and Descriptive Data Analysis. 3) F S SS
The nature construct n, and eva uat on of tests. Fre quency d str but ons der ved scores measures of centra tendency, var abi ty corre at on and regres s on

510 Essentials of Classroom Learning. 3) F, S SS
Emp r ca evidences of the deve opment of earn ng and mot vat n and the r re at on to educat ona processes Prerequ s te EDP 310 or equ va ent

514 Psychology of the Adolescent. (3 S
Menta phys ca s c al, and ei ot onal deve pment n ado escence and the nf uence of secondary schoo experiences on ado escent deve opment P erequ s tes PGS 100, EDP 310 or equ va ents

530 Theoretical Issues and Contemporary Research in Human Development. (3 S
Psycholog cal the r es research and methods re evant to human development empl as zing the e at ns be-tween ear y development and ater perfo mance

532 Psychology of Exceptionality. (3 S
Genera psycho og ca theory and expe menta re earch re evant to except ona ty, emphas z ng mp cat ons for educat ona p ograms wh ch recogn ze un que earner character st cs Field work

534 Principles of Behavior Modification. 3) F
Pr nc ples of cond t on ng as app ed to behav or m d f cat on cu rent research on the exper menta ana ys of behav or n educat ona p ycho ogy

540 Theoretical Views of Learning. (3) F, S, SS
Classical and cognitive theories of learning, plus recent orientations. Illustrative experimental and rational foundations; implications for educational practice. Prerequisites: 12 semester hours in psychology or educational psychology.

542 Learning of Text Materials: Research and Theory. (3) S
Critical review and evaluation of research on learning variables relevant to acquisition and retention of instructional materials. Laboratory experience.

544 Psychology of Reading. (3) F
Alternate analyses of the reading process; designs and procedures for investigating instructional and noninstructional variables related to reading achievement. Prerequisites: EDP 454, 510.

550 Basic Issues in Measurement. (3) S
Theoretical issues in educational measurement, their implications for educational measurement and evaluation, examined by critical review of research literature. Prerequisite: EDP 454.

552 Measurement and Inferential Data Analysis Techniques. (3) F, S, SS
Measurement and inferential procedures in educational research; theoretical frequency distributions, sampling design, statistical inference, hypothesis testing, and basic experimental design. Prerequisite: EDP 454.

554 Multivariate Procedures in Data Analysis. (3) F, S, SS
Contrasts, multiple classification analysis of variance and covariance, multivariate analysis of variance, discriminant function, and multiple linear regression. Prerequisite: EDP 552.

555 Computer Utilization for Data Processing in the Behavior Sciences. (3) F
Introduction to data processing skills through the uses of major statistical programming packages. Prerequisites: EDP 454 and 552, 552 may be taken concurrently.

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. (1-6) F, S, SS
Experience in administering and interpreting individual tests. Theoretical basis for ability testing, ethical considerations, and diagnostic use of test results. Prerequisites: EDP 454, 510, and written approval of instructor. Initial enrollment, 3 hour minimum. Laboratory experience.

562 School Psychology: Theory and Practice. (3) F
Development and present status of school psychology: overview of assessment and intervention strategies and professional issues.

566 Diagnosis of Learning Difficulties. (3) F
Clinical diagnosis of learning difficulties emphasizing specific academic problems. Use and interpretation of diagnostic instruments in practical school situations. Prerequisites: EDP 454, 510, 560 and 562.

636 Experimental Analysis Methods in Human Development. (3) S
An experimental analysis alternative to statistics in the conception, design, and conduct of educational research. Emphasis on writing the research proposal. Approval of instructor required.

710 Education Psychology. (3) F, S
Theory and research literature in educational psychology, and its implications for educational practice.

748 Recent Studies in Educational Psychology. (3) S
Selected literature in educational psychology, involving critical reading and discussion. Prerequisite: 15 semester hours in educational psychology.

750 Research Epistemology and Technical Writing. (3) F
Examines formal rationale of research, writing and editing according to *APA Publication Manual* of technical descriptions, research proposals and reports.



754 Advanced Multivariate Analysis. (3) S
Multivariate experimental design, multivariate multiple comparison procedures, confidence intervals, covariance structure analysis, and analysis of qualitative data. Prerequisite: EDP 554.

756 Advanced Quantitative Techniques. (3) S
Special techniques for analyzing educational data, including multivariate multiple regression, factor analysis, canonical correlation, and order and hierarchical analysis. Prerequisite: EDP 554.

Special Graduate Courses: EDP 494, 498, 499, 580, 583, 584, 590, 591, 592, 593, 594, 598, 599, 680, 683, 684, 690, 691, 692, 693, 700, 780, 783, 784, 790, 791, 792, 799. (See pages 30-31.)

Special Education

PROFESSORS:
PREHM (ED 305), ABRAHAM, FAAS, MOORE, SUNDWALL, WARREN

ASSOCIATE PROFESSORS:
BROWN, D'ALONZO, NELSON, ROBERTS, RUTHERFORD, WISEMAN

ASSISTANT PROFESSORS:
GILL, HARTWELL, HOWELL, McCOY, PRIETO, RUEDA, SULLIVAN, TIPPECONNIC, VALLEJO, ZUCKER

SPECIAL EDUCATION

SPE 311 Orientation to Education of Exceptional Children. (3) F, S, SS
Includes gifted, mentally retarded, vision, hearing, speech, emotional disturbance, disadvantaged, specific learning disabilities and others.

312 Mental Retardation. (3) F, S, SS
Causation and characteristics of mental retardation in children and adults. Terminology, educational programming and therapeutic procedures are emphasized.

320 Participation with Exceptional Children. (3) F, S
Clinical and laboratory experience with exceptional children in cooperating clinics, institutions, schools, and agencies. Prerequisite: SPE 311, or concurrently.

321 Curriculum and Methods of Teaching the Mentally Handicapped. (3) F, S, SS
Developing curricula and methodology for trainable and educable mentally handicapped pupils in grades K-12. Prerequisites: SPE 311 and 312, or concurrently.

401 Evaluating Exceptional Children. (3) F S SS
Normative and criter on-referenced d agnostic techn ques nc ud ng format ve evaluation. Emphas s upon application. A competency-based approach w l be used. Prerequisites. SPE 311 and EDP 310

402 Prescriptive Programming in Language, Reading and Arithmetic for Exceptional Children. (3) F S SS
Emphas'zes methods, techniques and mater a s for use in prescr ptive teach ng A competency-based approach wi be used Prerequ s te SPE 401.

403 Parent, School, Community Relations and the Exceptional Child. (3) F, S, SS
Counsel ng parents. Law and the hand capped, role and competencies of special educat on personne referra procedures and work ng w th commun ty agenc es Prerequ s te SPE 311 or approva of instructor

404 Societal Influences on Handicapping Conditions. 3) NR
Research on socia forces that nf uence the preva ence management, and treatment of except ona ch idren Prerequ s tes. SPE 311 and basic course in one exceptional ty

436 Behavioral and Emotional Problems in Children. (3) F, S, SS
Ma adapt've behav'or in chi dren and adolescents Exploration of the so ated deve opmenta and maintenance variables contr but ng to the behav or pat terns

437 Social Maladjustments in Children. (3) NR
Del nquency, drug abuse, se f destruct ve behav or and other soc al ma adjustments of chi dren and ado es cents. Techn ques and programs

438 Methods of Teaching the Emotionally Disturbed. (3) F, S, SS
Development of a therapeut c educat ona atmosphere for soc al y-maladjusted and emot onal y-d sturbed ch idren Prerequ s te SPE 436.

455 Early Childhood and the Handicapped. (3) A
Early chi dhood educat on as t applies to the hand capped ch'ld Methods, materials and techniques

461 Characteristics and Diagnosis of Learning Disabilities. (3) F, S, SS

462 Methods of Remediating Learning Disabilities. (3 15) F, S
Prerequ s te· SPE 461

465 Student Teaching in Special Education. (3 15) F, S
Prerequisites (1) Approval of Spec al Education Department (2) comp etion of SPE 401 and 402 and bas c methods courses in area of spec a zation and in teach ing read ng and mathematics n the elementary schoo Y grade only

511 The Exceptional Child. (3) F S SS
Educat ona needs of handicapped and g fted ch dren (Not ava lable to students who have completed SPE 311.)

512 The Mentally Retarded Child. (3) F S SS
Et ology, d agnosis and management of mentally re tarded ch ldren. Current trends in prevent on, programming, and teacher preparation (Not ava lable to students who have comp eted SPE 312.)

514 Methods of Perceptual-Motor Training. (3) A
Development of the sensory motor sk ls of hand - capped ch ldren. Prerequ s tes· SPE 511 or equivalent, and bas c course in one exceptiona ity.

515 Methods for the Remediation of Learning Problems of Exceptional Children. (3) F, S, SS
Methods and materia s for remediat ng the bas c academ c prob ems of gifted and mi dly hand capped ch ldren. Prerequ s tes: SPE 511, or equ valent, a bas c course in one except ona ity, or approva of nstructor.

531 Behavior Management Approaches with Exceptional Children. (3) F, S, SS
Behavior management approaches w th maladapt ve behavior of except onal ch ldren Prerequis te SPE 511 or equiva ent

574 Educational Evaluation of Exceptional Children. (3) F, S, SS
Des gn and stat st cal considerat ons of normative and cr ter on referenced tests. Co lect on, recording and analys s of data from format ve evaluat on. Prerequi s tes· SPE 311 or 511 and a methods course in the teach ng of read ng and mathematics

575 Current Issues in the Education of Exceptional Children. (3) F, S, SS
Mainstreaming noncategor cal, f nancing, legal, d ag nost c abel ng egis ative and other crit ca and controversial ssues re ated to the educat on of except ona ch ldren

578 Methods of Teaching the Mentally Retarded. (3) F S, SS
Specif c methods, mater a s of nstruction and curr cu ium development in teach ng educab e and tra nab e ch dren. Prerequ s te. SPE 312 or 512

579 Vocational Programs for the Mentally Retarded. (3) A
Curricu um p ann ng and methods of teaching in sec ondary schoo and post-school programs Work evaluation, work study sheltered emp oyment Prereq u s te· SPE 312 or 512.

581 Methods of Teaching the Trainable Mentally Retarded. (3) A
Deve opment of materials procedures and programs for the trainab e menta y retarded, preschoo through adu thood. Prerequ site SPE 312 or 512

588 The Gifted Child. (3) F, S SS
G fted chi dren's character stics, dent f cation needs school and home environments def nitions and misun derstandings Research on Terman, Witty, and others

589 Methods in Teaching the Gifted. (3) F, S, SS
Methods n teaching e ementary and secondary school g fted ch ldren. Newer techniques nclud ng pro grammed and computer ass sted nstruct on team teach ng Prerequ s te· SPE 588

Special Courses: SPE 294, 298 492, 493 494, 497, 498, 499 580, 583, 584 590, 591 592 593, 594 598 599

INDIAN EDUCATION

IED 411 Indian Education. (3) F, S
H stor ca development of nd an educat on w th present day imp cations The contemporary per od w l be em phasized.

422 Methods of Teaching Indian Children. (3) F S
Mater a s and methods used n Ind an education Use of ocal and tr bal mater a s n the c assroom Exper mentat on with new concepts Prerequis te ED 411

424 Curriculum and Practices for Indian Education. (3) F S
Current and past curr cu a and research in nd an education Spec fic techn ques for curr culum mprovement Prerequ s te ED 411.

425 Anthropological Applications in Indian Education. (3) F
Va ues and cultura assumpt ons w th the'r mpact on nd an educat on Case study approach in understanding socia and cu tural factors. Prerequ s te· ED 411

433 Guidance for the Indian Student. 3) F
Problems faced n prov d ng guidance serv ces to nd an students Tr ba values cultural understand ng and the r re at onsh p to effect ve gu dance Prerequ s te· ED 411.

490 Problems of Teachers of Indian Children. (3) F, S
Current ssues trends and prob ems encountered by teachers of nd an ch ldren Research rev ewed and evaluated Prerequ s te ED 411

511 School-Community Relations in Indian Education. (3) F, S
Techniques and methods ut l zed in real z ng harmoni ous and effective relat ons between the schoo and commun ty n wh ch ndian chi dren 've

522 Education of Indian Adults. 3) S
Methods of estab ish ng Ind an adu t educat on princi p es nvo ved n course se ect on and content, ngred ents of successfu Ind an adu t educat on programs

544 Community Development in Indian Education. 3) S
Methods and techn ques for community deve opment programs n commun ties in which ndians l ve; ro e and responsib t es of schoo community and ind v dua s

Special Courses: SPE and IED 492 493, 494, 497, 498 499 580, 583 584, 590 591 592, 593 594 598, 599 (See pages 30 31.

MULTICULTURAL EDUCATION

MCE 446 Teaching the Culturally Diverse Child. (3) F, S, SS
Physica soc a psycho og ca and educat ona needs of ch dren from cu tura y and nguist cal y d fferent popu at ons. Mu t d sc p nary approach w l be fol owed.

447 Methods of Teaching the Culturally Diverse Child. (3) A
Techn ques for organiz ng and prov ding spec a educa t ona exper ences for students from cu tura ly and ngu st ca ly d fferent popu at ons Prerequ site. MCE 446

448 The Mexican American Child. (3) A
Considerat on of var ab es n teach ng Mex can Amer - can ch dren Schoo programm ng based on b ngua cu tura and re ated factors

Special Courses: MCE 492, 493 494 497 498 499, 580 583, 584 590 591, 592, 593 594 598 599

Educational Technology and Library Science

PROFESSORS:
HIGG NS (ED B-146), GERLACH, SATTERTHWAITE, SULLIVAN, VERG S

ASSOCIATE PROFESSOR:
NILSEN

ASSISTANT PROFESSORS:
BEYARD-TYLER, CAREY SCHON

EDUCATIONAL TECHNOLOGY

EDT 405 Competency-Based Instruction. 3) F S SS
Students deve op instructiona objectives, se ect earn- ing act v t es and des gn assessment procedures for competency-based nstruct ona programs

501 Foundations of Educational Technology. (3) F
Current pract ces and iterature in nstruct onal techno ogy.

502 Design and Development of Instruction. (3) S
Formulat on development f e d test ng and rev s on of nstructional programs for c assroom use

503 Research Techniques for Instructional Development. 3) F
Procedures for analyz ng the effects of a ternative n structiona practices

504 Educational Evaluation. 3) S
Techn ques for eva uat ng the effectiveness of nstru t onal programs and educat onal projects

522 Computers in Education. 3) S SS
Appl cat on of computer techno ogy to nst uctiona and adm n strative funct ons

523 Computer Programming for Instruction. 3) F S SS
Author anguages and programm ng techniques for n struct ona purposes Students deve op computer contro led nstruct ona programs

791 Seminar. 1 3 F
Advanced techn ques of techn ca wr ting

792 Research. (3 S
Des gn and execut on of nstru t onal research on se ected top cs.

Special Courses: EDT 494 498, 499 580 583 584 590 591, 592, 593 594 598, 599 680 683, 684 690 691 692 693, 780, 783 784, 790 791 792, 799 See pages 30 31)

INSTRUCTIONAL MEDIA

IME 411 Audiovisual Materials and Procedures in Education. (3) F S, SS
Preparat on and t ization of aud ovisua mater a s and equ pment n inst uct ona teach ng contexts. ecture and laboratory

455 Cinema and Television. 3) F, S SS
Structure deve opment and behav ora effects of thea tr cal mot on pictures and commerc a te ev s on

522 Audiovisual Production Techniques in Education. 3) S
Production and use of aud tapes, v deo tapes, s ide programs and s mp e st and projected med a for the c assro m. Lecture and laboratory.

523 Audiovisual Resources for the Classroom. (3) F
Survey and eva uat on of commerc al y ava ab e aud o v sua materia s for the classroom and med a center

521 Design of Instructional Media. 3) F
Des gn ng storyboard ng and scr pt ng instruct onal programs for te evisi n, f m s de tape and s mi ar med a formats

524 Instructional Photography. 3) F, S SS
The camera, f lm exposure composit on and l ghting Dark room exper ences in deve oping and print ng b ack and white f lm Lecture and aboratory

525 Instructional Graphics. 3) F
Pr nciples of des gn, product on and ut l zat on of graph c med a n nstruct onal contexts Lecture and aboratory

526 Instructional Cinematography. 3) S
Pr nc p es of des gn product on and ut l zat on of edu cat ona mot on p ctures Lecture and aboratory

527 Instructional Television. (3 S
Des gn ng nstructiona programming f r te ev s on Pract ca exper ence n the product on f nstructional v deo tapes Lecture and aboratory

528 Advanced Photographic Media Production. (3 S
Des gn and production of mu t med a nstruct ona pro grams Emphas s o sl de tape format Prerequisite ME 524 or approval of nstructor Lecture and labora t ry.

533 Administration of Media Services. 3 S
Princip es for adm n ster ng aud ov sua services n schoo s and univers ties Prerequ s te 6 hours n ME or approval of nstructor.

560 Current Issues and Problems in Audiovisual Education. 3 NR
Cr t cal ana ys s of current pract ces n n truct onal med a Prerequis te 6 hours n ME or approva of n structor

Special Courses: ME 494, 498 499 5 0, 580, 583 584 590 591, 592 593 594 598, 599 See pages 30 31

LIBRARY SCIENCE

LIS 410 Children's Literature. 3 F S SS
Modern and c ass c l terature for preschoo and e emen tary schoo ch dren Techn ques for promot ng ndependent read ng.

411 Advanced Studies in Children's Literature. 3 S
Folk and modern iterature for ch dren Storyte ing, book talks, puppetry, and creative drama as motiva t ona techn ques Prerequis te L S 410 or approva of nstructor.

440 Classification and Cataloging. 3 F
Descript ve cataloging and Dewey Dec ma C ass fica t on of pr nt and nonpr nt l brary materials

461 Selection of Library Materials. 3) F
Pr nc ples and procedures used in the se ection of ma teria s for the schoo l brary.

463 Library Materials for Children. (3) F
Select ng and us ng pr nt and nonprint materials to support the e ementary schoo curr cu um

464 Library Materials for Adolescents. 3) S
Se ecting and using print and nonp nt mater a s to

support the secondary school curriculum.

465 Library Materials for Minority Students. (3) S
Library services and materials for children from Mexican American, Native American, Black, and other minority groups.

471 Basic Reference Resources. (3) F
Providing reference service in the school library. Content and use of basic resources.

481 School Library Administration. (3) S
Prerequisites: LIS 440 and 461.

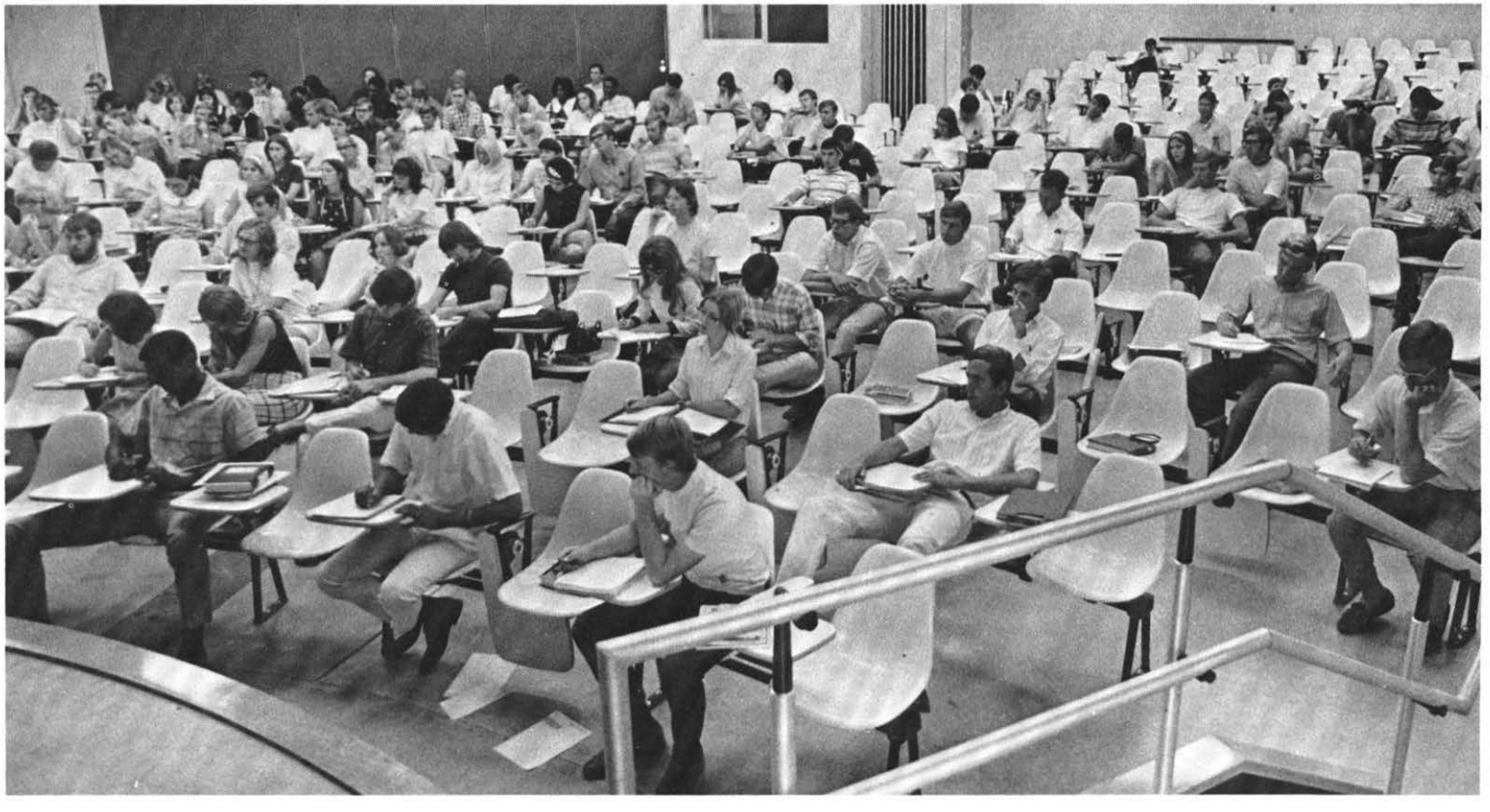
510 Technical Services and Automation. (3) S
Procedures for securing and processing library materials. Library uses of computers. Prerequisite: LIS 481 or approval of instructor.

533 Current Library Problems. (3) F
Critical analysis of current practices and problems in school librarianship. Prerequisites: LIS 481 or approval of instructor.

534 Evaluation of Children's Literature. (3) F
Applying standards of literary criticism to children's literature. Prerequisite: children's literature course or approval of instructor.

584 School Library Internship. (3) F, S
Prerequisites: LIS 440, 461, 463 or 464, 471, 481. Concurrent enrollment in LIS 481 is permitted.

Special Courses: LIS 492, 493, 494, 497, 498, 499, 580, 583, 584, 590, 591, 592, 593, 594, 598, 599. (See pages 30-31.)



College of Engineering and Applied Sciences

C. R. Haden, 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, agriculture, technology, or construction Every effort is made to carry on a well-rounded, well integrated program which will not only give the student proficiency for a professional career but also will develop character, judgment, ideals, breadth of view, and appropriate cultural attitudes. Students are taught to recognize the fact 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 organized to offer the following fields of specialization and areas of emphasis:

Division of Agriculture

Ag-Industry
Bio-Agricultural Sciences
Engineering of Agricultural Systems
Environmental Resources in Agriculture

Division of Construction

General Building Construction
Heavy Construction
Construction Systems Administration

School of Engineering

Aerospace Engineering and Engineering Science
Chemical and Bio Engineering
Civil Engineering
Electrical and Computer Engineering
Industrial and Management Systems Engineering
Computer Science
Mechanical and Energy Systems Engineering
Special Engineering Studies
- Bio Engineering
- Manufacturing Engineering
- Materials Science
- Nuclear Engineering
- System Engineering
- Urban Systems Engineering

Interdisciplinary Engineering Studies
- Business and Pre Law
- Education
- Geological Engineering
- Pre Medical

Division of Technology

Engineering Technology
- Aeronautical Engineering Technology
- Electronic Engineering Technology
- Manufacturing Engineering Technology
- Mechanical Engineering Technology

Industrial Technology
- Aeronautics
- Electronics
- Graphic Communications

Industrial Technical Education
- Industrial Arts Education
- Industrial Supervision
- Technical Teacher Education

Research

It is the policy of the College to encourage exceptional upper division undergraduate students, as well as graduate students, to participate with faculty members in research activity. Many faculty members are conducting research on government or industry sponsored programs. Research activities include computer science and applications, material science, solar energy, transportation

systems, speech processing, computer design, turbine design, structural systems, waste recy cling, solid state electronic devices, power systems, environmenta , biomedical, arid land agriculture, and many others

Degrees

Baccalaureate Degrees. The completion of a four-year program of study in agriculture, construction, or technology eads to the degree of Bachelor of Science (B S) The completion of a four-year program of study in engineering or engineering based interdisciplinary pro grams leads to the degree of Bachelor of Science in Engineering (B.S.E.) or Bachelor of Science (B.S.)

Integrated B.S.E.-M.S.E. Program. (For School of Engineering students only.) To provide greater program flexibility, qualified students may undertake a program which provides an integrated fourth and fifth year sequence of study in one of several fields of specialization in engineering. This gives the student 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 which will supervise 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 will require an application submitted to the Dean through the faculty advisor and the chair Applications will be reviewed by a School committee which will recommend the appropriate action to the Dean The applicat on may be submitted in the fifth semester.

Master of Science in Engineering Degree (M.S.E.). The Master of Science in Engineering degree is awarded upon successful completion of prescribed graduate level course work, engineering projects, and research en deavor. Entry into this program normally requires a bachelor's degree from an engineering program accredited by Engineers' Council for Professional Development (ECPD).

The pattern of course work applicable to the degree is potentially unique for each student, although each approved pattern is required to conform to the general guidelines for subject matter content for the degree as outlined in the *Graduate Catalog* and also to the criteria for advanced level accreditation of the ECPD. The M.S.E. programs in civil, electrical, industrial, and mechanical engineering, and engineering science (see pages 189 and 191) are accredited by the ECPD

Master of Science Degree (M.S.) Engineering. This graduate program is designed to provide an opportunity to the competent student with a baccalaureate degree in engineering or other selected fields to specialize in a particular subject area within engineering. Normally this objective may be attained through the satisfactory completion of graduate level course work and project or research endeavor.

Master of Science Degree (M.S.) Agriculture. This program provides competent students with opportunities to complete advanced studies with emphasis on research in agriculture.

Master of Technology Degree (M.T.) Selection between two areas of concentration is offered through this graduate degree One area is a technical concentration enhancing industrial employment in one of the technical specialties. The other area of concentration is Industrial Teacher Education providing both technical and professional education experience directed toward post secondary technical teaching.

Doctor of Philosophy Degree (Ph.D.) Engineering. The degree Doctor of Philosophy is awarded in engineering 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*

General Information

Definition of Terms. The terms used in this College to describe offerings are defined below for purposes of clarity.

Program of Study A broad term describing the complete array of courses included in the study leading to a degree. Example: engineering, technology, construction, agriculture

Field of Specialization A specialized group of courses contained within the program of study Example: program of study engineering, field of specialization civil engineering. Example. program of study agriculture; field of specialization bio agricultural sciences

Area of Emphasis technical electives Pattern or Concentration is a selection of courses within a field of specialization or among one or more fields of specialization. The number of technical electives varies from curriculum to curriculum. In a number of the fields of specialization the technical electives must be chosen from pre selected 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: field of specialization mechanical engineering; area of emphasis thermosciences

Admission. Students who wish to be admitted to full freshman standing in the College of Engineering and Applied Sciences should present certain secondary units which are specified in the requirements of the Divisions

and the School of Engineering. Students who have omissions or deficiencies in secondary school subject matter preparation may be required to complete additional university credit course work which may not be applied toward their degree

Transfer Students. Students who contemplate transferring into this College from other institutions, whether they be community colleges or four year institutions, should study carefully the pertinent sections under this College pertaining to their particular program and, if possible, should consult an advisor in this College prior to enrolling in that other institution This will assure a smooth transition at the time of transfer.

Transfer students may also obtain a copy of the "Approved General Studies Courses" for this College by writing to the Dean Credit is granted for transferred courses which are substantially equivalent to corresponding courses in the selected program of study, subject to grade and senior residence requirements. Credits will be accepted by transfer from a junior college to meet lower division requirements only. It should be noted that some courses taken in other colleges of this University or other universities may be acceptable for general University credit but may not be acceptable toward the degree requirements of this College Determination of those particular courses acceptable to a specific degree program will be made within the appropriate Division or School with the approval of the Dean.

Advisement and Counsel. For assistance and counsel in planning a program of study, each student will be assigned a faculty advisor who is familiar with the chosen field of specialization and who must be consulted before registering each semester. In addition, a student advisement coordinator is available in the Dean's Office to all students for counsel and assistance.

English Proficiency Requirement. English proficiency is required. As a minimum each student must complete ENG 102, or ENG 104, but any student whose written or spoken English in any course is unsatisfactory may be required to take additional course work by the appropriate division director or department chair. See Statement on English Proficiency under University General Studies Requirements, page 36, for qualifying for ENG 104

Pass-Fail Grades. Students enrolled in the College of Engineering and Applied Sciences will not receive degree credit for pass fail courses taken at this institution. In addition, no courses in this college are offered for pass fail credit. Students requesting credit for pass-fail courses taken at another institution must file a Petition for Variance form. Each request will be judged on its particular merits

Entry into Upper Division Courses. Prior to enrolling in courses at the 300 level and above, all students in good academic standing must secure the approval of their advisor Students who are not in good academic standing must secure the approval of their advisor *and* division 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.

Academic Honors. Students who maintain a 3.5 or above cumulative index are awarded, at the College Honors Convocation, a Certificate of Scholastic Excellence, and/or are listed in the Honors Convocation program. Students completing baccalaureate degree requirements will 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) Tau Beta Pi National Engineering Honor Society, (2 Eta Kappa Nu Electrical Engineering Honor Society, (3) Alpha Pi Mu Industrial Engineering Honor Society, (4) Pi Tau Sigma Mechanical Engineering Honor Society, (5) Sigma Lambda Chi Construction Honor Society, and (6) Alpha Zeta Agriculture Honor Society. Information on any of these organizations may be obtained from any of the Division or School offices, or the Office of the Dean

ROTC Students. Students pursuing a commission through either the Air Force or Army ROTC programs will be 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. ROTC students must also meet all other degree requirements of this College

General Studies

Higher education should provide the student not only with competency in the chosen subject field, but also with experiences which 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 personality requisite for a successful career. The development of moral, ethical and social concepts, along with a sound professional attitude, is required. It is expected that the attainment of an interest and pleasure in the above pursuits will be an inspiration to 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



The College requires a minimum of 6 hours in behavioral and social sciences, and a minimum of 6 hours in humanities and fine arts, with a total of 16 hours in these areas combined; 8 hours of science and mathematics; and 12 hours of General Studies electives to fulfill the General Studies requirement. These requirements are more specifically described below:

General Studies—Agriculture, Construction and Technology

(See University General Studies Requirements, pages 36-37.)

Students in each of the Divisions of Agriculture, Construction and Technology shall consult their advisors for the approved list from which courses may be selected.

General Studies—School of Engineering

The humanities and fine arts and the behavioral and social sciences requirements for students pursuing a baccalaureate program in Engineering are more closely structured than for other degree programs (see page 185).

General Studies and Elective Courses Offered for Students in Other Colleges.

This College offers a number of courses in agriculture, construction, engineering and technology which may be acceptable for General Studies or elective credit in other colleges upon approval of an advisor. The courses in engineering under the heading "Society, Values, and Technology" are specifically oriented to General Studies relating technology to social problems. Students in other colleges should consult with their advisors if they wish to take such courses.

Division of Agriculture

R. R. Chalquest, D.V.M., Ph.D., Director

Purpose

The Division of Agriculture provides new academic programs projected toward the modern needs of agriculture. Since agriculture is a very dynamic industry, it requires changes in courses at the University the same as it requires changes for all other sectors. The academic programs here are especially designed to include 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 further career development in the agricultural industry. Agriculture offers many new exciting careers which range from serving the input sector to managing the output of our agricultural enterprises.

Organization

The Division of Agriculture is composed of students, faculty, administrators, staff and physical facilities including the ASU Field Laboratory. The Division is organized into four fields of specialization: ag-industry, bio-agricultural sciences, engineering of agricultural systems and environmental resources in agriculture.

Degrees

Bachelor of Science (B.S.). A minimum of 126 hours of credit, including University General Studies, the Division and field cores, and area of emphasis courses lead to the Bachelor of Science degree. Forty percent of the semester hours required for graduation must be upper division.

Master of Science (M.S.). Curricula leading to the Master of Science degree are offered. Requirements for this degree are given in the *Graduate Catalog*.

Curricula in Agriculture

Curricula in Agriculture include the General Studies requirement, the Division of Agriculture core requirement, the field of specialization core requirement, together with the area of emphasis courses and elective courses to complete the graduation requirement of 126 credit hours. Prior to entering the junior year, each student with the aid of an advisor, is expected to select a field of specialization and an area of emphasis.

Bio-agricultural sciences and environmental resources in agriculture have a scientific orientation, whereas ag-industry and engineering of agricultural systems are functional, industry-oriented curricula. The more traditional study of the life cycle of animals and plants is expanded to include analysis of the effects of environment, either to enhance or inhibit desired production of a particular agricultural organism. Ag-industry focuses on the operational functions and management of the broad spectrum of agriculturally related industries (from the supply of resources and services needed by producers of agricultural commodities, to the processing and marketing of raw agricultural products, to the management of food and fiber processing plants).

The multi-disciplinary curricula integrate the fundamentals of physical, biological and social sciences with mathematics, engineering and business, and broaden the student's scope within either: (a) modern, agricultural science and environmental resources, or (b) relevant ag-industry. Opportunities are available to study the relationship of agriculture to warm, arid climatic conditions and to the rural-urban interface.

The Division also provides relevant agricul-

tural courses for those already in ag-industry positions but who have had little or no college level work in agriculture, as well as for those enrolled in other colleges and departments who are planning to go into ag-industry positions

Agriculture Core

All students pursuing a Bachelor of Science degree in the Division will complete the following general core courses

			Semester Hours
BAS	13	Plant Science	3
BAS	150	Animal Science	3
ERA	325	Soils	3
ERA	346	Environmental Conservation	3
AGI	380	Government Regulations in Agriculture	3
		Total	15

Fields of Specialization with Areas of Emphasis. Four fields of specialization are provided within which several areas of emphasis are permitted. Each such field includes a specified core of courses Further, each area of emphasis will require specialized agricultural courses, a selection of additional hours from a list of supporting courses, and enough electives to complete the program. All of these are to be selected in consultation with an advisor.

Fields of Specialization:	Areas of Emphasis:
Ag Industry	Agr business Management International Agriculture
Bio Agricultural Sciences	Nutritional Sciences and Quality Assurance Physiological Sciences Pre Veterinary Medicine
Engineering of Agricultural Systems	
Environmental Resources in Agriculture	Environmental Horticulture Natural Resource Management

Ag-Industry. The ag industry field of specialization covers the management and operational functions of the broad spectrum of agricultural industries. These include the supplying of resources and services to the producers of agricultural commodities, the management of crop and livestock enterprises, the processing and marketing of raw agricultural products and the management of food and fiber processing plants. It is designed to give the student scientific knowledge regarding food and fiber production and marketing in a form that can be applied to the business and operational aspects of agricultural industries Included in this field of specialization are courses to prepare graduates to take jobs in agriculture, with companies providing supplies to the farm and with those who process the products of the farm It also embodies preparation for government regulatory agencies and many technical positions related to agriculture, food and fiber, distribution and food manufacturing.

Students selecting ag industry as a field of specialization are required to take the following courses:

Ag-Industry Core:

			Semester Hours
ECN	201	Principles of Economics	3
CHM	101	Introductory Chemistry	4
AGI	312	Agricultural Marketing	3
BAS	350	Nutritional Science	3
AGI	364	Food Technology	3
AGI	402	Agricultural Cooperatives	3
AGI	442	Agribusiness Management I	3
AGI	453	World Agricultural Resources	3
		Total	25

Areas of emphasis in this field are

Agribusiness Management combines business and agriculture training. It focuses on management techniques applicable to positions in the agricultural industry. It combines business principles with agricultural resource management, thus providing foundations for functional leadership in any agricultural enterprise Graduates from this area are qualified to enter a broad range of agricultural enterprises and eventually to obtain management status Further specialization is possible in the following options: crop, food, livestock, and marketing industries.

International Agriculture relates world wide food resources to the requirements and potentials of the various nations. Particular emphasis is given to food production in arid countries and to the international trade of food products throughout the world. Special courses are offered to form a unique curriculum which is designed to train either the U.S. or foreign student to work in the development of agricultural potential in the world. It provides a basic knowledge of U.S. agricultural techniques and extends to the global aspects of agriculture. Graduates in this area should be particularly qualified to aid in the development of the world's agricultural potential to provide food to meet the world's food needs. Jobs exist in the commercial agricultural industry sector, U.S. government agencies and foreign government agencies

Bio-Agricultural Sciences. The bio-agricultural sciences field of specialization is concerned with the study of the scientific aspects of agriculture It focuses on the biological functions of domestic animals and plants. These functions include the study of birth or germination, growth, development, nutrition, reproduction, and adaptation to the various environmental factors

Students selecting bio-agricultural sciences as a field of specialization are required to take the following courses

Bio-Agricultural Sciences Core:

			Semester Hour
MAT	115	College Algebra and Trigonometry	4
CHM	113	General Chemistry	4
BIO	101	Biological Principles and Processes	4
CHM	231 or	Elementary Organic Chemistry CHM 331 and 335 General Organic Chemistry (4)	4
BAS	465	Physiological Chemistry	4
BAS	350	Nutritional Science	3
		Total	23

Areas of emphasis in this field are:

Nutritional Sciences and Quality Assurance concerns the study of nutrients, their requirements, metabolism in animals and man, and quality control. This area also permits the student to select greater depth of learning in food and feed quality techniques, nutrient metabolism, and food product development. Students may emphasize quality assurance as a part of their nutritional science area. It is a broad based nutritional area designed to prepare students for future graduate work or to accept jobs in the agricultural industry, food industry or government, and very importantly, in solving the food crisis of the world.

Physiological Sciences concentrates on the study of the biological functions and their control in animals and plants. These functions are studied under normal conditions as well as their adaptation to environmental changes and adverse conditions, such as stress and disease. This area of emphasis is based on the physiological functions of both animals and plants but does permit selection by the student for greater depth in either. It is intended to prepare students for graduate work in plant and animal science or to accept scientifically related jobs in the agricultural industry, medicine, government or colleges.

Pre Veterinary Medicine is primarily designed to meet the entrance requirements of professional veterinary medical schools in the United States and Canada. Selection of this area will permit students to complete the pre veterinary requirements for entrance to professional veterinary school. It is also designed to provide the completion of all requirements for a Bachelor of Science degree in Agriculture at Arizona State University by completing additional credits, if desired. A pre veterinary medicine student who elects to earn a Bachelor of Science degree in the Division of Agriculture may do so by taking three years at ASU, completing 94 semester hours of credit, with a minimum of 60 semester hours at ASU, and by completing the 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 will be eligible to receive the B.S. degree after the Registrar's Office 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 index of 2.00 or better.

Although this area of emphasis is primarily intended for the student preparing to enter professional veterinary medicine as a career, it is also an excellent basis for future degree programs or in any of the scientifically related jobs in the agriculture industry and government.

Engineering of Agricultural Systems. The engineering of agricultural systems is a field of specialization that combines the engineering sciences with agriculture. Agriculture has become highly automated, particularly under the intensified management systems currently practiced. Engineering knowledge is vital to design and maintain the automated equipment from the planting of the seed to the packaging of processed foods. Graduates can enter a challenging field of engineering with ample opportunities in the agricultural industry or governmental agencies.

Students selecting engineering of agricultural systems as a field of specialization are required to take the following courses:

Engineering of Agricultural Systems Core:

			Semester Hour
CHM	113 or	General Chemistry CHM 114 General Chemistry for Engineers	4
	or	ECE 168 Chemical Foundations of Engineering	4
MAT	20	and 121 Calculus I and II	10
MAT	212 or	Elementary Differential Equations ECE 386 Ordinary Differential Equations for Engineers	3
MAT	213 or	Elementary Linear Algebra ECE 382 Linear Algebra for Engineers (2)	2
ECE	102	Introduction to Engineering	2
ECE	104	Engineering Graphics and Design	2
ECE	122	Computer Programming	2
ECE	201	Mechanics and Heat	3
ECE	202	Electrical Science	4
AGI	364	Food Technology	3
ERA	326	Soils Laboratory	1
ERA	333	Water Resources	3
		Total	39

Environmental Resources in Agriculture. Agricultural success depends largely on the available environmental resources, such as air, water, soil and others related to plant and animal life. Variations in these resources, both natural and man made, are considered. Four different environments are identified. These include the rangelands, cultivated croplands, urban landscapes and controlled environments.

Students in this field should acquire a fundamental understanding of the functions of air, water, soil and other resources in their relation to plant and animal life. This field is designed for students interested in the management of our resources and their role in the environmental crisis.

Students selecting environmental resources in agriculture as a field of specialization are required to take the following courses

Environmental Resources in Agriculture Core:

			Semester Hours
BIO	10	and 02 Biological Principles and Processes	8
MAT	141	Mathematics for the Social Life and Management Sciences	4
CHM	113	General Chemistry	4
ERA	320	Soils Laboratory	1
ERA	332	Agricultural Chemicals	3
ERA	333	Water Resources	3
		Total	23

Areas of emphasis in this field are

Environmental Horticulture is designed to help beautify the areas in and around homes, gardens, industry and the general landscape Increased urbanization results in a very different plant population than existed on farms. The lawns, shrubs, trees, flowers and home gardens involve specific requirements for plants, seeds, fertilizers, pesticides and machinery Specialized plant knowledge by the homeowner as well as for trained nurserymen and individuals skilled in plant maintenance and landscaping is required. Public areas, particularly parks and golf courses, require skilled management by superintendents Production of crops in climate controlled greenhouses is emphasized as an important agricultural enterprise in arid and urban areas. Skilled production on small areas, be it for food, beauty or recreation, is the focal point. Specialized options include both commercial urban and landscape horticulture. Graduates of this area are particularly qualified for employment in nurseries, parks, and greenhouse enterprises.

Natural Resource Management emphasizes a unified approach to the study of ecosystem characteristics as they relate to man's use of renewable resources A major challenge in resource management is to achieve proper use within the constraints imposed by the complex interdependence which exists within ecosystems. The systems approach is developed as a basis for the study of this complexity. Applications of the systems approach to resource management are considered using examples drawn from Arizona's forest, range, and agricultural ecosystems. Students selecting the natural resource management program may choose options in range ecology, soil resources or resource systems. Employment opportunities in environmental resource management, range management, and soil conservation exist with private firms and government resource management agencies in both the U.S. and abroad

Agriculture

PROFESSORS:
CHALQUEST (AG 281) BARRETT, MILLER MONTY MOODY RICHARDSON, ROBINSON, STILES, TAYSOM, THOMPSON

ASSOCIATE PROFESSORS:
BRADY, LYTLE RASMUSSEN WEEMS, WHYSONG

ASSISTANT PROFESSORS:
BACKHAUS, BROCK EDWARDS GIPP, SEPERICH WEISSER

LECTURER:
WOODSON

AG-INDUSTRY

AGI 236 Agricultural Practices. (3) NR
Supervised experience in agricultural projects Especially intended for students wishing to acquire or improve agricultural techniques One lecture, 6 hours laboratory

240 Dairy and Poultry Production. 2) NR
Production techniques of modern dairy and poultry operations

300 Livestock Production and Management. (3 F S
Methods of production in livestock enterprises economics loss prevention and marketing Prerequisite BAS 150

310 Crop Production and Management. 3 F, S
Crop production factors and their application to farm management. Crop plans are prepared for crop production enterprises Prerequisite BAS 130

312 Agricultural Marketing. (3 F S
Marketing arrangements for agricultural products

325 Farm Power and Mechanization. (3) S
Mechanical solutions to agricultural production problems in the U S and abroad together with selection evaluation field operation and servicing of production harvesting and pest control equipment Two lectures 3 hours laboratory

333 Agribusiness Purchasing. 2 NR
Working with supplies for agribusiness, including standards inventories and records

343 Vegetable Crops. 3 F
Vegetable crop production in field greenhouse and garden Prerequisite BAS 130

344 Fruit Crops. (3) S
Tree vine and small fruit culture emphasizing subtropical plants Prerequisite BAS 130

350 Livestock Marketing. 3 NR
Livestock marketing functions including commodities trading and hedging

351 Livestock and Carcass Evaluation. 3 F
Evaluation of the physical appearance of livestock and carcasses. Two lectures 3 hours laboratory

363 Veterinary Practices. 2) S
Observation of and participation in veterinary medicine and surgery supervised by local veterinarians Four hours per week with veterinary practitioner plus one hour per week seminar Open to advanced preveterinary students only

364 Food Technology. 3 F S
Processing and preservation of food products Two lectures 3 hours laboratory

366 Meats. 3) S
Meat purchasing, retail cutting identification, meat prepara

t on and preservat on for the customer. Prerequis te BAS 150 or FON 142.

372 Light Horse Management. (2 F S
Breeds, care, se ect on and hand ng of horses

375 Horse Breeding and Management. (3 S
Cons ders current methods of improv ng genet c tra ts and repr duct ve performance of horses Prerequ s te· AG 372 Two ectures, 3 hours aboratory

376 Horse Feeding and Nutrition. (2 S
Rat on formu at n to meet nutrient requ rements for growth eproduct on and performance of horses. Pre requis te· AG 372

380 Government Regulations in Agriculture. 3) F S
Government agenc es the r format o and adm nistra t on of regu at ons affect ng agr culture.

390 Agricultural Accounting. (3 F
Bas c account ng app ıcat ons common y used by agr cultura ındustr es nc ud ng tax and management ınformat on systems.

402 Agricultural Cooperatives. 3 F Edwards
Organızat on operat on and management of agr cu tura co perat ves

403 Agribusiness Public Relations. (3 S Edwards
The mage of agricu ture ınc ud ng cons derat on of the agr cu tural press Prerequ s te AG 312

430 Range Livestock Management. 3) F· Taysom
Operat on and management of beef cattle and sheep emphas z ng range cond t ons Prerequ sites ERA 360 AG 300

431 Intensified Livestock Management. (4 S, Moody
Pr nc ples, operations and management techn ques ın h gh dens ty an ma growing un ts Prerequ s tes AG 300, BAS 353 Three ectures 3 hours aboratory

432 Feedlot Management. (3 NR Staff
Management aspects of feedlot operati n Case stud'es and management prob em ana ys s w l be nc uded

440 Food Marketing. 3 F Edwards
Food packag ng d str butıon and reta ng Prereq s te AG 364 Two ectures 3 hours aboratory

441 Meat Technology. (3 S; Seper ch
Processing and ut l zat on of meat products Prerequ site BAS 370. Two lectures, 3 ho rs laboratory

442 Agribusiness Management I. 3) F S, Edwards
Pr nciples of management p ann ng organ z ng nte grat ng measur ng and deve op ng peop e n agr bus ness organızat ons

443 Agribusiness Management II. (3 S, Edwards
Pr nc p es of human resource management w th empha s s on the spec al prob ems of agrıbus ness systems Prerequ s te AGI 442.

444 Agribusiness Analysis. 3) F St es
dent f es the s ze scope and organ zation of the var ous agricu tura ly oriented ndustr es

445 Advanced Crop Management. 3 S, R chardson
Latest techn ques ın produc ng harvest ng and ut ız ng the major f e d crops with emphas s on those grown under r gated env ronments. Prerequ s tes BAS 130 AGI 310 Two ectures 3 hours aboratory

451 World Soil Management. (3) F, Barrett
So l sc ence and so l management pract ces n arid re g ons of the world Prerequ s te ERA 325

452 World Food Dynamics. (3 NR St es
Trans t on and deve opment of raw agr cu tura com mod ties nto nutr t onal food products Emphas s g ven to food expans on n develop ng countr es

453 World Agricultural Resources. 3) S, Str es
Wor d product on and consumpt on of agricu tura prod ucts, nternat ona relat onsh ps and agenc es concerned w th wor d agr cu tura deve opment prob ems.

454 International Agricultural Trade. 3) S Woodson
D mens ons, ocat ons m x methods and changes of nternat onal trade agr cultura products

455 Agricultural Marketing Channels. (3 F Woodson
Operationa stages of agr cu tura commodit es n nor ma d str but o systems and mp ementat on of marketing strateg es Prerequ s te AGI 312

490 Recent Advances in Agribusiness. (1) NR, Staff
Reports and d scuss ons of current top cs and prob ems assoc ated w th agrıbus ness May be repeated for cred t

491 Recent Advances in International Agriculture. 1) NR Staff
Rep rts and d scuss ons of current top cs and probiems assoc ated w th ınternat onal agr cu ture May be re peated for cred t

508 Advanced Agricultural Marketing. 3 NR, Wood son
Theory and ana ys s of marketing farm commod t es r sks and effect of future trad ng on cash pr ce

512 Food Industry Management. (3) NR; Staff
Operat ons and management f fo d process ng facto r es food distr but on centers and reta food hand ng firms

516 International Agricultural Techniques. 3) F; St es
Coord nat on of production and market ng techn ques to consumpt on objectives w th agr cu tura products ın fore gn countr es

518 World Agricultural Development. 3 S St es
Factors that nf uence product on process ng and mar-keting of agr cultura products n deve oping countr es

519 Animal Production in Arid Regions of the World. 3 F Moody
Select on, nutrition, market ng and uti zation of an ma s 'n arid countr es Prerequ s te· AG 300.

520 Crop Production in Arid Regions of the World. (3 NR R chardson
Major field crops n ar d c ımates and the r potent al for supp y ng the future need for food and f ber. Prerequ site. AG 310

521 Soil Management in Arid Regions of the World. (3 F, Barrett
So l sc ence and so management pract ces for mainte nance of the fert l ty reservoir phys ca coı dit on and product v ty as related to t lage rrigation and con er vat n n ar d reg ons Prerequ s te ERA 325

Special Courses: AG 484 494 498 499 500 580 584 590 591 592, 593 594 598 599· See pages 30 31)

BIO-AGRICULTURAL SCIENCES

BAS 130 Plant Science. 3 F S
P ant growth and development n the rura and urban enviro me t. Two ectures 3 hours laborato y

150 Animal Science. 3) F, S
Comparative g owth, deve opn ent and propagat n of farm anima s Two ectures 3 hours laborato y

320 Anatomy of Agricultural Animals. (4) S
Gross and m croscop c structura anat my of orgar systems of agr cu tura an ma s concepts of physiologı ca processes discussed Prerequ s te BAS 150 or B O 101 102 Three ectures 3 hours aboratory.

350 Nutritional Science. (3 F S
Energy and nutr ents n ıv ng systems Prerequ s te. CHM 101

351 Nutritional Science Laboratory. 1 F S
Exper menta tr a s nvo v ng the pr nc ples of nutr tion and the phys o ogical ro es of nutr ents n metabo sm Coreq s te BAS 350 Th ee hours aboratory

353 Applied Animal Nutrition. (3) S
Feedstuffs feed ng standards and the r app cat on n meet ng nutrit na needs of an mals pr duc ng food and f ber Prerequ s te BAS 350

360 Crop Physiology. (4 NR
Phys o ogy of crop p ants w th emphasis o p ant nutr t on and env'ronmenta factors Prereq s te BAS 130 Three ectures, 3 hours laboratory

370 Meat Science. (3 F
Bas c sc ence of muscle and meat n an ma product on process ng and ut l zatıon Prerequis te BAS 150 or FON 142

450 Experimental Feeding. 3) NR G pp
Nutritiona appl cat ons re ated to max mum production n vestock Prerequ s te BAS 353 Two ectures, 3 hours aboratory

452 Comparative Non-Ruminant Nutrition. (3) F G pp
Nutr ent requ rements and uti zation for s mple-stomached an ma s. Prerequ s tes: BAS 350, CHM 231

453 Ruminant Nutrition. (3) S Moody
Rum nant d gestive system, rat'ons, fermentat on prod ucts and the r metabol sm Prerequisites. BAS 350 CHM 231.

454 Physiology of Nutrition. (3) F Moody
Metabo sm of nutr ents n the ife processes Prerequ s tes BAS 353 or FON 142, CHM 231

456 Animal Breeding. 3 S Taysom
Genetics app ed to an ma breed ng Prerequ s tes ZOL 100 B O 340 or ZOL 341

457 Advanced Animal Nutrition I. 3) S G pp
Nutr t onal energet cs, the ut l zat on and metabo sm of carbohydrates and pids n an mal systems Prerequ - s tes s x hours n nutr t on.

460 Animal Physiology I. (4) F S, Monty
Contro and funct on of the nervous muscular, card o vascu ar resp ratory and renal systems of domest c anima s Prerequis tes CHM 113 B O 101 Three lec-tures, 3 hours aboratory

461 Animal Physiology II. (3 NR; Monty
Control and funct on of the endocrine digestive, and reproduct ve systems of domest c an ma s Pr nc p es of adaptat on f animals to their env ronment Prerequ s te. BAS 460 or ZOL 360

462 Animal Physiology Laboratory. 1) NR Monty
Se ected phys o og ca exper ments to accompany BAS 461 Three hours aboratory

463 Physiology of Animal Reproduction. (4) F, Weems
Development, function and contro of the reproduct ve system of domest c anima s Prerequ s te BAS 150 Three lectures, 3 hours aboratory

465 Physiological Chemistry. 4) S Weems
Phys olog cal contro mechan sms of b ochem ca reac tions and nteract ons to metabo c components Prerequ s tes: BAS 460 or ZOL 360; CHM 231 or CHM 331. Three ectures 3 hours aboratory.

471 Diseases of Domestic Animals. 3) S Staff
Control and prevention of nfectious and non nfect ous d seases of domest c an ma s

475 Endocrinology. (3 F, Weems
Functions of the endocr ne g ands n the regulation of an ma phys olog cal processes Prerequis te BAS 460 or ZOL 360

478 Adaptation of Agricultural Animals. (3 NR, Monty
Physiolog ca morpholog ca , genetic, and behav ora adaptat on of rum nant and nonrum nant agr cu tura an mals to var ous env ronmenta condit ons. Prerequ s tes BAS 460 and 461 or ZOL 360

490 Recent Advances in Nutritional Sciences. (1) NR Staff
Discuss on and crit ca evaluat on of current top cs n nutrition and metabolism research May be repeated for cred t

491 Recent Advances in Physiological Sciences. 1) NR; Staff
Discuss on and cr t ca eva uat on of current top cs n phys olog ca research. May be repeated for cred t

Special Courses: BAS 484 494 498, 499 500, 580 584, 590 591, 592 593, 594 598, 599 (See pages 30 31)

ENGINEERING OF AGRICULTURAL SYSTEMS

The courses and facu ty for the engineer ng of agr cul tural systems f eld of specia ization are multid sc plinary in scope and exist n other departments and col eges within the University.

ENVIRONMENTAL RESOURCES IN AGRICULTURE

ERA 325 Soils. (3) F, S
Fundamenta propert es of so s their re at on to p ant growth and the nutr ti n of man and an mals Relat on of so ls to env ronmental qua ity Prerequ s te CHM 101 or 113, or equ va ent.

326 Soils Laboratory. 1 F, S
Selected exerc ses to broaden the background and understanding of bas c so pr nc p es Corequisite. ERA 325 Three hours aboratory

330 Soil Productivity. 3) S
Use of fert zers crop rotat ons and water n the man-agement of so ls Prerequ s te ERA 325 Two ectures, 3 hours aboratory

332 Agricultural Chemicals. 3) S
Compos t on, propert es and use of agr cu tura com merc a fert zers and pestic des and the r effects on so a r and water qua ity

333 Water Resources. (3 S
Sources their deve opment and conservation n arid regions for agr cultural and urban uses

346 Environmental Conservation. 3) F, S
The conservation of wi d and and agr cultura resources emphas z ng the systems approach for studying com p ex ty

350 Applied Quantitative Methods. 3) F S
Statist ca methods w th appl cat ons n natural resource management and the agricu tura sc ences Use of d g tal computer Prerequ s te MAT 141 or equ va ent

360 Range Ecosystems. (4 S
The interrelat ons of vegetat on so ls and graz ng an mals. Eva uation and s mulat on of grazing anima mpact Prerequisite ERA 346 or equiva ent Four hours lecture rec tation.

361 Range Ecosystem Practicum. (1 F
Descr pt'on of range and resources f e d dent f cat on of p ants and compass survey ng Prerequis te ERA 360 Three hours aboratory, two two-day weekend f eld tr ps.

370 Forest Ecosystems. (3) F 80
The descr pt on and s mu at on of t mber, water and graz ng resource dynam cs Ana ys s of success onal processes fo low ng d sturbance Prerequ s te ERA 346 or equ valent Three lectures fie d tr ps.

380 Environmental Horticulture. (3) F
P ant cu ture and use n urban agr culture. Prerequ s te BAS 130.

381 Propagation of Plant Cultivars. (3) S
Pr ncip es and ski s in propagat ng andscape trees and shrubs by semina and vegetat ve means inc ud ng fru t p ants Prerequ s te: BAS 130 Two ectures 3 hours aboratory

382 Lawns and Greens. (3 S
Se ection estab shment and ma nte ance of turf grasses for lawn park and sports areas Two lectures 3 hours aboratory

383 The Science of Home Gardening. (3 F '80
Use of natura systems n food production Two lec tures 3 hours laboratory

386 Indoor Landscape Plants. (3) S
Se ect on and care of conta ner-grown house p ants

400 Range Ecogeography. (3) S Brock
Structure funct on and p ant compos tion of range eco-systems. S mu at on of change resu t ng from man's use of resources Prerequ s te ERA 360 (ERA 370 recom-mended

402 Methods in Range Ecology. 3 S '81 Whysong
Vegetat on sampl ng and inventory as re ated to an ma hab tat re at ons Prerequis tes ERA 350 and 360 Two ectures 3 hours laboratory· two weekend f e d tr ps

407 Range Plants. (3 F, Brady
The d str bution, eco og ca character st cs ident fica tion and va ues of p ants on western range ands Laboratory emphas zes taxonomy and ident ficat on of grasses Prerequ site BOT 370 or equ va ent. Two ec tures, 3 hours aboratory

410 Population Habitat Relations. 3) S 80 Whysong nteract ons among an ma popu at ons and the r habi-tat Systems s mu at on of popu ation dynam cs as nf uenced by compet t on and management strateg es. Prerequ s te ERA 360 Three ectures one weekend fie d trip

420 Range Improvement Practices. (3) F, Brock
Brush and weed contro revegetat on burn ng ferti iza t on fenc ng, graz ng systems, and water deve opment. Emphas s on pr nciples and current improvement prac tices Prerequisite: ERA 360. Three ectures one weekend f e d trip

425 Soil Taxonomy. (3) S· Barrett
Fundamenta princ p es of soi genesis morphology and class f cation nc ud ng properties of s gn f cance n mapp ng and interpret ng so survey nformat on. Pre requisite· ERA 325. Two lectures, 3 hours aboratory

430 Landscaping Principles. (3 F Weisser
P anning and p ant ng for maximum beauty and ut ty, nc ud ng energy conservat on Prerequ s te ERA 380 or equ valent

438 Woody Plant Marketing. (3 F '80 Backhaus
Product on of trees and shrubs for wh esa e and retai market ng Prerequ s te ERA 380 or equ va ent Two ectures 3 hours aboratory.

440 Crop Growth and Development. (3 F Backhaus
Env ronmenta factors affect ng the adaptat on d str bu t on growth and deve opment of crops Prerequis te BAS 130

446 Forest and Range Soils. 3) F· Brock
Components of natura so systems and related pro cesses d scuss ng roots f re, water nutr ent cyc es and eros on abatement Prerequ s te ERA 325 360 or 370 Fie d tr ps requ red.

452 Irrigation. 3 F 79 Rob nson
Water measurement, conveyance and conservation w th emphas s on crop production and so p ant water rela t ons. Prerequ s te ERA 325

460 Applied Systems Ecology. 3 F 80 Whysong
The systems approach app ed to analys s and manage ment of natura resource ecosystems Use of s mu at on models Prerequ s tes ERA 350 or equ valent, one course n eco ogy

463 Greenhouse Systems. 3) F We sser
Funct ona des gn and ntegrated management of greenhouse and hydropon c systems Prerequ site ERA 325 Two ectures 3 hours laboratory

480 Natural Resource Planning. (3) S Brock
Pr nc p es and techn ques of p ann ng for management and conservat on of natura ecosystems Use of opt m zat on mode s and decision theory Preparat on of management plan Prerequ s tes ERA 370 402 and sen or standing. Three ectures one weekend f e d tr p

490 Recent Advances in Environmental Resources. (1 NR Staff
Current l terature and significant deve opments nvo v- ng env ronmenta resources May be repeated for cred t

548 Plants, Soils and Environmental Quality. 3) F Barrett
Effects of a r qua ity on p ants and so ls, and the r ro e n removing contam nants from the atmosphere Prerequ s te. ERA 325

560 Systems Ecology. (3) F '79, Whysong
Quant tative descr pt on and mathemat cal model ng of ecosystem structure and funct on Techniques for mode construction and s mulat on Prerequis tes s x hours n eco ogica stud es computer programm ng, ERA 350 or equ va ent Two lectures, 3 hours abora tory

Special Courses: ERA 484, 494 498, 499 500, 580, 584 590 591 592, 593, 594 598, 599 See pages 30 31.

Division of Construction

Vernon L Hastings, M.S.I.E., Director

Purpose

The centr al purpose of the Division of Con struction at Arizona State University remains, as it has since 1957, to provide students the opportunity to obtain a quality education in construction and qualify them directly for po sitions of leadership and responsibility in the construction industry. The curriculum includes course requirements in the physical sciences, mathematics, architecture, business, engineering sciences, and construction. To ensure a balanced understanding of the technical, pro fessional and philosophic standards which distinguish modern-day constructors, advisory groups representing leading associations of contractors and builders provide counsel in curriculum development.

General Information

Admission. Students who wish to be admit ted to full freshman standing in the construction program should present certain secondary school units in addition to the mini mum University entrance requirements. A total of 3 2 units is required in mathematics, including advanced algebra, geometry and trigonometry. The laboratory sciences chosen must include at least one unit in physics.

Students who have omissions or deficiencies in subject matter preparation may be required to complete additional university credit course work which may not be applied toward a construction degree Courses usually taken to satisfy omissions or deficiencies include one or more of the following: MAT 115 College Al gebra and Trigonometry, MAT 117 College Algebra, MAT 118 Plane Trigonometry and PHY 101 Introduction to Physics

Transfer Students. The freshman and sopho more program of study is designed to facilitate transfer for junior and community college stu dents or A.A. graduates. Prospective Arizona community college transfer students should consult their advisor and refer to the "Engi- neering" section of the annual *Arizona Higher Education Course Equivalency Guide* for a listing of the acceptable courses transferable to the ASU construction program. It is possi ble with proper advance planning for many transfer students with an A.A. degree to com- plete the four year B S. program in four semesters at ASU. Further information may be obtained from the: Division of Construc- tion, College of Engineering and Applied Sciences, Arizona State University, Tempe, Arizona 85281

The Division includes a chapter of Sigma Lambda Chi, national honorary construction fraternity, and a student chapter of the Asso ciated General Contractors of America

Scholarships. Apart from those given by the University generally, a number of scholarships from the construction industry are awarded to students registered in the construction pro gram. They are awarded on the basis of academic achievement and activities in the construction program.

Bachelor of Science Degree in Construction

Students seeking a Bachelor of Science degree in construction must satisfactorily complete a curriculum of not less than 128 credit hours Construction careers are so broadly diversified that no single curriculum will fit the student for universal entry into all fields As an example, engineering contractors usually place more emphasis on technical and engineering science skills than do residential constructors, who usually prefer a greater depth of knowledge in management and urban science. Nevertheless, construction has a common core of management, engineering science and behavioral courses on which students may build defined concentrations to suit individual backgrounds, aptitudes and objectives These fields of specialization are not absolute but generally match major divisions of the construction industry

Concentrations

General Building Construction

Heavy Construction

Construction Systems Administration

The lower division courses are the same for all concentrations. Therefore, should the student be undecided as to his career pattern, no decision need be made concerning the field of concentration until the junior year. Each concentration is arranged to accent requisite technical skills and develop management, leadership and competitive qualities in the student Prescribed are a combination of General Studies, a broad range of theoretical and applied management science subjects fundamental to the business side of contracting, and technical courses basic to engineering and architectural construction work Not only must the student be educated to survive heavy demands for explicit technical performance during his initial career years, but he should also understand the functions of his employers and the industry whose agency he serves. The student should acquire the motivation for continuing his education which, when combined with experience, will qualify him for top positions of leadership and authority in the construction industry.

Students in all concentrations shall be required to complete a construction core of science based engineering, construction and management courses. Since the credit hours vary for some alternative courses in the core, any differences in credits for the required courses will be made up in the selected option to achieve a minimum of 128 credit hours.

General Studies Requirements (39 Sem. Hrs.)

Humanities and Fine Arts (6 Sem Hrs)

Architecture (APH) Course Required		2
Electives		6

Behavioral and Social Sciences (9 Sem Hrs

ECN 201	Principles of Economics	3
ECN 202	Principles of Economics	3
ADS 305	Business Law	3

Science and Mathematics (22 Sem Hrs)

MAT120	Calculus I	5
PHY 111 1 3	General Physics Mechanics and Heat)	4
PHY 12 114	General Physics (Electricity Light Magnetism)	4
QBA 221	Business Statistics	3
ECE 122	Computer Programming	2
	Science Lab Elective	4

English Requirement (6 Sem Hrs)

ENG	First Year English	3
ENG 02 r	First Year English	3
ENG 1 4	Advanced First Year English	3

Must pass exempt examination

see placement examinations for proficiency, page 22)

Construction Core Requirements (68 Sem Hrs)

ACC	101	Elementary Accounting	3
ECE	104	Engineering Graphics	2
CON	221	Statics Mechanics	3
CON	243	Construction Materials and Specifications	2
CON	244	Construction Graphics	1
CON	252	Construction Equipment	2
ELE	273	Electrical Construction Fundamentals	4
CLE	341	Surveying	3
CIE	310	Materials for Construction	2
CIE	380	Hydraulics and Hydrology	3
CON	323	Strength of Materials	3
CON	33	Construction Safety	2
CON	345	Mechanical Systems	3
CON	366	Construction Methods	3
CON	3 4	Construction Systems Management	2
CON	383	Construction Estimating	3
CON	389	Construction Cost Accounting and Control	3
CON	395	Construction Planning and Scheduling I	2
CON	424	Structural Design	3
CON	453	Construction Labor Management	3
CON	463	Foundations and Concrete Structures	3
CON	474	Power and Process Plant Construction	3
CON	495	Construction Planning and Scheduling II	3
CON	496	Construction Contract Administration	3
CLE	453	Soil Mechanics in Construction	3
ECI	4	Engineering Communications	3

Advisor approved alternates/transfer credits for courses listed above may vary from the total required semester hours indicated. Such variances shall not reduce the minimum of 128 semester hours required for the degree.

Construction Areas of Concentration

One area is to be selected by the student.

General Building Construction. The general building concentration provides a foundation for students who wish to follow careers as managers or owners of firms engaged in the construction of residential, commercial and institutional structures While conventional building is still a major factor in this field, modern educational focus is on industrialized building systems required for the mass development and production of large scale projects General construction is treated as a complete process from initial conception through delivery of completed facilities to users.

General Building Concentration Requirements (15 Sem. Hrs.)

REA	251	Real Estate Principles	3
REA	411	Real Estate Law	3
CON	384	Advanced Building Estimating	3
CON	472	Land Development Feasibility	2
Approved electives			4

Heavy Construction. The heavy construction concentration prepares students for careers with constructors and contracting organizations, constructing large civil, mechanical and electrical systems Typical projects are space systems, highways, railroads, airports, power plants, rapid transit systems, process plants, harbor and waterfront facilities, pipelines, dams, tunnels, bridges, canals, sewerage and water works, mass earthwork, and other heavy public works

Heavy Construction Concentration Requirements (15 Sem. Hrs.)

ADS	306	Business Law	3
CEE	344	Route Surveying	3
CON	486	Heavy Construction Estimating	3
CON	482	Cost Engineering	2
Approved electives			4

Construction Systems Administration. This concentration is designed to provide graduates the capability of planning and organizing the unique and demanding systems and procedures required in the operation of a large-size construction organization.

The increasing complexity of critical issues in both the public and private sectors demand a greater breadth of technical and administrative perspective and greater depth of understanding of modern methodologies for system analysis. Emphasis is on objective and analytical procedures to facilitate sound decision making in the construction process.

Construction Systems Administration Requirements (15 Sem Hrs.)

IEE	330	Introduction to Data Base Design	3
IEE	422	Information Acquisition	3
CON	455	Construction Office Methods	3
CON	482	Cost Engineering	2
Approved electives			5

Additional concentration options, such as Mechanical Construction, Electrical Construction, Residential Construction or other specialty areas will be considered upon application by the student. In consultation with an advisor a specific program of courses in addition to the core course sequence may be developed subject to courses offered within the University and approval of the division director.

Construction

PROFESSORS:
HASTINGS (ECA 302), MICHELS, PETERMAN
ASSOCIATE PROFESSORS:
BURTON SELLECK WARD, WOODING

CON 221 Static Mechanics. 3) F S
Force systems acting on structural members Forces moments equilibrium centroids trusses, beams, cables, frames machines, friction, section properties, masses Both US and SI units of measurement Prerequisites MAT 120, PHY 111 113

243 Introduction to Construction Materials and Specifications. 2 F S
Construction building materials and components Emphasizing material description, usages and incorporation into the structure Field trips. Prerequisite ECE 104 or equivalent

244 Construction Graphics. 1) F, S
Sketching and architectural drafting of building materials and systems Field trips Three hours laboratory Prerequisite ECE 104 or equivalent.

252 Construction Equipment. 2 F S
Characteristics, capabilities motivations and employment of general building and heavy construction equipment Fleet operations maintenance programs Field trips

323 Strength of Materials. 3 F S
Analyses of strength and rigidity of structural members in resisting applied forces. Stress strain shear moment deflections combined stresses, connections moment distribution Both US and SI units of measurement Field trips Prerequisite CON 221 or equivalent.

331 Construction Safety. (2 F, S
Economics of accident prevention Design for safe field practice Hazard analysis Protective equipment and devices Worker education Occupational Health Occupational Safety and Health Act Field trips

345 Mechanical Systems. 3 F S
Heating and climatic systems for buildings Sanitary and water piping layout and simple design Field trips Four hours lecture and laboratory Prerequisites CON 243 EEE 273.

366 Construction Methods. 3 F S
Analysis of construction projects for the determination of the most appropriate and economic methods Job organization preplanning and site layout Field trips

Prerequisites: CON 243, 252, or approval of instructor. Four hours lecture and laboratory.

374 Construction Systems Management. (2) F, S
Organization and systems theory for construction. Conceptual foundations. Elements of leadership and human direction. Industry management, functions, and processes. Prerequisite: junior standing or approval of instructor.

383 Construction Estimating. (3) F, S
Theories and systems of building estimating. Quantity survey techniques, standard formats, classification and analysis of work, organization of detail, unit cost determinations, simulated bids. Field trips. Four hours lecture and laboratory. Prerequisites: ECE 122 or equivalent; CON 243; construction majors only or approval of instructor.

384 Advanced Building Estimating. (3) F, S
Methods analysis and cost estimating for construction of general building projects. Continuation of CON 383. Field trips. Four hours lecture and laboratory.

387 Building Construction Estimating. (3) F
Commercial and residential building estimating. Types of estimates. Quantity surveys. Analysis and organization of all building estimating details. Unit and total cost determination. Prerequisite: CON 244, or approval of instructor.

389 Construction Cost Accounting and Control. (3) F, S
Nature of construction cost. Investment models, depreciation and tax theory, variable equipment costs. Cash flow theory, profitability and analysis. Funding sources and arrangements. Builder's insurance. Prerequisites: A knowledge of FORTRAN; ECE 122 or equivalent, ACC 101, CON 383.

395 Construction Planning and Scheduling I. (2) F, S
Various network methods of project scheduling, such as AOA, AON, CPM, PERT and PDM. Using manual and computer systems. Other graphic methods including bar-charting, line-of-balance, and VPM, resource allocation and time/cost analysis. Prerequisites: computer programming; CON 244, 366, 383.

401 Construction Firm Management and Control. (3) F
Application of construction management principles by the small or specialty contractor. Directed experience in the analysis and evaluation of small contractor problems. Prerequisites: CON 374, 383, 389, 395.

411 Construction Operations Analysis. (3) F
Project information systems and their use in the decision-making process. Linear programming and optimization theory. Prerequisites: CON 383, 389. Corequisites: CON 366, 453.

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 history, union structure, and collective bargaining in the building and construction trades. Work customs and project organization. Applicable laws and government regulations. Area productivity differentials. Labor goals, economic power, jurisdictional disputes, grievance procedures. Four hours lecture and laboratory. Prerequisites: ECN 202, CON 374.

455 Construction Office Methods. (3) S
Administrative systems and procedures for the construction company office including methods improvement and work simplification, office layout, business forms and design, office manuals. Prerequisite: CON 389.

462 Project Planning and Control. (3) S
CPM, PERT and line of balance scheduling. Resource allocation. Control of time and cost. Prerequisite: CON 411.

463 Foundations and Concrete Structures. (3) F, S
Subsurface construction 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, cofferdams, caissons. Field trips. Prerequisites: CON 323, 424, CEE 450.

472 Land Development Feasibility. (2) S
Economic location theory. Analysis of the profitability of land developments. Prerequisites: CON 383, 389. Field trips.

474 Power and Process Plant Construction. (2-3) S
Review of selected industrial processes. Design isometric drawings, and estimating costs for pipe, electrical, pressure vessels, and instrumentation. Project management of major industrial projects. Two-three hours lecture. Field trips. Prerequisites: CON 244, 345, 389, or approval of the instructor.

482 Cost Engineering. (2) S
The time-value of money. Comparison of alternatives, depreciation methods and impact on taxes, replacement and break-even analysis. Construction financing and analysis. Prerequisite: CON 389.

486 Heavy Construction Estimating. (3) F, S
Methods analysis and cost estimation for construction of highways, bridges, tunnels, dams and other engineering works. Prerequisites: CON 383, CEE 344, or approval of instructor. Field trips.



495 Construction Planning and Scheduling II. (2) F, S
Applications of scheduling techniques. Project planning, monitoring and control. Schedule updates and revisions. Detail scheduling methods. Long range scheduling for the organization. Graphic communication techniques. Prerequisites: CON 389, 395.

496 Construction Contract Administration. (3) F, S
Case studies. Ethical practice, social responsibility, licensing, codes and public regulation of contracting. Quality control requirements. Claims, payments and changes. Bonding, insurance, idemnification procedures. Technical and fiscal failure. Formulation of management contracts, prime contracts, subcontracts, joint venture and consortium agreements. Arbitration, litigation and specification analysis. Term papers. Prerequisite: senior standing. Pre- or co-requisite: ECE 400.

531 Economics of the Construction Industries. (3) F; Burton
The economic environment of construction with emphasis on unique aspects; critical review of economic literature dealing with the construction industries. Prerequisites: ECN 201, 202 and CON 496 or approval of instructor.

532 Economic Models of the Construction Industries. (3) S; Burton
Forecasting the demand for structures. Models of the industry's capacity. Measures of productivity. Prerequisite: CON 531.

551 Facilities Operation and Maintenance. (3) S; Wooding
Analysis of maintenance work. Structure of the maintenance work and organization. Contract maintenance and force account economics. Maintenance control and supervision of operations. Field trips.

577 Construction Systems Engineering. (3) F; Burton
Systems theory as applied to the construction process. Alternates for structuring information flows and the control of projects. Prerequisite: CON 462 or equivalent.

Special Courses. 294, 484, 494, 498, 499. (See pages 30-31.)

School of Engineering

C. R. Haden, Ph.D., Director

Purpose

A large percentage of all engineering degree holders are found in leadership positions in a wide variety of institutional 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 will serve 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 Arizona State University 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 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; (5) those who wish to take certain electives in engineering while pursuing another program in the University.

General Information

Admission. Students who wish to be admitted to full freshman standing in all curricula in the School of Engineering should present certain secondary school units in addition to the minimum University requirements. A total of 3½ units is required in mathematics. Included must be: college algebra, geometry and trigonometry. The laboratory sciences chosen must include at least one unit in physics and one unit in chemistry.

Students who have omissions or deficiencies in subject matter preparation may be required to complete additional university credit course work which may not be applied toward an engineering degree. One or more of the courses—MAT 115 College Algebra and Trigonometry, PHY 111 and 113 General Physics, ENG 101 First Year English*, CHM 113 General Chemistry—are often taken to satisfy omissions or deficiencies.

Programs of Study. The composition of the Bachelor of Science (B.S.) and Bachelor of Science in Engineering (B.S.E.) degrees is made up of three approximately equal parts: University General Studies, an Engineering Core, and a Field of Specialization. This combination is illustrated in the accompanying chart.

The General Studies satisfy a University requirement and include basic studies in the humanities and fine arts, the social and behavioral sciences, the engineering and physical sciences, and mathematics (see page 36). These courses comprise approximately one-third of the degree program.

The Engineering Core is a specific and organized body of knowledge that will serve as a foundation to engineering and for further specialized studies in a particular engineering field of specialization. These courses comprise approximately one-third of the degree program.

The fields of specialization available are of two types: (1) those associated with a particular department within the School of Engineering (for example, electrical and computer engineering, civil engineering, etc.), and (2) those offered as Special and Interdisciplinary Studies (for example, manufacturing engineering, nuclear engineering, premedical, etc.). In general, the departmental curricula are extensions beyond the Engineering Core and cover a wide variety of subject areas within each field. In each case several courses



*See statement on Placement Examinations for Proficiency—English, page 22.

are set aside for the student's use as technical electives to support an area of emphasis.

For convenience, the departments are designated as CEE (Civil Engineering), CHE (Chemical and Bio Engineering), EEE (Electrical and Computer Engineering), ESE (Aerospace Engineering and Engineering Science), IFE (Industrial and Management Systems Engineering), and MEE (Mechanical and Energy Systems Engineering).

The areas offered under the Special and Interdisciplinary Engineering Studies are designed for those students whose educational objectives require more intensity of concentration on a particular subject or more curricular flexibility among engineering disciplines than is possible in the traditional departmental fields. Again, several courses are made available to the student within each field of specialization to support an area of emphasis. Field of specialization courses comprise approximately one-third of the degree program.

The first two years of study are concerned primarily with the General Studies and the Engineering Core, with more time being spent with General Studies. The final two years of study are concerned with the Engineering Core and the field of specialization, with the major part of the time being spent with the field of specialization. This arrangement can be illustrated by the following chart.

The sequential arrangement of all course work for the B.S. and B.S.E. degrees into the three categories above is especially helpful to the beginning student who is undecided concerning a specific career choice from within the various fields of specialization. It is possible, for example, to delay a final selection of the field of specialization until the third year. However, if a specific career choice has been made earlier, the semester by semester selection of courses will vary from one field to another. An example of a typical freshman engineering schedule is shown below.

Typical Freshman Year

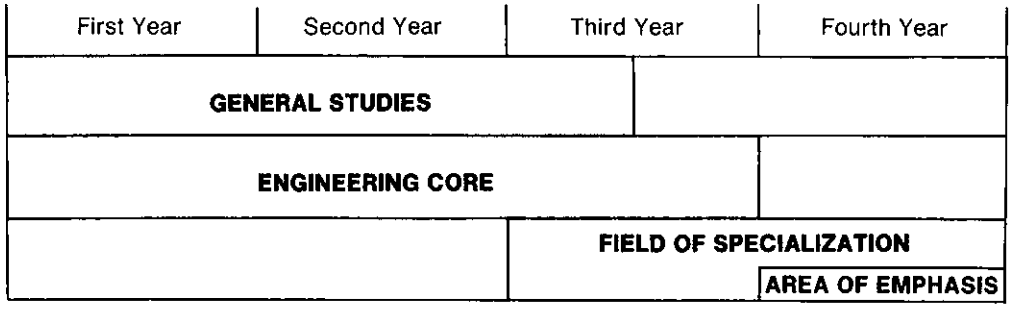
	Semester Hours
Fall Semester	
CHM 114 or ECE 168 Chemistry	4
MAT 120 Calculus I	5
FCI 102 Introduction to Engineering	2
FCI 104 Engineering Graphics and Design	2
Social Sciences	3
Total	16
Spring Semester	
FCI 122 Computer Programming	2
MAT 121 Calculus II	5
FCI 201[3] Mechanics	3
Humanities or Fine Arts	3
ENG 102[4] or ENG 104 English	3
Total	16

[1] Chemical Engineering students must take CHM 113.

Students must take MAT 119 Algebra and Trigonometry.

Students with a deficient background in physics (high school students should complete PHY 121 and 123 the preceding semester).

[4] Students must begin ENG 102 or ENG 104 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 fewer than four 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, i.e., in chemistry, English, physics, or mathematics, the student must complete more than the minimum of 128 semester hours. Therefore, in cases of inadequate secondary preparation, poor health, or financial necessity requiring much time for outside work, the undergraduate program should be extended to five years or longer.

Professional Accreditation

All the undergraduate engineering fields of specialization—chemical, civil, electrical, industrial, mechanical, and the special and interdisciplinary engineering studies in engineering—are accredited by the Engineers' Council for Professional Development (ECPD). Master of Science in Engineering programs are accredited by ECPD in the fields of electrical, civil, industrial, and mechanical engineering, and in engineering science.

Degrees

The School of Engineering offers two baccalaureate degrees, the Bachelor of Science in Engineering and the Bachelor of Science The programs of study leading to these degrees are carefully structured to meet the requirements of the University and of the Engineers' Council for Professional Development.

Integrated B.S.E.—M.S.E. Program

(This program is described on pages 187, 191.)

Degree Requirements. The degree programs in engineering at Arizona State University 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.

(1) *General Studies* to ensure that the engineer will acquire a satisfactory level of basic knowledge in the humanities and fine arts, social and behavioral sciences, and sciences and mathematics. 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

2 *Fundamental studies* in engineering, mathematics, and related subjects that will further develop the foundation for engineering and for further specialized studies in a particular engineering discipline

(3) *Field of specialization studies* that 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

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

General Studies			Semester Hours
ENG	1 2	or ENG 104 English	3
ECN	201	Principles of Economics	3
Humanities and Fine Arts Courses			6 10*
Behavioral and Social Sciences Courses			3*
CHM	1 4	Chemistry (CHM 6, or ECE 115)	4
ECE	20	Mechanics	3
ECE	202	Electricity and Magnetism	4
ECE	2 3	Sound and Optics	2
		or PHY 15 101 and 181 (Honors Section or by Permission for ECE 201 202 203)	
MAT	120	Calculus	5
MAT	21	Calculus I	5
		Total General Studies	42

*Credit hours vary with choice

A total of 16 semester hours of the General Studies must be in behavioral and social sciences (including ECN 201), and humanities and fine arts, with a minimum of 6 hours in each of these areas being required. It is recommended that at least 6 of the 16 semester hours total be 300 or 400 level courses, and that the students select two courses from the same subject area. Selections must be made from the following lists

Humanities and Fine Arts: Selected courses in architectural philosophy; English literature; foreign language literature; humanities; philosophy; music appreciation; drama appreciation, art history or art appreciation.

Behavioral and Social Sciences: Selected courses in anthropology; criminal justice, cultural geography; economics; society, values and technology engineering); history; political science; psychology; sociology.

Engineering Core

The courses included in the Engineering Core are taught in such a manner that they serve as basic background material (1) for all engineering students who will be taking subsequent work in the same and related subject areas, and (2) for those students who may not desire to pursue additional studies in a particular subject area Thus, subjects within the Engineering Core are taught with an integrity and quality appropriately relevant to the particular discipline, but always with an attitude and concern for both engineering in general and for the particular field(s) of specialization. The courses required are listed below:

Engineering Core

			Semester Hour
ECE	102	Introduction to Engineering	2
ECE	104	Engineering Graphics and Design	2
ECE	122	Computer Programming	2
ECE	211	Engineering Mechanics I	2
	or	ECE 217 Particle Mechanics	
ECE	305	System Dynamics and Networks	4
ECE	3 2	Engineering Mechanics II	3
	or	ECE 3 8 Rigid Body Mechanics	
ECE	313	Mechanics of Materials	3
ECE	335	Electrical Science	4
ECE	340	Thermodynamics	3
		or CHM 441 General Physical Chemistry	
ECE	350	Structure and Properties of Material	3
		or ECE 351 Engineering Materials or ECE 352 Semiconductors and Devices or CHM 442 General Physical Chemistry	
ECE	371	Transport Phenomena	4

ECE	380	Ordinary Different al Equations for Engineers	3
		or MAT 212 Elementary Differential Equat ons	
ECE	382	Linear A gebra for Eng neers	2
		or MAT 213 Elen e tary Linear Algebra or EC F 383 Probab lity and Statis tics for Engineers or I C I 384 Numerical Analysis for Lng neers o LCE 385 Vector Analys s for Engineers or ECF 386 Partial D fferentia Equations for Engineers or E C I 387 Co mplex Variables f r Eng neers	
Approved Mathematics Content Elective			2
ECE	400	Engineering Comn unications	3
		Total Engineering Core	42

Field of Specialization

Fields of specialization and areas of en phasis are offered by the seven engineering depart ments· Aerospace Engineering and Engineering Science, C hemical and Bio Engineering, Civil Eng neering, Electrical and Con puter Engineering, Industria and Management Systems Engineering, Mechanical and Lnergy Systems Engineering, and Special and Interdisciplinary Engineering About one-fourth of the field of specialization credits are reserved for the reserved for the student's use as an area of em phasis These credits are traditiona ly referred to as "technical electives." Requiren ents for each of the fields of specialization offered are described on pages 186 198.

Field of Specializ tion (including area of emphasis . . . . . 44 semester hours

Total Degree Requirements . . . . . 128 semester hours

Department of Aerospace Engineering and Engineering Science

C F Wallace, Ph D , Department Chair

Aerospace Engineering. The primary con cern of aerospace eng neers is th e design nd development of a wide variety of airer ift and space vehicles They also have the responsibil ty for the research and development necessary for future designs Th e current challenges to the aerospace engineer include the design of a new generation of high efficiency transport a rcraft, the development of a second generation of space transports and the design of large sp ace sys tems. In addition to the design of vehicles, the aerosp ace engineer is involved in the further devele pment of the many spin offs of the aerospace industry. These include contr butions to comm unications, air and water pollution moni toring, management of the e arth's land and resources, and the understanding and the co n trol of weather Future contributions are anticip ated in the area of zero gr avity manufac turing of high purity materials and medic nes, and the design of solar power s atellites.

The aerospace engineer ng curriculun is founded upon the broad fundamentals of math en atics and the engineering sciences, with the addition al specialized education in flight me ch anics, aerospace structures, aerodynamics, and propulsion providing the found ation neces sary for aerospace design

This program, leading to the Bachelor of Sci ence in Engineering degree, provides for early career c pportunities in industry or government Well-qualified students are also urged to consider graduate work le ading to the M aster of Science in Engineering and Doctor of Ph losophy degrees.

Aerospace Engineering Core

Students in the undergraduate aerospace engi neering emphasis are required to complete the Aerospace Engineering Core in addition to the Engineering Core. They may develop greater depth in areas of interest through a proper selec tion of approved electives.

The following courses from the Engineering Core are required for aerospace engineering students:

ECE	340	Thermodyn im cs	3
FCE	350	Structure and Propert es of Mater als	3
ECE	380	Ordinary Differential Equations for Eng neers	3
FCE	386	Partial Different al Equations for Eng neers	2

The following courses are required to fulfill the requ rements in aerospace engineering

ASE	304	Atomic and Nuclear Princ ples	2
ESF	413	Intermediate Dynam cs	3
ESE	415	Vibration Analysis	3
ESE	422	Mechanics of Materials	3
LSE	426	Aerospace Structures	3
ESI	450	Mechanica Properties of Solids	3
ESE	480	Aerospace Systems Design	3
MEF	372	Fluid Mechanics	4
MEE	382	Thermodynamics	3
MEF	450	Aerodynamics	3
MEE	453	Propulsion	3
Area of emphasis (technical e ectives)			11

The technical electives are selected with the approval of the student's advisor.

Engineering Science. The engineering science curriculum emphasizes the fundamentals of those scientific and mathematical disci plines which have application in solving important technological problems of society The program includes courses associated with

such fields as vibration and noise control, energy sources and conversion, nuclear energy, environmental protection and engineering materials.

This fundamental education provides the engineer with the flexibility and understanding required to cope with the rapidly occurring changes in technology and the needs of society.

Engineering Science Core

The undergraduate curriculum in engineering science is based upon the fundamental foundation provided by the Engineering Core. In addition to the Engineering Core, each student is to complete the requirements in the Engineering Science Core. Through the approved electives, the student may obtain greater depth in areas of special interest.

The following courses from the Engineering Core are required for engineering science students:

ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials	3
ECE	380	Ordinary Differential Equations for Engineers	3

The following courses are required to fulfill the requirements in engineering science:

ASE	304	Atomic and Nuclear Principles	2
CEE	361	Environmental Engineering	3
EEE	439	Measurement Systems for Engineers	3
ESE	410	Acoustics and Noise Control	2
ESE	413	Intermediate Dynamics	3
ESE	415	Vibration Analysis	3
ESE	422	Mechanics of Materials	3
ESE	430	Introduction to Continuum Mechanics	3
ESE	455	Physical Metallurgy	4
ESE	492	Project in Design and Development	3



MEE	411	Nuclear Engineering	3
MEE	487	Direct Energy Conversion	3
Area of Emphasis (technical electives)			9

The technical electives are selected with the approval of the student's advisor.

Materials Science and Manufacturing Engineering. Students pursuing programs in either the materials science or manufacturing engineering fields are advised by faculty members in Aerospace Engineering and Engineering Science. For descriptions of these two programs see the School of Engineering, Special Fields on page 194.

The B.S.E. Aerospace Engineering and Engineering Science curricula are accredited as a part of the Special Engineering Studies (see page 194) by ECPD as Engineering Science.

Integrated B.S.E.-M.S.E. Program. This program is for academically qualified undergraduate engineering students who desire a more efficient integration of their undergraduate and graduate programs. Qualified students are assigned a faculty committee to assist them in selecting appropriate courses for both the bachelor's and master's degree.

Department of Chemical and Bio Engineering

V. E. Sater, Ph.D., Acting Department Chair

The chemical engineer is generally concerned with processes involving a chemical change or separation. He applies chemistry as well as physics for the development, design and operation of processes and equipment. Mathematics is applied in computer analysis and design with economics as a practical guide. Since chemistry is involved in most activities, the chemical engineer is found in a diversity of industries which manufacture conventional chemicals, metals, ceramics, space propellants, solid state devices, petroleum products, plastics, foods, drugs and health care equipment.

Training in chemical engineering provides a broad background which prepares one for a variety of occupations including environmental control, extractive metallurgy, energy and material transformation, oceanography, biomedical, and nuclear engineering.

Although the bachelor's degree has sufficed for the majority, research and development activities often make graduate study desirable. Students expecting to undertake a graduate program should consult with their advisor before the senior year to obtain the best selection of courses for an integrated Master of Science in Engineering program.

Living systems represent the most complicated chemical processes requiring analysis. Biomedical courses offer the chemical engineer an opportunity to specialize in this area, and interdisciplinary options are provided for increased interaction between life science and other engineering majors.

Chemical Engineering Core

Since CHM 114 is a terminal course not de-

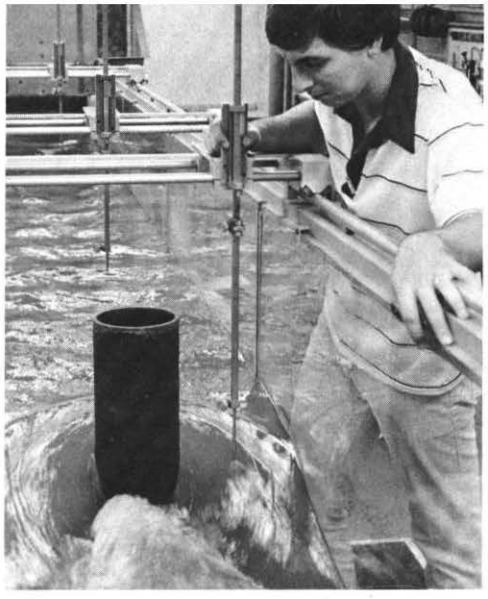
signed to prepare for advanced courses, its selection by chemical engineering majors is not recommended. The following courses are normally required for chemical engineering students as part of the engineering core requirements:

			Semester Hours
MAT	212	Ordinary Differential Equations	3
MAT	213	Linear Algebra	2
CHM	441, 442	General Physical Chemistry	6
ASE	487	Applied Mathematical Analysis	3

The following additional courses are normally required for the chemical engineering core:

CHM	331, 332, 335	General Organic Chemistry	8
CHM	443	Physical Chemistry Laboratory	1
CHE	311	Material and Energy Balances	2
CHE	332	Chemical Engineering Operations	3
CHE	333	Transport Phenomena Laboratory	1
CHE	342	Applied Chemical Thermodynamics	3
CHE	364	Chemical Process Instrumentation	3
CHE	432	Principals of Process Design	3
CHE	442	Chemical Reactor Design	3
CHE	451	Chemical Engineering Laboratory	2
CHE	461	Process Control	3
CHE	462	Process Design	3
CHE	492	Chemical Engineering Projects	2
CHE	496	Professional Seminar	0
Approved Technical Electives			3

The chemical engineering core is fundamentally chemical process engineering. Appropriate technical electives are chosen with the advice and consent of the advisor to allow some specialization in a field of interest. When greater specialization seems desirable, a maximum of two courses in the chemical engineering core may be replaced by selected courses meeting engineering education standards if approved by the advisor and faculty chair.



Chemical Engineering Areas of Emphasis. Suggested electives which may be selected to emphasize areas of interest include:

Biomedical. CHE 411, 413, 511, 513, 515, 517; IEE 425; BAS 460; EEE 465, 466, 565, 566.

Chemical Plant Administration. CHE 553, 581; CEE 564; ADS 305; MKT 300; MGT 301; CEE 564.

Computerized Design and Modeling. CHE 581; ASE 422, 425, 549.

Energy and Materials Conservation. CHE 523, 527, 553, 554, 571; MEE 487.

Environmental Control. CHE 553, 554, 556; CEE 361, 362, 564, 567.

Nuclear. CHE 521, 581; MEE 411, 412, 413.

Simulation and System Control. CHE 562, 581; IEE 463; MEE 465; EEE 480.

Department of Civil Engineering

Louis A. Hill Jr., Ph.D., Department Chair

Civil engineers are responsible for the planning, design, construction, research and management of many structural, urban and environmental projects which form the basis of our modern civilization. These include buildings, bridges, highways, dams, canals, irrigation projects, water and waste treatment plants and various multipurpose systems. Education in this field is established on scientific fundamentals with extensive training and practice in one or more areas of emphasis.

In addition to completing the engineering core with an average grade of C or better, plus at least a C grade in each of MAT 120, MAT 121, ECE 380, ECE 211, ECE 313, and ECE 312, civil engineering requires the completion of the courses listed below. Except for surveying, civil engineering, core courses may not be taken without special permission until the engineering core (excepting electrical and communication courses) has been completed with previously stated minimum grades.

Civil Engineering Core

The additional requirements for science, engineering sciences, and design specified in the engineering core are satisfied within the civil engineering core.

			Semester Hours
CEE	341	Surveying	3
CEE	321	Structural Mechanics	3
CEE	322	Structural Elements	3
CEE	323	Structural Engineering	3
CEE	351	Soil Mechanics	4
CEE	361, 362	Environmental Engineering	6

CEE	372	Transportation Engineering	3
CEE	381	Hydraulic Engineering	4
CEE	496	Topics in Civil Engineering Practice	3

Bachelor's Degree Program. Requirements for the bachelor's degree include the completion of the Civil Engineering Core courses and twelve (12) credit hours of technical electives with an average grade of C or better. Course selections will be made by the student with the advisor's approval and must include at least six (6) credit hours of *Civil Engineering Designated Design Electives*. The remaining six (6) credit hours of technical electives may be selected from, but are not restricted to, any of the courses listed under *Civil Engineering Elective Areas* For those students wishing to enter an area of emphasis, the technical electives should be selected from the elective area of particular interest The graduate courses listed under the elective areas may, with appropriate approvals, be taken for undergraduate credit

Civil Engineering Designated Design Electives

			Semester Hour
CEE	423	Structural Design	3
CEE	452	Foundations	3
CEE	466	Sanitary Systems Design	3
CEE	475	Highway Geometric Design	3
CEE	481	Water Resources Engineering	3

Civil Engineering Elective Areas of Emphasis with Suggested Courses

Structural Engineering Analysis and design of structures for buildings, bridges, space frames, structural mechanics: CEE 423, 521, 531, 532.

Soils and Foundation Engineering Properties of soils as an engineering material Foundation design Geotechnical engineering. CEE 452, 552, 555, 556, 557.

Environmental Engineering Water treatment. Industrial and domestic waste treatment and disposal Public health engineering Industrial hygiene. CEE 466, 461, 563, CHM 231, MIC 210, or MIC 201, 202

Transportation Engineering Analysis and design of transportation facilities. Transportation planning and economics. Transportation in the urban environment. CEE 475, 471, 572, 574, 576.

Water Resources Engineering Planning and design of facilities for collection, storage, and distribution of water. Water systems management. Estimating availability of water resources. CEE 481, 581, 582, 583.

Construction Engineering CEE 344, 573, CON 383, 395, 496

Pre-Architecture

Civil engineering provides a mechanism for qualified students to complete their requirements for admission to the College of Architecture while satisfying preliminary prerequisites for further study in structural engineering Required are: EDH 100, 101, 200 and 201, plus ENG 102 or 104, ECE 102, ASE 321, 6 hours of social and behavioral science, ECN 201, MAT 120 and 121, ECE 201, 211, 312, 313, 380, 383. Thirteen hours of design courses (DES 141, 160, 161, 221 and 222) complete the 65 semester hour requirement for admission to the three year professional program in architecture. To complete this pre architectural sequence in two years, students should have done well in algebra, trigonometry and physics in high school. A pre-calculus math course and chemistry may be desirable.

Joint Bachelor of Architecture Master of Science Engineering) Degree Program

Students who complete the pre architecture sequence in civil engineering may satisfy prerequisites for an M S., with a focus in structural engineering, by completing ECE 351 and CEE 321, 322 and 323 as technical electives during their three-year professional program in the College of Architecture. Upon receipt of their Bachelor of Architecture, such students can obtain their M.S. with 30 additional hours of approved course work if their academic qualifications satisfy graduate college requirements

Department of Electrical and Computer Engineering

Thomas E. Tice, Ph.D , Department Chair

Electrical Engineering. The professional activities of electrical engineers directly affect the lives of most of the world's population every day. Electrical engineers are responsible for the production and transmission of the vast quantities of electrical energy that our industrial society requires for its operation, and for the analysis, design and development of systems to control automatically the machines and processes of our factories Electrical engineers are responsible for the design and development of complex signal processing systems, such as telephone, radar, television, and analog and digital computers. Indeed, an electrical engineer is likely to be involved whenever power is utilized, intelligence is transmitted, or control of a physical process is required.

Computer Engineering. In recent years a rapidly increasing number of electrical engineers have devoted more and more of their time and talent to computer engineering Computer engineering encompasses a broad

spectrum of engineering design activities, from the design of digital integrated circuits to the design and implementation of software and operating systems for large-scale digital com puter systems Computer engineering topics within the electr c al engineer ng curriculum include digital circuit design, switching theory, digital and computer systems design, operat ing-systen and software design, computer a gorithms, and computer languages.

Current advances in n iniature digital inte grated circuits, which have made devices such as digital w itches and pocket s zed calculators commonplace, have also reduced computer hardw ire costs and m ide the microcomputer a reality As a result we are exper encing in explos on in the app ications of and demand for m croprocessors Electrical and computer engineering work is being done more and more in connect on with everyday products and consumer services

Electrical and Computer Engineering Core

The curriculum in electrical and computer engineering is based upon the fundan ental pr nciples of mathematics, science, and engi neering developed in the engineering core In add tion to the eng neering core, each student completes the electrical and computer engi neering core. Approved technical electives then prov de students with in opportunity to study in greater depth technical subjects in which they have special interests

The following courses are required for stu dents in electrical and computer engineering as part of the engineering core.

			Semester Hours
MAT	212	Elen entary D fferential Equ t ons	3
MAT	213	Element ry L near A gebra	2
MAT	362	Adv nced Mathematics or Engi neers and Scientists I (approved matl em t cs elective)	3
ICE	352	Sem c nductors and Devices (Mater ils Science)	3

In addition, the following courses are required to fulfill the electrical and computer engineering core:

			Semester Hours
EEE	301	Electrical Networks	3
EEE	303	Sign l s and F lters	3
EEE	320	Digital Computer Fundamentals	4
EEE	332	E ectronic Engineering	4
EEE	340	E ectron agnetic Engineer ng I	3
EEE	440	E ectrc m agnet c Engineer ng II	4
EEE	455	Communic t on Systems I	4
EEE	480	Feedback Systems	4
EEE	496	Profess onal Seminar	0

Technical Electives in Electrical and Computer Engineering
(M nimum tota 14 semester hours)

Technical electives may be selected from one or more of the following technical areas of emphasis.

Antennas and Microwaves EEE 441, 443, 445, 448, 541, 543, 547.

Bio Medi al and Clinical: EEE 465, 466, 467, 566; CHE 411, 413, 517

Computer Languages: ASE 324, 325, 422, 423, 425; EEE 514, 515, 516

Computer Programming ASE 324, 325, 422, 423, 425; EEE 420, 514 516

Controls EEE 420, 427, 428, 475, 482, 483, 550, 582; MEE 451

Digital Circuit Design EEE 425, 426, 427, 431, 483, 525

Digital Computer Systems Design: EEE 420, 483, 514, 520, 522; ASE 423.

Electrical Communications: EEE 451, 456, 551, 553, 554, 555, 557; ECE 383; ASE 484, 485.

Electrical Networks EEE 402, 405, 406, 428, 433, 445, 470, 501, 503, 504

Engineering Math. ECE 383, 384; ASE 483, 484, 485, 487, 582, 583, 586, 587; MAT 342, 461, 462, 463, 464, 465, 550, 551.

Lasers and Coherent Optics. EEE 434, 448, 548, 549.

Measurement Systems and Instrumenta tion EEE 420, 425, 428, 433, 439, 483; ASE 425.

Power Systems and Machinery: EEE 470, 471, 472, 473, 474, 475, MEE 411, 412, 413, 415, 417, ECN 451 (CUG 364 recom mended for social science elective).

Solid State Electronics EEE 425, 426, 431, 432, 433, 434, 435, 436, 437, 438, 531, 533

With the approval of the student's faculty advisor, technical electives may also be chosen from other courses in engineer ng, mathemat ics, the sciences, and bus ness administration at or above the 300-level

Department of Industrial and Management Systems Engineering

David D. Bedworth, Ph.D , Department Chair

The Department of Industrial and Manage ment Systems Engineering administers two undergraduate curricula i field of specializa tion in industrial engineering and an emphasis in computer science Both are accredited by the Engineers' Council for Professional Development and lead to B S E. degrees. In addition, computer science courses (CSE) are taught with n the department The CSE courses serve as elective courses for students of industrial engineering or computer science who desire additional emphasis in computer science material. The CSE courses also serve other majors who desire a con puter science background.

Industrial Engineering. Provides a multi-disciplinary approach for analyzing, under standing and resolving problems within organizations. Emphasis is on objective and analytical procedures for structuring ap proaches that facilitate sound decision making for problem solution. Industrial engineering has applications in all industrial categories such as manufacturing, service, commercial and governmental activities. It is the branch of engineering concerned not only with things but with people, making industrial engineers a prime source of management talent. Typical organizations employing industrial engineers include hospitals, government at all levels, transportation, construction, banks, process ing, facilities design, manufacturing and warehousing.

Since modern industrial engineering ap proaches for designing effective operational systems are universally applicable to all forms of enterprise, students must gain competence in a number of areas of knowledge and be capable, through application of such knowl edge, of understanding complex systems.

The purpose of the industrial engineering field of specialization, therefore, is to provide each student with an understanding of (1) how operational systems are designed, (2) how each component of a system contributes to overall system effectiveness, (3) the methodol ogies of systems analysis, (4) the probabilistic nature of events, (5) the human as a complex system component, and (6) organization and management to facilitate planning and con trol

Industrial Engineering Field of Specialization

The following courses are required as a part of the Engineering Core:

			Semester Hours
FCE	380	Ordinary Differential Equations for Engineers	3
FCF	362	Linear Algebra for Engineers	2
ECE	383	Probability and Statistics for Engineers	2

In addition, the following courses are required for the Industrial Engineering Field of Specialization:

ACC	331	Cost Accounting for Engineers	3
ACC	498	Pro Seminar Cost Accounting for Engineers	1
ASE	485	Engineering Statistics	3
IEE	300	Economic Analysis for Engineers	2
IEE	362	Industrial Engineering Analysis	3
IEE	374	Quality Control	2
IEE	431	Engineering Administration	3
IEF	461	Planning, Scheduling and Control of Resources	3
IFE	473	System Applications of Linear Programming	3
IEE	475	Fundamentals of Simulation	3
ILE	476	Introduction to Operations Research Models	3
ILL	492	Project in Design and Development	3
MEE	332	Production Processes	3
Area of Emphasis (technical electives)			9

In consultation with an advisor, technical electives, including CSE course possibilities, are selected for an area of emphasis. The principal areas include (1) applied statistics and probability, (2) computer science, (3) human factors and productivity, (4) industrial systems and controls, (5) information systems, (6) management systems, and (7) operations research.

Integrated B.S.E.-M.S.E. Program. For the well qualified undergraduate student who seeks both the B S.E. and the M.S.E. degrees in an integrated five-year study plan, an advanced degree program is available leading to the degree of Master of Science in Engineering with Industrial Engineering major. The advanced degree program includes the requirements for the B.S.E. degree in Industrial and Management Systems Engineering. Admission to the B.S.E. M.S E. program is normally at the junior or senior level and requires an application to the Dean through the faculty and the chair. Admission at the undergraduate level does not automatically qualify the student for admission to the fifth year graduate program, but it is expected that qualified students in this program will complete both the B S.E. and M.S.E. degrees within a five year term of full time study

Fifth Year M.S.E. Program. The 30 semester hours of graduate work builds on the undergraduate Industrial Engineering Field of Specialization to provide an integrated and efficient path to the M.S E degree Composition of the fifth year includes:

	Semester Hours
Probability Statistics Mathematics Selection	3
Operations Research Selection	3
Management or Economic Analysis Selection	3
Engineering Design and Systems Selections	9
Electives	9
IFF 592 Engineering Report	3

Computer Science. Computers have had a significant impact on our way of life in general and on engineering education and engineering practice in particular This impact may even be greater in the future as the full potential of modern computing systems and techniques is realized. The computer science curriculum gives emphasis to the structure of information, the nature of information processing systems, and the use of computers in the solution of a broad range of engineering and non engineering problems. Primary emphasis is placed upon the use of the computer, rather than upon the design of the computer logic.

Computer Science Area of Emphasis

The following courses are required as a part of the Engineering Core:

			Semester Hours
ASE	100	Introduction to Computer Science I (replaces FCF 127)	3
FCL	380	Ordinary Differential Equations for Engineers	3
FCE	382	Linear Algebra for Engineers	2
FCE	383	Probability and Statistics for Engineers	2

In addition, the following courses are required for the Computer Science Field of Specialization.

ASE	101	Introduction to Computer Science II	3
ASL	324	Introduction to COBOL, or ASE 325 Introduction to PL/1	3
ASE	423	Symbolic Programming	3
ASE	483	Probability for Engineers, or ASE 485 Engineering Statistics	3
CSE	31	Computer Organization and Architecture	3
FCE	384	Numerical Analysis for Engineers	2
ELE	320	Digital Computer Fundamentals	4
IEE	330	Introduction to Data Base Design	2
IEE	463	Process Control Computers	3
IEE	475	Fundamentals of Simulation	3
IEE	492	Project in Design and Development	3
Area of Emphasis (technical electives)			11

Technical electives, including CSE course possibilities, are selected in consultation with an advisor (At least 3 semester hours must be of engineering design type content

Department of Mechanical and Energy Systems Engineering

Darryl E. Metzger, Ph.D., Department Chair

The Department of Mechanical and Energy Systems Engineering provides two options in curriculum planning, either of which can serve as entry points to immediate professional employment or to graduate study The emphasis is on development of fundamental skills which will have long lasting utility in our rapidly changing technical society Employers' desire for this emphasis is a strong point in favor of these choices of curricula over technology programs or special programs which emphasize primarily current applications.

Both options in the department build on the broad exposure in mathematics, physics and the engineering sciences offered by the engineering core Both also build on a common department core with specialty cores and technical electives that allow specialization in a number of areas Analytical capability is fostered in advanced engineering courses while ample laboratory experiments demonstrate the application of analyses and principles to practical systems.

Mechanical Engineering Option. More than a century of educational and professional development provides an established foundation for mechanical engineering graduates seeking employment opportunities now and in the future Employers recognize that mechanical engineering students are trained in the areas of fluid mechanics (flows of gases and liquids such as in pipe lines or over objects), the conversion of energy (such as in solar devices, gas turbine engines and nuclear reactors), the transmission of energy (in thermal systems via heat exchangers or in mechanical systems via gear boxes and shafts), in creative design (in configuring of systems and machine parts to meet functional and failure prevention requirements and in novel approaches to problem solving), and in experimental testing (such as appropriate measuring techniques and control of meaningful tests)

Mechanical engineers are found throughout modern society in an extremely wide variety of capacities. They are employed in technical positions by government, industry and consulting firms to seek new knowledge through research, to do creative design and to build and control the modern devices and systems needed by society. They are also sought for non technical fields such as sales and management because of their broad understanding of technical problems and their methodical approach to problem solving

At the undergraduate level, students may elect to specialize in a variety of areas of emphasis: aerospace; biomechanical, computer methods; controls and measurement systems; dynamics; manufacturing; stress analysis, failure prevention, and materials; and thermosciences. A general area of emphasis is also available and can be used to generate a pre approved sequence that is of particular interest to the student.

Energy Systems Engineering Option. Awareness of the world's mounting and chronic energy problems has been increasing ever since the world oil crises in 1973. In an effort to solve these problems and to lessen their impact on economies and lifestyles, both government and industry have increased their commitments to production, conservation and research. This in turn has stimulated employment of engineers and scientists trained in fields that relate to this problem area.

Of the established fields of engineering, the field of mechanical engineering is the most

closely allied to energy, its production (i.e., conversion of one form to another), transportation and end use. In this context, it is natural to find energy systems engineering housed in the same department with mechanical engineering at ASU.

It is the purpose of this option to build on the traditional mechanical engineering areas of fluid flow, thermodynamics, heat transfer, design and controls with student-selected courses in the following areas of emphasis: alternative sources and conversion; conventional sources and conversion; electrical power and distribution; environmental, and nuclear. A general area of emphasis is also available to allow a student to generate a pre-approved sequence of interest.

Minimum Scholastic Requirements. Both option areas require that students attain at least a C (2.00) average in the combined engineering, department and specialty cores in order to be eligible for graduation. Also, the department may require additional or remedial work for those students who have demonstrated a trend of academic difficulty.

Department Core

Among the options listed on page 185 as part of the engineering core requirements, mechanical and energy systems engineering students are required to select the following:

			Semester Hours
CHM	114	General Chemistry for Engineers or CHM 116 General Chemistry and Lab	4
ECE	340	Thermodynamics	3
ECE	350	Structure and Properties of Materials	3
ECE	384	Numerical Analysis	3

Also, ECE 386 Partial Differential Equations must be used to fulfill the "approved mathematics content elective" in the engineering core.

In addition, the following courses are required to fulfill the requirements of the department core:

			Semester Hours
ASE	304	Atomic and Nuclear Principles	2
MLE	365	Control Systems Principles	3
MEE	372	Fluid Mechanics	4
MEE	44	Principles of Design	3
MEE	445	Engineering Design	3
MEE	488	Heat Transfer	3
MEE	491	Experimental Mechanical Engineering	3
MEE	492	Mechanical Engineering Projects	2

Specialty Cores

Mechanical Engineering Option

In order to fulfill the requirements of the mechanical engineering core, ESE 415 Vibration Analysis (3) must be taken along with an additional six (6) hours of course work selected from the following.

			Semester Hours
MEE	321	Kinematics and Force Analysis in Machinery	3
MEE	382	Thermodynamics	3
MEE	442	Principles of Design II	3
ESE	472	Mechanics of Materials	3

Energy Systems Engineering Option

In order to fulfill the requirements of the energy systems engineering core, MEE 382 Thermodynamics (3) must be taken along with an additional six (6) hours of course work selected from the following

			Semester Hours
MEE	411	Nuclear Engineering	3
MEE	446	Thermal Systems Design	3
MEE	498	Energy Technologies	3
MEE	487	Direct Energy Conversion	3

Areas of Emphasis

In both option areas, programs are completed with 12 hours of course work chosen from the lists below in the student's area of emphasis. A 2 or 3 semester hour course in mathematics, computer programming or the natural environment (BIO 320 or CEF 361) may also be used (300 level or above). In both options, a student may, with prior approval of the department Undergraduate Committee, select a general area or a set of courses that would support a career objective not covered by the following categories.

Mechanical Engineering Areas of Emphasis

Aerospace MEE 382, 446, 450, 451, 452, 453, 455, 456, 471, 487; ESE 410, 413, 480.

Biomechanical. MEE 321, 412, CHE 411, 571 (recommended); EEE 301, 439.

Computer Methods. MEE 471; ASE 425, 483, 485, 486, 487, 582; CHE 581; CSE 304; ECE 383, 384; IEE 475, MAT 464, 465.

Controls and Measurement Systems. MEE 451, 465 (recommended), 487; ECE 383; EEE 301, 320, 340, 439 (recommended).

Design. MEE 321, 332, 442, 465, 487; ASE 402; ECE 383; EEE 439; ESE 351, 401, 413.

Dynamics. MEE 321, 442, 465; EEE 439; ESE 410, 413, 422

Manufacturing. MEE 321, 332, 442, 465; ESE 355, 422, 450, 453, 455; IEE 300, 374, 411, 431, 461, 463.

Stress Analysis, Failure Prevention and Materials. MEE 321, 489; ECE 383; EEE 439; ESE 355, 422, 426, 450, 451, 453, 455.

Thermosciences. MEE 382, 383, 386, 411, 450, 453, 455, 471, 487, 489, 498

Energy Systems Engineering Areas of Emphasis

Alternative Sources and Conversion. MEE 411, 446, 458, 487, 489, 498; ECE 352; EEE 438, 439; GLG 301

Conventional Sources and Conversion. MEE 383, 411, 455, 456, 465, 498; EEE 439; ESE 415, 422.

Electrical Power and Distribution. MEE 411, 415, 441, 455, 465, 487; EEE 301, 470, 471, 473, 474, ESE 415, 422.

Environmental. MEE 386, 412, 465, 498; BIO 320, 330; CEE 361, 362, 461; GLG 302

Nuclear MEE 411, 412, 413, 415, 417, 441, 446, 457, 465, 487, EEE 439; ESE 415, 422; GLG 321.

Programs in Special and Interdisciplinary Engineering Studies

George C Beakley Jr., Ph D., Associate Dean

The programs of Special Engineering Studies and of Interd sciplinary Engineering Studies accommodate students whose educational objectives require more intensity of concentra tion on a particular subject or more curricular flexibility within an engineering discipline than the traditional departmenta fields gener ally permit These fields of specialization are administratively located within the Office of the Director, School of Engineering. Unlike the departmental field areas, however, there is not a separate faculty. The faculty teaching in these programs are from the entire School of Engineering.

For many students, engineering studies form the basis of preparation for professional engi neering work where proficiency in the application of science and the physical and social technologies are brought to bear on problems of large scope The necessary breadth that these students seek often is not obtainable by branching from existing engineer ng fields. Rather, especia ly designed progr ms of course work that merge the required principles and approaches drawn from all fields of engineering and other pertinent disciplines are desired. As an answer to this need, two types of course arrangements are availab e (1) the Bachelor of Science in Engi neering degree special programs; and (2) interdisciplinary programs that lead to the degree Bachelor of Science

The B.S.E. Special Programs are designed primarily for students intending to pursue en gineer ng careers at a professional level in industry or graduate studies. The B.S. Inter disciplinary Programs accommodate those students who desire the integrity of an engineering education but plan to enter professions other than engineering, or particu arly to serve society in socially relevant activities. Both are developed beyond the General Studies and the engineering core

The curricula leading to both the Bachelor of Science in Engineering (B.S.E.) and the Bachelor of Science (B.S) have been accredited by the Engineers' Council for Professional Development under the category *Engineering Science*

Special Engineering Studies—B.S.E.

Aerospace Engineering. This emphasis is administered by the Department of Aerospace Engineering and Engineering Science (see page 186).

Bioengineering. Bioengineering bridges the engineering, physical, and life sciences. Engineers, physicists and mathematicians routinely join with the biologist and physician in developing techniques, equipment and materials. The multidisciplinary approach to solving problems in medical treatment and research has evolved from exchanges of information between specialists of the concerned areas. Advanced study beyond the bachelor's degree is acutely needed in bioengineering, requiring a depth of knowledge from at least two diverse disciplines. This program emphasis is espe cially designed for entry into this type of work.

The following course is required as a part of the engineering core:

			Semester Hour
ECE	118	Chemical Foundations of Enginee ng	4
		or CHM 116 General Chem stry	

In addition, the following courses are re quired:

BAS	460	Animal Physiol gy .	4
CHE	364	Chemical Process Instrumentation	3
CHE	411	Biomedica Engineer ng	3
CHE	4 3	Physio ogica Instrumentat on . . .	3
CHE	492	Chemical Eng neer ng Projects ..	3
CHM	331	General Org nic Chemistry	3
CHM	332	General Organic Chemistry	3
CHM	335	General Organic Chemistry Lab	1
CHM	361	Principles of Bi ol em stry . . .	3
EEE	465	C inica Eng neer ng I	3
EEE	466	Clinical Eng n ering II	3
Area of emphasis (techn cal e ectives) including one course each f engineering sciences and engineering des gn type content) ..			12

Engineering Science. This emphasis is administered by the Department of Aerospace Engineering and Engineering Science (see page 186).

Manufacturing Engineering. Manufactur ng engineering is concerned with the applications of the pr nc ples of science to increase productivity in industry. This involves the design of products and of manufacturing facilities so that consumer goods may be made with the least labor content, minimum materia con tent, and the lowest investment of capital. This involves a thorough knowledge of the principal manufacturing processes and how these may be organized to produce a required end result. An important aspect of manufacturing engi neering is the evaluation of several possible

functional designs from the point of view of manufacturability Construction materials play an important role in any manufacturing process and it is important that a manufactur ing engineer have a thorough knowledge of materials properties and the application of the principles of materials science to practical situations. Another important aspect of manufacturing engineering is engineering economics. This becomes evident when it is realized that the success of most manufactured products is evaluated in terms of the following considerations: (1) ability to do the intended job; (2) initial cost; (3) useful life.

The following courses are required as a part of the engineering core·

			Semester Hours
ECE	350	Structure and Properties of Materials	3
ECE	383	Probabil ty and Statistics for Engineers	2

In addition, the following courses are required:

FSE	401	Manufacturing Engineering	3
ESE	415	Vibrati n Analysis	3
ESE	422	Mechanics of Materials	3
ESE	450	Mechanica Properties of Solids	3
ESE	455	Physical Metallurgy	3
IEE	300	Economic Analysis for Engineers	2
IEL	374	Qua ty Control	2
IEE	431	Engineering Administration	3
IEE	463	Control Computer Foundations	3
MEE	332	Production Processes	3
MEF	441	Principles of Design I	3
MET	300	N C Manual Programming	3
Area of emphasis technica electives)			10

Materials Science. Historically, life has been influenced greatly by the development and uti lization of new materials. Many challenges faced in the past were met successfully only after new materials had been developed to meet the new demands, most recently evidenced by the space program. Today's engineers must find solutions to problems in the area of energy production, transportation, communications, pollution control, and effi cient utilization of our natural resources. Challenges to the materials scientists in these areas range from studying the behavior of ex isting materials in new or more hostile environments, to developing new materials to meet new demands. Advanced research methods including X ray and electron diffraction, scanning electron microscopy and Mossbauer spectroscopy are tools used by materials scientists in problem solving. This program emphasis is designed to provide students with the basic knowledge necessary to understand materials problems and to generate and ana lyze the scientific data which must be developed to formulate effective solutions. Many students in materials science elect to continue their education at the graduate level

The following course is required as a part of the engineering core:

			Semester Hours
ECE	350	Structure and Properties of Materials	3

In addition, the following courses are required:

ASE	304	Atomic and Nuc ear Princ ples	2
ECE	352	Semiconductors and Devices	3
EEE	439	Measurement Systems Eng neer ng	3
ESE	450	Mechan cal Properties of Solids	3
ESE	451	X Ray and Electron Diffraction	3
ESE	453	Corrosion and Corrosion Control	3
ESE	455	Physica Metal urgy	4
ESE	492	Project in Design and Deve opment	3
MEE	489	Statistical Thermodynamics	3
Area of emphasis (technical electives)			
(includ ng one course of engineering design type content)			17

Nuclear Engineering. Nuclear engineering is concerned with the release, control and utilization of nuclear energy, including an understanding of basic principles in the design and application of nuclear reactors for electrical power generation, marine propulsion, sea water desalting, and power systems for outer space. Advanced research methods are also studied using neutron activation analysis and radioisotope techniques in the field of medi cine, biology, agriculture, and industry. This program is deeply rooted in the thermal and electrical sciences as well as'nuclear science.

The following courses are required as a part of the engineering core

			Semester Hours
ECE	350	Structure and Properties of Materials	3
		or ECE 352 Sem conductors and Devices	
ECE	386	Partial Differenti al Equations for Engineers	2

In addition, the following courses are required:

ASE	304	Atomic and Nuclear Pr nciples	2
ESE	415	Vibration Analysis	3
MEE	411	Nuclear Engineering	3
MEE	412	Health Physics Principles and Radiation Measurements	3
MEE	413	Reactor Safety Ana ysis	3
MEE	415	Nuclear System Design	3
MEE	417	Nuclear Engineering Lab	3
Approved electives from a field of specia zation			9
Area of emphasis (technic e ectives)			
(includ ng one course of eng neering science type content)			15

System Engineering. The increasing involvement of engineers in vital issues of the public sector has emphasized the need for breadth in technical perspective. In addition the complexity of technology demands the depth of technical insight which is characteristic of tra

ditional engineering disciplines. Coping with environmental issues, resource management, public policy formulation and decision criteria in the public arena requires this perspective and insight The systems for transportation, urban development, pollution control and law enforcement are examples of bridges between public concerns and engineering activities. A solid foundation in science and technology with an engineering orientation is essential to the development and implementation of work able design concepts compatible with the needs of society. The system engineering pro gram is designed to provide this foundation in three parts, as follows the basic elements of system theory and its application are intro duced from the point of view of the traditional engineering disciplines—chemical, civil, elec trical, engineering science, mechanical and industrial, the technical electives are sufficient to provide a substantial introduction to spe cialization in one of these fields; and General Studies requirements include courses specifically oriented to the relationships among technology, society, human values and public policy

The following courses are required as a part of the General Studies requirement:

			Semester Hours
HUM	402	Technology, Society and Human Values	3
STE	403	Technology and Public Policy	3

The following courses are required as a part of the engineering core.

ECE	382	Linear Algebra for Engineers	2
ECE	383	Probability and Statistics for Engineers	2

In addition, the following courses are required:

ASE	406	System Engineering Methodology	3
ASE	408	Integrated System Engineering	3
ASE	441	Introduction to Cybernetics	3
CEE	361	Environmental Engineering	3
CHE	461	Process Control	3
EEE	320	Digital Computer Fundamentals	4
EEE	439	Measurement Systems Engineering or EEE 301 Electrical Networks	3
IEE	473	System Applications of Linear Programming	3
IEE	476	Introduction to Operations Research Models	3
MEE	365	Control System Principles	3
Area of emphasis (technical electives)			13

Urban Systems Engineering. Frequently civilizations are measured by their cities For the past 100 years America has been moving toward urbanization, and forecasts indicate that this trend will likely continue for the next two decades The problems of urbanization extend over a wide range of physical, social and economic conditions. These problems are also affected by scale, thus an urban area with a concentration of 1,000,000 people is not always functionally the same as another area with a population of 100,000. The problems of urban areas are highly interrelated and inter disciplinary. This program emphasis leads into such areas as urban engineering, transportation planning, environmental engineering, city planning, urban management and decision making, or perhaps serving the electorate directly.

The following courses are required as a part of the General Studies requirement

			Semester Hour
PGS	100	Introduction to Psychology	3
SOC	301	Principles of Sociology	3

The following courses are required as a part of the engineering core

ECE	382	Linear Algebra for Engineers	2
ECE	383	Probability and Statistics for Engineers	2

In addition, the following courses are required:

PUP	475	Interdisciplinary Urban Planning	3
ASE	485	Engineering Statistics	3
CEE	371	Urban Problems	3
CEE	372	Transportation Engineering	3
CEE	461	Environment and Society	3
CEE	471	Planning and Design of Urban Systems	3
IEE	300	Economic Analysis for Engineers	2
IEE	431	Engineering Administration	3
IEE	473	System Applications of Linear Programming	3
IEE	476	Introduction to Operation Research Models	3
Area of emphasis (technical electives) (including one course of engineering design type content)			15

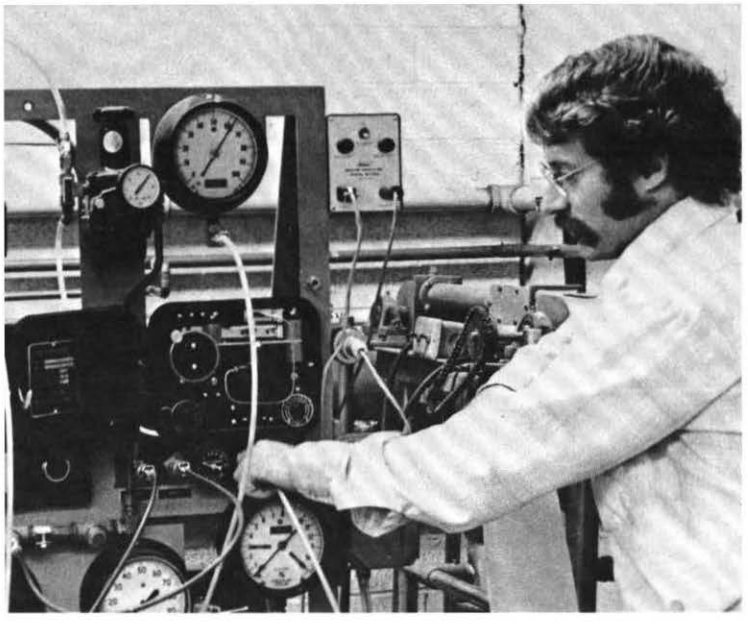
Interdisciplinary Engineering Studies—B.S.

Business and Pre-Law. This program accommodates especially those engineering students whose primary intent is to earn a graduate degree in business administration or law The success with which engineers have risen to positions of leadership in business and government is well established. It is predicted that with the rapid increase in technological advance on every hand, opportunities for engineers to enter business and legal careers will be enhanced to an even greater degree in the future. Students who complete this program may complete requirements for the degree Master of Business Administration in one calendar year.

The following course is required as a part of the General Studies requirement

			Semester Hour
ECN	202	Principles of Economics	3

The following course is required as a part of the engineering core:



			Semester Hours
ECE	382	Linear Algebra for Engineers	2

In addition, the following courses are required:

			Semester Hours
ACC	331	Cost Accounting	3
ACC	498	Cost Accounting for Engineers	1
ADS	305	Business Law	3
ASE	324	Introduction to COBOL	3
ASE	485	Engineering Statistics	3
		or ASE 441 Introduction to Cybernetics	
FIN	300	Fundamentals of Finance	3
IEE	300	Economic Analysis for Engineers	2
IEE	362	Industrial Engineering Analysis	3
IEE	461	Planning, Scheduling and Control of Resources	3
IEE	473	Systems Applications of Linear Programming	3
IEE	492	Project in Design and Development	3
MGT	301	Principles of Management	3
MKT	300	Principles of Marketing	3

Area of emphasis (technical electives)
(including one course each of engineering sciences and engineering design type content) 8

Education. This program accommodates those who wish to couple an engineering education with a career in teaching. It is particularly directed to those who desire teaching competence in engineering, mathematics, or the physical sciences. Its content has been organized in cooperation with the College of Education and the Arizona State Department of Public Instruction. Graduates of this program who wish to receive a secondary teaching certificate with a teaching major in engineering science must complete two additional courses: RDG 467 Reading in Content Areas: Secondary (2 sem. hrs.) and RDG 480 Practicum: Secondary Reading (1 sem. hr.). It is also possible to obtain teaching minors in mathematics and physics.

The following courses are required as a part of the General Studies requirement:

			Semester Hours
POS	300	American Government	3
POS	311	Arizona Government	2

In addition, the following courses are required:

			Semester Hours
ASE	441	Introduction to Cybernetics	3
ASE	492	Project in Design and Development	3
EEE	439	Measurement Systems Engineering	3
		or IEE 362 Industrial Engineering Analysis	
IEE	300	Economic Analysis for Engineers	2
EDP	310	Educational Psychology	3
SED	310	The Secondary School	3
SED	311	Principles and Curricula of Secondary Schools	3
SED	411	Teaching and Evaluating in Secondary Schools	4
SED	433	Student Teaching in Secondary Schools	6

Area of emphasis (technical electives)
(including two courses each of engineering sciences and engineering design type content) .. 14

Geological Engineering. This program emphasis incorporates the joint application of engineering and geological principles to the planning, analysis and design of engineering projects directly related to the earth, its materials, structures and forces. The goal of the program is to investigate the physical properties of the shallow portions of the earth's crust which influence the design and construction of engineering structures such as foundations, excavations, dams, highways and sites for waste disposal. Additionally, the geological factors associated with land use planning and with the occurrence of petroleum and mineral deposits are encompassed within the program.

The following course is required as a part of the engineering core:

			Semester Hours
ECE	351	Engineering Materials	3

In addition, the following courses are required:

			Semester Hours
ASE	492	Project in Design and Development	3
CEE	351	Soil Mechanics	4
CEE	452	Foundations	3
CEE	552	Geological Engineering	3
GLG	101	Physical Geology	4
GLG	310	Structural Geology	3
GLG	321	Mineralogy	4
GLG	418	Geophysics	3
GLG	423	Optical and X-Ray Techniques	2
GLG	424	Petrology-Petrography	4

Area of emphasis (technical electives)
(including one course each of engineering sciences and engineering design type content)
(An approved summer engineering-geology field course is also highly recommended) 11

Pre-Medical. In the past decade the interrelation between engineering and medicine has become vigorous and exciting. Our rapidly expanding technology dictates that engineering will continue to become increasingly involved in all branches of medicine. As this develops, so will the need for physicians

trained in the engineering sciences medical men and women with a knowledge of com puter technology, operations research, electronics and cybernetics. This program emphasis wou d be of special interest to stu dents desiring entry into a medical college and whose medical interests lie in research, aero space and undersea medicine, or biophysics Since both engineering and medicine have as their goal the well-being of man, this program could be compatible with any field of medical endeavor

The fol owing courses are required as a part of the engineering core·

			Sem ester H urs
FCF	118	Chemical Foundat'ons of Engineering	4
		or CHM 116 Gener t Chemistry	
CHM	441	Gener il Physical Chemistry	3
CHM	442	General Phys cal Chemistry	3

In addition, the following courses are re quired

			Seme ter H urs
BIO	101	Biol g cal Principles and Processes	4
BIO	102	Biolog cal Principles and Processes	4
CHL	311	Materia and Energy Balances	2
CHE	411	Biomedical Engineer ng	3
CHF	492	Chemical Engineering Projects .	3
CHM	331	Genera Organic Chemistry	3
CHM	332	General Organic Chemistry . . .	3
CHM	335	General Organic Chemistry Laboratory	1
CHM	336	General Organic Chemistry Laboratory	1
EEE	439	Measurement Systems Engineer ng	3
		or CHE 364 Chemica Process Instrumentation	
EEE	465	C inical Engineer ng I	3
Approved Pre Medical E ective . . .		. . .	3
Aren of emphasis (technical electives) (ncluding two courses each of engineer ng sci ences and engineer ng design type content) .			11

Aerospace Engineering and Engineering Sciences

PROFESSORS:
WALLACE (EC G 120B), AVERY BICKFORD, CHEN, NELSON, SHAW, STANLEY, L P THOMPSON TURNBOW

ASSOCIATE PROFESSORS:
HENDRICKSON, RANKIN S. J. RUSSELL

Engineering Communications

ASSOCIATE PROFESSORS:
LAWLER, STADM LLER

ESE 315 Strength of Materials Laboratory. 2) S
Experiments and demonstrat ons related to the me chan cal behavior of eng neer ng mater a s One hour ecture, two hours laboratory For non eng neer ng ma- jors Corequisite. DSE 351

355 Metallurgy. (3) F'80
Ferrous and nonferrous metals Relat ons between mi crostructure and properties. Cast ng, form ng and heat treat ng For noneng neer ng majors Laboratory. Pre- requisite. CHM 114

401 Manufacturing Engineering. 3) F Shaw
Analys s and optim zation of manufact r ng processes Prerequ s te MEE 332

410 Acoustics and Noise Control. 2 S Wa ace
Acoust c ana ysis and des gn Acoust c fatigue of aero space structures. A rcraft traff c and industr a no se control. Environmental no se standards Arch tectural acoust cs Prerequ site ECE 203 or equiva ent

413 Intermediate Dynamics. (3) S Turnbow
Rotating reference frames Lagrange s and Euler's equat ons gyroscopic mot on, trans ent response of dynamica systems, aerospace vehic e f ight mechan cs veh cular mpact Prerequ s tes ECE 312 318

415 Vibration Analysis. 3) F S Staff
Free v brat on and forced response of s ng e and mult ple degree of freedom systems normal modes random v brations Lecture and laboratory Prerequisite· ECE 313

422 Mechanics of Materials. (3 F S
Fa lure theor es torsion of nonc rcu ar members f n te element methods, p ates curved beams unsymmetr ca bend ng shear flow shear center, energy methods Prerequ s te ECE 313 Lecture and aboratory

426 Aerospace Structures. (3 S, Avery
Load analysis th n wal ed members nc ud ng sk n str nger structure; r ngs frames· determ nate and nde terminate structures sandw ch construction, numerical methods Prerequis te. ESE 422

430 Introduction to Continuum Mechanics. (3 F Ran k n
App cat on of the principles of ont uum mechanics to such f e ds as flow in porous media meteoro ogy bio- mechanics electromagnet c continua, magneto-f u d mechanics Prerequ s tes ECE 313, 371

450 Mechanical Properties of Solids. 3 S· Hendr ck- son
Effects of env ronmental and m rostructura variab es on mechan cal properties; plast c deformat on fat gue, creep, br tt e fracture, nterna fr ct on Prerequ s te. ECE 350

451 X-Ray and Electron Diffraction. 3 S Hendrickson
Fundamentals of X ray d ffraction, transm ssion e ectron microscopy and scann ng e ectron m croscopy Tech- n ques for study ng surfaces internal microstructures and fluorescence Lecture and demonstrations.

453 Corrosion and Corrosion Control. (3) F Hendrick- son
ntroduct on to corros on mechan sms and methods of prevent ng corrosion. Top cs e ectrochem stry, polari zat on, corros on rates, ox dat on coat ngs cathodic protection Prerequ site. ECE 350.

455 Physical Metallurgy. 4) F; Hendr ckson Stan ey
Crysta structure and defects Phase d agrams meta - ography sol dif cation and cast ng deformat on and anneal ng. Prerequ s te ECE 350 Three ectures 3 hours laboratory

474 Dynamic Meteorology I. (3 F Rank n
Bas c equations of atmospher c mot ons sca e analys s atmospher c waves p anetary boundary layer equa- t ons barotrop c and barocl n c mode s Prerequ s tes: ECE 380, 371 or GPH 412 or approva of instructor

475 Dynamic Meteorology II. (3) S; Rank n
Turbu ence dynamic forecast ng numerica methods, object ve ana ys s spec a topics Prerequ site. ESE 474.

480 Aerospace Systems Design (3) S
Prerequ s tes· ESE 413 426, MEE 450 453

492 Project in Design and Development. (2 3) F S
Ind v dua project in creat ve des gn and synthes s

511 Acoustics. (3 F 79 Wa ace
Pr nc p es underly ng the generat on transm ssion and recept on of acoustic waves. App cat ons to no se con tro electroacoust c transducers and arch tectural acoust cs

512 Acoustics Laboratory. (2 F 80, Wal ace

Experiments and measurements associated with architectura acoust cs and no se control Lecture and aboratory

513 Advanced Dynamics I. (3) F; Turnbow
Dynam cs and systems of partic es Genera zed coordi nates D Alembert s and Ham ton's princ p es Lagrange s equat ons, k nematics and k netics of r gid bodies

514 Advanced Dynamics II. 3) S'80; Turnbow Ne son Gyrodynam cs Orbits and trajector es. Aerospace veh' cle motion. Free and forced response of nonlinear mechan ca systems Prerequisite: ESE 413

515 Vibrations: Discrete Systems. (3) S; Nelson
Free v brat on and forced response of d screte e astic systems F nite elements. Analyt ca and computer methods of so ut on Random v brat ons Prerequ s te ESE 415.

516 Vibrations: Continuous Systems. (3) F; Bickford, Nelson
Free vibrat on and forced response of continuous e as t c systems Variat ona methods Exact and approximate methods of so ution. Wave propagat on Prerequ s te ESE 415.

518 Dynamics of Rotor-Bearing Systems. (3) S'80, Nel son
Cr t ca speed and response analys s of r gid and flexible rotor systems Bear ng inf uence and representat on. Stabil ty analys s. Methods of ba ancing.

522 Variational Principles of Mechanics. (3) S'81; Bickford
V rtual work, stat onary and comp ementary potent a energ es. Hami ton s pr nciple Appl cat on of these and direct methods to vibrat ons, e ast city and stab ity.

523 Theory of Plates and Shells. (3) S Avery, Chen
Bending of p ates. P ates on elastic foundation. Large def ect on of p ates Membrane theory of she s. She s of revo ut on Approx mate methods

524 Theory of Elasticity. (3) F; Bickford Chen, Rankin
Ana ysis of stress and stra n n three d mens ons. Gen era theorems Plane elastostat c problems Bend ng and torsion thermoe ast city, ax -symmetr cal problems App ications. Prerequisite: ECE 386.

526 Biomechanics. (3) S, Chen, Russell
Mechanics of the human body. Mechan ca and phys ca propert es of t ssues. App cation to fields of nterest includ ng jo nt rep acement, sports medic ne.

528 Fracture Mechanics. (3) F'79; Chen, Stan ey
Basic concepts of sol d mechan cs appl ed to the prob lem of fracture M crostructural effects n fracture in tiat ons and propagat on Exper menta methods

529 Theory of Elastic Stability. (3) S 80, Bickford, Chen
Genera concepts; stab l ty of d screte and cont nuous systems. Torsional and atera buckling of thin plates and she ls. Dynam c instabi ity. Prerequ s te: ECE 386 or MAT 460

530 Continuum Mechanics. (3) F'80, Rank n
Methods of cont nuum mechan cs with applicat ons to current research.

542 Computation Methods in Engineering Science. (3) F 80, Rank n
Ut l zation of documented computer programs Appl ca- t'on in analys s, design and computer graphics

544 Engineering Structures and Systems. (3) F· Shaw
Pr'nc ples of d mens onal ana ysis and simil tude with appl cat on to a wide variety of problems from severa fields of eng neer ng

546 Finite Element Methods in Engineering Science. (3) F; B ckford
D scretizat on, nterpolat on elemental matrices, assem- b y, computer mplementation. Appl cation to so d and f uid mechanics heat transfer t me dependent prob- lems Prerequ site: ASE 582

550 Theory of Crystalline Solids. (3) F Hendr ckson, Stan ey
Anisotrop c propert es of crystals tensor treatment of elastic, magnetic, electr c and thermal properties· crys- ta ography of Martens tic transformations

551 Effects of Radiation on Materials. (3) S'80, Stan ey
Defect production and anneal ng rrad ation nduced changes, enhanced diffus on by photons, neutrons, e ectrons and heavy ons and swel ng

553 Physical Metallurgy. (3) S Hendr ckson Stanley
Advanced research techn ques in phys ca metal urgy ternary and quarternary phase d agrams thermal ana - ysis magnet c analys s, meta lography fracture analys s. Two ectures 3 hours aboratory

554 Metallurgical Thermodynamics and Kinetics. (3) S 81; Hendrickson, Stanley
Thermodynamics of a loy systems d ffus on n sol ds kinet cs of precip tation and phase transformat ons n solids. Prerequ s tes. ECE 340, 350

555 Analysis of Material Failures. (3) F Hendr ckson
Indent ficat on of types of fa lures Ana ytica tech- n ques Fractography, SEM, nondestruct ve inspect on, meta lography Mechan ca and electronic components. Prerequ s te. ECE 350 or equ valent.

574 Dynamic Meteorology. (3) S'81, Rankin
Appl cat ons of f uid mechanics to atmospher c motions d ffus on processes and pollut on mode ng.

Special Courses: ESE 484, 494, 498, 499, 500, 590 591, 592 594 598, 599, 792 799 (See pages 30 31)

Analysis and Systems

ASE 100 Introduction to Computer Science I. (3) F
Fundamental concepts of computers and programming· machines, algorithms languages and programm ng techniques. Prob em so v ng us ng FORTRAN Lecture and laboratory.

101 Introduction to Computer Science II. (3) S
Cont nuation of ASE 100. Concepts of. recursion, block structure, storage c asses, nterrupts bit and str ng man pulation. Prerequ s te. ASE 100. Lecture and abo- ratory.

200 Engineering Drawing. (2) F
Further study of orthograph c projection, aux liary v ews, sect on v ews, d mens on ng, and standard eng - neering drawing convent ons Drafting sk l s and precision d mension ng techniques for product on draw ings of typica eng neer ng parts Prerequisite: ECE 104 or ND 111. Six hours lecture-laboratory.

226 Digital Computer Programming. (2) F S, SS
Ro e of the d g tal computer n business and soc ety; computer systems and nformat on representat on; prob em so v ng and a gor thm des gn FORTRAN pro- gramming fundamenta s. Lecture and laboratory.

300 Communication Processes. (3) F
Synthesis of bas c communication processes with em phasis upon l stening, speak ng reading, and writing. Prerequ s tes: ENG 101 or approva of nstructor.

301 Words and Human Behavior. (3) F
Techn ques for recogniz ng and avoid ng those habitua responses to fami iar words that generate much every- day hosti ity, anx ety confusion and frustration.

304 Atomic and Nuclear Principles. (2) F, S
Atom c and nuc ear princ p es w th app cations to engi- neering. Prerequisite. ECE 202 corequ s te· ECE 203

321 Fundamentals of Computer Programming. (3) F, S
A human or ented, systems approach to problem defini- t on formulation and solut on, using FORTRAN Su tab e as either an ntroductory or term na course (ASE 100 and 321 cannot both be used for credit.) Computer solution requ red for pro ects. Prerequisite· h gh schoo algebra Lecture and laboratory

324 Introduction to COBOL. (3) F
The business or ented language COBOL. Emphas s on appl cations to management information systems.

325 Introduction to PL/1. (3) S
Basic concepts of programming language PL/1. Prereq u s te ECE 122 or ASE 100 or 226 or equ valent. Lecture and laboratory.

335 Legal Aspects of Engineering and Construction. (2) S
nf uence of contract property and tort aw on eng - neering and construction act vities. Influence of governmenta regulations (OSHA)

406 System Methodology. (3 F; Welch
ntroduction to genera systems theory w th appl cat on to both natural and man made systems Prerequisite: MAT 142 or equ valent.

407 Environmental Systems Planning. (3) NR; Welch Smith
Review of nterdiscipl nary systems ana ysis and tech n ques for plann ng and manag ng environmental programs, student group invest gations of projects formulated in col aboration w th un vers ty faculty members and/or commun ty groups (A so sted as GPH 407)

408 Integrated System Engineering. (3) NR We ch Mode ing and structuring comp ex systems nvo ving nteractions among techno ogical, industria govern mental and env ronmenta systems Case stud es and group projects Prerequ s te Sen or stand ng n Engineer ng

410 Medical Practice Seminar. (2 S Dorson
Lecture and rec tat on on methods used n diagnos s and treatment of diseases and d sorders emphas zing rel ance on techn ca information n each medical spec a ty Prerequ s te approva of nstructor

422 Programming Languages. (3) F· C ark
Programm ng anguage spec f cation and ts appl cat on to FORTRAN V and ALGOL-l ke anguages Prerequ - s tes· ECE 122 or ASE 100 or 226, ECE 380 or MAT 212. Lecture and laboratory

423 Symbolic Programming. (3) F S; Staff
Symbo c assembly language programm ng techn ques and app ications Prerequisites. ECE 122 ASE 226 or 321. Lecture and laboratory.

425 Advanced Programming. (3 F, S Lewis Lovel
A broad range of computer app cat ons Advanced FORTRAN, character handl ng, mach ne dependency sorting and merg ng and p ott ng. Use of magnet c tape, magnet c d sks, t me-shar ng term na s and l brary programs Prerequ site. a first course n FORTRAN pro gramm ng Lecture and aboratory

440 Computer Privacy, Security and Ethics. (3) S, Ba ey Sm th, Lewis
Sem nar format d scussion of the ro e of computers in soc ety, the r uses and potent al for misuse the ntr ns c assumpt ons, value systems and soc a factors re at ng to computer usage Prerequisite Sen or stand ng Three hours lecture

441 Introduction to Cybernetics. (3) S, S Russe
H stor ca survey and mathemat ca fundamentals of cybernet c engineer ng App ications in technology, ndustry, biology and society.

480 Medical Data Analysis. (3) F, Dorson
Appl cat ons of stat st ca and probabil st c mode s to study and ana ys s of bio og ca and c in cal problems nclud ng exper ence with b omedica program pack ages. Prerequisite: MAT 121 or MAT 142

483 Probability for Engineers. (3) S, Ro l er, Dean
F rst course n app ied stochastic processes. Spec al emphasis on applying theory deve oped for Markov and renewal processes to queueing rel ab lity, time series and soc a and behavioral problems Prerequisite· ECE 383

485 Engineering Statistics. (3) F, S; Anderson Dean, Rol ier
Stat st ca methods appl ed to engineering problems Regress on and corre at on ana yses, qual ty contro and tolerance charts d stribut on of extremes, and introduct on to experimenta des gn and ana ysis of variance. Prerequisite. ECE 383.

486 Numerical Analysis in Engineering. (3) F· Bickford, Lew s
Appl cat on of numer ca procedures to the solution of complex engineer ng prob ems. Analys s and organ za t on of pract ca programs for numerica so ut on of in tial, boundary and eigenva ue problems Prerequ s te ECE 380 or MAT 212.

487 Applied Mathematical Analysis. (3) F, Berman, P erin
Treatment and interpretation of engineering data, math ematica models of engineering problems inear a gebra and introduction to opt m zation techn ques, and computation techn ques for so v ng non inear equat ons. Prerequisite: ECE 380 or MAT 212.

492 Project in Design and Development. (2,3) F S SS ndividual project n creat ve des gn and synthes s.

510 Rotating Internship. (1) NR; Dorson
Exposure by schedu ed rotating assignments to major hospital and hea th delivery departments inc ud ng med ca , admin strat ve, and support functions.

511 Clinical Practicum. (3) F, S Dorson
Extended superv sed eng neer ng serv ce n health delivery systems w th assignment of indiv dual project culm nat ng in technica report defense

541 Cybernetics. (3) F, S Russel , Downs Lew s
Ana ysis of adaptive, earn ng and se f-organ zing systems. Appl cat ons to problems of current interest.

582 Linear Algebra in Engineering. (3) S S Russe l, Bickford
Matrix theory and numerica ana ys s of matr x operat ons. App ications from mechanica , structural, electrical and contro fie ds of eng neer ng. Prerequisite ECE 386 or MAT 460.

583 Process Analysis by Statistical Methods. (3) F; Kuester
Descriptive stat stics, l near and nonl near regress on ana ysis experimenta des gn, and experimental opt mum seeking techniques

586 Partial Differential Equations in Engineering. (3) F; Bickford, S. Russell
Ordinary d fferent a equations, ser es so ut ons, boundary va ue problems. Four er series separat on of var ab es nhomogeneous prob ems Prerequis tes ECE 380 or MAT 212 ECE 386 or MAT 460

Special Courses: ASE 484, 494 498 499.

Chemical and Bio Engineering

PROFESSORS:
(EC G-120C), BERMAN, DORSON, KUESTER, REISER SATER

ASSOCIATE PROFESSORS:
BELLAMY, GU LBEAU

ASSISTANT PROFESSOR:
P ERINI

CHE 311 Material and Energy Balances. (2) F S
Pr nciples of physics and chem stry appl ed to the for mu at on of materia and energy balances Prerequ s te· CHM 116 corequ s te. MAT 121. Two hours lecture

332 Chemical Engineering Operations. (3) F, S
Process operat ons nc uding d st at on extract on, absorption, dry ng, crysta lization f ltration, mater a s hand ing and preparat on Prerequis te ECE 371

333 Transport Phenomena Laboratory. (1) S
Phys cochem cal measurements and determinat on of transport propert es. Prerequ s te ECE 371. Three hours laboratory.

342 Applied Chemical Thermodynamics. (3) F, S
Energy re at ons and equ l br um convers ons based on chem ca potent als and phase equi ibr a Prerequ s tes CHE 311, CHM 441.

364 Chemical Process Instrumentation. 3) S
Theory and appl cations of analytica and control nstru mentat on used n the chemical process ndustr es Prerequ s tes. CHM 116, ECE 203, 335. Lecture dem onstrat ons and laboratory.