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# **The University of Texas at El Paso**

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## **Graduate Studies Catalog 1987-1989**

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**August, 1987**





# General Information

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# HISTORY OF THE GRADUATE SCHOOL

The University of Texas at El Paso, second oldest academic component of the University of Texas System, was created in 1913 by the Texas Legislature as the Texas State School of Mines and Metallurgy. Since 1916 the campus has been located in the western foothills of the Franklin Mountains. As the institution grew in size and increased its offerings, the name was changed to the Texas College of Mines and Metallurgy in 1919, Texas Western College in 1949, and finally to The University of Texas at El Paso in 1967.

A significant part of this growth and development came with the introduction of graduate study, first approved in 1940 with graduate courses offered the following year. The first master's degree, in history, was awarded in 1942. Initially, graduate study was supervised by an interdepartmental Graduate Council. By 1955, a Graduate Division was needed, and in 1967 a Graduate School was organized. The present structure of the Graduate School was adopted in 1974. In that same year the first doctoral level degree program, the Doctor of Geological Sciences, was approved by the Coordinating Board of the Texas College and University System, with the first degree awarded in 1979.

In 1989, The University of Texas at El Paso will celebrate its Diamond Jubilee, the seventy-fifth anniversary of its founding by the Texas Legislature. The Graduate School will then be approaching its fiftieth anniversary in a role of leadership within the institution, boasting a distinguished faculty, superior facilities for research and teaching, outstanding academic and professional programs, and a tradition of scholarship and service to the region.

## ORGANIZATION OF THE GRADUATE SCHOOL

The Graduate School is essentially a body of professors and scholars designated as Members or Senior Members of the Graduate Faculty and of students duly admitted to pursue their studies beyond the baccalaureate degree. All members of the Graduate Faculty are expected to maintain a national reputation in their field of scholarship. The administrative head of the Graduate School is the Graduate Dean. In academic areas or departments offering graduate level courses, the Members of the Graduate Faculty constitute an individual Committee on Graduate Studies. All recommendations made by committees on graduate studies are subject to review and approval by the Graduate Dean.

The Graduate School faculty and administration award all post-baccalaureate degrees conferred by the University under authority delegated by the Board of Regents of the University of Texas System.

Graduate work is divided into areas and departments. Areas differ from departments in that they may be broader in scope, involving courses and research in several departments. The candidate for an advanced degree presents work done in a chosen major department or area, but is also usually expected to have done supporting work of an advanced level (upper division or graduate) in one or more associated areas. There are three component parts to graduate study: course work, independent study, and independent scholarly research leading to a report, thesis, or dissertation. No one of these component parts can be neglected by the graduate student, although the proportion of independent study to course work may vary according to the previous training of the individual student and the area chosen.

## Areas of Study and Degrees Offered

### Master of Accountancy

### Master of Arts

- Applied English Linguistics
- Communication
- Economics
- Education
- English
  - British and American Literature
  - Creative Writing
  - Professional Writing and Rhetoric
- History
- Political Science
- Psychology
  - Clinical
  - General Experimental
- Sociology
- Spanish
- Theatre Arts

### Master of Arts in Interdisciplinary Studies

### Master of Arts in Teaching

- Mathematics

### Master of Business Administration\*

### Master of Education

- Agency Counseling
- Curriculum Specialist
- Educational Administration
- Educational Diagnostician
- Instructional Specialist
- School Counseling
- Special Programs

### Master of Music

### Master in Public Administration\*

### Master of Science

- Biological Sciences
- Chemistry
- Civil Engineering
- Computer Engineering
- Computer Science
- Electrical Engineering
- Engineering
- Geological Sciences
- Geophysics
- Health and Physical Education
- Industrial Engineering
- Mathematics
- Mechanical Engineering
- Metallurgical Engineering
- Physics
- Speech Pathology and Audiology
- Statistics

### Master of Science in Interdisciplinary Studies

### Master of Science in Nursing

### Cooperative Master of Science in Social Work

### Doctor of Geological Sciences

### Cooperative Doctoral Program in Border Studies

\*There is also a two-degree option in which students may pursue the M.B.A. and M.P.A. degrees simultaneously. See either program, in the pages which follow, under "Business Administration" or "Political Science"

# CALENDAR FOR ACADEMIC BIENNIUM 1987-89

1987		FALL SEMESTER	1988	
Wed	July 1	Admission applications due for Fall Semester (Upon submission of a \$15.00 Late Fee, applications will be accepted after this date with the exception of international applications and supporting documents which must be received by the due date.)	Fri	July 1
Wed-Fri	Aug 26-28	Fall Registration	Wed-Fri	Aug 24-26*
Mon	Aug 31	Classes Begin	Mon	Aug 29
Mon-Fri	Aug 31-	Late registration and Add/Drop.	Mon-Fri	Aug 29-
	Sept 4	Registration and Add/Drop ends 4:30 p.m. on last day		Sept 2*
Mon	Sept 7	Labor Day Holiday	Mon	Sept 5
Wed	Sept 16	12th Class Day—Census Day	Wed	Sept 14
Fri	Sept 25	Last day to select Pass/Fail Option	Fri	Sept 23
Fri	Oct 9	Graduation application deadline for degrees to be conferred in December	Fri	Oct 7
Fri	Oct 9	Last day to drop a class or officially withdraw with an automatic <i>W</i> ; after this date, grade of <i>W</i> or <i>F</i> determined by each instructor	Fri	Oct 7
Sat	Oct 17	Homecoming		
Fri	Nov 20	Deadline for faculty initiated course drops. Students enrolled in courses after this date may not receive grade of <i>W</i> .	Fri	Nov. 18
Thur-Fri	Nov 26-27	Thanksgiving Holidays	Thur-Fri	Nov 24-25
Fri	Dec 4	Deadline for graduate degree candidates for submission of theses, dissertations and research papers, and for certification of graduate degree final examinations to the Graduate Dean	Fri	Dec 2
Fri	Dec 11	Last day of Classes	Fri	Dec 9
Mon-Fri	Dec 14-18	Final examinations	Mon-Fri	Dec 12-16
Fri	Dec 18	Winter Commencement, 7:00 p.m.	Fri	Dec 16
Dec 21-Jan 17		Winter holidays for students	Dec 19-Jan 15	
Tue	Dec 22	Fall semester final grades due in Registrar's Office, 12:00 noon	Tue	Dec 20
Mon	Jan 4	Grades mailed to students	Mon	Jan 2
	1988			1989
Mon	Jan 4,	University offices re-open	Mon	Jan 2,
	1988			1989

\*Consult term *Schedule of Classes* for confirmation of Registration dates.

1988		SPRING SEMESTER	1989	
Mon	Nov 16, 1987	Admission applications due for Spring Semester (Upon submission of a \$15.00 Late Fee, applications will be accepted after this date with the exception of international applications and supporting documents which must be received by the due date)	Tue	Nov 15, 1988
Wed-Fri	Jan 13-15*	Spring Registration	Wed-Fri	Jan 11-13*
Mon	Jan 18	Classes begin	Mon	Jan 16
Mon-Fri	Jan 18-22*	Late registration and Add/Drop. Registration and Add/Drop ends 4:30 p.m. on last day	Mon-Fri	Jan 16-20*
Tue	Feb 2	12th Class Day—Census Day	Tue	Jan 31
Fri	Feb 12	Last day to select Pass/Fail Option	Fri	Feb 10
Fri	Feb 26	Graduation application deadline for degrees to be conferred in May	Fri	Feb 24
Fri	Feb 26	Last day to drop a class or officially withdraw with an automatic <i>W</i> ; after this date, grade of <i>W</i> or <i>F</i> determined by each instructor	Fri	Feb 24
Mon-Fri	March 28-	Spring Holiday for students, no classes	Mon-Fri	March 20-
	April 1	meet		24
Sun	April 3	Easter	Sun	March 26
Fri	April 8	Deadline for faculty initiated course drops. Students enrolled in courses after this date may not receive grade of <i>W</i> .	Fri	April 7
Fri	April 29	Deadline for graduate degree candidates for submission of theses, dissertations and research papers, and for certification of graduate degree final examinations to the Graduate Dean	Fri	April 28
Fri	May 6	Last day of classes	Fri	May 5
Mon-Fri	May 9-13	Final examinations	Mon-Fri	May 8-12
Sat	May 14	Commencement	Sat	May 13
Tue	May 17	Spring semester final grades due in Registrar's Office, 12:00 noon	Tue	May 16
Mon	May 23	Grades mailed to students	Mon	May 22
Mon	May 30	Memorial Day—Offices closed	Mon	May 29

\*Consult term *Schedule of Classes* for confirmation of Registration dates

1988		SUMMER SESSION	1989	
Dates for Summer Session to be announced at a later date			Dates for Summer Session to be announced at a later date	





# Admission to Graduate Study

Applications for admission must be made to the office of the Dean of the Graduate School, where forms may be secured.

The following documentation must be presented to the office of the Dean before the application for admission to a degree program is acted upon.

1. Completed application form, and—for international students only—a health form;
2. Proof of a bachelor's degree from an accredited institution in the United States or of equivalent training at a foreign institution. Graduates of UT El Paso must supply two complete transcripts on which the degree is posted; graduates of other colleges and universities must provide one complete official transcript on which the degree has been posted;
3. Evidence of a satisfactory grade point average in upper division (junior and senior level) work and in any graduate work already completed;
4. A satisfactory score on either the Graduate Record Examination General Test (GRE) or the Graduate Management Admission Test (GMAT), depending on the department involved, and the Test of English as a Foreign Language (TOEFL) for international students. Students from non-English speaking foreign countries must make a score of at least 550 on the Test of English as a Foreign Language (TOEFL) given by the Educational Testing Service. The Departments of Languages and Linguistics and Geological Sciences require all applicants to take the Subject sections of the examination in appropriate areas. Each applicant must have the official scores of required tests (GRE, GMAT, TOEFL) sent to the office of the Graduate Dean. Student copies are not acceptable. UT El Paso students may obtain assistance from Study Skills and Tutorial Services in preparing for the standardized tests.
5. Evidence of adequate subject preparation for the proposed graduate major;
6. Applications for admission from citizens of foreign countries, with the exception of Mexico, must be accompanied by a check or money order in the amount of \$50, payable to The University of Texas at El Paso, in U.S. dollars.

The committee on graduate studies of the proposed major department will recommend acceptance, conditional acceptance, or rejection based on the information submitted. The committee's recommendation will be transmitted to the student by the Graduate Dean.

The Graduate Dean reserves the right to examine any application and, at his or her own discretion regardless of other criteria, admit or reject the student.

**DEADLINE FOR SUBMISSION OF APPLICATION:** Individuals holding a baccalaureate degree from The University of Texas at El Paso should apply for admission at least thirty days prior to the beginning of the semester or summer session in which they plan to register. Those with degrees from other American universities or colleges should file their applications, along with official transcripts of all previous college or university work, at least sixty days in advance. International students should apply at least ninety days prior to the beginning of the semester or term. Submission of the appropriate admission documents and acceptance by the Graduate School must be accomplished before the registration process can begin. Individuals who submit admission applications after the deadline for submission of applications published in the Class Schedule for a given semester and who meet all other admission requirements will be permitted to register during the late registration period.

**THE GRADUATE RECORD EXAMINATION GENERAL TEST:** The General Test of the Graduate Record Examination is designed to test preparation and aptitude for graduate study, and it must be passed with a satisfactory score by everyone seeking admission to all graduate programs except the M.B.A. program,

which requires the Graduate Management Admission Test (GMAT), the M.P.A. program, which will accept either GRE or GMAT test scores, and the M.A. Program in Spanish, which requires only the Advanced Spanish Graduate Record Examination. The GRE is taken at the applicant's own expense and is given five times a year, usually in October, December, February, April, and June.

**THE GRADUATE MANAGEMENT ADMISSION TEST:** The GMAT is an aptitude test designed to measure certain mental capabilities important in the study of management at the graduate level, and it must be completed with a satisfactory score by all students seeking admission to the M.B.A. program; it may be taken instead of the GRE by students seeking admission to the M.P.A. program. The test is taken at the applicant's own expense and is given four times a year, usually in October, January, March and June.

**GRADE-POINT AVERAGE:** An applicant with a 3.0 average (on a scale of 4.0) in all upper division (junior and senior) and graduate level work previously taken has satisfied the minimum requirements of the Graduate School in this regard. Some applications showing less than a 3.0 average may nevertheless be accepted upon special recommendation of departmental graduate studies committees.

**ACCEPTANCE BY THE COMMITTEE ON GRADUATE STUDIES:** Students meeting other requirements for admission may nevertheless be denied admission by the departmental committee on graduate studies in their proposed area of study when there are more qualified applicants than can be accommodated in the available facilities, or when there are more than can be adequately instructed by the available faculty.

**CONDITIONAL ADMISSION:** A student desiring to work toward an advanced degree in an area in which his/her undergraduate training is insufficient may be admitted with the understanding that coursework must be completed to make up the deficiencies noted by his/her graduate advisor. Such make up work will be in addition to the regular degree requirements.

When a student with a less than minimum grade-point average or with a less than satisfactory GRE or GMAT test score is admitted on the recommendation of a graduate studies committee, the first 12 semester hours the conditional student is to take will be assigned by the graduate advisor. Frequently, special conditions will be assigned regarding the number of semester hours to be taken and the specific grade-point average to be maintained. If these conditions are not met, the student will be barred from subsequent registration in the Graduate School. Only in the most exceptional cases will conditional students be allowed to drop or request a grade of incomplete in an assigned course.

## ENROLLMENT IN GRADUATE COURSES WITHOUT ADMISSION TO GRADUATE SCHOOL

**PENDING ADMISSION:** A student who has applied for admission to a graduate degree program, but has not furnished all of the documents, i.e., official transcripts and/or standardized test scores required for admission, will be classified by the Graduate School as a "Pending" student. When the student has furnished the Graduate School with the required admission documents his/her admission status will be changed to "Accepted," "Conditionally Accepted," or "Rejected" by recommendation of the student's major department and approval by the Graduate Dean.

**UNCLASSIFIED ADMISSION:** Individuals who have received a baccalaureate degree from an accredited institution (or its equivalent) and who do not wish to pursue a graduate degree may register for courses with the permission of the instructor as "Unclassified" students.

Pending or Unclassified students may register for courses with

the permission of the instructor. However, such registration does not constitute admission to the Graduate School. Courses taken prior to formal admission to the Graduate School cannot be counted toward a graduate degree without specific recommendation by the Departmental Graduate Studies Committee and approval by the Graduate Dean. Such approval is rarely given for coursework taken after the student's first semester of study. Pending or unclassified students who wish to request permission to count coursework taken during their first semester of study should complete the admission requirements during that semester.

**FINANCIAL ASSISTANCE:** Scholarships, assistantships, work study and loan funds are available. Graduate scholarships are available to students of exceptional qualifications. Information on University and national scholarships may be obtained from the Graduate School Office.

Applications for University scholarships are normally due on February 15th for awards that begin the following academic year.

Assistantship awards and some scholarships are handled by the departments. The College Work-Study Program and student loans are administered by the Financial Aid Office.



## Administrative Officers

**DIANA S. NATALICIO**, *Interim President and Vice President for Academic Affairs*, 1971\*

B.S., St. Louis University; M.A., Ph.D., The University of Texas at Austin

**WILLIAM C. ERSKINE, C.P.A.**, *Vice President for Business Affairs*, 1981

B.A., University of Washington

**JOSEPH HENRY PIERLUISSI, P.E.**, *Interim Dean, The Graduate School*, 1969

B.S.E.E., University of Puerto Rico; M.S.E.E., Cornell University; Ph.D., Texas A&M University

**JOSE FERNANDO AVILA**, *Dean of Students*, 1971

B.S., M.Ed., The University of Texas at El Paso

**RICHARD WEBSTER BURNS**, *Interim Dean, The College of Education*, 1952

B.A., University of Northern Iowa; M.S., Ph.D., State University of Iowa

**JAMES VINCENT DEVINE**, *Dean, The College of Liberal Arts*, 1967

B.S., M.S., University of New Mexico; Ph.D., Kansas State University

**REYNALDO S. ELIZONDO**, *Dean, The College of Science*, 1987

B.S., Texas A&M University; Ph.D., Tulane School of Medicine

**ROBERT BELANGER GRIEVES**, *Dean, The College of Engineering*, 1982

B.A., M.S., Ph.D., Northwestern University

**RONALD WAYNE HASTY**, *Dean, The College of Business Administration*, 1983

B.B.A., M.B.A., Eastern New Mexico University; D.B.A., University of Colorado

**LYNNE BRODIE WELCH**, *Dean, The College of Nursing and Allied Health*, 1986

B.S., University of Connecticut; M.S.N., The Catholic University of America; Ed.D., Teachers College, Columbia University

\*First year of appointment at The University of Texas at El Paso

## Board of Regents

### OFFICERS

**JACK S. BLANTON**, Chairman

**SHANNON H. RATLIFF**, Vice-Chairman

**BILL RODEN**, Vice-Chairman

**ARTHUR H. DILLY**, Executive Secretary

### MEMBERS

Terms Expire February 1, 1989:

**ROBERT B. BALDWIN III**, Austin

**JESS HAY**, Dallas

**MARIO YZAGUIRRE**, Brownsville

Terms Expire February 1, 1991:

**JACK S. BLANTON**, Houston

**SHANNON F. RATLIFF**, Austin

**BILL RODEN**, Midland

Terms Expire February 1, 1993:

**SAM BARSHOP**, San Antonio

**LOUIS A. BEECHERL, JR.**, Dallas

**W. A. "TEX" MONCRIEF, JR.**, Fort Worth

### OFFICE OF THE CHANCELLOR

**HANS MARK**, Chancellor

**JAMES P. DUNCAN**, Executive Vice-Chancellor for Academic Affairs

**CHARLES B. MULLINS, M.D.**, Executive Vice-Chancellor for Health

Affairs

**MICHAEL PATRICK**, Executive Vice-Chancellor for Asset Management

## Graduate School Administration

**JOSEPH HENRY PIERLUISSI, P.E.**, *Interim Dean*, 1969  
B.S.E.E., University of Puerto Rico; M.S.E.E., Cornell University; Ph.D.,  
Texas A&M University

**HARMON M. HOSCH**, *Associate Dean*, 1975  
B.A., University of Northern Iowa; M.A., Pepperdine University; Ph.D.,  
The New School for Social Research

**WILLIAM H. RIVERA**, *Associate Dean for Graduate Studies*, 1962  
B.S., Ph.D., University of Louisville

**ELEANOR FLORENCE MITCHELL**, *Assistant to the Graduate Dean*,  
1972  
B.S., Lincoln University

## The Graduate Council, 1987-1988

The Graduate Faculty of The University of Texas at El Paso (senior members, members, and ex officio members) exercises its legislative functions through a Graduate Assembly. The Graduate Assembly is the final faculty authority for recommending policies concerned with academic standards for admission and retention of students, for furthering the development of the gradu-

ate program, and other matters affecting graduate study. The Graduate Council serves as the administrative arm of the Graduate Assembly, and includes the chairman of the Assembly (who automatically becomes chairman of the Council), two members elected from each college, and four elected at-large.

**DONALD E. MOSS** (1988)\*  
Professor of Psychology  
Chairman, Graduate Assembly and Graduate Council

**DENNIS BIXLER-MARQUEZ** (1990)  
Associate Professor of Teacher Education  
College of Education

**JOHN R. BRISTOL** (1989)  
Professor of Biology  
Member at Large

**ARTURO BRONSON** (1990)  
Associate Professor of Metallurgical Engineering  
College of Engineering

**ELBA BROWN-COLLIER** (1988)  
Associate Professor of Economics and Finance (1988)  
College of Business Administration

**LOU BURMEISTER** (1988)  
Professor of Teacher Education  
College of Education

**MICHAEL P. EASTMAN** (1988)  
Professor of Chemistry  
College of Science

**DAVID G. HARRIS** (1988)  
Associate Professor of Accounting  
College of Business

**Z. ANTHONY KRUSZEWSKI** (1990)  
Professor of Political Science  
Member at Large

**DAVID V. LeMONE** (1990)  
Professor of Geological Sciences  
Member at Large

**CHERYL MARTIN** (1988)  
Associate Professor of History  
College of Liberal Arts

**OSCAR MARTINEZ** (1989)  
Professor of History  
College of Liberal Arts

**JOSEPH A. PEROZZI** (1988)  
Associate Professor of Speech, Hearing, and Language Disorders  
Member at Large

**NICHOLAS PINGITORE** (1989)  
Associate Professor of Geological Sciences  
College of Science

**SHARON PONTIOUS** (1989)  
Associate Professor of Nursing  
College of Nursing

**S. K. VARMA** (1990)  
Associate Professor in the Department of Metallurgical Engineering  
College of Engineering

**JOSEPH H. PIERLUISSI**  
Interim Dean of the Graduate School  
Ex-Officio

\*Term expires on August 31 of year indicated.

# Academic Regulations

## Academic Regulations

The successful applicant will be informed by mail about his or her admission. The student should then, at the earliest opportunity, meet with the assigned advisor. The course program must be approved each semester by the official graduate advisor of the major department before registration for courses.

**GRADES AND GRADE-POINT AVERAGE:** Credit is given in the Graduate School for the grades A, B, and C. Every semester hour of C, however, must be balanced by one of A, because the degree candidate is required to present an overall grade-point average of 3.0. Grades of D or F are not acceptable in courses which are to be used to satisfy minimum requirements for the graduate degree; such courses must be retaken (see "Repetition of Courses" below). In the event that a graduate student making a D is allowed to continue, the D must be balanced by two A's. An F must be balanced by three A's. A grade of A in a thesis course, dissertation course, or in a specifically authorized seminar, conference, or research course involving a report in lieu of a thesis may not be used to offset a C. Only upper division and graduate level courses taken in graduate status at the University or reserved in the senior year for graduate credit (except thesis and dissertation courses) are counted in the average.

Master's degree candidates must maintain, in addition to the overall grade-point average, a 3.0 or better average in all upper division and graduate courses in the major and in the minor, respectively. Individual departments may impose more rigorous grading standards. High grades in courses outside the major and minor will not serve to bring up these averages. On the other hand, high grades in the major and minor may raise the overall average, provided they are in upper division or graduate courses.

In some courses the standard grading system is not practical; such courses are not counted in the grade-point average. Grades which fall in this category include P (in progress), W (withdrawal), and S or U (in Pass/Fail courses).

**INCOMPLETE OR IN PROGRESS WORK:** Assignment of the grade I is made only in exceptional circumstances and requires the instructor to file with the Graduate Dean an outline of the work to be completed and the time span (in no case longer than one calendar year) allowable for the work's completion. In no case may repetition of the course be assigned as work to be completed. If the work has not been done at the end of the specified time, the I will be changed to an F. Students will not be cleared for graduation until all incompletes have been eliminated from their record.

The grade of P (in progress) is limited to specific courses in which re-enrollment is required. This includes all thesis courses (3598-3599, 3620-3621), graduate internships, and a few specified graduate courses. Each semester a list of courses for which the grade P may be given is published by the Registrar's Office.

**COURSES TAKEN ON A PASS/FAIL BASIS:** A student may elect to take a Pass/Fail grade in a course, but this course cannot count as deficiency work or as a part of the minimum requirements for a degree.

**REPETITION OF COURSES:** In exceptional cases a course may be repeated and the new grade substituted for a previous grade provided the student has received written permission to do so from the Dean of the Graduate School prior to enrolling in the course to be repeated. Any course repeated without adhering to this procedure will be used along with all other previously attempted hours for that course in computing the grade point average.

**MAXIMUM COURSE LOAD:** The maximum course load for a graduate student is 15 semester hours, or an appropriately fewer number in a summer term; registration in excess of these maxima must have the special consent of the Dean and will be permitted

only under exceptional circumstances. If the student is employed by the University as a teaching assistant, research assistant, or student assistant, the course load must be correspondingly reduced. The student should consult the graduate advisor about the combined course and work load. Nine semester hours of graduate work is normally considered to be a full-time course load.

Credit for supervised teaching is not counted in determining combined course and work load.

**REGISTRATION AND CHANGES IN REGISTRATION:** University policy and dates governing registration and changes in registration are printed in the Schedule of Classes which is available prior to each semester or summer session.

**CONTINUATION IN THE GRADUATE SCHOOL:** Every student enrolled in the Graduate School, whether seeking a degree or not, is required to maintain a high level of performance and to comply fully with policies of the University. The Graduate School may place on probation or suspend any graduate student who does not maintain good academic standing or who fails to adhere to University regulations.

**GOOD STANDING:** A graduate student is considered to be in good academic standing and making satisfactory progress if he or she:

1. removes any admission conditions within the time required, and
2. maintains a 3.0 grade point average on all upper division and graduate coursework undertaken while enrolled in the Graduate School.

**ACADEMIC PROBATION AND DISMISSAL:** A student whose cumulative grade point average drops below 3.0 will be placed upon academic probation and must return his or her grade point average to at least 3.0 by the end of his or her next full-time academic enrollment period (whether semester or summer session).

A student taking less than a full course load will have nine (9) semester hours to return his or her grade point average to at least 3.0. Failure to meet the 3.0 grade point average requirement during the probationary period will result in the student's dismissal from the Graduate School. A student who has been dismissed may be readmitted for further graduate study in the same or in a different program only upon the recommendation of the relevant graduate studies committee and the approval of the Dean of the Graduate School.

**RESIDENCE:** The minimum requirement for any degree is two semesters or the equivalent, which need not be consecutive.

A graduate student may register for certain courses without being in residence at the University. These include conference courses (with permission of the instructor), thesis, and dissertation courses.

No student may receive advice and assistance from a member of the faculty in the preparation of a thesis or dissertation without being registered (if necessary, for multiple semesters) for the appropriate thesis course.

**EXTENSION:** Work done in extension classes, up to a limit of 6 semester hours, upon recommendation of the departmental committee on graduate studies and approval of the Dean, may be allowed for graduate credit, provided that (1) the courses and instructors are approved by the Graduate School and the department in which the student would have otherwise taken the work on campus; and (2) the applicant, before taking the extension course, is accepted for admission to the Graduate School and approved by the Dean for the courses desired. Correspondence courses are not accepted for graduate credit.

**RESERVATION OF WORK BY UNDERGRADUATES FOR GRADUATE CREDIT:** Ordinarily, undergraduates are barred from graduate courses. A student who has a bachelor's degree is not eligible to reserve courses for graduate credit. It is possible for undergraduate seniors to register in graduate courses in their last semester under the following conditions:

1. The undergraduate must lack not more than 12 semester hours (or 3 semester hours in a short summer session) of work to complete all requirements for the first bachelor's degree and must have a grade point average of at least 3.0 in junior and senior courses.
2. These 12 hours (or less) must all be completed in the same semester or summer session in which the graduate courses are taken.
3. Total registration for all work must not exceed 15 semester hours (or 6 hours in a short summer session).
4. All registration for graduate courses must be approved at the time of registration by the graduate advisor of the department, the undergraduate dean, and the Graduate Dean.

The undergraduate cannot count work in graduate courses toward the bachelor's degree. It will be reserved for credit toward a graduate degree. A form for reserving courses, which needs the signature of the undergraduate dean, the official graduate advisor in the student's major area, and the Graduate Dean, must be secured from the Graduate Dean's office.

**COURSES COUNTED FOR ANOTHER DEGREE:** No course counted toward another degree may be counted toward a graduate degree, either directly or by substitution.

**PETITION FOR CANDIDACY:** At the end of the first semester of study and prior to completion of the first 12 hours of graduate work, each student must submit to the office of the Dean a Petition for Candidacy signed by the departmental graduate advisor. The petition should show the courses taken and the courses required by the department before graduation. Petitions which show an incomplete grade or a GPA below a 3.0 average cannot be approved. Copies of the Petition for Candidacy are available in the office of the Dean.

**TRANSFER OF CREDIT:** Ordinarily all work for a graduate degree must be done at the University. A maximum of up to 6 semester hours of graduate course-work may be transferred from another institution on the approval of the committee on graduate studies in the student's major area and the Dean. In cases where such transfer is approved, the student must still meet the residence requirements of two full semesters or the equivalent. Courses for which a grade of "C" was earned may not be transferred to UT El Paso.

**ENGLISH REQUIREMENTS:** Students admitted to the Graduate School are expected to write papers and examinations in English, except in specified foreign language programs. For admission to some areas of graduate study, the student is required to pass an examination in English; in other areas, proficiency in written and spoken English will be checked in courses and in contacts with faculty members.

**TIME LIMITS AND CATALOG CHANGES:** All requirements for a master's degree must be completed within one six-year period. Work over six years old is lost and can be reinstated only by special permission of the Dean upon the recommendation of the committee on graduate studies.

General and specific requirements for degrees in the Graduate School may be altered in successive catalogs. Provided the requisite course continues to be offered, the student is bound only by the course requirements of the catalog in force at the time of admission or re-admission within a six year limit, unless, with the approval of the Graduate Dean, he or she elects to be bound by the course requirements of a subsequent catalog. This regulation applies to course requirements only.

**GRADUATION DATES:** Degrees will be conferred at the end of each semester and at the end of the summer session. Students intending to graduate must file an application for the degree prior to the deadline date published in the Schedule of Classes for the semester in which they plan to graduate.

**DEGREE APPLICATION PROCEDURES:** Graduate degree candidates must bring to the office of the Graduate Dean for approval an application for the degree signed by the departmental graduate advisor. The Graduate Dean-approved form must then be hand-carried by the student to the Business Office for payment of the graduation fee. The degree application process is completed by filing the approved and paid application in the Registrar's Office for the ordering of the diploma. This fee is not refundable if the student does not graduate on the date specified in the application.

The Graduate School discourages students from working toward more than one graduate degree at the same level.

## General Degree Requirements

**PREREQUISITES:** Every master's degree program is based on the assumption that the student participating in it already possesses a general college education through the baccalaureate level. Accordingly, the first prerequisite for the entering student is a baccalaureate degree from an accredited institution (or, for international and special students, proof of equivalent training). A second prerequisite is that the entering student must have taken at least 12 semester hours of advanced undergraduate courses in the area of study in which he or she proposes to pursue a graduate major. Some areas may require more semester hours of undergraduate preparation. Students must earn at least a 3.0 grade-point average in any deficiency work required. If a student without adequate preparation still wishes to enter a given graduate program, admission will be conditional until such time as the student has completed the courses of preparatory work designated by the graduate advisor. These courses will be in addition to the 30 hours (or more) required for the master's degree itself.

**COURSE REQUIREMENTS:** At least 30 semester hours of upper division and/or graduate instruction are required for any master's degree. 9 semester hours of upper division courses are the maximum allowable in any individual's program and not more than 6 semester hours may be included in either the major or the minor. Those graduate programs for which a major/minor is declared require the completion of at least 18 semester hours of instruction in the major area and a minimum of 6 hours in a supporting subject or subjects outside the major area. The relative number of hours in the major and minor fields, as well as the nature of the supporting work, will be determined in consultation with the student's graduate advisor. Every proposed program of work needs the approval of the Dean.

**THESIS REQUIREMENTS:** The candidate for the master's degree writes a thesis under the direction of a supervising committee, consisting of at least two departmental representatives and one member from outside the department. The thesis is subject to the approval of the committee and ultimately to the approval of the Graduate Dean. The researching and writing of the thesis involves 6 semester hours of credit, but with special recommendation of the advisory committee and approval of the Dean, 9 semester hours of credit may be awarded. In order to earn the 6 semester hours of credit for the thesis, the student must register for course 3598 when work on the thesis is begun. Thereafter, the student must register for course 3599 during each semester or term in which work on the thesis is being done. Students may not enroll in 3598 and 3599 simultaneously, nor may they enroll in more than three hours of thesis at any one time.

Two completed and bound copies of the thesis, suitably titled, neatly typed on good quality bond paper in uniform large type, double-spaced, must be presented to the Dean of the Graduate School prior to the deadline date published in the Schedule of Classes for the semester in which the student intends to graduate. Both copies of the completed thesis submitted to the Graduate Dean's Office must bear original signatures of the members of the thesis committee.

If a student has not completed thesis work at the end of two years after the subject has been approved and recorded, the supervisor may require the choice of another subject. Credit in the thesis course will not be granted until the thesis is completed and approved. Information on thesis preparation should be obtained from the Graduate Dean's Office.

**IN-ABSENTIA REGISTRATION:** A registered degree candidate who has completed the final requirements for the degree (including submission of the thesis or dissertation) too late for the semester deadline but before the first registration day of the following semester may register *in absentia* in the next following semester or summer session for the sole purpose of receiving the degree. A student registered *in absentia* may not enroll for coursework. See below, p.00, for discussion of applicable fees.

**SUBSTITUTIONS FOR THE THESIS:** In selected programs, non-thesis options are available in lieu of the thesis. The particular option for each student must be approved by the departmental graduate advisor and the Graduate Dean. Among such non-thesis options are internship reports (where the internship is approved as an essential part of the graduate program by the Graduate Dean), professional reports, and reports or formal papers prepared in certain graduate seminar- or conference-type courses. Reports should be comparable to the thesis in every respect except for the evidence of original research. Reports and other formal papers are normally completed just as theses are; they must be reviewed and accepted by a supervising committee composed of at least two departmental representatives and one member from outside the department; and upon acceptance of the report by the committee, the candidate submits two bound copies, consistent with theses in all respects, to the Office of the Graduate Dean for approval.

**FINAL EXAMINATION:** All graduate degree candidates are required to complete satisfactorily an oral or written examination or both. The examining committee, consisting of at least three members, is appointed by the Graduate Dean, on recommendation of the graduate studies committee of the department or area, and when a thesis is written, it will normally be the thesis committee. The committee will have one representative from the minor area. If there is no minor, one member of the committee must be from another department. Individual departments may elect to drop a student after a first or second failure of the examination upon the recommendation of the examining committee, but under no circumstances will a student be permitted to take the examination more than three times; a student failing such an examination for the third time will be dropped from the program.

#### GRADUATION REQUIREMENTS:

1. Completion of all required coursework as listed on the Petition for Candidacy.
2. Acceptance of thesis, dissertation or reports by the Graduate School.
3. Satisfactory completion of an oral or written exam or both.
4. Filing of an approved and paid Application for the Graduate Degree with the Registrar's Office.

### Specific Degree Requirements

**MASTER OF ACCOUNTANCY:** The objective of the Master of Accountancy program is to provide professional education for students interested in careers in Accounting. The program is designed to provide instruction in general accounting or to emphasize an area of accounting, specifically, taxation, managerial, or financial/auditing.

Requirements for the Master of Accountancy degree are found under "Accounting" in this catalog.

**MASTER OF ARTS:** General requirements for all programs include:

1. A thesis (6 semester hours) plus 24 semester hours of coursework. There must be a minimum of 21 hours, including the thesis, of graduate courses (those numbered 3500 and above). For non-thesis programs, a minimum of 36 hours of coursework is required. Only 9 hours of 3300 and 3400 courses are permitted in a program, and no

more than 6 hours may be included in either the major or minor.

2. A major with a minimum of 18 semester hours including the thesis. Major fields for the Master of Arts include Economics, Education, English, History, Linguistics, Political Science, Psychology, Sociology, Spanish, Speech, and Theatre Arts.
3. A minor of from 6 to 12 hours in a related field may be accepted or required by the department. A transfer student must complete at least 3 hours of the minor in residence.

Specific Master of Arts degree requirements are found under the above departmental sections in this catalog.

**MASTER OF ARTS IN INTERDISCIPLINARY STUDIES:** The M.A.I.S. program is designed for the individual who, having completed a baccalaureate program or professional degree program at an accredited college or university, now wishes to expand his or her knowledge in areas outside of the previous training or present profession. To this end, each student will participate in the design of a degree program composed of courses offered by a variety of departments and core seminars designed specifically for students in the program.

Requirements for the M.A.I.S. degree are found under Master of Arts in Interdisciplinary Studies in this catalog.

**MASTER OF ARTS IN TEACHING** (With a Major in Mathematics): This program provides an opportunity for secondary school teachers of mathematics to earn an advanced degree with a primary emphasis on the subject matter of their field and at a level that will be of value in their classrooms. This option gives the student a broad background in mathematics, rather than a specialized research-oriented program. The particular courses taken depend on the individual's background and interest and are selected in consultation with the Graduate Advisor of the Department of Mathematical Sciences.

Requirements for the Master of Arts in Teaching degree with a major in Mathematics are found under "Mathematics" in this catalog.

**MASTER OF BUSINESS ADMINISTRATION:** The objective of the M.B.A. program is to give students the opportunity to prepare for executive careers in business or in institutions that use business techniques and policies in management and administration. The program meets this objective by being broad in nature and aimed at general competence in overall management and administration. The bulk of coursework is devoted to a broad understanding of the environment, controls and practices which are common to most institutions. The remaining courses are determined by the student's special area of interest or concern.

In addition, the M.B.A. program—in conjunction with the Master in Public Administration Program—offers qualified students the option of completing both the M.B.A. and the M.P.A. degrees simultaneously. The objective of this program is to permit students with broad interest in both the public and private sectors to register simultaneously in both programs. With the increasing interdependence of the public and private sectors, this option is attractive to those students wishing to pursue careers in positions that involve working with their counterparts in private or public organizations.

Requirements for the M.B.A. degree and the M.B.A.-M.P.A. option are found under "Business Administration" in this catalog.

**MASTER OF EDUCATION:** General requirements for all programs include:

1. Thirty-six semester hours of coursework.
2. There must be a minimum of 27 hours of graduate courses (those listed 3500 and above). The other courses must be those numbered 3300 and 3400 or above which are approved for graduate credit.
3. A transfer student must complete at least 3 semester hours of the minor in residence.

Students who are employed in full-time teaching positions are limited to 3 semester hours of work each semester by the Texas

Education Agency. With the written consent of the school superintendent, a student may take 6 semester hours of graduate credit for one semester a year.

**TEACHER CERTIFICATION:** If a student wishes to work toward a graduate degree and at the same time meet the requirements for an initial teacher's certificate, he or she should consult with the Dean or Assistant Dean of the College of Education in addition to the departmental graduate advisor.

**APPROVED PROGRAMS:** The following graduate programs have been approved by the Texas Education Agency and the State Board of Education for the Professional Certificate:

- Teacher Education
  - Elementary Teaching
  - Secondary Teaching
  - Health and Physical Education (all levels)
  - Reading Specialist (all levels)
- Educational Leadership and Counseling
  - School Supervision
  - Educational Administration
  - School Counseling
  - Agency Counseling
  - Educational Diagnostician
  - Special Programs

Specific Master of Education degree requirements are found under the above two departmental sections in this catalog.

**MASTER OF MUSIC:** The Master of Music degree is offered in two programs: Performance, which specializes in the study of a performing medium; and Music Education, which is designed for advanced training in the teaching profession. All instrumental and vocal media are available for study.

Specific requirements for the Master of Music degrees are found under "Music" in this catalog.

**MASTER IN PUBLIC ADMINISTRATION:** The professional Master in Public Administration (M.P.A.) degree provides professional education for students interested in public service careers. The program is designed to stress the knowledge, skills, values and behavior essential to the successful public servant. Some flexibility in curriculum is permitted to meet the diverse educational needs of pre-entry and in-career students, changing career students, and students with interests in different career specialties in public administration. The curriculum components are designed to produce professionals capable of intelligent and creative analysis, communication, and action in the public sector.

In addition, the M.P.A. program—in conjunction with the Master of Business Administration program—offers qualified students the option of completing both the M.P.A. and the M.B.A. degrees simultaneously. The objective of this program is to permit students with broad interest in both the public and private sectors to register simultaneously in both programs. With the increasing interdependence of the public and private sectors, this option is attractive to those students wishing to pursue careers in positions that involve working with their counterparts in private and public organizations.

Requirements for the M.P.A. degree and the two-degree option are found under "Political Science" in this catalog.

**MASTER OF SCIENCE:** General Requirements for all programs include:

1. A thesis (6 semester hours) plus 24 semester hours of coursework. (Some departments have plans requiring 36 hours without a thesis). Only 9 hours of 3300 and 3400 courses are permitted in a program, and no more than 6 hours may be included in either the major or minor.
2. A major with a minimum of 18 semester hours including the thesis. Major fields for the Master of Science include Biological Sciences, Chemistry, Computer Science, Engineering, Geological Sciences, Geophysics, Health and Physical Education, Mathematics, Physics, Speech Pathology and Audiology, and Statistics
3. A minor of from 6 to 12 hours in a related field may be accepted or required by the department. A transfer stu-

dent must complete at least 3 hours of the minor in residence.

Specific requirements for the M.S. degree may be found under the above departmental sections in this catalog.

**MASTER OF SCIENCE IN INTERDISCIPLINARY STUDIES:** The M.S.I.S. Program is designed for the individual who, having completed a baccalaureate program at an accredited college or university, now wishes to expand his or her knowledge at the graduate level not only in the baccalaureate field of study but more particularly in areas outside of the previous training. Students' motivation for such training may stem from needs of their present employment, from the desire to prepare for unusual employment opportunities (outside the usual academic disciplines), or from the desire to be able to solve problems in trans-disciplinary areas. Individual programs of study are designed to fit the needs of the student.

Requirements for the M.S.I.S. degree are found under "Master of Science in Interdisciplinary Studies" in this catalog.

**MASTER OF SCIENCE IN NURSING:** The curriculum of the graduate program in Nursing is designed to prepare professional nurses for advanced leadership through enhanced clinical practice, research, and role expansion.

Requirements for the Master of Science in Nursing degree are found under "Nursing" in this catalog.

**DOCTOR OF GEOLOGICAL SCIENCES.** The Department of Geological Sciences offers the Doctor of Geological Sciences degree to outstanding students who wish to continue graduate studies at the doctoral level. Although similar to most Ph.D. programs, this doctoral program is unique in that it requires an internship of nine months of practical experience in industry or a geological survey. This aspect of the program has proven invaluable to graduates who have entered teaching as well as those who have gone into industry. Another unique aspect of this program is the fact that outstanding students from allied areas of science and engineering are encouraged to apply for admission. A special program of leveling courses has been designed to make a crossover to the geological sciences possible with a minimum of delay.

Requirements for the Doctor of Geological Sciences degree are found under "Geological Sciences" in this catalog

**COOPERATIVE DOCTORAL PROGRAM IN BORDER STUDIES:** The University of Texas at El Paso and The University of Texas at Austin have long shared a vibrant interest in Latin America, Mexico, and the U.S.-Mexico borderlands. Strong faculty, dynamic research centers, outstanding libraries, and exceptional field laboratories enable this program to offer unique opportunities for graduate study and research in these fields.

Through the Cooperative Doctoral Program in Border Studies, a graduate student may pursue studies focusing on the U.S.-Mexico borderlands within the following academic majors: sociology, geography, applied linguistics, history, economics, government (political science), anthropology, social work, community and regional planning, and Latin American Studies.

Since UT Austin is the degree-granting institution, the details of each student's program of studies must be developed within the context of departmental requirements and procedures currently in effect at UT Austin. Every student will be required to spend one full academic year at the Austin campus. At least six semester hours of course work and/or research must be completed at UT El Paso.

Admission to the program may be initiated at either institution. Students must qualify for admission to the Graduate Schools at UT El Paso and UT Austin and comply with all of the academic regulations of both campuses throughout the duration of the program. Students must also demonstrate oral and written competency in both English and Spanish to participate in the program.

Further information about the program may be obtained at the Graduate School or at the Center for Inter-American and Border Studies at UT El Paso, or at the Graduate School or at the Institute for Latin American Studies at UT Austin.



# Tuition and Fees

The charges shown in these schedules must be paid by all students registering for credit. The amounts include the following:

## Tuition

**TEXAS RESIDENTS**—\$16 per semester hour with a minimum assessment of \$100 for up to 6 semester hours. Effective Fall 1989, \$18 per semester hour with a minimum assessment of \$100 for up to 5 semester hours.

**NON-RESIDENT/INTERNATIONAL STUDENTS**—\$120 per semester hour. Effective Fall 1988, non-resident/international students will be assessed the actual cost of education per semester hour as determined by the Coordinating Board, Texas College and University System

## Mandatory Fees

**GENERAL FEE**—\$6 per semester hour

**STUDENT SERVICES FEE**—\$7.50 per semester hour, to a maximum of \$90 (12 semester hours).

**STUDENT GENERAL PROPERTY DEPOSIT**—\$10 fee assessed at the time of the student's initial registration at the University. This fee is refundable to the student at the end of his or her University enrollment. A property deposit which remains without call for refund for a period of four years from the date of last attendance at the University will be forfeited and will become the property of the Student General Property Deposit Endowment Fund. Such funds will be invested and the income will be used for scholarship purposes.

**COURSE-RELATED FEES**—assessment of varying amounts, based on courses for which the student is enrolled.

## Tuition and Mandatory Fees Schedules

Long Semesters (Fall and Spring), per semester:

Semester Hours	Resident Students (thru Fall 1988)	Non Resident/International Students (thru Fall, 1989)
1	\$113.50	\$ 133.50
2	127.00	267.00
3	140.50	400.50
4	154.00	534.00
5	167.50	667.50
6	181.00	801.00
7	206.50	934.50
8	236.00	1,068.00
9	265.50	1,201.50
10	295.00	1,335.00
11	324.50	1,468.50
12	354.00	1,602.00
13	376.00	1,728.00
14	398.00	1,854.00
15	420.00	1,980.00
16	442.00	2,106.00
17	464.00	2,232.00
18	486.00	2,358.00
19	508.00	2,484.00
20	530.00	2,610.00
21	552.00	2,736.00

**Thesis/Dissertation**—Students enrolling for courses 3598, 3599, 3620 or 3621 will be assessed as follows for tuition and mandatory fees:

Resident Students: \$88.50

Non-Resident/International Students: \$400.50

## Summer Sessions, 5½-week, and 11-week and 9-week terms:

The term length of Summer Session 1988 and 1989 has not been decided; it may consist of 5½ week, 11 week, or 9 week terms.

Semester Hours	Resident Students		
	5½-week term (thru Summer 1989)	11-week term 5½-11 week combination (thru Summer 1989)	9-week term
1	\$ 63.50	\$113.50	\$113.50
2	77.00	127.00	127.00
3	90.50	140.50	140.50
4	118.00	154.00	154.00
5	147.50	167.50	167.50
6	177.00	181.00	181.50
7	206.50	206.50	206.50
8	236.00	236.00	236.00
9	265.50	265.50	265.50
10	295.00	295.00	295.00
11	324.50	324.50	324.50
12	354.00	354.00	354.00

A resident student who is enrolled for one or more 11-week course(s) and who later registers for additional work during the 2nd Term will not be assessed additional tuition, but will be assessed only the appropriate fees (student activities fee, general fee, etc.) for the 2nd Term courses, provided the 2nd Term enrollment is 6 semester hours or less.

**Summer Sessions—Non-Resident/International Students**—Tuition and mandatory fees will be the same as the long semester schedule through Fall of 1988.

**Thesis/Dissertation**—Students enrolling for courses 3598, 3599, 3620 or 3621 will be assessed as follows for tuition and mandatory fees:

Resident Students: \$85.50

Non-Resident/International Students: \$397.50

## LAB AND FINE ARTS FEES

	LAB FEE	FINE ARTS FEE
AHS 3401, 3402	\$4.00	
ANTH 6247, 6447	Varies according to destination of trip	
ART 3502 (Except Art History & Art Education)		\$10.00
ARTE 3311, 3312, 3321	\$4.00	
ARTF 3101, 3102, 3103, 3104	\$4.00	
ARTG 3206, 3316, 3336, 3406, 3426		\$4.00
ASTR 1107, 1108	\$8.00	
BIOL 1107, 1108, 1212, 1215, 1217, 1319, 1498, 2423, 2498, 3426, 3498, 3502, 3505, 3514, 3518, 3520, 3521, 3524, 5502	\$8.00	
BIOL 2425, 3425, 4425, 5425, 6425	Varies according to destination of trip	
BOT 1473, 2338	\$8.00	
BROD 3303	\$10.00	
BROD 3320	\$20.00	
CE 1334, 1336, 1453, 2396, 3313, 3314, 4390, 4448, 4509, 4537, 4539	\$8.00	
CERM 3204, 3214, 3304, 3314, 3324	\$8.00	
CERM 3404, 3414, 3424	\$10.00	
CHEM 1310, 1324, 1325, 1326, 1351, 1352, 1465, 1476, 1501, 2106, 2214, 2321, 2322, 2412, 3476, 4107, 4108	\$8.00	
DRAW 3208, 3218, 3308, 3318	\$8.00	

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DRAW 3420, 3430 .....	\$10.00
EE 3385 .....	\$4.00
EE 1205, 1251, 2310, 2411, 2412, 4360, 4377 .....	\$8.00
ESOL 2111, 2112 .....	\$2.00
FREN 4101, 4102 .....	\$2.00
GEOG 1106, 3208, 3308, 3310 .....	\$8.00
GEOG 1101, 1102, 1455, 1457, 3103, 3104, 3213, 3214, 3304, 3305, 3315, 3321, 3325, 3462, 3530, 3534, 3535, 3536, 3541, 3542, 3545, 3566, 3567, 3568, 3576, 3580, 4111, 4112, 4320, 4323, 4458, 4591, 4592 .....	\$8.00
GEOG 6465 .....	Varies according to destination of trip
GEOP 3333, 3432, 3434, 3558 .....	\$8.00
GERM 4101, 4102 .....	\$2.00
IE 3216, 3236, 3377 .....	\$6.00
JOUR 3307, 3308 .....	\$15.00
LATN 4101, 4102 .....	\$2.00
LING 4103 .....	\$2.00
MECH 3305, 3501, 4354, 4451 .....	\$6.00
MET 1203, 3413, 4304, 4305, 4306, 4307, 4405, 4417 .....	\$6.00
MICR 1241, 1328, 1344, 1346, 1350, 1452, 1454, 1456, 2348 .....	\$8.00
MTLS 3203, 3213, 3303, 3313, 3323 .....	\$8.00
MTLS 3403, 3414, 3423 .....	\$10.00
MUSA 2181, 2191, 2391, 2581 .....	\$20.00
MUSA 3181, 3191, 3391, 3581, 3591, 4191, 4391 .....	\$35.00
NURS 3302, 6306, 7302, 7303, 7370, 7371, 7410, 7411, 7471, 7472 .....	\$4.00
PE 1101 (Swimming) .....	\$8.00
PE 1101 (All Other Activities) .....	\$4.00
PSCI 3101 .....	\$8.00
PHYS 1120, 1121, 1217, 1218, 2217, 2343, 2446, 4103, 4104 .....	\$8.00
PNTG 3201, 3231, 3301, 3331, 3341 .....	\$4.00
PNTG 3401 .....	\$6.00
PNTG 3431, 3441 .....	\$10.00
PRNT 3205, 3225, 3305, 3325, 3335 .....	\$8.00
PRNT 3405, 3425, 3435 .....	\$10.00
PSYC 1321, 1322, 3401 .....	\$3.00
PSYC 3523 .....	\$5.00
RUSS 4101, 4102 .....	\$2.00
SCUL 3202, 3232, 3302, 3332, 3342 .....	\$8.00
SCUL 3402, 3432, 3442 .....	\$10.00
SPAN 4101, 4102, 4103, 4104 .....	\$2.00
ZOOL 1365, 1455, 1457, 1471, 1477, 1479, 1481, 4366 .....	\$8.00

### INCIDENTAL FEES

**TRANSPORTATION FEES** will vary according to the destination of the trip involved in the course.

**GEOLOGY TRANSPORTATION FEE** of \$200 will be assessed to students enrolled in Geology courses requiring extensive field trips during a semester.

**COMPUTER USER CHARGE**—A \$10 assessment is made when a student enrolls for certain classes which include substantial use of University computing facilities. Such classes are identified in the semester class schedule.

**LATE REGISTRATION FEE**—Any student who, with proper permission, registers after the appointed days for registering will be

required to pay a special charge of \$5.00 for the first late day and \$2.50 for each additional late day to a maximum of \$15.00 to defray the cost of the extra services required to effect the late registration.

**ADD/DROP FEE**—A fee of \$5.00 is assessed each time a student makes a change in the initial registration.

**INTERNATIONAL STUDENT APPLICATION FEE**—A fee of \$50.00 is assessed of all applicants for admission who are citizens of countries other than Mexico and who are not permanent residents of the United States. Applications not accompanied by a \$50 check or money order, payable in U.S. funds, will not be considered. An individual who has applied, paid the fee, and been accepted but who does not enroll, will be considered for later admission only upon reapplication including payment of this fee again.

**SPECIAL EXAMINATION FEE**—A fee of \$1.00 is required of persons who wish to take an advanced standing examination, an examination to remove a condition, or an examination to be given at a time other than that for which it is regularly scheduled. Permission of the academic dean must be secured before payment is made.

**GRADUATION FEE**—A fee of \$15.00 is required of candidates for graduation. This fee must be paid each time an application for degree is filed and under no circumstances is subject to refund. Veterans attending the University under an exemption as described elsewhere in this section are not exempt from payment of this fee.

**IN ABSENTIA REGISTRATION FEE**—A fee of \$15.00 will be assessed to graduate students who have completed the degree requirements, including submission of the thesis or dissertation, after the semester deadline, but prior to registration for the following semester to register for the sole purpose of receiving the degree.

**LATE UNDERGRADUATE ADMISSION APPLICATION FEE**—A fee of \$15 will be assessed to undergraduate applicants that file after the scheduled deadlines to submit applications for admission to the University.

**NEW STUDENT ORIENTATION FEE**—A \$15.00 fee will be assessed to all students that participate in the University's orientation program that is offered to all incoming Freshmen and new transfer students.

**LIBRARY FEES**—A fee of \$.20 per day to a maximum of \$6.00 per book will be assessed to students that fail to return library books when due. A student will be charged the replacement value for a lost book.

**TRANSCRIPT FEE**—A fee of \$1.00 will be assessed to students for an unofficial copy of their transcript. A fee of \$2.00 will be assessed for an official copy.

**RETURNED CHECK FEE**—A fee of \$15.00 will be assessed to students that issue payment to the University with a check that is returned to the University for insufficient funds.

**INSTRUMENT USERS FEE**—A fee of \$15 will be assessed to students per semester that wish to use musical instruments that are available through the Music Department.

**STUDENT IDENTIFICATION CARD REPLACEMENT FEE**—A fee of \$10 will be assessed to students that need to replace their I.D. cards. The cards are issued free to incoming freshmen and new transfer students. The I.D. card is required of all students and should be carried at all times. I.D. cards that are five years or older will be replaced free of charge when the card is lost or damaged.

**CATALOG FEE**—A fee of \$1 will be assessed to students that pick up the University catalog. A fee of \$2.00 will be assessed to students that request a University catalog to be mailed.

**PARKING FEE**

The Board of Regents has approved a parking fee as follows for those students desiring to park cars on the campus:

Fall Semester.....	\$10.00
Spring Semester .....	6.50
Summer Session .....	4.00

Note: The fee is payable only once during the school year and is in effect from the date paid to the end of the school year in which paid. There will be no refund of the parking fee.

**Methods of Payment**

The University offers the following three payment options *during long semesters only*:

1. Full payment of tuition and all fees at the time of registration.
2. One half payment of tuition, mandatory and course-related fees at the time of registration, with the remaining one-half due by the end of the seventh week of classes. All other fees and charges, including an Installment Payment Service Charge of \$12, are to be paid at the time of registration.
3. One-fourth payment of tuition, mandatory and course-related fees at the time of registration, with the remaining three-fourths due in equal installments by the end of the third, seventh and eleventh weeks of classes. All other fees and charges, including an Installment Payment Service Charge of \$12, are to be paid at the time of registration.

Assessments for which payment can be deferred under options 2 or 3 above include the following:

- Tuition
- Mandatory Fees (General Fee, Student Services Fee)
- Course-related Fees (Laboratory, Fine Arts, Transportation Fees; Computer User Fees)

Items for which payment **MAY NOT** be deferred include the following:

- Student General Property Deposit
- Service Fees/Incidental Fees (Late registration, Add/Drop, etc.)
- Discretionary Fees (Parking decals, liability insurance, health insurance)
- Installment Payment Service Charge
- Amounts due for financial holds or from prior periods

The following additional policies will apply to deferral of payments:

1. All student account balances due from prior semesters, including items associated with payment deferred, must be paid in full before a student may begin registration for a subsequent semester.
2. A payment plan selected at the time of registration will be binding and will be applied in any subsequent add/drop activities; however, pre-payment of outstanding balances will be accepted. The University shall assess the Installment Payment Service Charge of \$12.00 for those students choosing payment options 2 or 3; this charge is payable at the time of registration. A Late Installment Payment Charge of \$10.00 will be assessed at the end of the third, seventh, and eleventh class weeks if the payment due for that period is not paid in full.
3. Students on scholarships, financial aid, or other third-party programs will be required to make full payment of tuition and all fees at the time of registration when the award amount is sufficient to cover the assessed amount. If the award amount is insufficient to cover the assessed amount, the total amount of the financial aid award will be applied to the payment of tuition and all other fees and charges; the student may then choose either Option 2 or 3 for payment of the remainder.
4. The Bursar's Office of the University will send bills during the second, sixth, and tenth class weeks to students paying tuition and fees under Options 2 and 3.

Under the Law, students who do not make installment pay-

ments by the due date may be barred from classes. The Law also states that students who fail to make full payment by the end of the semester may not receive credit for the work done that semester.

**Refund of Tuition and Fees**

Refund policies are established by, and are subject to change by, the Legislature of the State of Texas and are applicable to withdrawals and dropped courses. Refunds of tuition, laboratory fees, general fees and student services fees will be made under the following conditions:

**WITHDRAWALS**—Students withdrawing during a long semester or during a long summer session will be refunded applicable tuition and fees as follows:

Prior to first class day	100% less \$15.00
During first five class days	80%
During second five class days	70%
During third five class days	50%
During fourth five class days	25%
After fourth five class days	No Refund

Students withdrawing during a short Summer Session term will be refunded applicable tuition and fees as follows:

Prior to first class day	100% less \$15.00
During first three class days	80%
During second three class days	50%
After sixth class day	No Refund

**DROPPED COURSES**—Refunds of applicable tuition and fees will be made for courses from which students drop within the first twelve class days of a Long Session semester or an appropriately shorter period for a Summer Session term, provided the student remains enrolled for that semester or term. Refund of tuition for dropped courses will be made only if the original payment exceeds the established minimum amount.

Refunds of tuition and fees paid in the student's behalf by a sponsor, donor or scholarship will be made to the source rather than directly to the student who has withdrawn or dropped courses if the funds were made available through the University. Students who withdraw or drop courses must, in order to qualify for a refund, surrender all applicable privileges, including identification cards and athletic and cultural entertainment tickets. Refunds provided for above will be granted if applied for by the end of the semester in which the withdrawal or drop occurs and if records indicate the official withdrawal or drop was appropriately completed.

**Housing Expenses**

Rates for 1986-87 which include room and twenty meals per week are as follows:

**Barry Hall, Room and Board:**

<b>SEMESTER CONTRACT—4½ months</b>	
Double Room	\$1,330
Single Occupancy (When available)	1,630
<b>LONG SESSION CONTRACT—9 months</b>	
Double Room	2,400
Single Occupancy (When available)	3,000
<b>SUMMER SESSION, PER TERM</b>	
Double Room	520
Single Occupancy (When available)	627

**Student Apartments:**

Monthly (includes utilities)	\$ 300
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Rates are subject to change by action of the Board of Regents, The University of Texas System. Further information about the UT El Paso student housing facilities, as well as application forms, can be obtained from:

The Housing Office  
 Barry Hall  
 UT El Paso  
 El Paso, TX 79968  
 (915) 747-5353

## Residency Regulations—General Rules

The following regulations apply to permanent residents and citizens of the United States.

Each student is responsible for paying the proper tuition rate based upon residency classification. If there is any question of legal residence in Texas under state laws and University regulations, the student must resolve the question with the Director of Admission before registration. Attempts on the part of a non-resident to evade the non-resident tuition will be taken seriously and may lead to expulsion. Any student who has paid the wrong tuition will be charged the difference and will be responsible for paying the additional amount before the next registration period. Any student classified as a resident who becomes a non-resident at any time by virtue of a change of legal residence is required to immediately notify the Office of Admission and Evaluation.

### MINORS AND DEPENDENTS

An individual under 18 years of age who is living away from home, and whose family resides in another state or has not resided in Texas for the 12-month period immediately preceding the date of registration, shall be classified as a non-resident student.

An individual 18 years of age or under or who is a dependent whose family has not resided in Texas for the 12-month period immediately preceding the date of registration shall be classified as a non-resident student regardless of whether the student has become the legal ward of residents of Texas or has been adopted by residents of Texas while attending an educational institution in Texas, or within a 12-month period before attendance, or under circumstances indicating that the guardianship or adoption was for the purpose of obtaining status as a resident student.

An individual 18 years of age or under whose parents were residents of Texas at the time of the student's registration is entitled to pay resident tuition following the parents' change of legal residence to another state, as long as the individual remains continuously enrolled each long semester in a state-supported institution of higher education.

### INDIVIDUALS OVER EIGHTEEN

An individual 18 years of age or over who has come from outside Texas and who is gainfully employed in Texas for a 12-month period immediately preceding registration in an educational institution shall be classified as a resident student as long as legal Texas residence is maintained.

An individual 18 years of age or over who resides out of the state or who comes from outside Texas and who registers in an educational institution before having resided in Texas for a 12-month period shall be classified as a non-resident student.

An individual who would have been classified as a resident for the first five of the six years immediately preceding registration, but who resided in another state for all or part of the year immediately preceding registration, shall be classified as a resident student.

A non-resident student classification is presumed to be correct as long as the residence of the individual in the state is primarily for the purpose of attending an educational institution. After residing in Texas for at least 12 months, a non-resident student may petition for reclassification as a resident student as provided in the rules and regulations adopted by the Coordinating Board, Texas College and University System. Any individual reclassified as a resident student is entitled to pay the tuition for a resident of Texas at any subsequent registration as long as legal Texas residence is maintained.

### MARRIED STUDENTS

A student who is a resident of Texas and who marries a non-resident is entitled to pay the resident tuition as long as the student does not adopt the legal residence of the spouse in another state.

### MILITARY PERSONNEL AND VETERANS

A person who is an officer, enlisted person, selectee, or draftee of the Army, Army Reserve, Army National Guard, Air National

Guard, Air Force, Air Force Reserve, Navy, Navy Reserve, Marine Corps, Marine Corps Reserve, Coast Guard, or Coast Guard Reserve of the United States, who is assigned to duty in Texas, and the spouse and children of such an officer, enlisted person, selectee, or draftee, are entitled to register in a state institution of higher education by paying the tuition and other fees or charges required of Texas residents, without regard to the length of time the officer, enlisted person, selectee, or draftee has been assigned to duty or resided in the state. However, out-of-state Army National Guard or Air National Guard members attending training with Texas Army or Air National Guard units under National Guard Bureau regulations may not be exempted from non-resident tuition by virtue of that training status nor may out-of-state Army, Air Force, Navy, Marine Corps, or Coast Guard Reserves training with units in Texas under similar regulations be exempted from non-resident tuition by virtue of that training status. It is the intent of the legislature that those members of the Army or Air National Guard or other reserve forces mentioned above be exempted from the non-resident tuition fee and other fees and charges only when they become members of Texas units of the military organizations mentioned above.

A person in military service who wishes to pay the resident tuition personally or for dependents must submit before EACH registration a statement from the Commanding Officer or Personnel Officer certifying assignment of duty in Texas and that same will be in effect at the time of registration in an institution of higher education.

As long as they reside continuously in Texas, the spouse and children of a member of the Armed Forces of the United States who has been assigned to duty elsewhere immediately following assignment to duty in Texas are entitled to pay the tuition and other fees or charges provided for Texas residents.

A Texas institution of higher education may charge to the United States Government nonresident tuition for a veteran enrolled under the provisions of a federal law or regulation authorizing education or training benefits for veterans.

The spouse and children of a member of the Armed Forces of the United States who dies or is killed are entitled to pay the resident fee, if the wife and children become residents of Texas within 60 days of the date of death.

If a member of the Armed Forces of the United States is stationed outside Texas and his spouse and children establish residence in Texas by residing in Texas and by filing with the Texas institution of higher education at which they plan to register a letter of intent to establish residence in Texas, the institution of higher education shall permit the spouse and children to pay the tuition, fees, and other charges provided for Texas residents without regard to length of time that they resided within the State.

A person who enrolls in a public institution of higher education following separation from military service must be classified as a non-resident student unless, (1) he or she was a legal resident of Texas at the time of entrance into military service and has not relinquished that residence, (2) he or she can prove that during military service bona fide, legal residence in Texas was established at least 12 months prior to registration, or (3) he or she has resided in Texas other than as a student for 12 months prior to registration and subsequent to discharge from service.

### TEACHERS AND PROFESSORS

A teacher or professor of an institution of higher education, and the spouse and children of such a teacher or professor, are entitled to register in an institution of higher education by paying the tuition fee and other fees or charges required for Texas residents without regard to the length of time the teacher or professor has resided in Texas. A teacher or professor of an institution of higher education and the teacher's or professor's family are entitled to the benefit of this section if the teacher or professor is employed at least one-half time on a regular monthly salary basis by an institution of higher education.

### TEACHING OR RESEARCH ASSISTANTS

A teaching assistant or research assistant of any institution of higher education and the spouse and children of such a teaching

assistant or research assistant are entitled to register in a state institution of higher education by paying the tuition and other fees or charges required of Texas residents, without regard to the length of time the assistant has resided in Texas, if the assistant is employed at least one-half time in a teaching or research assistant position which relates to the assistant's degree program under rules and regulations established by the employer institution.

#### **SCHOLARSHIP RECIPIENTS**

A student who holds a competitive academic scholarship of at least \$200 for the academic year or summer for which the student is enrolled and who is either a non-resident or a citizen of a country other than the United States of America is entitled to pay the tuition and other fees and charges required of Texas residents without regard to the length of time the student has resided in Texas. The student must compete with other students, including Texas residents, for the academic scholarship and the scholarship must be awarded by a scholarship committee officially recognized by the administration and be approved by the Coordinating Board, Texas College and University System, under criteria developed by the Board.

#### **CITIZENS OF OTHER COUNTRIES**

An alien who is living in this country under a visa permitting permanent residence or who has filed with the proper federal immigration authorities a declaration of intention to become a citizen has the same privilege of qualifying for resident status for tuition purposes as has a citizen of the United States. Generally, individuals who obtain permanent resident status while in Texas must wait a minimum of 12 months from the date of issue to request resident status for tuition purposes.

#### **OFFICIAL CHANGE OF RESIDENCE STATUS**

Every student classified as a non-resident shall be considered to retain that status until such time as application for reclassification is made and approved in writing by the Office of Admission and Evaluation. The Residence Questionnaire and supporting documents should be submitted at least one month prior to registration for the semester for which the change is requested. Additional questions concerning residence status should be directed to the Office of Admission and Evaluation.



# Facilities & Services

**The Library** is the heart of the institution, serving the research and study requirements of students and faculty with a rapidly-expanding collection of books, periodicals, microforms, audio-visual materials, documents, and maps. As of August 31, 1986, holdings of the Library include 629,959 books and bound periodicals, 139,303 documents, 4,078 current serial and periodical subscriptions, 353,447 volume equivalents of microform, and 82,268 maps. Although the Map Collection provides support for the geosciences, these holdings represent varied and important resources for all faculty and students.

On October 24, 1984, the new six-level Central Library opened its doors to students and faculty. In keeping with campus tradition, the building is Bhutanese in architectural style, and its 275,000 square feet will seat 2,305 users and will eventually house 1.2 million volumes. High-quality, functional furniture complements the Bhutanese theme. Seventy-four individual study rooms provide private space for faculty engaged in library-related research, and a graduate student working on a thesis may reserve one of the 192 carrels available. Twenty-nine rooms of various sizes provide accommodations for meetings and group study. The building is designed to meet the needs of the handicapped, and a special room for the hearing and visually impaired provides specialized equipment and materials.

The University Library, in addition to maintaining efforts to develop collections which strongly support the programs of the University, is an active participant in cooperative networks. The Library's memberships in AMIGOS Bibliographic Network and OCLC provide additional materials and services through the sharing of bibliographic information and library resources. Research facilities are also supplemented by interlibrary loan transactions with libraries throughout the United States.

The Library is fortunate to have several outstanding special collections of books and other materials which support important academic emphases of the University which are housed on the smaller sixth floor, the "Penthouse." In the John H. McNeely Room the Southwestern Collection, donated by Professor McNeely, is a major resource for scholars, and the J. Carl Hertzog Collection of materials on print, books and book design is located in the room named for Dr. Hertzog. Other special collections include the Judaica Collection, and the S.L.A. Marshall Military History Collection. Rare books, archival and other manuscript materials are also located on the sixth level.

Latin American and Chicano Studies programs have shown rapid growth in the past few years and have required support by the Library in the development of library resources. Of special interest is the Library's Chicano Services Section, one of the pioneering efforts in this area of library service. During the 1970s, the Science and Education branch libraries were set up to provide additional space for the growing collections. These branch library collections merged into the new central library when it was completed. When the College of Nursing came into the University System in September 1976, the Nursing/Medical Library, with a collection of over 15,000 volumes on health care, became a branch of the University Library. The Nursing/Medical library has recently been incorporated as a component of the Main Library.

The Library staff includes 23 professional positions, 46 classified positions and approximately 102 student assistants. The Library is open 92 hours per week with some departments maintaining shorter schedules.

**The Computer Center** was established in 1974 and functions as a service agency for all academic and administrative units of the University. The Center provides on-line support for the administrative and student records applications, batch computing for administrative and academic applications, interactive computing support, administrative programming support, network access through BITNET, access to the U.T. System Cray IMP/24 and limited maintenance support. The Computer Center also operates on behalf of the Library the library automation system.

The Center operates three processors in a loosely coupled network. The batch computing and on-line administrative applications are supported through MVS/JES2 on an IBM 4381-p2 with 10 gigabytes of online storage. Interactive computing and access to BITNET are handled by the MUSIC/SP system on an IBM 4341-m2 with 1.5 gigabytes of online storage. The library automation is handled by the NOTIS software system on an IBM-4361-k2. There are about 100 IBM-3270 type terminals of which 55 are available for student and faculty use. In addition to the IBM-3270 terminals, any ASCII terminal or personal computer can be attached through the data PBX and protocol converters. Dial-up access is also available to students and faculty. Access to the U.T. System CHPC Cray IMP-24 is provided either through BITNET or through the network interface processor at UTEP.

Software installed for academic support includes various plotting packages; statistical software including SAS, SPSS, BMDP and statpak; script text processing; mathematical software; and various language compilers.

The Computer Center is housed in three buildings. The administrative offices and programming support group are in the ground floor of Benedict Hall. Computer operations, systems programming, production control, data entry and academic users services are in the North end of Bell Hall. There is a satellite terminal area with a remote printer, documentation and some user assistance in the fourth floor of the classroom building.

**The Schellenger Research Laboratories (SRL)**, created in 1953 under the will of Mrs. Emma L. Schellenger as a memorial to her husband, Newton C. Schellenger, were founded to promote and encourage research in electricity.

Although administered by the Department of Electrical Engineering, the programs of SRL are interdisciplinary in nature and regularly involve faculty and students throughout the University. Funds from the trust are also used to support the Schellenger Research Professorship in Electrical Engineering.

SRL has specialized in atmospheric and acoustic research and instrumentation, and has investigated virtually every parameter of the atmosphere and has developed instruments for measuring and testing these parameters. SRL has also conducted studies in the life sciences including cardiac, dental, and orthopedic research. Recent activities include research in applications of artificial intelligence, computer vision and optical fiber communications.

**The Laboratory for Environmental Biology** was established as the major research and teaching support unit for the field-oriented biological sciences. The Resource Collections division is a major regional center for collections of plants, modern vertebrates, modern mollusks, and late Cenozoic fossil vertebrates and mollusks of the Southwest and Mexico. These collections, initiated in 1965, form an internationally recognized base for teaching and research in systematics, ecology, biogeography, and paleontology, with some 80,000 curated specimens. Other laboratory facilities include specialized equipment and collections of research literature in selected fields. The university is a member of the Association of Systematics Collections and the mammal collection meets the criteria of the American Society of Mammalogists.

**The El Paso Centennial Museum** opened in 1936 with funds allocated by the Commission for the Texas Centennial Celebration. It is devoted to the preservation, documentation, and exhibition of objects and ideas pertaining to the human and natural history of the El Paso del Norte region. Noteworthy collections include pottery, stone tools and shell jewelry from the prehistoric Mexican ruins of Casas Grandes, Chihuahua; mineral and rock specimens from regional and extraregional mines and localities; dinosaur bones from the Texas Big Bend area; and fossil elephant and other remains from local Ice Age deposits. The Museum is open to the public from 10 a.m. to 4:30 p.m. Tuesdays through Fridays of every week and on Sundays from 1:30 to 5:30.

**The Cross-Cultural Southwest Ethnic Study Center** was established at the UT El Paso campus in September 1971 under a Spencer Foundation Grant. The Center is devoted to investigating Southwest ethnic group relationships and conflicts. It aims at helping to prepare courses and self-contained units on the Southwest ethnic heritage for inclusion and integration in the regional liberal arts curricula. The Center is also coordinating activities aimed at creating a cultural data bank for illuminating various aspects of interethnic relationships.

The Center's Research Associates conducting projects in Humanities and Social Sciences represent a broad interdepartmental spectrum from various departments of the Colleges of Liberal Arts and Education, and from the Center for Inter-American Studies at UT El Paso. They utilize a variety of research techniques to collect, analyze, and interpret basic cultural data on ethnic groups.

The Center's projects have included: (1) research on sociolinguistics and communication problems funded by the Gulf Oil Foundation, (2) a four-year project funded by the National Endowment for the Humanities to develop courses for the Humanities Border Studies Program, (3) the Inter-institutional Bicentennial Project of the El Paso Community College/UT El Paso, funded by the Texas Colleges Bicentennial Program, Inc., and (4) Bilingual/Bicultural Education Symposia project funded by the Excellence Fund.

Recently the Center has undertaken a project on regional and national attitudes toward Hispanics and Hispanic immigration.

**The John W. Kidd Memorial Seismic Observatory** is in continuous year-round operation and is part of the World-Wide Standardized Seismograph Network. The station is equipped with six seismographs and recorders for study of both short and long-period seismic waves. The records are used for research on earthquakes and related phenomena and are made available to the scientific community through an international data center.

**The J. W. Miller Memorial Geophysical Laboratory** is a major research arm of the Department of Geological Sciences. This facility includes computer interfaced laboratory apparatus and a well-equipped computer graphics laboratory.

**The Division of Adult and Continuing Education** has a two-fold function:

1. Presents courses or programs to answer community needs for education or training outside the regular channels of instruction. Although college credit is not granted for such work except in limited selected courses, certificates from the University are presented to those who complete the courses. In addition, if the course meets specified requirements, each person who completes it is awarded Continuing Education Unit credit.
2. Coordinates and administers conferences, seminars, symposia, special educational programs, etc., initiated by academic units or individual faculty and designated primarily for non-university personnel and agencies. Activities in this category may result in the award of academic credit or Continuing Education Units, as appropriate, if the activity meets specified requirements.

**The Bureau of Business and Economic Research** was established on the campus in September 1963. The Bureau has the primary objective of supporting economic and industrial development of the El Paso and West Texas area, and the northern area

of the State of Chihuahua, Mexico. The Bureau conducts extensive research and maintains a comprehensive data bank on the economic and industrial growth of the areas.

The Bureau is a State of Texas Census Data Affiliate. As such, it maintains census data on the Upper Rio Grande area of Texas.

The Bureau publishes *The El Paso Economic Review* and the *Southwest Journal of Business and Economics*. The *Review* is published bi-monthly, and contains articles of interest on the local area economy, as well as business barometers. The *Journal* is published quarterly and contains articles of interest to the academic and business community throughout the United States. The *Journal* is a refereed publication. The Bureau publishes several special reports each year based on research conducted by the staff of the Bureau or the faculty of the College of Business Administration.

**Texas Western Press** is an internationally known book publisher and university press. It issues hardback books as well as paperbacks (including the Southwestern Studies monographs) which are sold nationally. TW Press specializes in the history and culture of the Southwest, although some titles are broader in scope. Manuscripts may be submitted to the director for consideration by the Editorial Board. Offices are located at 1825 Hawthorne, in the News Service building, phone 747-5688.

**The Center for Inter-American and Border Studies** promotes teaching, research and outreach programs that are designed to further the understanding of Latin America and its importance to the United States. Its particular interest is in Mexico and the nature of the special cultural, institutional, social, environmental, commercial and economic relationships that apply to the Mexico-U.S. border region.

The Center promotes and supports research by faculty and graduate students and sponsors the publication of scholarly material in its areas of special interest. Many academicians, scholars, artists and public personalities from Latin America are brought to the University each year by the Center to present lectures to students, faculty and the community at large.

The Center represents the University in a number of inter-institutional organizations that deal with inter-American and border issues. It also plays a prominent role in the special relationship between UT El Paso and Mexican educational institutions.

**The Center for Professional Development** offers intensive professional continuing education for executives, professionals, and their staff members through a variety of workshops, seminars, conferences, and short courses. These are designed to provide updating and new skills development and may be directed toward individual growth, organizational effectiveness, or licensing/certification needs.

Sessions vary in length and are taught by instructors selected for their expertise in subject area, related work experience, and demonstrated ability to have successfully conducted similar sessions. They may be college or university faculty members, practitioners from the community, or nationally and internationally recognized talent.

Many of the Center's programs are available in Spanish, and most may be customized for a particular group. In-house presentations can be designed to meet special needs or situations, and may be held at the Center or on-site.

Located in the College of Business Administration, the Center is committed to life long learning. It serves to link the business and professional communities to the educational resources needed to grow or keep current and updated.







# Programs of Study

## The College of Business Administration—Introduction

The primary mission of the College of Business Administration Graduate curriculum is to provide students with programs designed to prepare them for leadership positions in their business careers. The College meets these needs through specialized education leading to the Master of Accountancy, the Master of Business Administration, and the Master of Arts in Economics.

The Master of Accountancy is a professional graduate degree designed for students preparing for careers as professional accountants. The Program provides in-depth exposure to the basic areas of accounting, but allows for specialization to accommodate the student's particular needs and interests. In addition, the program is designed with concentration areas in Managerial Accounting, Tax Accounting, and Financial/Auditing.

The Master of Arts in Economics degree is designed to prepare graduates for positions in industry, finance, and government which require strong research/analytical backgrounds. In addition to the standard theory courses, the curriculum strongly emphasizes application of quantitative techniques to problem solving. The program also permits the student to take multiple courses in areas of special interest.

The objective of the MBA program is to give students an opportunity to prepare for executive careers in business and other fields using business techniques and policies in management and administration. Because the program is designed with the working professional in mind, all of the graduate courses are taught in the evening.

At the heart of these programs is a distinguished faculty committed to teaching, research and community service. An important part of the College's research and public service effort is the Bureau of Business and Economic Research, which serves as both collector and clearinghouse for research on the border. The BBER also serves as headquarters for the El Paso Small Business Institute. Established in 1976, the SIB's goal is to improve the small business management skills of CBA students and of community small business owners through cooperative projects.

The College's public service program is also focused through its Center for Professional Development (CPD). The Center offers approximately 100 non-credit programs annually for business persons and other professional groups.

The work of the BBER, CPD and faculty, as well as that of their students, is supported by the superb facilities of the College of Business Administration. This 80,000 square foot, \$7 million building opened in 1983 and includes four micro-computer laboratories and an HP3000 mainframe.

# Accounting

260 Business Administration Building  
(915) 747-5192

CHAIRPERSON: Richard G. Schroeder

GRADUATE FACULTY: Austin, Collier, Harris, Mann, Pavelka, Putnam, Schroeder

The Department of Accounting offers studies leading to the degree of Master of Accountancy. The objective of the program is to provide education for students interested in careers in professional accounting fields. It is designed to permit students to tailor their curriculum to meet their career objectives, allowing either general studies in accounting or specialization in taxation, managerial accounting, or financial accounting and auditing. Furthermore, it allows the student to supplement his or her accounting studies with a general or specialization curriculum in non-accounting topics.

### BASIC REQUIREMENTS FOR ADMISSION TO THE MASTER OF ACCOUNTANCY PROGRAM

To be admitted to the Master of Accountancy program, an applicant must have successfully completed approved courses in the common body of knowledge in business. The common body

of knowledge includes accounting, business computer applications, marketing, economics, finance, management, and business law. If an applicant has not studied these subjects at the undergraduate level, he or she may meet this requirement by earning a B average or above in the courses listed below.

Financial Accounting	ACCT 3501
Business Computer Applications	CIS 3502
Marketing Systems	MKT 3503
Business Economics	ECON 3504
Financial Concepts and Analysis	FIN 3505
Business Law and Ethics	BLAW 3506
Management Concepts	MGMT 3507
Concepts of Production Management	MGMT 3508

In addition to the course requirements of the Master of Accountancy program, applicants will be required to take any of the following courses for which they have not previously received credit:

Accounting Information Systems	ACCT 3320
Intermediate Accounting I	ACCT 3321
Intermediate Accounting II	ACCT 3322
Cost Accounting	ACCT 3323
Federal Income Tax—Individuals	ACCT 3327
Auditing Principles & Procedures	ACCT 3404

### MASTER OF ACCOUNTANCY PROGRAM

The MAcc program consists of a 12-hour accounting core, 12 to 15 hours of accounting electives, and 9 to 12 hours of approved electives. Students must complete a minimum of 36 hours and take a final examination (see page 13 of this catalog for details regarding the final examination). Students may earn three hours credit writing a professional report. If they write a professional report, their defense of the document will serve as their final examination. Two other options for satisfying the final examination requirement are: revise and defend major research papers prepared in ACCT 3510, ACCT 3522, and one other graduate-level accounting course; or complete an examination over all courses in the candidate's plan of study. The thesis or professional report may be used to augment any of the options described below or to focus on specific issues of interest to the candidate.

#### Accounting Core

All candidates must complete the accounting core unless the Graduate Studies Committee approves modifications of their plan of study. The core is:

Contemporary Accounting Issues	ACCT 3510
Controllershship	ACCT 3512
Tax Concepts: Research and Procedure	ACCT 3522
Computer Applications in Accounting and Auditing	ACCT 3524

#### General Option

Candidates in the general option must take at least 12 accounting hours in addition to the core listed above. They may select these hours from any accounting courses approved for graduate credit except ACCT 3501, ACCT 3511, and ACCT 3514 (refer to Accounting Courses Approved for Graduate Credit).

#### Managerial Option

Candidates in the managerial option must take the following courses in addition to the core listed above: ACCT 3405, Not-for-profit Accounting; ACCT 3421, Advanced Cost Accounting; ACCT 3591, Seminar in Managerial Accounting; and one more three-hour accounting course.

#### Financial/Auditing Option

Candidates in the financial/auditing option must take the following courses in addition to the core listed above: ACCT 3405, Not-for-profit Accounting; ACCT 3423, Issues in Accounting; ACCT 3523, Advanced Auditing; and one more three-hour accounting course.

#### Tax Option

Candidates in the tax option must take the following courses in addition to the core listed above: ACCT 3428, Federal Income

Tax—Partnerships and Corporations; ACCT 3525, Estate and Gift Taxation; ACCT 3526, Advanced Corporate Taxation; ACCT 3520, Taxation of Partnerships and Sub S Corporations; and ACCT 3523, Advanced Topics in Federal Taxation.

#### Accounting Courses Approved for Graduate Credit

The following accounting courses are approved for either undergraduate or graduate students. Refer to the undergraduate catalog for course descriptions.

#### 3401 Advanced Accounting I

#### 3402 Advanced Accounting II

#### 3405 Not-for-profit Accounting

#### 3421 Advanced Cost Accounting

#### 3423 Issues in Auditing

#### 3425 International Accounting

#### 3428 Federal Income Tax—Partnerships and Corporations

The following accounting courses are approved for graduate students only:

#### 3501 Financial Accounting (3-0)

An intensive study of accounting with emphasis on the use and interpretation of financial statements, cost behavior, and analysis of cost accounting reports, budgeting and variance analysis. Designed to meet the needs of those who will read, analyze and interpret financial statements. *Prerequisite:* Admission to a graduate program in business. May not be counted for credit toward any graduate degree in business or economics.

#### 3510 Contemporary Accounting Issues (3-0)

Development of accounting theory; controversial issues involved in the measurement and reporting of enterprise periodic income. Study of authoritative pronouncements.

#### 3511 Accounting for Management (3-0)

A study of accounting as related to making business decisions. Readings, cases, and problems dealing with accounting concepts, budgeting and cost control, use of accounting data in planning operations and policy formulation, and tax planning in business policies. *Prerequisite:* ACCT 3309 or equivalent.

#### 3512 Controllership (3-0)

A study of the major phases of controllership practice, including organizational status, objectives, functions, duties, and responsibilities and the managerial utilization of accounting and statistical data for planning and control. *Prerequisite:* ACCT 3511 or equivalent.

#### 3514 Managerial Tax Planning (3-0)

Aspects of income taxation affecting management decisions, including executive compensation, tax shelters, corporate reorganizations, fixed assets, capital gains, S Corporations, and other selected topics. *Prerequisite:* ACCT 3311 or 3327 or equivalent, or consent of instructor. May not be counted as an elective in the Master of Accountancy Taxation Option.

#### 3520 Taxation of Partners, Partnerships and Sub S Corporations (3-0)

The intensive study of federal income tax principles applicable to the formation, operation, sale and liquidation of partnerships. Special attention will be paid to the issues of distributions, basis and tax minimization opportunities. *Prerequisites:* ACCT 3428 and 3522 (or concurrent registration) or equivalent.

#### 3521 Advanced Topics In Federal Taxation (3-0)

Topics will vary depending on current developments, e.g., taxation of foreign persons and multinational operations, consolidated tax returns, state and local taxation, pension plans, charitable organizations, and tax reform proposals. *Prerequisites:* ACCT 3327 and 3522 (or concurrent registration) or equivalent.

#### 3522 Tax Concepts, Research and Procedure (3-0)

The goal is to develop skill in tax issue identification and development of documentary support and arguments for tax problems. To be com-

bined with analysis of concepts germane to all areas of taxation. Emphasis on written communication skills. Also, tax procedure will be covered. *Prerequisites:* ACCT 3327 and approved computer science (or concurrent registration) or equivalent.

#### 3523 Advanced Auditing (3-0)

Provides intensive coverage of technical and professional aspects of public accounting. It builds primarily upon the Auditing Principles and Procedures course (ACCT 3404), but is designed to integrate other relevant aspects of undergraduate and graduate accounting and business courses. *Prerequisite:* ACCT 3404.

#### 3524 Computer Applications in Accounting and Auditing (3-0)

Design and control of computerized accounting, use of computers in accounting and their applications to the auditing functions, stress is placed on E.D.P. control; internal auditing considerations. *Prerequisite:* ACCT 3404.

#### 3525 Estate and Gift Taxation (3-0)

A comprehensive survey of principles involved in determining the federal estate tax and federal gift tax including the taxability and valuation of property and analysis of deductions, including the federal marital deduction. *Prerequisites:* ACCT 3327 and 3522 (or concurrent registration) or equivalent.

#### 3526 Advanced Corporate Taxation (3-0)

Reorganizations, net operating losses; and other advanced areas in the field of corporate taxation. *Prerequisite:* ACCT 3428.

#### 3590 Accounting Seminar (3-0)

A study of the development of accounting thought as a background for its application to current accounting problems. Influences of government and organizations of accountants. *Prerequisite:* Twenty-one semester hours of accounting or consent of instructor.

#### 3591 Seminar in Managerial Accounting (3-0)

Advanced topics in managerial accounting including applications of stochastic processes to accounting and cost variance investigation models. Topics will vary to reflect current literature. *Prerequisite:* ACCT 3421.

#### 1592-3592 Directed Individual Study in Accounting

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of instructor.

#### 3594 Current Issues In Accounting (3-0)

A course organized to investigate special topics and current issues in accounting. May be repeated for credit when content varies. *Prerequisite:* Consent of instructor.

#### 3597 Professional Report in Accounting

May be taken only once for credit. Consent of instructor required.

## Business Administration

### MASTER OF BUSINESS ADMINISTRATION

The College of Business, through the departments of Accounting, Economics and Finance, Management, and Marketing, offers a Master of Business Administration degree. The objective of the M.B.A. program is to give students the opportunity to prepare for executive careers in business or in institutions that use business techniques and policies in management and administration. The program meets this objective by being broad in nature and aimed at general competence in overall management and administration. The majority of the coursework is devoted towards a broad understanding of the environment, controls, and practices which are common to most institutions. The remaining courses are determined by the student's special area of interest or concern.

**Enrollment in Graduate Courses without Admission to the M.B.A. Program**

Unclassified students enrolling in any graduate business course must have the written permission of the M.B.A. Advisor.

**Basic Requirements for Admission to the M.B.A. Program**

1. A bachelor's degree from an accredited institution in the United States (or proof of equivalent training in a foreign institution).
2. A satisfactory grade-point average in upper division (junior and senior level work and in any graduate work already completed).
3. A satisfactory score on the Graduate Management Admissions Test, the GMAT
4. Acceptance by the Committee on Graduate Studies in the College of Business Administration.
5. Adequate subject matter preparation in Business Administration. Applicants must demonstrate sufficient knowledge in each area of the common body of knowledge of business. Such demonstration may be made by:
  - a. Completion of appropriate undergraduate preparation in each subject area, or
  - b. Completion of the courses listed below at this University or equivalent courses at other institutions.

Common Body of Knowledge Area	Corresponding Course at UT El Paso	Credit Hours
Financial Accounting	ACCT 3501	3
Business Computer Applications	CIS 3502	3
Business Communications Management*	ADMS 3500	3
Marketing Systems	MKT 3503	3
Business Economics	ECON 3504	3
Financial Concepts and Analysis	FIN 3505	3
Business Law and Ethics	BLAW 3506	3
Management Concepts	MGMT 3507	3
Concepts of Production Management	MGMT 3508	3
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**Specific Requirements for the M.B.A. Degree**

1. Completion of the required Business Core (24 hours):
 

Accounting	3511 Accounting for Management
Economics	3511 Managerial Economics
Economics	3512 The Economic Environment
Finance	3511 Financial Management
Marketing	3511 Marketing Management
Management	3511 Organizational Management Seminar
2. Completion of an additional 9 elective hours, not more than 6 of which may be senior-level undergraduate courses acceptable for graduate credit. Coursework is not restricted to courses offered by the College of Business Administration, but in any circumstances, elective courses must have a meaningful design that corresponds to the student's educational goals.
3. Successful completion of the Professional Report (3 credit hours).
4. Successful completion of the final oral examination, and approval of the Dean of the Graduate School.

**TWO DEGREE OPTION—MBA/MPA**

Students may also apply for a two-degree option MBA-MPA program. The objective of this program is to permit students with broad interest in both the public and private sectors to double register in both the MBA and MPA programs. With the increasing interdependence of the public and private sectors, this option is attractive to those students wishing to pursue careers in positions responsible for working with their counterparts in private or public organizations. In order to be admitted into the two-degree option,

the applicant must specify the option *at the time of application to the Graduate School*. Students who wish to enter the MBA-MPA program should consult with the Graduate Advisor for the College of Business Administration with regard to admission requirements and required courses.

**Specific Requirements for the MBA-MPA Two-Degree Option**

1. Students must meet all admission requirements of both programs.
2. The same leveling work required of an M.B.A. student without a B.B.A. will be required, subject to the waiver procedures currently operative in the M.B.A. program.
3. The program consists of 24 hours of core M.B.A. courses, 24 hours of core M.P.A. courses, POSC 3594 and a comprehensive written exam in the core subject areas of public administration, plus any additional required courses. The number of hours necessary to complete the two-degree option will vary depending upon each student's background and previous academic work, but will in any case involve a minimum of 57 hours and a maximum of 78 hours.
4. The core curriculum in each of the separate degree programs must be satisfactorily completed.
5. Electives must be approved by the academic advisors of both programs; upon such approval, the core courses of one program may be used to meet the elective requirements of the other.
6. Successful completion of the M.B.A. Professional Report is required.
7. Admission and continuance decisions are handled separately by the M.B.A. and M.P.A. graduate committees and by the Graduate School.

## Economics and Finance

236 Business Administration Building  
(915) 747-5245

CHAIRPERSON: Timothy P. Roth

GRADUATE FACULTY: Brannon, Brown-Collier, Holcomb, James, Roth, Schauer, Smith, Sprinkle, Tollen

**MASTER OF ARTS DEGREE IN ECONOMICS**

The Department of Economics and Finance offers a master's degree in economics with the opportunity for specialization in areas within economics and for course work in areas outside economics. Some suggested areas for specialization within economics are regulation, international economics, applied business economics, and border economics. Some suggested areas for the minor or for interdisciplinary work are border studies, finance, accounting and computer science. All proposed degree plans must be approved by the Graduate Advisor and the Dean of the Graduate School.

Thesis and non-thesis programs are available. Students enrolled in the thesis program must take 24 hours of course work in addition to completion of the thesis for which six hours credit are given. The non-thesis option requires a total of 36 hours of course work including completion of Economics 3595 and submission of two bound research papers which may be drawn from previous graduate courses in economics. Both the thesis and the reports must be presented to a committee charged with the responsibility of conducting a final examination.

The ability to take course work in areas outside economics is available either through completion of a minor, with as many as 12 hours and a minimum of six, or through the interdisciplinary program. The interdisciplinary program is a 36 hour program with a minimum of 18 hours in economics. The student may elect to write a thesis for 6 hours credit or may enroll in Economics 3595 for 3 hours credit and submit two bound research papers which

may be drawn from previous graduate courses in economics. A representative from the minor or interdisciplinary area must be a member of the thesis or report committee.

#### Prerequisites and Core Requirements:

1. Prerequisites for the graduate program in Economics are ECON 3302 (National Income Analysis), ECON 3303 (Intermediate Economic Analysis), FIN 3320 (Money and Banking), or their equivalents, and three hours of Statistics.
2. All students must complete ECON 3501 (Research Methodology), ECON 3502 (Microeconomic Theory), and ECON 3503 (Macroeconomic Theory), or their equivalents, as required course work.

The Department of Economics and Finance also participates in the Master of Business Administration degree, the requirements of which are found under "Business Administration" in this catalog.

For Undergraduate and Graduate Students

#### ECONOMICS

- 3401 Economic History of the U.S. (3-0)
- 3430 Public Finance (3-0)
- 3435 Urban Economics (3-0)
- 3440 Economics of Labor (3-0)
- 3468 Economy of Mexico (3-0)
- 3490 Comparative Economic Systems (3-0)
- 3492 The Soviet Economy (3-0)

#### FINANCE

- 3411 Commercial Bank Management (3-0)
- 3412 Current Issues in Banking (3-0)
- 3418 Financial Statement Analysis (3-0)
- 3428 Central Banking (3-0)

For Graduate Students Only

#### ECONOMICS

*Prerequisite:* Twelve semester hours of economics or consent of the instructor.

#### 3501 Research Methodology (3-0)

Concentrated study of data gathering methods, research design and analytical and statistical techniques used in economics research. The purpose of the course is to master the quantitative methods necessary to understand current economics literature.

#### 3502 Microeconomic Theory (3-0)

The determination of prices and output. The theory of markets ranging from perfect competition through monopolistic competition and oligopoly to monopoly. The theory of the firm and the industry. Welfare implications of price determination.

#### 3503 Macroeconomic Theory (3-0)

The analysis of the determination of total income in the economy and related problems. Strong emphasis is given the theory of income determination, studies in the demand and supply of money, and the relationship between government policy and economic activity.

#### 3504 Business Economics (3-0)

An intensive, in-depth study of economics with emphasis upon the theory of the static profit maximizing firm and upon the effects of the economic environment upon the firm. *Prerequisite:* Admission to a graduate program in business. May not be counted for credit toward any graduate degree in business or economics.

#### 3511 Managerial Economics (3-0)

An evaluative study of the theory of economic decision making in individual firms, groups of firms, and industries under market conditions ranging from competition to monopoly. (This course may not be counted for graduate credit by students in the MA program in economics.)

#### 3512 The Economic Environment (3-0)

An evaluative study of the determinants of levels of national income, employment, and prices. (This course may not be counted for graduate credit by students in the MA program in economics.)

#### 3520 Monetary and Fiscal Policies and Problems (3-0)

An analysis and critique of monetary and fiscal policies and practices designed to facilitate economic stability and economic progress. Emphasis is given development and application of techniques used for analysis of economic activity, in-depth studies of stabilization policies and their effects, and analysis of problems inherent in the economic system.

#### 3550 Industrial Organization and Policy (3-0)

Selected topics in the structure, conduct, regulation of business and public policy toward business.

#### 3560 International Economics (3-0)

Economic principles of the flow of goods, services, and capital funds across international borders. Analysis of existing national and international economic institutions influencing international trade and capital flow.

#### 3565 Economic Development (3-0)

A critical analysis of policies designed to achieve economic growth in less developed countries. Topics include monetary and fiscal measures, development of human resources, capital formation, investment allocation, introduction of new technologies and coordination of domestic policies with the international economy.

#### 3566 Latin American Economics (3-0)

A study of the existing economic institutions in Latin America. Application of economics principles to Latin American economic problems and policy. The emphasis is institutional rather than analytical.

#### 3570 Advanced Quantitative Methods in Economics (3-0)

Correlation and regression analysis, autocorrelation, elements of linear algebra and other current quantitative topics will be treated. The course is designed to provide basic expertise in the application of quantitative techniques to economic problems.

#### 3580 Development of Economic Thought (3-0)

An interpretative survey of principal doctrines in the field of economic theory and policy since the middle of the 18th century.

#### 6590 Free Enterprise (6-0)

Class is designed generally for public elementary and secondary school teachers. Cannot be used for graduate credit toward degrees in the College of Business.

#### 1592-3592 Directed Individual Study in Economics

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Instructor.

#### 3494 Current Issues in Economics (3-0)

A course organized to investigate special topics and current issues in economics. May be repeated for credit when content varies. *Prerequisite:* Consent of instructor.

#### 3595 Seminar in Applied Economic Research

Performance of supervised research studies on selected economic problems. Emphasis is on practical, career oriented research.

#### 3597 Professional Report in Economics

May be taken only once for credit. Consent of instructor required.

#### 3598 Thesis

#### 3599 Thesis

#### FINANCE

#### 3505 Financial Concepts and Analysis (3-0)

An intensive, in-depth study of finance with emphasis on the managerial implications of financial concepts. *Prerequisites:* Admission to a graduate program in business; ACCT 3501. May not be counted for credit toward any graduate degree in business or economics.

#### 3511 Financial Management (3-0)

A study of the financial manager in executive decision making, involving financial planning and analysis in the allocation of the financial resources of a firm; investment decision making, capital budgeting, and financial problems of growth.

**3515 Securities Analysis (3-0)**

An in-depth study of the techniques of market and security analysis. Special emphasis is placed on the development of portfolio theory, application of the theory to real-world situations, and the evaluation of portfolio management. *Prerequisite:* FIN 3511 or consent of instructor.

**3518 Capital Formation, Analysis, and Budgeting (3-0)**

This course is designed to provide an in-depth study of the cost capital and arguments concerning the appropriate specification of capital costs; analysis of the capitalization package of the firm; study of cash flows as they relate to the investment decision; risk analysis in the capital budgeting process and a study of techniques of capital budgeting under various constraints.

**3522 International Finance (3-0)**

An in-depth study of theoretical principles involved in the financing of the flow of goods and services among nations, balance of payments considerations, and international monetary problems. Subject matter may vary at the discretion of the instructor.

**3525 International Financial Management (3-0)**

An in-depth study of foreign exchange risk management as it relates to the protection of future investment decisions, the cost of capital, and the firm's financial structure. Subject matter may vary at the discretion of the instructor. *Prerequisite:* FIN 3511 or consent of the instructor.

**3592 Directed Individual Study in Finance**

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Instructor.

**3594 Current Issues in Finance (3-0)**

A course organized to investigate special topics and current issues in finance. May be repeated for credit when content varies. *Prerequisite:* Consent of Instructor.

**3597 Professional Report in Finance**

May be taken only once for credit. Consent of instructor required.

## Management

205 Business Administration Building  
(915) 747-5496

CHAIRPERSON: Bruce Woodworth

GRADUATE FACULTY: Buckley, Case, George, Hoffman, Ibarreche, Lackey, Lind, Thakur

At present the Management Department does not offer a graduate level degree, but it does participate in the Master of Business Administration degree, the requirements of which are found under "Business Administration" in this catalog.

The following areas are included under Management:

- Business Law
- Computer Information Systems
- Management
- Quantitative Methods

**BUSINESS LAW**

For Undergraduate and Graduate Students

3400 Legal Aspects of the Management Process (3-0)  
3425 International Business Law (3-0)

For Graduate Students Only

**3506 Business Law and Ethics (3-0)**

A broad-based course covering legal, social and ethical considerations as they affect business. *Prerequisite:* Admission to a graduate program in business. May not be counted for credit toward any graduate degree in business or economics.

**COMPUTER INFORMATION SYSTEMS**

For Undergraduate and Graduate Students

3425 Business Systems Analysis (3-0)  
3445 Business Systems Design (3-0)  
3452 Systems Control (3-0)  
3455 Business File and Data Structure (3-0)  
3462 Computer Business Decision Models (3-0)  
3465 Business Data Base Management (3-0)

For Graduate Students Only

**3502 Business Computer Applications (3-0)**

An intensive study of the use of computers, especially personal computers, as an aid to the solving of business problems. The course will be team-taught, with professors from the various business disciplines demonstrating applications from their respective areas. *Prerequisites:* Admission to a graduate program in business; ability to program in at least one programming language. May not be counted for credit toward any graduate degree in business or economics.

**3503 Software Product Engineering Management (3-0)**

A study of the management methodologies for the planning, design, construction, evaluation, documentation, distribution and maintenance of computer application software. Topics include software as a product, the phase-function matrix, hierarchical decomposition, interface management, software quality, programming productivity, software testing, correctness proofs, standards and procedures.

**1592-3592 Directed Individual Study in CIS**

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Instructor.

**3594 Current Issues in CIS (3-0)**

A course organized to investigate special topics and current issues in Computer Information Systems. *Prerequisite:* Consent of Instructor.

**MANAGEMENT**

For Undergraduate and Graduate Students

3422 Operations Planning and Control (3-0)  
3425 International Management (3-0)

For Graduate Students Only

**3507 Management Concepts (3-0)**

An intensive, in-depth study of the concepts and theories of management. *Prerequisite:* Admission to a graduate program in business. May not be counted for credit toward any graduate degree in business or economics. POSC 3500 may be substituted with permission of M.B.A. director.

**3508 Concepts of Production Management (3-0)**

An intensive, rigorous study of the concepts and techniques of production and inventory management. *Prerequisites:* Admission to a graduate program in business; MATH 3201, or equivalent; and QMB 3201, or equivalent. May not be counted for credit toward any graduate degree in business or economics.

**3511 Organizational Management Seminar (3-0)**

Study of the basic processes of organization and management. Study of structural elements, behavior within structure, and behavior among structures. The decision-system approach will be used.

**3512 Labor Relations and Collective Bargaining (3-0)**

An examination and appraisal of collective bargaining processes, public policy issues, and major labor relations problems.

**3513 Labor Relations in the Public Sector (3-0)**

An examination of the development and practice of collective bargaining between federal, state, and local governments and their employees.

**3520 Macro-Organizational Behavior (3-0)**

The review of current research findings and case studies designed to provide a more comprehensive understanding of the behavior of complex organizations as entities interacting with their external and internal

environments and the implications of these interactions toward a better understanding of organizational effectiveness.

**3521 Micro-Organizational Behavior (3-0)**

The study of the effective functioning of individuals and groups, and intergroup interactions within simple and complex organizations through the application of traditional management concepts and use of case studies.

**3522 Advanced Personnel Theory (3-0)**

An investigation into the behavioral foundations of the instruments of modern personnel management. Building of appropriate testing, training, performance evaluation, interviewing and/or wage and salary instruments designed to correct organizational deficiencies will be stressed. Note: 3522 and 3403 may not both be counted toward the M.B.A. degree.

**3523 Management Science Seminar (3-0)**

A discussion of management cases involving quantitative aspects, computer evaluation, and management information systems. Note: 3523 and 3402 may not both be counted toward the M.B.A. degree.

**3524 Business and Society (3-0)**

A seminar devoted to examining the ideology and the socio-economic position of private business enterprise in America and the world. The influence of corporate management on society and public policy will be stressed.

**3525 Management Strategy and Policy (3-0)**

A seminar devoted to an investigation, analysis, and discussion of American business problems, trends, policies, and major issues. (To be taken in the last semester.)

**1592-3592 Directed Individual Study in Management**

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Instructor.

**3594 Current Issues in Management (3-0)**

A course organized to investigate special topics and current issues in management. May be repeated for credit when content varies. *Prerequisite:* Consent of Instructor.

**3597 Professional Report in Management**

May be taken only once for credit. Consent of instructor required.

**QUANTITATIVE METHODS**

For Undergraduate and Graduate Students

- 3450 Statistical Survey Techniques (3-0)
- 3460 Regional Analysis, Methods and Principles Seminar (3-0)

For Graduate Students Only

**3511 Quantitative Methods in Business (3-0)**

Basic mathematical techniques employed in the solution of management problems, including probability theory and tests of hypotheses.

# Marketing

230 Business Administration Building  
(915) 747-5185

CHAIRPERSON: J. Robert Foster

GRADUATE FACULTY: DeLisle, English, Foster, Hasty, Michie, Palmore, Sullivan

At present the Marketing Department does not offer a graduate level degree, but it does participate in the Master of Business Administration degree, the requirements of which are found under "Business Administration" in this catalog.

The following areas are included under Marketing:

- Administrative Services
- Marketing
- Real Estate

**ADMINISTRATIVE SERVICES**

For Undergraduate and Graduate Students

- 3497 Business Report Writing (3-0)
- 3499 Business Education Seminar (3-0)
- 3450 Business Education Workshop (3-0)

For Graduate Students Only

**3500 Business Communications Management (3-0)**

Development of clear, persuasive writing through intensive application of communication principles. *Prerequisite:* Admission to a graduate program. May not be counted for credit toward any graduate degree in business or economics.

**MARKETING**

For Undergraduate and Graduate Students

- 3410 Distribution Logistics (3-0)
- 3425 International Marketing (3-0)
- 3450 Export and Import Marketing (3-0)
- 3492 Product and Price Management (3-0)
- 3494 Marketing Channels (3-0)

For Graduate Students Only

**3503 Marketing Systems (3-0)**

An intensive study of the concepts and analytical techniques employed in marketing, including assessment of the marketing environment and of market potential, the selection of target markets, and the design and implementation of marketing activities. *Prerequisite:* Admission to a graduate program in business. May not be counted for credit toward any graduate degree in business or economics.

**3511 Marketing Management (3-0)**

Analysis of policy formulation by marketing management with special emphasis on the influence of internal and external environment factors that affect the competitive strategies of a marketing firm.

**3521 Marketing Analysis (3-0)**

A study of research designs, methods and analytical techniques applicable to those business activities involved in moving goods from producer to consumer.

**3522 Current Marketing Problems Seminar (3-0)**

A study of current marketing problems. Special emphasis on delineating the problems and the practices relevant to the solutions, including the contribution and interrelationships with other disciplines.

**3530 Industrial Sales and Buying Behavior (3-0)**

Examines key factors affecting buyer and seller behavior in industrial, institutional, and governmental organizations. Focuses on how sellers adapt their marketing strategies and sales tactics to stages in the industrial buying process, types of buying situations, multiple buying influences, and the purchase motives of industrial buyers. *Prerequisite:* MKT 3511 or consent of instructor.

**3540 Industrial Marketing Strategy (3-0)**

Delineates the process by which industrial marketing firms assess market opportunities, formulate marketing strategies, allocate resources to marketing programs, and evaluate marketing performance. Attention is given to the role of product development, pricing, promotional strategies, and distribution planning. *Prerequisite:* MKT 3511 or consent of the instructor.

**1592-3592 Directed Individual Study in Marketing**

This course may be repeated, but no more than three semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Instructor.

**3594 Current Issues in Marketing (3-0)**

A course organized to investigate special topics and current issues in Marketing. May be repeated for credit when content varies. *Prerequisite:* Consent of Instructor.

**3597 Professional Report in Marketing**

May be taken only once for credit. Consent of instructor required.

**REAL ESTATE**

For Undergraduate and Graduate Students

- 3405 Real Estate Finance (3-0)  
3410 Real Estate Marketing (3-0)

For Graduate Students Only

**3520 Real Estate Process (3-0)**

The course concentrates on the overall real estate process of planning, production, acquisition, operation and transfer. In addressing these areas, the course will focus on the need to balance the production function with the consumption function. The dynamics of the urban system as explored in urban land economics will anchor the course.

**3550 Feasibility and Investment Analysis (3-0)**

The course is structured to look at the full range of real estate involvement and the real estate life cycle. The course will identify the major participants in the real estate process, explore their objectives and constraints, and indicate how real estate fits into portfolio planning. All students will prepare a full narrative feasibility report which demonstrates their understanding of the various real estate skills. *Prerequisites:* REST 3520 and 3530.

**The College of Education—Introduction**

The College of Education has a three-fold mission: to prepare effective teachers, counselors and school administrators; to investigate and disseminate knowledge in pedagogy; and to work with persons in the profession and in the community to improve the schools. At the graduate level, the College fulfills its mission through Masters-degree programs offered by both the Department of Educational Leadership and Counseling and the Department of Teacher Education.

In the Department of Educational Leadership and Counseling, students may pursue programs leading to either the M.Ed. or the M.A. degree in School Supervision, in Educational Administration, in School and Agency Counseling, and as Educational Diagnosticians. Students may also design special M.A. and M.Ed. programs to meet their own needs. It is also possible for students to take coursework leading to certification by the Texas Education Agency as Professional School Counselors, Professional School Supervisors, Professional Mid-Management School Administrators, and Professional School Superintendents.

The Department of Teacher Education offers the Master of Arts in Education, the Master of Science in Health and Physical Education, and the Master of Education. The M.Ed. program offers specializations in both Curriculum and Instruction.

# Educational Leadership and Counseling

701 Education  
(915) 747-5300/5302/5355

CHAIRPERSON: Sharon R. Morgan  
PROFESSOR EMERITUS: James F. Day  
GRADUATE FACULTY: Ainsa, Ball, Duran, Gallegos, Lindahl, Morgan, Walker, Wholeben

**GRADUATE PROGRAMS AND PLANS**

The Department of Educational Leadership and Counseling offers the M.Ed. or M.A. degree in the following areas:

- School Supervision
- Educational Administration
- School Counseling
- Agency Counseling
- Educational Diagnostician
- Special Programs

In addition to these degree programs, the department offers course work leading to certification by the Texas Education Agency in the following areas:

- Professional School Counselor
- Professional School Supervisor
- Professional Mid-Management School Administrator
- Professional School Superintendent

**ADMISSION REQUIREMENTS**

Students seeking admission to any of the graduate programs in the department must complete the following prior to the semester in which they first plan to enroll:

1. Complete the application for admission to the Graduate School and qualify for admission to the Graduate School;
2. Take the Graduate Record Examination;
3. Schedule an appointment with the Graduate Advisor (915) 747-5572

**PROGRAM DESCRIPTIONS AND REQUIREMENTS**

**SCHOOL SUPERVISION (M.Ed.—36 hours semester hours)**

This plan is intended primarily for students who wish to complete requirements for certification as a Professional School Su-

pervisor. The student should confer with the Graduate Advisor to determine additional requirements for T.E.A. certification as a Professional School Supervisor.

*Prerequisite:* (12 semester hours):

12 semester hours of upper division course work in Professional Education.

*Core Requirements* (15 semester hours):

- EDRS 3505 Educational Research and Statistics I
- EDRS 3506 Educational Research and Statistics II
- EDAD 3510 Introduction to Educational Administration
- EDAD 3512 Instructional Leadership and Supervision I
- TED 3501 Curriculum Theory and Design

*Subject Concentration* (6 semester hours):

A minimum of 6 semester hours of approved upper division or graduate credit in the candidate's teaching endorsement; may include reading, special education, or bilingual education.

*Specialization* (15 semester hours):

- EDAD 3540 Human Factors in Education
- EDAD 3542 Educational Law
- EDAD 3544 Instructional Leadership and Supervision II
- EDAD 3546 Educational Program Planning & Evaluation
- EDPC 3542 Psychology of Individual Differences
- or
- EDPC 3540 Theories of Learning

*Comprehensive Examination:*

Departmental written comprehensive examination. *Prerequisite:* completion of all required EDAD courses, or permission of department.

Total: 36 semester hours.



**EDUCATIONAL ADMINISTRATION (M.Ed.—36 semester hours).**  
 This plan is intended primarily for students who wish to complete requirements for certification as a Professional Mid-Management School Administrator. The student should confer with the Graduate Advisor to determine additional requirements for T.E.A. certification as a Professional Mid-Management School Administrator.

*Prerequisite* (12 semester hours):  
 A minimum of 12 semester hours of upper division course work in Professional Education.

*Core Requirements* (15 semester hours):  
 EDRS 3505 Educational Research and Statistics I  
 EDRS 3506 Educational Research and Statistics II  
 EDAD 3510 Introduction to Educational Administration  
 EDAD 3512 Instructional Leadership and Supervision I  
 TED 3501 Curriculum Theory and Design

*Academic Area* (6 semester hours):  
 SOCI 3575 Seminar: Southwestern Cultures, or other approved upper division or graduate course in multi-cultural studies; and 3 semester hours of approved upper division or graduate course work from sociology, accounting, psychology, business administration, economics, or public administration.

*Specialization* (15 semester hours):  
 EDAD 3540 Human Factors in Education  
 EDAD 3542 Educational Law  
 EDAD 3544 Instructional Leadership and Supervision II  
 EDAD 3546 Educational Program Planning & Evaluation  
 EDAD 3548 Administration of School Personnel & Services

*Comprehensive Examination:*  
 Departmental written comprehensive examination. *Prerequisite:* completion of all required EDAD courses, or permission of department.  
 Total: 36 semester hours.

**SCHOOL COUNSELING (M.Ed.—36 semester hours).**  
 This plan is intended primarily for students who have concentrated their previous academic work in the area of Professional Education. The student should confer with the Graduate Advisor to determine additional requirements for T.E.A. certification as a Professional School Counselor, or licensure by the Texas State Board of Examiners for Professional Counselors.

*Prerequisite* (12 semester hours):  
 A minimum of 12 semester hours of upper division work in the behavioral sciences and Professional Education to include:  
 SPED 3425 Special Education for the Classroom Teacher, and  
 BED 3430 Principles of Bilingual Education/ESL  
 The above courses must be completed with a grade of B or better.

*Core Requirements* (12 semester hours):  
 EDRS 3505 Educational Research and Statistics I  
 EDRS 3506 Educational Research and Statistics II  
 EDPC 3517 Human Growth and Development  
 EDPC 3518 Introduction to Counseling

*Specialization* (18 semester hours):  
 EDPC 3519 Organization & Administration of Guidance Services  
 EDPC 3520 Socio-Economic Information in Counseling  
 EDPC 3535 Principles of Appraisal and Assessment  
 EDPC 3536 Advanced Appraisal and Assessment  
 EDPC 3538 Advanced Techniques of Counseling  
 EDPC 3539 Group Counseling Theory and Practice

*Practicum* (6 semester hours):  
 EDPC 3572 Practicum in Counseling  
 EDPC 3573 Advanced Practicum in Counseling

*Comprehensive Examination:*  
 Departmental written comprehensive examination. *Prerequisite:*

completion of all required EDPC courses, or permission of department.  
 Total: 36 semester hours.

**AGENCY COUNSELING (36 semester hours)**  
 This plan is intended primarily for students who have concentrated their previous academic work in one of the behavioral sciences and who are not interested in meeting the requirements for T.E.A. certification as a Professional School Counselor. The student should confer with the Graduate Advisor to determine additional requirements for licensure by the Texas State Board of Examiners for Professional Counselors.

*Prerequisite:* (12 semester hours):  
 12 semester hours of upper division course work in the behavioral sciences or Professional Education with a grade of B or better.

*Core Requirements* (12 semester hours):  
 EDRS 3505 Educational Research and Statistics I  
 EDRS 3506 Educational Research and Statistics II  
 EDPC 3517 Human Growth and Development  
 EDPC 3518 Introduction to Counseling

*Specialization* (12 semester hours):  
 EDPC 3538 Advanced Techniques of Counseling  
 EDPC 3539 Group Counseling Theory and Practice  
 Plus six semester hours of approved graduate course work in Educational Psychology.

*Practicum and Internship* (12 semester hours):  
 EDPC 3572 Practicum in Counseling  
 EDPC 3573 Advanced Practicum in Counseling  
 EDPC 6580 Internship in Counseling

*Comprehensive Examination:*  
 Departmental written comprehensive examination. *Prerequisite:* completion of all required EDPC courses, or permission of department.  
 Total: 36 semester hours.

**EDUCATIONAL DIAGNOSTICIAN (M.Ed.—36 semester hours).**  
 This plan is intended primarily for students who have concentrated their previous academic work in Special Education. The student should confer with the Graduate Advisor to determine additional requirements for T.E.A. certification as a Professional Educational Diagnostician.

*Prerequisite* (12 semester hours):  
 Completion of a minimum of 12 semester hours of upper division course work in Special Education, three of which must be a survey course, or its equivalent. The above course work must be completed with a grade of B or better.

*Core Requirements* (12 semester hours):  
 EDRS 3505 Educational Research and Statistics I  
 EDRS 3506 Educational Research and Statistics II  
 SPED 3545 Teaching Children with Learning Disabilities  
 SPED 3520 Introduction to Special Education

*Specialization* (18 semester hours):  
 EDPC 3535 Principles of Appraisal and Assessment  
 EDPC 3536 Advanced Appraisal and Assessment  
 EDPC 3540 Theories of Learning  
 EDPC 3544 Use and Interpretation of Standardized Tests  
 RED 3546 Clinical Diagnosis of Reading Difficulties  
 BED 3531 Bilingual/Bicultural Curriculum Design and Development

Internship for Educational Diagnostician 6 hrs.

*Comprehensive Examination:*  
 Departmental written comprehensive examination. *Prerequisite:* completion of all required EDPC courses, or permission of department.

## SPECIAL PROGRAMS

*Master of Education (M.Ed.—36 semester hours)*

Students whose professional needs are not met by any of the above M.Ed. programs may plan a special program. Please see the Graduate Advisor for information and assistance.

*Master of Arts—Plan I (no minor)*

A major consisting of the Thesis (6 semester hours) plus 24 semester hours of supporting coursework in Educational Psychology and Counseling; a minimum of 21 semester hours of coursework, including the Thesis, must be graduate level (3500 and above).

*Master of Arts—Plan II (minor)*

A major consisting of the Thesis (6 semester hours) plus 12 to 18 semester hours of supporting coursework in Educational Psychology and Counseling; a minimum of 21 semester hours of the major, including the Thesis, must be graduate level (3500 and above); a minor of 6 to 12 semester hours in a related discipline; a minimum of 3 semester hours of the minor must be taken in residence.

## EDUCATIONAL ADMINISTRATION (EDAD)

**3510 Introduction to Educational Administration (3-0)**

An introduction to the roles and functions of the school administrator emphasizing administrative and organizational theory and practice; identifies the primary knowledge, skills and competencies required to be an effective school administrator. *Prerequisite:* permission of department.

**3512 Instructional Leadership and Supervision I (3-0)**

An introduction to the roles and responsibilities of the supervisor or school administrator as an instructional leader; emphasizes systematic classroom observation, evaluation of teaching, and clinical supervision. *Prerequisite:* EDAD 3510, or permission of department.

**3540 Human Factors in Education (3-0)**

Treats interpersonal relations and human variables in groups and formal organizations with special emphasis on schools and organization; identifies strategies for the school principal to improve work group effectiveness. *Prerequisite:* completion of 15 semester hour core in school administration, or permission of department.

**3542 Educational Law (3-0)**

An introduction to the federal and state legal systems including constitutional provisions, federal and state regulations, and court decisions affecting public education; includes student and employee rights and responsibilities, statutory and assumed authority of school boards, relations with employee organizations, civil liability of school personnel and elements of due process. *Prerequisite:* Completion of 15 semester hour core in school administration, or permission of department.

**3544 Instructional Leadership and Supervision II (3-0)**

Development of the knowledge, skills, and competencies required by the supervisor or school administrator to direct instructional improvement programs; emphasis on instructional management, staff development, in-service workshops, working with groups. *Prerequisite:* EDAD 3512.

**3546 Educational Program Planning and Evaluation (2-2)**

Development of the knowledge, skills, and competencies required to plan and manage regular and special school programs; includes policy formulation, goal setting, and evaluation emphasizing data-based management systems; requires field-based component. *Prerequisite:* completion of 15 semester hour core in school administration, or permission of department.

**3548 Administration of School Personnel and Services (3-0)**

Emphasizes school management tasks and responsibilities related to certified and non-certified staff including position descriptions, recruitment, selection, assignment, and compensation; treats E.E.O. regulations, due process, grievance handling, and other legal requirements including collective bargaining. *Prerequisite:* completion of 15 semester hour core in school administration, or permission of department.

**3555 Philosophies of Education (3-0)**

An in-depth study of major philosophies of education and their impact on education in the United States.

**3565 Directed Individual Study (3-0)**

Area of study will be designated; may be repeated for credit when topic varies. *Prerequisite:* completion of 15 semester hour core in school administration, or permission of department.

**1570-3570 Graduate Workshop in Educational Administration and Supervision (1-6)**

Selected topics for graduate students, supervisors, and school administrators in such areas as grant writing, school discipline, computer utilization, and other special problems; may be repeated for credit when topic varies. *Prerequisite:* completion of 15 semester hour core in school administration, or permission of department.

**3573 School Supervision Internship I (1-4)**

First half of a two course sequence including planned field experience and seminars for the Professional Instructional Supervisor Certificate candidate; field experience includes working with a fully certified cooperating administrator under the supervision of a university professor; includes consideration of problems relating to assessment techniques, teacher review, consulting skills, and planning and evaluation of programs and materials. *Prerequisites:* completion of all other course work required for the supervision certificate and permission of department.

**3574 School Supervision Internship II (1-4)**

Continuation of EDAD 3573. *Prerequisites:* EDAD 3573 and permission of department.

**3575 School Management Internship I (1-4)**

First half of a two-semester sequence including planned field experience and seminars for the professional Mid-Management School Administrator Certification candidate; field experience includes working with a fully certified cooperating administrator in elementary, middle, and high school setting under the supervision of a university professor; includes administration of special programs, community education programs, student services, discipline management, scheduling, budgeting, and school business management; offered Fall Semester only. *Prerequisites:* completion of all other course work required for the mid-management certificate and permission of department.

**3576 School Management Internship II (1-4)**

Continuation of EDAD 3575; offered Spring Semester only. *Prerequisites:* EDAD 3575 and permission of department.

**3580 Organizational Development in Education (3-0)**

Describes the systems approach to the renewal of educational organizations; emphasizes institutionalization of organization development in school districts and essential competencies for organization renewal. *Prerequisite:* formal acceptance to the Superintendent Certification Program by the department.

**3582 Educational Finance (3-0)**

Basic concepts of the economics of education; uses the systems approach to analyze the issues of equity and equality in educational resource allocation and distribution; includes current Texas state funding policies. *Prerequisite or co-requisite:* EDAD 3580.

**3584 Educational Facilities Management (3-0)**

Identifies the knowledge, skills, and competencies required of the school administrator to manage educational facilities; includes population projections and needs assessments, planning developing educational specifications, site selection, capital outlay, and costs; covers rehabilitating existing buildings, maintenance and operations, and equipment management. *Prerequisite or co-requisite:* EDAD 3580.

**3586 Educational Policy Development (3-0)**

Treats the techniques of describing and selecting among alternative problem solutions based on quantifiable prediction; application to both general and specific educational issues including socio-political factors. *Prerequisite or co-requisite:* EDAD 3580.

**3588 Central Office Administration (2-2)**

Critical aspects of central office administration including personnel, programs, budget, planning, evaluation, school board relations, state

and federal influences, public relations, and general administration of a school district; field experience required. *Prerequisite or co-requisite:* EDAD 3580.

**3588 School Superintendent Internship (1-4)**

Planned field experience and seminars for the Professional School Superintendent Certificate candidate; field experience includes working with a fully certified cooperating administrator in school and central office settings under the supervision of a university professor; includes consideration of problems relating to overall school district operations. *Prerequisites:* completion of all other course work required for the superintendent certificate and permission of department.

**EDUCATIONAL PSYCHOLOGY AND COUNSELING (EDPC)**

**3517 Human Growth and Development (3-0)**

Descriptive analysis of the typical patterns of human physical, social, emotional, and intellectual growth, including cognitive and moral development, emphasizes major descriptive theories.

**3518 Introduction to Counseling (3-1)**

An introduction to counseling theory and techniques applicable to individuals and groups; includes socio-cultural foundations of counseling and counseling in multicultural and special education settings; requires involvement in laboratory group. *Prerequisite:* 12 semester hours of upper division or graduate courses in the behavioral sciences including professional education.

**3519 Organization and Administration of Guidance Services (3-0)**

Identification and analysis of problems of organization and administration of guidance services including staffing, finances, effective interpersonal relationships, community participation, in-service education, and evaluation of the guidance program. *Prerequisite:* EDPC 3518 or permission of department.

**3520 Socio-Economic Information in Counseling (3-0)**

Educational, occupational, and social information, and its use in counseling and guidance; includes life planning and career development. *Prerequisite:* EDPC 3518 or permission of department.

**3535 Principles of Appraisal and Assessment (3-0)**

Principles of psychological testing in counseling and guidance, including purposes, methods, and procedures; analysis, evaluation, and administration of educational and psychological instruments commonly employed in counseling and guidance. *Prerequisite:* EDPC 3518 or permission of department.

**3536 Advanced Appraisal and Assessment (3-0)**

Analysis, evaluation, and administration of individual instruments such as Stanford-Binet Intelligence Scale, and two of the Wechsler Tests (WAIS, WISC-R, WPPSI); includes preparation of individual and professional reports. *Prerequisite:* EDPC 3535.

**3538 Advanced Techniques of Counseling (3-0)**

Advanced counseling theory and techniques applicable to individual, family, school, and community mental health problem; includes analysis of social implications of mental health/mental illness. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**3539 Group Counseling Theory and Process (3-0)**

History, principles, theory, and techniques of group counseling applicable to multicultural and special education settings; emphasizes acquisition of technical knowledge and specialized skills facilitating personal growth and therapeutic groups. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**3540 Theories of Learning (3-0)**

Analysis of behavioristic, field, cognitive, and functional theories of learning from primary sources; includes Thorndike, Tolman, Watson, Skinner, Guthrie, Robinson, Ausubel, Piaget, Bruner, and Gagne; relates learning theory to counseling theory. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**3541 Theories of Counseling (3-0)**

Analysis of psychoanalytic, phenomenologic, gestalt, and third force psychologies of counseling from primary sources; includes application

to counseling process, relationship to learning theory and various definitions of mental health. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**3542 Psychology of Individual Differences (3-0)**

Analysis of individual differences in intelligence, personality, interests, and attitudes, and their effects on achievement and educational, vocational choices; includes group differences and techniques of studying individual differences. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**3543 Construction and Use of Classroom Tests (3-0)**

Application of the theory of testing to provide practical experience in the construction and evaluation of tests for typical classroom use; student selects focus on elementary school, middle school, or high school level.

**3544 Use and Interpretation of Standardized Tests (3-0)**

Identifies techniques and procedures to interpret results of various standardized tests and other procedures to diagnose learning problems; emphasis on the use of data to treat learning disabilities and develop potentialities. *Prerequisite:* completion of 15 semester hour core in educational counseling, or permission of department.

**1570-3570 Graduate Workshop In Educational Psychology and Counseling (1-6)**

Selected topics for graduate students, teachers, school counselors, and agency counselors in special areas, may be repeated when topic varies. *Prerequisite:* completion of 15 semester hour core in counseling, or permission of department.

**3565 Directed Individual Study (3-0)**

Area of study will be designated; may be repeated for credit when topic varies. *Prerequisite:* completion of 15 semester hour core in educational psychology and counseling, or permission of department.

**3572 Practicum in Counseling (0-6)**

Supervised experience in the application of principles, tools, and techniques of counseling and guidance; provides practice in clinical setting with selected clients supported by qualified counselor educator. *Prerequisite:* EDPC 3538, EDPC 3539, or permission of department.

**3573 Advanced Practicum in Counseling (0-6)**

Advanced supervised experience in the application of counseling principles and techniques to work with clients. *Prerequisite:* completion of EDPC 3572 with a grade of B or better.

**1580-6580 Internship in Counseling and Guidance (Credit Varies)**

Supervised experience in selected schools, agencies, and institutions. *Prerequisites:* completion of EDPC 3573 with a grade of B or better, and permission of department.

**3598 Thesis**

**3599 Theals**

**EDUCATIONAL RESEARCH AND STATISTICS (EDRS)**

**3500 Statistical Methods in Education (3-0)**

Study of fundamental statistical concepts including probability distributions, sampling distribution and certain non-parametric procedures; introduction to experimental design and applied statistical research procedures.

**3502 Research Methods in Education (3-0)**

An in-depth analysis of research design including identification of the problem to be researched, review of research literature, formulation of the hypothesis or hypotheses to be tested, selection of research procedures, collection of data, the analysis of findings, and drawing of warranted conclusions, requires the development of a formal research proposal. *Prerequisite:* EDRS 3400, or EDRS 3500.

**3505 Educational Research and Statistics I**

First of a two-course sequence to develop interrelated concepts and skills of research methods, experimental design in education, and statistical methods; includes computer applications and required computer laboratory; requires development of a formal research proposal.

**3506 Educational Research and Statistics II**

Second course in a two-course sequence; includes survey research methods, computer application and required computer laboratory, requires preparation of a formal research report. *Prerequisite:* EDRS 3505 with grade of C or better.

**3510 Computer Applications for Teachers and Administrators (2-2)**

A structured introduction to computer programming using BASIC language to develop instructional courseware; intended for people with little or no experience with computers; involves hands-on experience on microcomputers in a laboratory setting.

**3511 Advanced Computer Applications for Teachers and Administrators (2-2)**

Advanced computer programming and courseware development for computer-assisted and computer-managed instruction; includes high resolution graphics, hardware and software evaluation, the design and planning of instructional computing laboratories for elementary and secondary schools; tutorials in LOGO and PILOT provided; requires hands-on experience on microcomputers in a laboratory setting. *Prerequisite:* EDRS 3510, or permission of department.

**3540 Advanced Statistics (3-0)**

Review of experimental design and computer applications; includes linear regression, multivariate analysis; with an introduction to nonparametric techniques. *Prerequisite:* EDRS 3500, or EDRS 3506.

**SPECIAL EDUCATION (SPED)****3520 Introduction to Special Education (3-0)**

A survey of the characteristics of exceptional children including learning disabilities, emotional disturbance, autism, orthopedic handicaps, visual handicaps, auditory handicaps, giftedness, and mental retardation.

**3545 Teaching Children with Learning Disabilities (3-0)**

Focuses on learning disabled student; provides information on how to teach learning disabled students in reading, writing, spelling, and the language arts; includes assessment of content area achievement of students with learning difficulties. *Prerequisite:* SPED 3520.

**3547 Parents of Exceptional Children (3-0)**

Relevant approaches and techniques for teachers to work with parents of exceptional children; includes strategies for developing knowledge and skills associated with facilitating child growth by cooperative home-school planning. *Prerequisite:* SPED 3520.

**3563 Intervention for the Severely Emotionally Disturbed (3-0)**

Focus on methods for promoting behavior change and facilitating affective development of children who are emotionally impaired/behaviorally disordered; provides a wide variety of intervention strategies. *Prerequisite:* SPED 3520, or permission of department.

**3568 Vocational Habilitation of the Severely Handicapped (3-0)**

Analysis of procedures and procedural research in vocational habilitation of severely handicapped adolescents and adults; task analysis, direct instruction of vocational skills, and procedures for supervising production in non-sheltered employment. *Prerequisite:* SPED 3520.

# Teacher Education

501 Education Building  
(915) 747-5426

CHAIRPERSON: James L. Milson

PROFESSORS EMERITI: William Harold Harris, James Gordon Mason

ASSOCIATE PROFESSORS EMERITI: Mary Louise Zander Aho, John Paul Scarbrough

GRADUATE FACULTY: Barker, Bixler-Marquez, Burmeister, Burns, Crawley, Descamps, Ekwall, Elam, Hardin, Heger, Hernandez, B. Kelly, N. Kelly, Kies, Klingstedt, Louisell, Milson, Salinger, Seda, Tinajero

THE UNIVERSITY OF TEXAS AT EL PASO

The Department of Teacher Education offers graduate programs of interest to teachers and to others who desire to acquire advanced professional education skills for application in school and non-school settings.

Students who wish to pursue graduate degrees in Teacher Education may select from three programs. The Master of Arts in Education and the Master of Science in Health and Physical Education are designed for students wishing to pursue research and to continue studies beyond the master's degree level. The Master of Education degree is directed toward the professional educator.

**MASTER OF ARTS IN EDUCATION**

*Prerequisites:* At least 12 semester hours of 0300 and/or 0400 level education courses, and admission to the thesis program by the Graduate Studies Committee of the Department.

*Program:* Thirty semester hours, including at least 21 semester hours at the 0500 level. Satisfactory completion of EDRS 3505-06 and six semester hours of thesis (TED 3598-99).

*Thesis:* A thesis, satisfactory to the Graduate Faculty of the Department, must be completed before the degree will be awarded.

**MASTER OF SCIENCE IN HEALTH AND PHYSICAL EDUCATION**

*Prerequisites:* At least 12 semester hours of 0300 and/or 0400 level courses in health and physical education, and admission to the thesis program by the Graduate Studies Committee of the Department.

*Program:* Thirty semester hours, including at least 21 semester hours at the 0500 level. Satisfactory completion of EDRS 3505-06, PE 3560, and six semester hours of thesis (TED 3598-99).

*Thesis:* A thesis, satisfactory to the Graduate Faculty of the Department, must be completed before the degree will be awarded.

**MASTER OF EDUCATION**

*Prerequisites:* At least 12 semester hours of 0300 and/or 0400 level education courses and admission to the M.Ed. program by the Graduate Studies Committee of the Department.

*Program:* Thirty-six semester hours, including at least 27 semester hours at the 0500 level. All 0300 and/or 0400 level work proposed for inclusion in this graduate degree must be recommended for approval by the Graduate Advisor of the Department. Students who are working toward the Master of Education degree may select from one of the options listed below:

**Curriculum Specialist Option**

Specialization Area—	TED 3501, TED 3503, ELED 3521 or SCED 3526, and 3 semester hours of 0500 level in courses offered by the Department of Teacher Education.
Professional Development—	EDRS 3505-06 (or TED 3500 with approval), EDAD 3555 or TED 3504, ENGL 3512
Resource Area—	Six semester hours of computer applications.
Electives—	Six to nine semester hours in courses approved for graduate credit.

**Instructional Specialist Option**

Specialization Area—	Twelve semester hours of graduate level courses in a subject area for which the candidate has prior certification or in a subject area approved the Graduate Advisor of the Department.
Professional Development—	TED 3500 and TED 3502. <i>Plus</i> TED 3501 and TED 3503 for Early Childhood, Elementary, and Secondary levels or HE 3550 and PE 3564 for All-levels Health and Physical Education.

- Resource Area— Six semester hours in courses approved for graduate credit which provide support for the academic specialization area or for professional development.
- Electives— Six semester hours in courses approved for graduate credit.

### Individualized Option

Students whose professional needs are not met by any of the above M.Ed. programs may plan a special program. Please see the Department Graduate Advisor for information and assistance.

Final Comprehensive Examination and Scholarly Paper. A written comprehensive examination, satisfactory to the Graduate Faculty of the Department, must be completed before the degree will be awarded. All degree candidates will be expected to write several scholarly papers, one of which must be presented to the Graduate Advisor for inclusion in the student's file.

### PROGRAM ADVISING

It is the responsibility of the student to consult the Graduate Advisor of the Department regarding admission and degree requirements. The student is expected to maintain a continuing advising relationship which includes preparing a degree plan, submitting a petition for candidacy, and requesting a comprehensive examination or thesis defense. The Department cannot assure that courses taken before admission and/or before degree plan preparation will apply to degree requirements.

### TEACHER CERTIFICATION

This catalog does not cover teacher certification requirements. The College of Education Certification Office and the Graduate Advisor of the Department can provide more information in this area.

A degree program is not the same as a certificate program. Courses included in a program for a first teaching certificate are not creditable toward a graduate degree. Courses included in a program for advanced certificates and certain endorsement programs are creditable toward a graduate degree, and most can be combined with a graduate degree program. However, a perfect match between state certification and degree requirements is not likely.

### TEACHER EDUCATION (TED)

#### 3500 Research for the Classroom Teacher (3-0)

Research methodology relating to the problems and needs of classroom teachers with major emphasis on interpreting professional literature and conducting classroom-based action research. A scholarly paper will be required.

#### 3501 Curriculum Theory and Design (3-0)

Theoretical foundations and principles of curriculum design.

#### 3502 Instructional Strategies and Classroom Management (3-0)

Decision-making methodologies and human interactions as they relate to classroom management.

#### 3503 Construction and Use of Classroom Evaluation Instruments (3-0)

Construction and use of norm-referenced and criterion-referenced achievement measures for summative and formative evaluation.

#### 3504 Educational Trends—Seminar (3-0)

Critical consideration of selected trends in education.

#### 3505 Practicum in Instruction in Elementary and Secondary Schools (1.5-10)

Observation by the University instructor of the student's classroom teaching and seminars designed to relate the classroom instructional situation to corresponding educational theory. Designed to be concurrent with public school teaching. May be repeated once for credit. *Prerequisites:* A grade point average of at least 2.5 in each teaching field and in all education courses, and permission of the instructor.

#### 1511-3511 Current Topics in Language Arts Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with language arts instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

#### 1512-3512 Current Topics in Social Studies Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with social studies instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

#### 1513-3513 Current Topics in Multicultural Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with multicultural education instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

#### 1514-3514 Current Topics in Science Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with science instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

#### 1518-3518 Current Topics in Mathematics Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with mathematics instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

#### 1519-3519 Graduate Workshop in Education (1-0, 2-0, 3-0)

Studies in a designated area. May be repeated for credit when topic varies.

#### 3596 Independent Graduate Studies (3-0)

Studies in an area of the student's choice that have been approved by the sponsoring professor. May be repeated for credit when topic varies.

#### 3597 Practicum for Master Teachers (1.5-10)

Assessment and verification of the competencies in a practicum situation as required for the Master Teacher Certificate. *Prerequisites:* Professional elementary, secondary, or all-levels certification, and a masters degree.

#### 3598 Thesis

#### 3599 Thesis

### ELEMENTARY EDUCATION (ELED)

#### 3520 Instructional Problems (Elementary)—Seminar (3-0)

Identification of problems affecting instruction in the elementary schools. Examination of literature for solutions to these problems. May be repeated for credit when topic varies.

#### 3521 Curriculum in the Elementary School (3-0)

Curriculum in subject areas in elementary school and the development of plans and procedures for instruction. *Prerequisite:* TED 3501.

### SECONDARY EDUCATION (SCED)

#### 3525 Instructional Problems (Secondary)—Seminar (3-0)

Identification of problems affecting instruction in the secondary schools. Examination of literature for solutions to these problems. May be repeated for credit when topic varies.

#### 3526 Curriculum in the Secondary School (3-0)

Curriculum in subject areas in the secondary school, and the development of plans and procedures for instruction. *Prerequisite:* TED 3501.

### BILINGUAL EDUCATION (BED)

#### 1530-3530 Current Topics in Bilingual Education (1-0, 2-0, 3-0)

Development of competencies necessary to deal effectively with bilingual education instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

**3531 Bilingual/Bicultural Curriculum Design and Development (3-0)**  
Identification of principles, problems, and issues affecting bilingual curriculum. Examination of rationale and philosophies of various models of bilingual education programs. *Prerequisite:* ELED 3302 and BED 3435.

**3532 Teaching Reading in Spanish (3-0)**  
Fundamental principles for teaching reading in Spanish to Spanish-dominant children. Examination of classroom reading materials representative of various bilingual reading programs and development of criteria for the selection of materials appropriate for various types of bilingual reading classes. *Prerequisites:* RED 3340 and BED 3434.

**3533 Oral Language Assessment (3-0)**  
Analysis of oral language tests and procedures, and their application to the bilingual classroom. *Prerequisite:* Six hours from the following: LING 3471 (Language acquisition); LING 3471 (Bilingualism); LING 3472.

**3534 Teaching Content in Spanish (3-0)**  
Analysis and evaluation of Spanish curriculum materials in the content areas. Emphasis on the development of methods for teaching content in Spanish using specialized language at various levels. *Prerequisite:* BED 3434, SPAN 3402, or Language Proficiency.

**3535 Microcomputers in Bilingual Education/ESL (3-3)**  
Applications of microcomputers to bilingual education/ESL instruction. Included in the course is a review of Basic/Logo, instruction on Co-PILOT 1 and 2; Super PILOT; criteria for software evaluation, and research on software. *Prerequisite:* CS 3110.

#### EARLY CHILDHOOD EDUCATION (ECED)

**1550-3550 Current Topics in Early Childhood Education (1-0, 2-0, 3-0)**  
Development of competencies necessary to deal effectively with early childhood instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

**3551 Trends in Early Childhood Education (3-0)**  
Research related to philosophies, objectives, and practices in early childhood education, including analysis through comparison and contrast of pre-school programs, plus implications for designing such programs based on research and evaluation. *Prerequisite:* Texas Kindergarten Endorsement or equivalent, as approved by instructor.

**3552 Seminar in Early Childhood Curriculum (3-0)**  
Curriculum development for the early childhood teacher which includes program design, activity planning, examination and construction of materials, and teaching and evaluation techniques. *Prerequisite:* Texas Kindergarten Endorsement or equivalent, as approved by instructor.

**3553 Development of Literacy Skills, Preschool to Grade 3 (3-0)**  
Emergent reading and writing behaviors in preschoolers; growth of reading and writing, kindergarten to grade three, attention to linguistically different and second-language learners, review of relevant research. *Prerequisite:* Texas Kindergarten Endorsement or equivalent, as approved by instructor.

**3554 Development of Mathematics and Science Foundations, Preschool to Grade 3 (3-0)**  
Preschool awareness of quantitative and scientific principles in the environment as a foundation for concept growth. *Prerequisite:* Texas Kindergarten Endorsement or equivalent, as approved by instructor.

#### HEALTH EDUCATION (HE)

**3550 Curriculum Construction in Health Education (3-0)**  
Health education curriculum in all public school levels, with emphasis on curriculum as recommended by the Texas Education Agency.

**3551 The Teaching of Family Life and Sex Education—Seminar (3-0)**  
Biological, behavioral, and cultural aspects of human sexuality. Emphasis is centered on teacher understanding and the development of teaching methods and materials for all grade levels.

**3552 Evaluation in School Health Instruction (3-0)**  
Principles of objective test construction, the place of behavior and attitude scales, questionnaires, and inventories in the evaluation of school health instruction.

**3553 Problems in Content and Method in Health Instruction—Seminar (3-0)**  
Development of content and teaching methods in problem areas in the health education curriculum.

**3554 Current Issues in School Health Education (3-0)**  
Individual identification and study of current issues in school health education. Extensive reading and critical analysis of literature is required.

#### PHYSICAL EDUCATION (PE)

**3560 History, Philosophy, and Professional Literature in Health and Physical Education (3-0)**  
Historical development of physical and health education with the philosophical viewpoints and literature which have had the greatest influence on current health and physical education.

**3561 Scientific Basis of Physical Education (3-0)**  
Advanced level kinesiological, mechanical, physiological, and psychological aspects as a basis for physical education.

**3562 Administration and Supervision of Health and Physical Education (3-0)**  
Administration problems and supervisory techniques in health and physical education.

**3563 Sociological and Psychological Foundations of Physical Activity and Sports (3-0)**  
Socio-psychological processes, principles, and factors affecting the behavior of humans in physical activity and sport. Investigation of current socio-psychological problems with implications for physical education and athletic coaching.

**3564 Advanced Topics in Health and Physical Education (3-0)**  
Individual problems in the field of health and physical education. May be repeated once for credit.

**3565 Curriculum in Physical Education (3-0)**  
Analysis of criteria and procedures for curriculum construction in physical education; development of written guides for programs in elementary and secondary schools, colleges, and universities.

**3566 Facilities Planning in Health, Physical Education, and Recreation (3-0)**  
Principles, standards, and designs utilized in planning, construction, and maintenance of indoor and outdoor facilities to prepare students to serve as members of planning committees.

**3567 Administration of Recreation Programs (3-0)**  
Organization and administration of recreation programs in communities and educational institutions; analysis of planning programs, legal problems, public relations, personnel administration, areas and facilities, and finance and business procedures.

**3568 Problems in the Organization and Administration of Athletics (3-0)**  
Problems in managing the affairs of athletic programs, including intramural sports, interscholastic and intercollegiate athletics. Consideration is given to policies, contest management, facilities and equipment, finances and budgets, scheduling, safety, public relations, and legal liability.

**3569 Physical Education in the Elementary School (3-0)**  
Organization, administration, and curricular content of elementary school physical education with emphasis on the various teaching approaches involved.

#### READING EDUCATION (RED)

**1540-3540 Current Topics in Reading Education (3-0)**  
Development of competencies necessary to deal effectively with reading instruction; includes curriculum, concepts, teaching strategies, and skills necessary to integrate content and teaching strategies. May be repeated for credit when topic varies.

**3541 The Diagnostic Teaching of Reading (3-0)**  
Standardized and informal materials and techniques for diagnosing the reading strengths and weaknesses of individuals and groups, tech-

niques and materials for building specific reading abilities, and methods of individualizing instruction and grouping according to student needs and interests. *Prerequisite:* RED 3340 or 3342, may not be taken by those who have taken CURR 3441 or RED 3441 after 1982.

### 3543 Psychology of Reading (3-0)

Psychological and linguistic foundations of the reading processes of beginning and skilled readers, special emphasis on problems of culturally different children, comprehension skills, and analysis of relevant research. *Prerequisite:* RED 3340 or 3342.

### 3544 Seminar in Reading (3-0)

In-depth exploration of ways of developing higher level cognitive, affective, psychomotor, and psycholinguistic abilities of students through the use of printed materials and other media. Individual and/or group creative projects and research findings will be shared. *Prerequisite:* RED 3340 or 3342.

### 3545 Remedial Reading (3-0)

Operation and administration of remedial reading programs, including the screening procedures for selection of students as well as criteria for selecting and designing materials suitable for use in remedial reading. Strategies for counseling and teaching disabled readers are also emphasized. *Prerequisite:* RED 3340 or 3342.

### 3546 Clinical Diagnosis of Reading Difficulties (3-0)

Comprehensive study of and clinical practice in the diagnosis of specific, limiting, and complex cases of reading disability. Experiences in administering and interpreting batteries of diagnostic tests and in the analysis and synthesis of findings for case studies. *Prerequisite:* RED 3340 or 3342.

### 3547 Clinical Reading Laboratory Experience (1.5-3)

Actual laboratory experience for application of concepts, media, and evaluation to meet the needs of disabled readers. May be repeated for credit when topic varies. *Prerequisite:* RED 3441 or 3541 or 3546.

## The College of Engineering—Introduction

The University's first two names, the College of Mines and the College of Mines and Metallurgy demonstrate the institution's long-standing commitment to quality education in engineering. Today the College of Engineering strives to educate engineers who have the desire to learn and the breadth of vision to formulate and solve the problems of today and tomorrow.

At the graduate level, the College fulfills its mission by offering master's degree programs in all of its departments. Master of Science degrees are available in Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, Industrial Engineering, Mechanical Engineering, and Metallurgical Engineering. In addition to these programs, students may pursue the Master of Science in Engineering, with a concentration in manufacturing engineering.

# Civil Engineering

201B Engineering Science  
(915) 747-5464

CHAIRPERSON: Wayne F. Echelberger, Jr.

GRADUATE FACULTY: Applegate, Echelberger, Fuentes, Grieves, Oey, Picornell-Darder, Rozendal, Tarquin

The Civil Engineering Department offers an undesignated Master of Science with a major in Engineering and a Master of Science with a major in Civil Engineering. Specific courses of study in the Civil Engineering major include structural, geotechnical and environmental engineering. Thesis and non-thesis programs are available under this degree. Students enrolled in a thesis program normally take 24 hours of coursework plus Civil Engineering 3598-99, Thesis. Non-thesis students follow a 33 hour pro-

gram which includes credit for Civil Engineering 3596-97, Graduate Projects. Under exceptional circumstances the department graduate faculty may recommend a non-thesis program consisting of a minimum of 36 hours of coursework without a report.

A student holding a Bachelor of Science with a major in Civil Engineering may work toward a 33 hour undesignated Engineering degree without a thesis, leading to a sub-specialization in an area outside of the major. The coursework includes 18 hours in Civil Engineering, and at least 12 hours in the particular area of sub-specialization. The work in the major field includes credit for Civil Engineering 3596-97, Graduate Projects. Possible areas of sub-specialization may consist of Business Management, Computer Science, Industrial Engineering or others, as approved by the student's graduate committee.

For Undergraduate and Graduate Students

- 2425 Construction Equipment, Methods and Project Control (2-0)
- 3435 Structural Design I (3-0)
- 3438 Traffic Engineering Fundamentals (3-0)
- 3440 Transportation Engineering (3-0)
- 3441 Water Supply Engineering (3-0)
- 3442 Wastewater Engineering (3-0)
- 3446 Engineering Law (3-0)
- 3447 Ethics in Engineering (3-0)
- 4448 Soil Mechanics (3-3)
- 3449 Foundation Engineering (3-0)
- 1453 Water and Waste Laboratory (0-3)
- 4456 Hydraulic Engineering (3-3)
- 4460 Structural Analysis II (3-0)
- 3461 Structural Design II (3-0)
- 4470 Mechanics of Materials II (3-3)

For Graduate Students Only

### 3502 Groundwater Hydrology (3-0)

Properties of aquifers and vadose zones, theory of groundwater movement, mechanics of well flow, physical and analytical models for the analysis of flow-systems, multiphase flow, salt water intrusion, and aquifer recharge. *Prerequisite:* Permission of instructor.

### 3503 Engineering Analysis (3-0)

Formulation and solution of initial and boundary value problems arising in structural mechanics. *Prerequisites:* MATH 3226, and permission of instructor.

### 3505 Advanced Structural Analysis (3-0)

Theory of finite element approximation, numerical solutions of a variety of problems in structural mechanics including beam-columns, grid beams and plates on linear and nonlinear foundations, matrix structural analysis. May be repeated for credit. *Prerequisite:* CE 3343 and permission of instructor.

### 3506 Advanced Soil Mechanics I (3-0)

Stress and strain, rigid and flexible footings, stress in soil due to various types of loading, pore water pressure parameters, consolidation, sand drain, settlement analysis, permeability, seepage, dewatering. *Prerequisites:* CE 4448, and permission of instructor.

### 4509 Analysis of Water and Wastes (2-6)

Analysis of physical, chemical and biological properties of water and wastes; evaluation of processes involved in complex pollution problems. *Prerequisite:* Permission of instructor. Laboratory Fee: \$8

### 3512 Environmental Processes (3-0)

Critical study of fundamental theories and modeling approaches for physical, chemical and biological processes that affect the fate of chemicals in the environment. Mass flow and diffusion, kinetics and equilibrium, solubility and precipitation, volatilization, oxidation-reduction, types of sorption, complexation, radiodecay and biotransformation. Applications focus on waste disposal, soil and groundwater reclamation, and advanced water and wastewater treatment operations. *Prerequisite:* Permission of instructor.

### 3517 Similitude and Statistical Methods (3-0)

Dimension and model theory and its use in analyzing physical experiments. Applications of probability and statistical analysis. *Prerequisite:* Permission of instructor.

**3520 Advanced Soil Mechanics II (3-0)**

Shear strength, earth pressure calculation on retaining structures, soil bearing capacity theories, stress on shaft and tunnel linings, introduction to bearing capacity on permafrosts, slope stability. *Prerequisites:* CE 4448, and permission of the instructor.

**3521 Industrial Hygiene and Toxicology (3-0)**

Techniques of industrial toxicology, mechanisms by which toxic gases, vapors, and dusts produce disease in experimental animals and in man. *Prerequisite:* Permission of instructor.

**3525 Design of Structures for Dynamic Loads (3-0)**

Behavior of structural members under dynamic loads. Vibration theory, particular reference to structures, design of structural systems for dynamic loads, wind loads, and earthquakes. *Prerequisite:* Permission of instructor.

**3526 Air Pollution Control (3-0)**

Effect of air pollution, classification of wastes, meteorological factors, sampling and analysis, abatement, statistical analysis. *Prerequisite:* Permission of instructor.

**3532 Modern Methods of Engineering Computations (3-0)**

Methods of iterations, approximations, and numerical procedures used in solution of complex problems and optimizations such as occur in Engineering Design and Scientific Analysis. *Prerequisite:* Permission of instructor.

**3533 Plates and Shells (3-0)**

The theory and design of plates and shell structures by the membrane and bending stress theories. *Prerequisite:* Permission of instructor.

**3535 Soil Dynamics (3-0)**

Fundamentals of vibration, wave propagation in elastic homogeneous medium, shear modulus of soil, geophysical exploration, foundation vibration—half space theory, lumped parameter systems, dynamic lateral earth pressure, soil liquefaction. *Prerequisites:* CE 4448, and permission of instructor.

**3536 Rock Mechanics (3-0)**

Classification and index properties, rock strength and failure criteria, initial stresses and their measurements, planes of weakness, deformability, underground openings, slope stability, application to foundation engineering. *Prerequisites:* Graduate standing, CE 4448, and permission of instructor.

**4537 Properties of Unconsolidated Sediments (2-6)**

Introduction to physico-chemical properties of soils; soil structure; soil classification; soil permeability; principle of effective stress; shear strength of soils; partially saturated soils; laboratory testing procedures. *Prerequisite:* Permission of instructor. Laboratory Fee: \$8.

**3538 Slope Stability (3-0)**

Properties of soils relevant to slope stability. Site investigation, instrumentation and monitoring of slopes. Methods of stability analysis for embankments, dams, natural and manmade cut slopes, rockfalls, debris flow, mud slides, and submarine slopes. Stability of slopes under earthquake loading conditions. *Prerequisite:* Permission of instructor.

**4539 Foundations on Expansive Soils (3-3)**

Fundamentals of the behavior of unsaturated soils. Volume change and strength properties. Environmental indicators that affect their behavior. Design of footings, slabs and beams on grade, and drilled piers. Soil improvement techniques and foundation rehabilitation methods. *Prerequisite:* Permission of instructor. Laboratory Fee: \$8.

**3540 Numerical Methods in Earth Sciences (2-3)**

Formulation of finite difference, finite element, boundary element method, and mixed algorithms. Stability and convergence. Applications to problems related to seepage, diffusion, consolidation, subsidence, stability and deformation of soil masses. Use of computer codes in working actual engineering applications. *Prerequisite:* Permission of instructor. Laboratory Fee: \$8.

**3542 Groundwater Contamination and Reclamation (3-0)**

Groundwater pollution sources and typical cases in radioactive and hazardous waste management. Fundamentals of flow and transport of chemicals in porous media. Modeling phase distribution of chemicals

in subsurface environments. Use of state-of-the-art computer codes (mainframe- and micro-computers). Applications to either planning, case evaluation, remedial action or clean-up technologies. *Prerequisite:* Permission of instructor.

**3590 Special Topics in Civil Engineering**

Advanced topics of contemporary interest in civil engineering. May be repeated for credit when topic varies. *Prerequisite:* Permission of instructor.

**1591-3591 Individual Studies**

Individual variable-credit research, design or analysis on advanced phases of Civil Engineering problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of departmental graduate advisor.

**1594-6594 Graduate Research**

Individual variable-credit research of contemporary topics in civil engineering. *Prerequisite:* Permission of departmental graduate advisor.

**1595 Graduate Seminar**

Conferences and discussions of various topics in civil engineering by faculty, graduate students, and speakers from industry and other institutions. Attendance required of all full-time graduate students during each semester of enrollment.

**3596 Graduate Projects**

Individual research, design or analysis on advanced phases of civil engineering problems conducted under the direct supervision of a faculty member. The course, including a written report, is required of all students in the non-thesis option. *Prerequisite:* Permission of instructor.

**3597 Graduate Design Projects****3598 Theses****3599 Theses**

## Computer Science

306 Bell Hall  
(915) 747-5494

CHAIRPERSON: Stephen Riter

GRADUATE FACULTY: Bell, Bernat, Gelfond, Patterson, Przymusińska, Riter, Williams

The Computer Science Department offers a Master of Science with a major in Computer Science. Specific courses of study include computer information systems, computer software systems, computer systems organization, theory of computation, data communications, and computing applications. All students are required to take at least 12 hours of coursework chosen from Computer Science 3511, 3515, 3522, 3530, 3577 and Electrical Engineering 3573. Thesis and non-thesis programs are available under this degree. Students enrolled in a thesis program normally take 27 hours of coursework plus Computer Science 3598-99, Thesis. Non-thesis students normally follow a 30 hour program plus credit for Computer Science 3596-97, Graduate Projects.

*Prerequisite* for the degree is a baccalaureate degree in Computer Science, or at least 13 hours of undergraduate credit in Computer Science, consisting of CS 3330 (or CS 3333), CS 4332, CS 3335, and CS 3452, and a first course in calculus (MATH 4111 or equivalent), or permission of the graduate advisor.

For Undergraduate and Graduate Students

Courses marked with an asterisk (\*) may not be applied toward the degree of Master of Science in Computer Science.

\*3330 Problem Oriented Programming Language (3-0)

\*4332 Assembler Language Programming (3-0)

\*3333 Basic Concepts in Computer Science (3-0)

\*3335 Systems Programming (3-0)

\*3350 Automata, Computability and Formal Language (3-0)



- \*3360 Design and Implementation of Programming Languages (3-0)
- 3370 Computer Graphics (3-0)
- \*3410 Software Engineering I (3-0)
- \*3411 Software Engineering II (3-0)
- 3416 Computer Networks (3-0)
- 3420 Artificial Intelligence (3-0)
- 3442 Data Base Management (3-0)
- 3450 Systems Simulation (3-0)
- 3452 Translation of Programming Languages (3-0)
- 1471-3471 Computer Science Problems (1-0, 2-0, 3-0)
- 3475 Theory of Operating Systems (3-0)
- 3490 Special Topics in Computer Science (3-0)

For Graduate Students Only

#### 3510 Computer Graphics (3-0)

Computer representation and display of graphical information including line, character, and curve generation, two and three dimensional graphical techniques, interactive methods, and advanced topics. *Prerequisite:* CS 3370.

#### 3511 Survey of Programming Languages (3-0)

Comparative study of a variety of current programming languages and the effects of their features on language applications.

#### 3514 Artificial Intelligence (3-0)

Advanced treatment of selected topics from Artificial Intelligence, such as production systems, search strategies, learning and inference, understanding natural language, vision, automatic programming, and current research topics of interest. *Prerequisite:* CS 3420 or permission of instructor.

#### 3515 Theory of Computation (3-0)

Finite state automata, regular expressions, context free languages. Turing machines, recursive and recursively enumerable sets, unsolvable problems.

#### 3522 Advanced Information Storage and Retrieval Systems (3-0)

A survey of advanced concepts in data management. Topical coverage includes B-trees, extendable hashing, field level sensitivity, multiple PCBs, advanced topics in data base management, file directory design, data dictionary systems, and context addressed disk systems.

#### 3530 Data Communications (3-0)

Study of modern techniques for data transmission including modulation methods, coding theory, transmission techniques, and switching theory. *Prerequisite:* CS 3416.

#### 3540 Expert Systems In Computer Science (3-0)

Study of topics from artificial intelligence which form the basis for expert systems design, including: knowledge representation, search techniques, user (language) interfaces, inference control methods, and knowledge acquisition. Applications and building tools for expert systems are also studied, with one important tool covered in detail. *Prerequisites:* Graduate standing and permission of the instructor.

#### 3560 Computer Vision (3-0)

Fundamental concepts associated with the construction of meaningful descriptions of physical objects from images; including image segmentation, two-dimensional and three-dimensional representations, knowledge representation, matching and inference. *Prerequisite:* Permission of instructor. May be taken as IE 3560 or EE 3560.

#### 3577 Distributed Processing (2-3)

Interprocess communication, use of semaphores, bus design and handshaking, resource protection, process synchronization, resource management, and multiprocessor hardware requirements. Laboratory experiments on memory management, bus connections and interfacing and interprocess communication. *Prerequisite:* A knowledge of microprocessors, and assembler programming.

#### 3590 Special Topics

Advanced topics of contemporary interest in Computer Science. May be repeated for credit when topic varies. *Prerequisite:* Permission of the instructor.

#### 1591-3591 Individual Studies

Individual variable-credit research, design or analysis on advanced phases of Computer Science problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of departmental graduate advisor.

#### 1594-6594 Graduate Research

Individual variable-credit research of contemporary topics in Computer Science. *Prerequisite:* Permission of departmental graduate advisor.

#### 1595 Graduate Seminar

Conferences and discussions of various topics in Computer Science by faculty, graduate students, and speakers from industry and other institutions. Required of all graduate students during each semester of full-time enrollment.

#### 3596-97 Graduate Projects

Individual research, design, or analysis on advanced phases of Computer Science conducted under the direct supervision of a faculty member. The courses, including a written report, are required of all students in the non-thesis option. *Prerequisite:* Permission of the instructor.

#### 3598 Theals

#### 3599 Thesis

## Electrical Engineering

301B Engineering Science Complex  
(915) 747-5470

CHAIRPERSON: Stephen Riter  
GRADUATE FACULTY: Austin, Alafodimos, Gibson, Grande-Moran, Liu, Manoli, McDonald, Parra, Pierluissi, Riter, Schroder, Shadaram, Singh, Williams

The Electrical Engineering Department offers a Master of Science Degree with a major in either Electrical Engineering, Computer Engineering or Engineering.

Specific courses of study in the Electrical Engineering major include electromagnetics, control systems, power systems, communications, bioengineering and instrumentation. All students are required to take EE 3500 and at least 12 hours of graduate coursework in Electrical Engineering. Thesis and non-thesis programs are available. Students enrolled in a thesis program normally take 24 hours of coursework plus EE 3598-99 Thesis. Non-thesis students follow a 36 hour program which includes credit for EE 3596-97 Graduate Project.

All students enrolled in the Master of Science degree program in Computer Engineering will be required to take at least 15 hours of graduate coursework in areas with a strong emphasis in or applicability to Computer Engineering. These must include EE 3500 and either CS/EE 3530, EE 3573 or EE 3575. Thesis and non-thesis degree programs are available. Students enrolled in a thesis program normally take 24 hours of coursework plus EE 3598-99 Thesis. Non-thesis students follow a 36 hour program which includes credit for EE 3596-97 Graduate Projects. The Thesis or project work should be in a computer related area.

Students holding a Bachelor of Science degree with a major in Electrical Engineering may work toward a 33 hour undesignated Master of Science Degree in Engineering, which will lead to a sub-specialization in an area outside of the major field. All students are required to take at least 15 hours of graduate coursework in the major, and at least 12 hours of coursework in an area outside of their major leading to a sub-specialization. In lieu of a thesis the program must include EE 3596, Graduate Projects, in which a written report is required not necessarily involving results of research conducted by the student. Possible areas of sub-specialization may include Business Management, Operations

Research, Industrial Engineering, Computer Science, Mathematics, and others approved by the student's Graduate Committee. The Graduate Committee must include a member from the sub-specialization.

For Undergraduate and Graduate Students

- 3340 Electronics II (3-0)
- 3347 Electromagnetic Energy Transmission and Radiation (3-0)
- 3369 Digital Systems Design I (3-0)
- 3376 Microcomputer Instrumentation (3-0)
- 1376 Microcomputer Instrumentation Laboratory (0-3)
- 3385 Energy Conversion (3-0)
- 3441 Communication Systems (3-0)
- 3442 Digital Systems Design II (3-0)
- 1442 Laboratory for Electrical Engineering 3442 (0-3)
- 3450 Solid State Physical Electronics (3-0)
- 3485 Biomedical Instrumentation (3-0)
- 3464 Systems and Controls (3-0)
- 3473 Minicomputers (3-0)
- 3474 Operating System Design (3-0)
- 3478 Microprocessors and Interfacing (3-0)
- 1478 Laboratory for Electrical Engineering 3478 (3-0)
- 3480 Microwave Communications (3-0)
- 3481 Electro-Optical Engineering (3-0)
- 3484 Probabilistic Methods in Engineering and Science (3-0)
- 3482 Antenna Engineering (3-0)
- 3483 Digital Signal Processing (3-0)
- 3486 Power Systems Analysis (3-0)
- 3487 Computation Techniques for Power Systems Analysis (3-0)
- 3495 Special Topics in Electrical Engineering (3-0)

For Graduate Students Only

**3500 Advanced Mathematics for Engineers I (3-0)**

Integral equations, probability, random variables, basic random processes, minimum mean square estimation, Wiener filtering. *Prerequisite:* EE 3484 or equivalent.

**3501 Advanced Mathematics for Engineering II (3-0)**

Fundamental mathematical concepts of linear differential equations, linear transformations, vector analysis, Fourier series and integrals, partial differential equations and complex variables. *Prerequisite:* MATH 3335 or 3436 or equivalent.

**3502 Linear Systems Analysis (3-0)**

Analysis of generalized linear systems through a state space approach. Topics include linear algebra, continuous and discrete operational calculus, solution methods, controllability and observability and an introduction to non-linear solutions and stability methods.

**3506 Antenna Theory (3-0)**

Fundamental theory of point sources; the antenna as an aperture; methods of analyzing and calculating characteristics of various types of antennas; self and mutual impedances of antennas; array of linear antennas; antenna measurement techniques. *Prerequisite:* EE 3347.

**3507 Modern Control Theory (3-0)**

State space techniques (continuous case); controllability and observability. Lyapunov's second method of steepest descent; and other optimization techniques. *Prerequisite:* EE 3502.

**3510 Computer Graphics (3-0)**

Computer representation and display of graphical information including line, character, and curve generation, two and three-dimensional graphical techniques, interactive methods, and advanced topics. *Prerequisite:* CS 3370.

**3511 Semiconductor Devices (3-0)**

Theory and application of advanced semiconductor devices including light emitting diodes, semiconductor lasers, solar cells, electroluminescent devices, integrated circuits, semiconductor memories, charge transfer devices, thyristors, IMPATT and Gunn device. *Prerequisite:* EE 3450 or equivalent.

**3515 Advanced Electromagnetic Theory (3-0)**

Theorems and concepts of uniqueness, equivalence, induction, reciprocity and Green's functions. Application of plane, cylindrical, and

spherical wave functions to resonators, waveguide, radiators, apertures, and scatterers. *Prerequisite:* EE 3347.

**3516 Active Circuits Analysis (3-0)**

Analysis of active networks, network sensitivity, Filter synthesis and design, immittance simulation. *Prerequisites:* EE 3340, EE 3441, and EE 3502.

**3517 Linear Integrated Circuit Application (3-0)**

Techniques of analysis and design of electronic circuits, using operational amplifiers, and linear integrated circuits such as multipliers, logarithmic amplifiers and RC active filters. *Prerequisites:* EE 3340 and EE 3502.

**3518 Power System Analysis I (3-0)**

Equivalent circuits and characteristics of multi-winding transformers grounding and mutual coupling. Load flow studies. Analysis of balanced and unbalanced conditions in multiphase systems. Sequence impedances of equipment.

**3519 RF Circuit Design (3-0)**

Resonant circuits and impedance transformation. Small signal High-Frequency amplifiers. Sine Wave oscillators and phase lock loops. Mixers, AM, FM, and PM receivers and transmitters. Tuned power amplifiers. *Prerequisites:* EE 3340, EE 3441, and EE 3502.

**3523 Communication Theory (3-0)**

Transmission of information over noisy channels, coding for reliable transmission, error-detecting and error-correcting codes, modulation schemes. *Prerequisite:* EE 3500.

**3524 Statistical Detection and Estimation Theory (3-0)**

Application of statistical decision theory and estimation theory to problems of modern communication systems, radar and sonar systems, etc. Random signal representations, detection of signals with known and unknown parameters, estimation of signal parameters. *Prerequisite:* EE 3500.

**3530 Data Communications (3-0)**

Study of modern techniques for data transmission including modulation methods, coding theory, transmission techniques, and switching theory.

**3543 Microwave Engineering (3-0)**

An introduction to the fundamentals of microwave engineering. Topics include waveguide transmission, impedance transformation and matching, passive microwave elements, resonant cavities, microwave networks and periodic structures. *Prerequisite:* EE 3347.

**3546 Atmospheric Processes (3-0)**

The fundamental principles of atmospheric physics including structure and composition, radiative transfer, wave propagation and atmospheric circulation. *Prerequisite:* EE 3347.

**3560 Computer Vision (3-0)**

Fundamental concepts associated with the construction of meaningful descriptions of physical objects from images, including image segmentation, two-dimensional and three-dimensional representations, knowledge representation, matching and inference. *Prerequisite:* Permission of instructor.

**3571 Digital Signal Processing (3-0)**

Properties of discrete signals and systems. Reconstruction of continuous waveforms from discrete signals. FFT, DFT, and Z transforms. Digital filter design for noisy deterministic and stochastic signals. Advanced Topics. *Prerequisite:* EE 3441.

**3573 Computer Architecture (3-0)**

Selected topics in computer hardware design such as micro-programming, pipeline and multiprocess configurations, memory architectures, and array processing. *Prerequisites:* EE 3369 and knowledge of assembly programming.

**3575 Digital System Design (3-0)**

Emphasis on the design of computer hardware and large digital systems where sequential circuit design is impractical. The design process is based on the use of register-transfer language and control-sequence design language where a software description is translated into hardware circuitry. Applications to computer and computer based

design, including microprocessors. *Prerequisites:* EE 3442 and EE 3478.

### 3576 Data Acquisition and Processing (3-0)

Advanced topics in data acquisition, storage, and communications. *Prerequisite:* EE 3473.

### 3577 Distributed Processing (2-3)

Interprocess communication, use of semaphores, bus design and handshaking, resource protection, process synchronization, resource management, and multiprocessor hardware requirements. Laboratory experiments on memory management, bus connections and interfacing, and interprocess communication. *Prerequisite:* Knowledge of microprocessors and assembler programming.

### 3590 Special Topics

Advanced topics of contemporary interest in electrical or computer engineering. May be repeated for credit when topic varies. *Prerequisite:* Permission of the instructor.

### 1591-3591 Individual Studies

Individual variable-credit research, design or analysis on advanced phases of Electrical Engineering problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of graduate advisor.

### 1594-6594 Graduate Research

Individual variable-credit research of contemporary topics in electrical or computer engineering. *Prerequisite:* Permission of departmental graduate advisor.

### 1595 Graduate Seminar

Conferences and discussions of various topics in electrical and computer engineering by faculty, graduate students, and speakers from industry and other institutions. Required of all graduate students during each semester of full-time enrollment.

### 3596-97 Graduate Projects

Individual research, design or analysis on advanced phases of electrical or computer engineering problems conducted under the direct supervision of a faculty member. The courses, including a written report, are required of all students in the non-thesis option. *Prerequisite:* Permission of the instructor.

### 3598 Thesis

### 3599 Thesis

# Mechanical and Industrial Engineering

101 Engineering Science Complex  
(915) 747-5450

INTERIM CHAIRPERSON: Juan M. Herrera  
GRADUATE FACULTY: Bhaduri, Craver, Dowdy, Herrera, Hu, Johnson, McLean, Swift

The Mechanical and Industrial Engineering Department offers an undesignated Master of Science with a major in Engineering, a Master of Science with a major in Mechanical Engineering, and a Master of Science with a major in Industrial Engineering. Specific courses of study in the Mechanical Engineering major include fluid and thermal systems, and solid mechanic and machine design. Courses of study in the Industrial Engineering major include operations research, quality control and manufacturing process engineering. Thesis and non-thesis options are available under the last two degrees. Students enrolled in a thesis program normally take 24 hours of coursework plus 3598-99, Thesis. Non-thesis students follow a 36-hour program, which includes credit for 3596-97, Graduate Projects, and is open only

to part-time students whose work schedule prohibits doing a thesis.

Any students holding a Bachelor of Science Degree in any Engineering field can participate in a program which leads to the Master of Science in Engineering with concentration in Manufacturing Engineering.

The course work requires a total of 33 credit hours of which 15 are to be selected from an approved group of core courses, three consist of a graduate project course, and 15 are electives, to be selected by the student from five specialties available. The project course, in which a report is required, must involve research and/or design on a problem in manufacturing engineering.

A student holding a Bachelor of Science with a major in either Mechanical or Industrial Engineering may work toward a 33-hour undesignated degree without a thesis, leading to a sub-specialization in an area outside of the major. The coursework includes 18 hours in the major field and at least 12 hours in the particular area of sub-specialization. The work in the major field includes credit for 3596, Graduate Projects. Possible areas of sub-specialization are Business Management, Computer Science, Mathematics or others, as approved by the student's graduate committee.

For Undergraduate and Graduate Students

## MECHANICAL ENGINEERING

Courses marked with an asterisk (\*) may not be applied toward the degree of Master of Science in Mechanical Engineering.

- 3411 Automatic Controls
- 3412 Fluid Power and Control Systems
- 3442 Introduction to Hybrid Computation
- 3443 Robotics and Automated Manufacturing
- 3455 Gas Dynamics
- 3456 Application of Solar Energy
- \*3464 Senior Analysis
- 3468 Environmental Control Engineering
- 3487 Aerodynamics
- \*4451 Heat Transfer
- \*4465 Dynamic Response

## INDUSTRIAL ENGINEERING

None of these courses may be applied toward the degree of Master of Science in Industrial Engineering.

- 3432 Safety Engineering
- 3465 Project Planning and Control
- 3484 Industrial Layout
- 3485 Statistical Quality Control & Reliability
- 4491 Production and Inventory Control
- 3492 Probabilistic Operations Research
- 3493 Engineers and Managing
- 4466 Senior Design

For Graduate Students Only

### Mechanical Engineering

#### 3501 Experimental Stress Analysis (2-3)

Modern techniques for determining state of stress and strain experimentally. The laboratory provides the opportunity to gain practice in the use of these devices and their ancillary equipment. *Prerequisite:* CE 3234 or permission of instructor. Laboratory Fee: \$6.

#### 3502 Advanced Mechanics of Materials I (3-0)

An introduction to the theory of elasticity and the principles of stress and strain. Solution of some elasticity problems such as bending and shear of beams, torsion of bars. Energy method and stability. *Prerequisite:* CE 3234.

#### 3503 Advanced Heat Transfer I—Conduction (3-0)

Conduction in various coordinate systems; steady and transient-state cases with various boundary conditions; analytical, numerical and graphical solutions. *Prerequisite:* MATH 3226 or permission of instructor.

**3504 Advanced Heat Transfer II—Convection (3-0)**

Thermal boundary-layer theory; forced convection in laminar and turbulent flows; free convection. *Prerequisite:* MECH 4354 or permission of instructor.

**3505 Advanced Heat Transfer III—Radiation (3-0)**

Properties of radiating media; diffuse, specular and directional interchange for gray and non-gray surfaces; gas radiation. *Prerequisite:* MECH 4451 or permission of instructor.

**3506 Advanced Fluid Mechanics I (3-0)**

Survey of the principal concepts of fluid mechanics, statics, continuity, momentum and energy relations for continuum fluids, kinematics of fluid motion, governing equations for motion of non-viscous fluid, vorticity and circulation, Kelvin's theorem, Helmholtz theorem, Crocco's theorem, stream function, potential flow, conformal transformation, theory or lift, wave phenomena in fluids. *Prerequisite:* MECH 4354 or permission of instructor.

**3507 Advanced Fluid Mechanics II (3-0)**

Viscous and turbulent flows. Viscosity and dissipation phenomena. The Navier-Stokes and energy equations; creep flow at low Reynolds numbers, laminar boundary layers, laminar stability, transition and turbulence, turbulent boundary layers, jets, wakes, and separated flows. *Prerequisite:* MECH 4354 or permission of instructor.

**3508 Advanced Mechanical Design (2-3)**

Study of the method of optimum design for mechanical systems. Evolution of optimum design; approximation for explicit design; mathematical functions in design, evaluation of the effects of manufacturing errors on product performance, optimum choice for method of analysis, statistical consideration for factor of safety; adequate design, optimum design, design equations, normal redundant and incompatible specifications, loose limits and loose specifications; problems with more than one primary design equation.

**3509 Structural Dynamics (3-0)**

Continuation of MECH 4465 with emphasis on multiple degree-of-freedom systems and their response to disturbances. Normal mode theory, matrix representation of problem; Laplace transform, electrical analogue and mobility techniques of solution. Vibration measurements and analysis. *Prerequisite:* MECH 4465 or permission of instructor.

**3510 Advanced Thermodynamics (3-0)**

Applications of general thermodynamic relations; study and applications of time-dependent energy relationships; analysis of power, refrigeration, cryogenic and direct energy conversion systems. *Prerequisite:* MECH 3376 or permission of instructor.

**3512 Advanced Mechanics of Materials II (3-0)**

Traditional approach to mechanics of materials with topics such as failure theories, fatigue, beams on an elastic foundation, stress concentrations, thick-walled and laminated cylinders, contact stresses, and inelastic behavior. *Prerequisite:* MECH 3502.

**3513 Advanced Fluid Mechanics III (3-0)**

Compressible flow; energy, continuity and momentum principles applied to compressible fluid flows; one, two, and three dimensional subsonic, supersonic and hypersonic flow; normal and oblique shocks; methods of characteristics; mixed flows; hodograph method; compressible laminar and turbulent boundary layers. *Prerequisite:* MECH 3455 or permission of instructor.

**3514 Robotics and Flexible Automation (3-0)**

Modern concepts of robotics and flexible automation including power and control mechanisms, flexible material handling systems, programmable controllers, interfacing and end-of-arm tooling. *Prerequisite:* Permission of instructor.

**3518 Advanced Dynamics (3-0)**

Velocity and acceleration analysis, motion of a point in space, rotating coordinate systems, balancing of masses; generalized coordinates, work and energy, impulse and momentum. *Prerequisite:* MECH 3238 or equivalent.

**3559 Computer-Aided Manufacturing (3-0)**

Modern concepts of using computers for manufacturing, including the theory of computer numerical control (CNC) and direct numerical

control (DNC), CNC milling, CNC tuning and computer-aided process design. *Prerequisite:* Permission of Instructor.

**3562 Graphical Elements of Computer-Aided Design and Manufacturing (3-0)**

Modern concepts of using computer graphics for engineering design and manufacturing, including computer graphics standards such as CORE graphics and GKS, graphic input/output devices, software design and programming techniques for computer-aided design and manufacturing (CAD/CAM). *Prerequisite:* MECH/IE 3559.

**3590 Special Topics**

Advanced topics of contemporary interest in mechanical engineering. May be repeated for credit when topic varies. *Prerequisite:* Permission of the instructor.

**1591-3591 Individual Studies**

Individual variable-credit for non-thesis related research, design or analysis on advanced phases of Mechanical Engineering problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of Graduate Advisor.

**3594, 6594 Graduate Research**

Individual variable-credit research of contemporary topics in mechanical engineering. *Prerequisite:* Permission of departmental graduate advisor.

**1595 Graduate Seminar**

Conferences and discussions of various topics in mechanical engineering by faculty, graduate students and speakers from industry and other institutions. Required of all graduate students during each semester of full-time enrollment.

**3596-97 Graduate Projects**

Individual research, design or analysis on advanced phases of engineering problems conducted under the direct supervision of a faculty member. The courses, including a written report, are required of all students in the non-thesis option. *Prerequisite:* Permission of the instructor.

**3598 Thesis****3599 Thesis****Industrial Engineering****3513 Expert Systems for Industrial Applications (3-0)**

Survey of applied areas of artificial intelligence including machine vision and robotics. Expert systems technology as it applies to industrial problems. Discussion of commercial expert systems. Construction of expert system using expert system building tools. *Prerequisite:* Permission of the instructor.

**3514 Robotics and Flexible Automation (3-0)**

Modern concepts of robotics and flexible automation including power and control mechanisms, flexible material handling systems, programmable controllers, interfacing and end-of-arm tooling. *Prerequisite:* Permission of Instructor.

**3551 Linear and Combinatorial Optimization Methods (3-0)**

Deterministic operations research techniques such as linear programming and its extensions, duality theory, sensitivity analysis, network related models, integer programming, and dynamic programming. Applications include production planning and project networks such as PERT/CPM. *Prerequisite:* IE 3389 or permission of instructor.

**3552 Design and Analysis of Industrial Experiments (3-0)**

Investigation of statistical sampling methods, hypothesis testing procedures, and design of experiments. Both parametric and non-parametric procedures are included. *Prerequisite:* IE 3485 or permission of instructor.

**3554 Advanced Engineering Economy (3-0)**

Capital budgeting, deterministic investment analysis, probabilistic engineering economy, manufacturing cost models, utility theory, and computer applications to engineering economy. *Prerequisite:* IE 3326 or permission of instructor.

# Metallurgical Engineering

M201 Engineering Science Complex  
(915) 747-5468

CHAIRPERSON: Stephen W. Stafford  
GRADUATE FACULTY: Bronson, Fisher, Guard, McClure, Mutso, Stafford, Varma

The Metallurgical Engineering Department offers an undesignated Master of Science with a major in Engineering and a Master of Science with a major in Metallurgical Engineering. Specific courses of study in the Metallurgical Engineering major include extractive metallurgy, physical metallurgy, corrosion, and processing of materials. All students are required to take Metallurgy 3501, 3502, and 3507. Thesis and non-thesis programs are available under this degree. Students enrolled in a thesis program normally take 24 hours of coursework plus Metallurgical Engineering 3598-99, Thesis. Non-thesis students follow a 36 hour program which includes credit for two Metallurgical Engineering Graduate Project courses, 3596 and 3597.

A student holding a Bachelor of Science with a major in Metallurgical Engineering may work toward a 33 hour undesignated degree without a thesis, leading to a sub-specialization in an area outside of the major. The coursework includes 18 hours in the major field and at least 12 hours in the particular area of sub-specialization. The work in the major field includes credit for Metallurgical Engineering 3596, Graduate Project. Possible areas of sub-specialization may consist of Business Management, Operations Research, Structural Mechanics or others, as approved by the student's graduate committee.

For Undergraduate and Graduate Students

3309 Physics of Materials  
3314 Advanced Materials Concepts  
3321 Engineering Alloys  
4304 Process Metallurgy I  
4305 Process Metallurgy II  
4306 Physical Metallurgy I  
4307 Physical Metallurgy II  
3409 Corrosion  
3416 Failure Analysis  
4405 Materials Fabrication  
4413 Structural Characterization  
4418 Metallurgical Design

For Graduate Students Only

## 3501 Thermodynamics of Materials (3-0)

The principles of chemical thermodynamics are applied to selected topics from all aspects of metallurgical processing. Subjects to be covered include solutions, phase equilibria, surface phenomena, free energy-composition diagrams, temperature-pressure diagrams, Eh-pH diagrams, and statistical estimation of thermodynamic functions.

## 3502 Transport Processes in Metal Systems (3-0)

The fundamental concepts of fluid flow, heat and mass transfer, and reaction kinetics are applied to selected topics from all areas of metallurgical processing.

## 3503 Structural Characterization (2-3)

Theory and application of techniques for characterizing chemical and microstructural features of solid materials. Techniques that will be stressed include reflected light microscopy, transmission and scanning electron microscopy and x-ray diffraction. Conventional and specialized sample preparation techniques will be covered for both metal and non-metallic specimens. Offered in alternate years.

## 3556 Probabilistic Optimization Methods (3-0)

Probabilistic operation research technique such as stochastic programming, Markov decision models, queueing theory, and system reliability theory. *Prerequisite:* IE 3492 or permission of instructor.

## 3557 Computer Simulation Applications (3-0)

An introduction to the concepts of simulation methodology as applied to the design and analysis of industrial systems. Specialized computer simulation language is applied to an industrial analysis or design term projects. *Prerequisites:* Knowledge of FORTRAN and permission of instructor.

## 3558 Nonlinear Optimization Methods (3-0)

General Optimization theory and numerical optimization methods for non-linear decision models. Coverage includes applications to automatic process control, engineering design optimization as well as available computer softwares. *Prerequisite:* IE 3389 or permission of instructor.

## 3559 Computer-Aided Manufacturing (3-0)

Modern concepts of using computers for manufacturing, including the theory of computer numerical control (CNC) and direct numerical control (DNC), CNC milling, CNC tuning and computer-aided process design. *Prerequisite:* Permission of Instructor.

## 3560 Computer Vision (3-0)

Fundamental concepts associated with the construction of meaningful descriptions of physical objects from images; including image segmentation, two-dimensional and three-dimensional representations, knowledge representation, matching and inference. *Prerequisite:* Permission of instructor. May be taken as CS 3560 or EE 3560.

## 3562 Graphical Elements of Computer-Aided Design and Manufacturing (3-0)

Modern concepts of using computer graphics for engineering design and manufacturing, including computer graphics standards such as CORE graphics and GKS, graphic input/output devices, software design and programming techniques for computer-aided design and manufacturing (CAD/CAM). *Prerequisite:* MECH/IE 3559.

## 3590 Special Topics

Advanced topics of contemporary interest in industrial engineering. May be repeated for credit when topic varies. *Prerequisite:* Permission of the instructor.

## 1591-3591 Individual Studies

Individual variable-credit for non-thesis related research, design or analysis on advanced phases of Industrial Engineering problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of Graduate Advisor.

## 3594, 6594 Graduate Research

Individual variable-credit research of contemporary topics in industrial engineering. *Prerequisite:* Permission of departmental graduate advisor.

## 1595 Graduate Seminar

Conference and discussions of various topics in industrial engineering by faculty, graduate students, speakers from industry and other institutions. Required of all graduate students each semester of full-time enrollment.

## 3596-97 Graduate Projects

Individual research, design or analysis on advanced phases of industrial engineering problems, conducted under the direct supervision of a faculty member. The courses, including a written report, are required of all students in the non-thesis option. *Prerequisite:* Permission of instructor.

## 3598 Thesis

## 3599 Thesis

**3504 Plastic Deformation (3-0)**

The nature and behavior of materials when plastically deformed beyond their yield strength. The crystalline behavior of metals will be particularly discussed according to dislocation theory, slip, and microstructure. Offered in alternate years.

**3505 Metallurgical Process Analysis (3-0)**

The underlying principles of metal extraction and refining processes will be explored in depth using thermodynamics, kinetics, surface phenomenon, electrochemistry, non-aqueous and aqueous equilibria, and mathematical modeling. Offered in alternate years.

**3507 Phase Transformations in Metals (3-0)**

The theory of the nucleation and growth kinetics of metallic phases including continuous, discontinuous, and martensitic phases is developed. These concepts will be discussed by using phase diagrams, diffusion and metallic structure to describe behavior as well as to control transformations. *Prerequisites:* MET 4306 and 4307 or permission of instructor.

**3508 Corrosion and Oxidation in Metals Systems (3-0)**

Electrochemical theory will be applied to aqueous corrosion, high temperature corrosion and oxidation, and methods for metal protection. Offered in alternate years.

**3509 Fracture Mechanics (3-0)**

The subject of fracture is covered from the continuum and microscopic viewpoints. The importance of the stress intensity factor and the fracture mechanics approach to analyzing failure is developed. Environmental embrittlement and fatigue are also discussed. Offered in alternate years. *Prerequisite:* MET 3504 or permission of instructor.

**3590 Special Topics**

Advanced topics of contemporary interest in metallurgical engineering. May be repeated for credit when topic varies. *Prerequisite:* Permission of the instructor.

**1591-3591 Individual Studies**

Individual variable-credit research, design or analysis on advanced phases of Metallurgical Engineering problems conducted under the direct supervision of a faculty member. A maximum of 3 credit hours may be applied towards the M.S. degree. *Prerequisite:* Permission of graduate advisor.

**1594-6594 Graduate Research**

Individual variable-credit research of contemporary topics in metallurgical engineering. *Prerequisite:* Permission of departmental graduate advisor.

**1595 Graduate Seminar**

Conferences and discussions of various topics in metallurgical engineering by faculty, graduate students, and speakers from industry and other institutions. Required of all graduate students during each semester of full-time enrollment. Up to 3 credits can be applied to the degree.

**3596-97 Graduate Projects**

Individual research, design or analysis on advanced phases of engineering problems conducted under the direct supervision of a faculty member. The courses, including a written report, are required of all students in the non-thesis option. *Prerequisite:* Permission of the instructor.

**3598 Thesis****3599 Thesis****The College of Liberal Arts—Introduction**

In 1942 the History Department, a component of today's College of Liberal Arts, awarded UT El Paso's first master's degree. Since then, the College has developed graduate programs in most of its departments. Master of Arts degrees are available in Communication, English, History, Linguistics, Political Science, Psychology, Sociology, Spanish, and Theatre Arts. In addition to the M.A., the Political Science Department offers the Master in Public Administration Degree and, in conjunction with the College of Business Administration, the two-degree MBA/MPA option. The Department of Music offers the Master of Music degree with options in Performance and in Music Education.

The College of Liberal Arts also offers the Master of Arts in Interdisciplinary Studies. Students wishing to expand their knowledge in areas outside of their previous training or present profession may pursue this degree by designing an interdisciplinary course of study suited to their individual needs.

The most recent addition to the College's graduate programs is a joint UT El Paso-UT Austin doctorate in Border Studies. Students enrolled in this program will receive their degrees from Austin but may do much of their work in El Paso.

## Art

**350 Fox Fine Arts  
(915) 747-5181**

CHAIRPERSON: Charles Fensch

PROFESSORS EMERITI: Clark Garnsey, Wiltz Harrison, Robert Massey

GRADUATE FACULTY: Arnold, Fensch, Parish, Perlman, Thiewes, Wong

GALLERY DIRECTOR: Henry Barendse

At present the Art Department does not offer a graduate-level degree but the following upper division undergraduate courses may be used for graduate credit when appropriate:

**ART EDUCATION**

3421 Special Problems in Art Education

3451 Advanced Art Education

3452 Special Problems in Art Education

**CERAMICS**

3404 Ceramics VI

3414 Ceramics VII

3424 Special Problems in Ceramics

**HISTORY OF ART**

3409 Research Problems in Art History

3419 Special Problems in Art History

**DRAWING**

3430 Special Problems in Life Drawing

3410 Advanced Drawing I

3420 Advanced Drawing II

**METALS**

3403 Metals VI

3413 Metals VII

3423 Special Problems in Metals

**PAINTING**

3401 Painting VI

3431 Painting VII

3441 Special Problems in Painting

**PRINTMAKING**

3405 Printmaking VI

3425 Printmaking VII

3435 Special Problems in Printmaking

**SCULPTURE**

3402 Sculpture VI

3432 Sculpture VII

3442 Special Problems in Sculpture

For Graduate Students Only

**3502 Graduate Problems in Art (0-6)**

This course stresses individual direction and achievement in the following areas: art education, art history, ceramics, drawing, metals, painting, printmaking, and sculpture. May be repeated for credit. Fine Arts Fee: \$10, except when problem is in art history or education.

**3511 Teaching of Creative Art in the Elementary School (3-0)**

This course is designed for the elementary classroom teacher. A series of projects, experiences, and discussions will assist the classroom teacher in making art a meaningful part of the curriculum.

# Communication

202 Cotton Memorial  
(915) 747-5129

CHAIRPERSON: Lawrence J. Johnson  
ASSOCIATE PROFESSOR EMERITA: Jean Miculka  
GRADUATE FACULTY: Johnson, Pratt, Wood

**M.A. DEGREE PREREQUISITES:** Twelve advanced hours (3300-3400) in Speech, Journalism, or Broadcasting. Satisfactory score on Graduate Record Examination.

## COMMUNICATION

**M.A. DEGREE REQUIREMENTS:** Majors in Communication must take a minimum of eighteen semester hours in Communication. For majors electing to do a thesis, six hours of credit (3598-99 Thesis) may be counted toward a required minimum of thirty hours of total coursework, of which at least twenty-one hours must be in courses numbered 3500-3599. Majors electing a non-thesis option must take a minimum of thirty-six hours of total coursework, of which at least twenty-seven must be in courses numbered 3500-3599.

Undergraduate courses for graduate credit. With the prior approval of the graduate advisor, students may take up to 9 hours of upper level coursework from a list of approved departmental offerings to strengthen and enrich the graduate offering. A list of these courses is available from the graduate advisor.

For Graduate Students Only

## SPEECH

### 3531 Seminar in the Classical Rhetorical Tradition

Study of both theory and practice of persuasion and verbal communication during the classical Greek and Roman periods. May be taken more than once with a change in area of emphasis.

### 3532 Seminar in Contemporary Rhetoric

Study of the contributions to understanding of persuasion and communication by modern humanistic theorists, such as Kenneth Burke, I. A. Richards, and Marshall McLuhan. Application of such theory to a variety of contemporary communication events. May be taken more than once with a change in area of emphasis.

### 3541 Seminar in Speech Education

Develops a perspective on aims and methods for teaching a variety of courses in communication and public speaking at the high school and lower college division levels. May be repeated for credit when the content varies.

### 3543 Seminar in Communication Theory

Study of recent non-traditional contributions to theories of human communication. Investigates the application of models, the implications of recent developments in social psychology, and the results of experimental research. May be repeated for credit when content varies.

### 3550 Directed Study

Investigation of a significant area in rhetoric, communication, public address, or filmic communication by individual students or small groups. May include individual research projects or field study. May be taken more than once with a change in area of emphasis.

### 3562 Organizational Communication

Philosophy, methods and designs for studying the communication systems and practices in a complex organization.

### 3590 Critical Analysis of Motion Pictures

Various functions of the motion picture medium, such as artistic expression, mass entertainment, and communication to differing limited target audiences. Elements, syntax, and creative options in the medium. Standards for evaluation and analysis of motion pictures.

### 3591 Film as a Medium for Social Influence

Use of films for mass persuasion and reinforcement in differing societies. Use of films as specific persuasive messages adapted to distinct target audiences. Application of rhetorical and psychological theory, communication models, and film theory in analysis of specific techniques used in filmic persuasion. Detailed analysis of significant persuasive films. *Prerequisite:* SPCH 3491 or SPCH 3590 or permission of instructor.

### 3598 Thesis

### 3599 Thesis

# Criminal Justice

303 Jack Vowell Hall and 102 Old Main  
(915) 747-5296 or 747-4740

INTERIM CHAIRPERSON: John C. Hedderson  
DIRECTOR: Joseph B. Graves, Jr.  
GRADUATE FACULTY: Graves, Mahan

The Master in Public Administration (M.P.A.) degree in the Department of Political Science is the graduate program for the Criminal Justice Department. Graduate courses in Criminal Justice are designed for students who want to take courses in Criminal Justice to satisfy the twelve (12) hour elective requirement in the MPA degree.

### 3500 Seminar in Criminal Justice Administration (3-0)

Research, writing and discussion.

### 3508 Seminar in Juvenile Justice (3-0)

Research, writing and discussion.

### 3510 Seminar in Law Enforcement (3-0)

Research, writing and discussion.

### 3520 Seminar in Corrections (3-0)

Research, writing and discussion.

### 3540 Seminar in Selected Topics (3-0)

Research, writing and discussion.

Both basic and specific requirements for the M.P.A. degree are found under "Political Science" in this catalog.

# English

111 Hudspeth Hall  
(915) 747-5731

CHAIRPERSON: Mimi R. Gladstein  
PROFESSORS EMERITI: Lurline Coltharp, Joseph Lee Leach, Charles L. Sonnichsen  
GRADUATE FACULTY: Anderson, Bledsoe, Boley, Burlingame, Dick, Esch, Gingerich, Gladstein, Johnson, Jussawalla-Dasenbrock, Meyers, Mortimer, Potts, Scheiber, Stafford, Taylor, Ullman, West

## M.A. DEGREE IN ENGLISH

The English Department offers three master's degree options: British and American Literature, Creative Writing, and Professional Writing and Rhetoric.

### BRITISH AND AMERICAN LITERATURE

The primary objective of the Literature Option is to develop skill in reading and interpreting literature. The coursework is designed to provide both a comprehensive knowledge of literature in its

historical and intellectual contexts and the opportunity to explore competing theories of critical interpretation. The Literature Option prepares students for teaching in secondary schools and at junior colleges. It also prepares students for admission to Ph.D. programs in British and American Literature.

*Prerequisites:* (1) a bachelor's degree; (2) combined score of 1000 or more on the GRE verbal and analytical tests; (3) 18 hours of advanced level English courses; (4) writing sample.

**Requirements:** (A) 30 semester hours of coursework, English 3598-99, and an oral examination; or (B) 36 semester hours of coursework, English 1597, and an oral examination.

1. **Core Curriculum** (27 hours): English 3500; four courses from English 3501-06; four courses in at least three different literary periods from English 3551-56 (English 3525 may be included as one of the four).
2. **Electives** (3-9 hours): any other graduate English courses except English 1530-3530; graduate courses in other departments as approved by the Director of Graduate Studies.
3. **Research Options** (1-6 hours): (a) Thesis (English 3598-99)—a substantial work of literary scholarship: the student submits a thesis proposal and the names of a thesis director, English Department reader, and outside reader to the Director of Graduate Studies for approval, and then follows the Graduate School guidelines for preparing and submitting a thesis; (b) Master's Paper (English 1597): the student submits a graduate research paper for expansion and revision under the supervision of a director, English department reader, and an outside reader.
4. **Oral Examination:** A defense of the thesis or master's paper before the student's committee. In all cases a majority vote of the committee will determine acceptance or rejection.

#### CREATIVE WRITING

The Creative Writing Option combines workshop experience with the study of British and American Literature, allowing students to develop their personal writing skills in the context of their literary and critical heritage. Workshop courses in Fiction, Poetry, Screenwriting, Genre Fiction, and Non-fiction Freelancing are regularly offered. Students may select literature surveys and seminars that will heighten their awareness of literary traditions and develop their sensitivity to textual strategies. The Creative Writing Option equips students for careers as writers: many succeed in publishing works produced in the course of their study. The program also prepares students to teach writing or to pursue more advanced degrees.

*Prerequisites:* (1) a bachelor's degree; (2) a combined score of 1000 or more on the GRE verbal and analytical tests; (3) 9 hours of advanced level Creative Writing courses; (4) 9 hours of advanced level literature coursework; (5) writing sample.

**Requirements:** 30 semester hours of coursework, English 3598-99, and an oral examination.

1. **Core Curriculum** (21 hours): English 3500 or 3520; two courses from among English 3501-06; two courses from among English 3566-67-68.
2. **Electives** (9 hours): 3 hours must be Literature or Rhetoric; 6 hours selected from any graduate English courses except English 1530-3530; graduate courses in other departments as approved by Director of Graduate Studies.
3. **Thesis** (6 hours): English 3598-99—the Creative Writing Option requires the completion of an original imaginative work. The student submits a thesis proposal and the names of a thesis director, an English Department reader, and an outside reader to the Director of Graduate Studies for approval, and then follows the graduate school guidelines for preparing and submitting a thesis.
4. **Oral Examination:** A defense of the thesis made before the thesis committee. In all cases a majority vote of the committee will determine acceptance or rejection.

#### PROFESSIONAL WRITING AND RHETORIC

The Professional Writing and Rhetoric Option stresses discourse theory, textual analysis, and practical writing. The core curriculum includes courses in linguistics, the theory of rhetoric, analysis of texts, informative and persuasive writing, and literary discourse. There is, moreover, sufficient flexibility to allow students to fashion degree programs suitable to their individual interest. Within the program there is also an English Education Track designed for secondary English/Language Arts teachers. The Professional Writing and Rhetoric Option prepares students for careers as teachers and professional writers as well as for future academic study.

*Prerequisites:* (1) a bachelor's degree; (2) a combined score of 1000 or more on the GRE verbal and analytical tests; (3) 18 semester hours of advanced level courses in Liberal Arts, 9 hours of which must be completed in English, including Advanced Composition or the equivalent (may be waived upon consent of Director of Graduate Studies after presentation of evidence of advanced writing skills); (4) writing sample.

**Requirements:** 33 semester hours of coursework, English 3597, and an oral examination.

##### 1. **Core Curriculum:**

- (a) Professional Writing and Rhetoric (24 hours);  
 Research Methods: English 3500  
 Rhetorical Theory: English 3510; Speech 3531 or 3532  
 Language Theory: Linguistics 3509 or 3519  
 Informative Discourse: English 3512 or 3515 (when topic is appropriate)  
 Persuasive Discourse: English 3511 or 3515 (when topic is appropriate)  
 Literary Discourse: at least 3 hours from English 3501-3506, 3550-3556, 3525; up to 3 hours from English 3520, 3566-68.

or

- (b) Professional Writing and Rhetoric/English Education (27 hours);  
 Research Methods: English 3500  
 Rhetorical Theory: English 3510; Speech 3531 or 3532  
 Language Theory: Linguistics 3509, 3519, or English 3545 (when topic is appropriate)  
 Informative/Persuasive Writing: English 3511, 3512, or 3515 (when topic is appropriate)  
 Literary Discourse: at least 3 hours from English 3501-3506, 3525, 3550-3556; up to 3 hours from English 3520, 3566-68  
 English Teaching Methods: English 3545 (one repetition as topic varies)

2. **Electives** (6-9 hours): Electives may include any course listed above that is not being counted as part of the required hours; other approved electives include Linguistics 3508, 3570, 3573, Speech 3491, 3541, 3543, 3550, 3590, Reading Education 3342; or graduate courses in other departments as approved by the Director of Graduate Studies.
3. **Practicum** (3 hours): English 3597—The Professional Writing and Rhetoric Option requires the completion of supervised experience in addressing, responding to, and resolving an academic or commercial communication problem through the preparation of an appropriate written document. The student submits a practicum proposal and the names of a practicum director, English Department reader, and an outside reader to the Director of Graduate Studies for approval, and then follows the Graduate School guidelines for preparing and submitting the practicum paper.
4. **Oral Examination:** A defense of the document prepared in English 3597 before the student's committee. In all cases a majority vote of the committee will determine acceptance or rejection.



## INFORMATION FOR ALL OPTIONS

1. **Undergraduate Credit Hours:** Generally, undergraduate credit hours may not be used to satisfy graduate requirements. Exceptions must be approved by the Director of Graduate Studies and in no cases are to exceed 6 hours.
2. **Foreign Students:** Foreign students must supply a satisfactory grade in a special proficiency test in the English language before being allowed to register (write to Director of Graduate Studies, Department of English, for details).
3. **Graduate Advising:** Each student upon entering the graduate program will outline a tentative degree plan with the Director of Graduate Studies in consultation with the director of the student's option. Students who have deficiencies in their undergraduate preparation are encouraged to supplement their graduate courses with undergraduate courses (no graduate credit).
4. **Petition for Candidacy:** At the end of the first semester of full-time study, or upon completion of the first 12 hours of graduate work, each student must submit to the Office of the Dean a Petition for Candidacy signed by the Departmental Graduate Advisor. The Petition shall show the courses taken and the additional courses required by the department before graduation. Petitions which show an incomplete grade or a GPA below 3.0 cannot be approved. Copies of the Petition for Candidacy are available in the Office of the Dean.

## For Graduate Students Only

**3500 Introduction to Graduate Studies in English (3-0)**

Introduces students to the range of scholarly endeavors in English studies, to the standards, methods, and tools of research in the field, and to theoretical assumptions implicit in the various analytical and critical approaches to texts. Coursework will include a substantial research project carried out under close faculty supervision.

**3501 British Literature to 1485 (3-0)**

Survey of Old English and Middle English literature ranging from Beowulf to the Arthurian romances and covering such writers as Chaucer, the Gawain poet, and Malory.

**3502 British Literature 1485-1660 (3-0)**

Survey of representative writers, literary trends, and the social and intellectual background from the early Renaissance through the Restoration. Such writers as More, Wyatt, Sidney, Spenser, Shakespeare, Donne, Herbert, Milton, and Marvell, and such issues as Humanism, Petrarchanism, Neoplatonism, and Metaphysical poetics may be discussed. Emphasis will vary with the instructor.

**3503 British Literature 1660-1832 (3-0)**

Survey of literature from the Restoration through the Romantic period. Such writers as Dryden, Swift, Pope, Richardson, Fielding, Johnson, Wordsworth, Coleridge, Keats, and Byron, and such subjects as Restoration Theatre, Neoclassicism, the novel, Gothicism, and the Romantic aesthetic may be covered. Emphasis will vary with the instructor.

**3504 British Literature 1832-Present (3-0)**

Survey of representative writers and literary trends from the Victorian period to the present. Such writers as Tennyson, Browning, Dickens, Bronte, Eliot, Wilde, Shaw, Joyce, Woolf, Yeats, Lawrence, Lessing, and Fowles, and such issues as social reform, religious turmoil, industrialism, Darwinism, Marxism, and existentialism may be discussed. Emphasis will vary with the instructor.

**3505 American Literature to 1860 (3-0)**

Survey of representative writers, literary trends, and the social and intellectual background from the colonial period to 1860. Such writers as Bradford, Franklin, Jefferson, Bryant, Irving, Cooper, Poe, Hawthorne, Whitman, Emerson, Thoreau, and Melville, and such issues as Puritanism, national self-realization, and Transcendentalism may be discussed. Emphasis will vary with the instructor.

**3506 American Literature since 1860 (3-0)**

Survey of representative writers and literary trends from the Civil War to the present. Such writers as Twain, James, Crane, Dickinson, Cather, Frost, Cummings, Pound, Fitzgerald, Hemingway, Steinbeck, Faulkner,

Porter, Ellison, and Plath, and such subjects as Realism, Naturalism, Marxism, Freudianism, sexism, racism, Modernism, the World Wars, and regional writing may be discussed. Emphasis will vary with the instructor.

**3510 The Field of Discourse: Theory and Analysis (3-0)**

Exploration of the common and distinguishing characteristics of expressive, informative, persuasive, and literary discourse through the study of discourse theory and close analysis of texts.

**3511 Practical Rhetoric: Persuasion and Argument (3-0)**

A writing course stressing the application of classical and contemporary rhetorical theory to a variety of practical writing tasks involving argument and persuasion.

**3512 Technical Writing Proseminar (3-0)**

A writing course focusing upon rhetorical techniques for technical writing, graphics, and editing.

**3515 Professional Writing Seminar (3-0)**

Intensive study and practice of a particular genre of professional writing, such as biography, historiography, news and feature writing, and translation. May be repeated once when the topic varies.

**3520 Literary Criticism: Theory and Practice (3-0)**

A survey of the basic critical texts and arguments about literature in the Western tradition. Students will examine and practice the translation of these arguments into practical readings and valuation of selected literary texts. Coursework includes at least one substantial research project carried out under close faculty supervision.

**3525 Genre: Theory and Practice (3-0)**

Studies in the theory of genre with focus on one genre, such as the novel, the lyric, comedy, or the epic. Course may be repeated when the topic varies.

**1530-3530 Topics in Composition (1-0, 2-0, 3-0)**

Discussion, from a basis in discourse theory, of problems surfacing in the teaching of English composition and the application of strategies in the self-contained classroom and other instructional formats. Students may enroll for 1 to 3 hours; the course may be repeated; grading will be pass/fail. *Prerequisite:* ENGL 3510 or consent of the Director of Graduate Studies.

**3545 English Teaching Methods (3-0)**

An advanced course in English teaching methods, stressing theory and its classroom applications, and focusing alternately on such topics as teaching literature, composition, grammar, creative writing, or appropriate combinations of these. May be repeated when topic varies.

**3550 Seminar: Special Topics (3-0)**

Studies in comparative literature, current literary thought or techniques, or a focus on a prescribed area such as a subgenre or literary group.

**3551 Seminar: Studies in British Literature to 1485 (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the Anglo-Saxon period to the Renaissance.

**3552 Seminar: Studies in British Literature 1485-1650 (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the early Renaissance through the Restoration.

**3553 Seminar: Studies in British Literature 1660-1832 (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the Restoration through the Romantics.

**3554 Seminar: Studies in British Literature 1832-Present (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the Victorian period to the present.

**3555 Seminar: Studies in American Literature to 1860 (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the Colonial period to the Civil War.

**3556 Seminar: Studies in American Literature Since 1860 (3-0)**

Detailed study of one or more major authors, schools, literary trends or genres from the Civil War to the present.

**3566 Advanced Fiction Writing (3-0)**

Intensive study and practice in the various forms and approaches of fiction writing, including workshop discussion of individual student manuscripts. May be repeated once under a different instructor.

**3567 Advanced Poetry Writing (3-0)**

Intensive study and practice in the various forms and approaches within the writing of poetry, including workshop discussion of individual student poems. May be repeated once under a different instructor.

**3568 Creative Writing Seminar (3-0)**

A variable topics course that provides intensive practice and study in one of the genres of imaginative writing, such as novel writing, screenwriting, non-fiction freelancing, or biography/autobiography. May be repeated when topic varies.

**3597 Writing Practicum**

The student submits a practicum proposal and the names of a practicum director, English Department reader, and an outside reader to the Director of Graduate Studies and then follows the Graduate School guidelines for preparing and submitting the practicum paper. Required of Professional Writing and Rhetoric majors.

**1597 Master of Arts Research Paper (British and American Literature Option)**

The student submits a graduate research paper for expansion and revision under the supervision of a director, English Department reader, and an outside reader.

**3598 Thesis****3599 Thesis**

# History

334 Liberal Arts  
(915) 747-5508

CHAIRPERSON: Ellery Schalk

PROFESSOR EMERITUS: W. H. Timmons

GRADUATE FACULTY: Ambler, Bailey, Clymer, Fuller, Jackson, Kawashima, Martin, Martin, Martinez, McGee Deutsch, Schalk, Shover, Thurston, Weber

DEPARTMENTAL REQUIREMENTS FOR THE M.A. DEGREE: Students working toward the Master of Arts degree in history may choose either the standard option or a specialized option in the history of the United States-Mexico Border. Both options provide degree plans with or without a thesis.

**Standard Degree Plans (I & II)**

**Prerequisite:** Admission to the Graduate Program in History.

**Plan I** requires the completion of 30 hours, including an acceptable thesis. A Plan I student must complete History 3581 and 6 additional hours of graduate seminars in history, 9 hours of graduate studies courses in history, and History 3598-3599. It is recommended that History 3581 be taken before enrolling in another seminar.

The remaining 6 hours may be selected, in any combination, from among graduate studies courses, graduate seminars, and upper division undergraduate courses taken for graduate credit.

As part of the total 30 hours, a student may choose a Minor in a related field, provided the department's graduate advisor approves. The Minor requires 6 hours, of which at least 3 must be at the 3500 level. The student's graduate committee conducts a final oral examination for the M.A. degree, as prescribed by the Graduate School.

**Plan II** requires the completion of 36 hours, including the submission of two acceptable seminar papers in lieu of a thesis. A Plan II student must complete 12 hours of graduate studies courses in history, 6 hours of graduate seminars in history, and, in the final semester of work, History 3593.

The remaining 15 hours may be selected from among graduate

studies courses, graduate seminars, and upper division undergraduate courses taken for graduate credit. In keeping with graduate school regulations, no more than 9 hours of undergraduate courses may be counted for graduate credit and only 6 of these hours may be taken in history; 3 additional hours may be included in a Minor field, if a Minor field is selected and approved.

Plan II students must submit the two seminar papers to the departmental committee which conducts the final examination for the M.A. degree, as prescribed by the Graduate School. The two seminar papers must be written under the direction of different professors.

As a part of the total 36 hours, a student may choose a Minor in a related field, provided the department's graduate advisor approves. The Minor requires 6 hours, of which at least 3 must be at the 3500 level.

**Border History Degree Plans (III & IV)**

**Prerequisite:** Admission to the Graduate Program in History, and the completion of the fourth semester of Spanish language instruction with a grade of "B" or better, or successful completion of a department-approved Spanish language competency examination.

**Plan III** requires the completion of 30 hours, including an acceptable thesis. Specific requirements are as follows:

**Seminars:** Nine hours required, including the core course in border history and two other courses directly related to the U.S.-Mexico borderlands. Course substitution is permitted with the approval of the Border Studies Graduate Committee.

**Studies Courses:** Nine hours required. Of the nine hours, six must be related to the U.S.-Mexico Border and must be approved by the Border Studies Graduate Committee.

**Other Courses:** Six hours required from among History 3309, 3312, 3316, 3317, 3322, 3327, 3328, 3342, 3343, and 3390 (when topic is related to the U.S.-Mexico Border). With the approval of the Border Studies Graduate Committee, a student may substitute graduate courses, or a student may select a Minor field in a related discipline. A Minor field requires 6 hours, of which at least three hours must be at the graduate (3500) level.

**Thesis:** History 3598-3599.

**Plan IV** requires the completion of 36 hours; in lieu of a thesis, two revised seminar papers must be submitted to the committee conducting the final examination. The two seminar papers must be written under the direction of different professors. Specific requirements are as follows:

**Seminars:** Six hours required of courses related to the U.S.-Mexico border. Course substitution is permitted with the approval of the Border Studies Graduate Committee.

**Studies Courses:** Twelve hours required, of which at least nine must be related to the U.S.-Mexico Border and must be approved by the Border Studies Graduate Committee.

**Undergraduate Courses Taken for Graduate Credit:** Six hours from among the following—History 3309, 3312, 3316, 3317, 3322, 3327, 3328, 3342, and 3390 (when topic is related to the U.S.-Mexico Border). With the approval of the Border Studies Graduate Committee, a student may substitute graduate level courses.

**Other Courses:** Nine hours from among any graduate courses in the department of history, or three graduate hours in the department of history and six hours in a Minor field in a related discipline. Minor fields must be approved by the Border Studies Graduate Committee. A Minor field requires 6 hours, of which at least three hours must be at the graduate (3500) level.

**Independent Research:** History 3593, to be taken in the final semester of work.

For Undergraduate and Graduate Students

The following undergraduate courses have been approved for graduate credit. Students taking these courses for graduate credit will be required to do additional work.

- 3301 Colonial America to 1763 (3-0)
- 3302 The American Revolution and the New Nation, 1763-1815 (3-0)
- 3304 The Age of Jackson, Clay, and Webster, 1815-1860 (3-0)
- 3305 The Civil War and Reconstruction Era, 1860-1877 (3-0)
- 3306 The Rise of Modern America, 1876-1900 (3-0)

- 3307 The Twentieth Century: From Roosevelt to Roosevelt (3-0)  
 3308 U.S. Since 1933 (3-0)  
 3309 Mexican-American History (3-0)  
 3310 American Legal History (3-0)  
 3311 History of American Foreign Relations to 1914 (3-0)  
 3312 History of American Foreign Relations since 1914 (3-0)  
 3313 American Military History (3-0)  
 3314 American Intellectual Movements and Thinkers to 1900 (3-0)  
 3316 Southwest Frontier (3-0)  
 3317 History of Texas since 1821 (3-0)  
 3319 The Old South (3-0)  
 3320 The New South (3-0)  
 3321 The Great West to 1840 (3-0)  
 3322 The Great West since 1840 (3-0)  
 3324 The United States in Southeast Asia (3-0)  
 3327 Attitudes Toward Minorities in the United States (3-0)  
 3328 History of Hispanic Peoples in the United States (3-0)  
 3330 History of the Far East (3-0)  
 3331 History of Religion in the East (3-0)  
 3332 Russia (3-0)  
 3333 The Soviet Union (3-0)  
 3336 Pre-Modern Africa (3-0)  
 3337 Modern Africa (3-0)  
 3339 History of the Ancient Near East: Early Bronze Period to the Iron Age (3-0)  
 3340 The Middle East and Islam (3-0)  
 3342 The Spanish Borderlands (3-0)  
 3343 The U.S.-Mexican Border (3-0)  
 3344 Latin America: The Colonial Period (3-0)  
 3345 Latin America: Reform and Revolution (3-0)  
 3346 Central America and the Caribbean (3-0)  
 3347 South America since 1810 (3-0)  
 3349 History of Mexico to 1900 (3-0)  
 3350 The Mexican Revolution (3-0)  
 3351 Tudor England (3-0)  
 3354 England to 1547 (3-0)  
 3355 England since 1547 (3-0)  
 3359 History of Religion in the West (3-0)  
 3360 The Ancient World (3-0)  
 3362 The Medieval World (3-0)  
 3364 The Age of Renaissance (3-0)  
 3365 The Age of the Reformation (3-0)  
 3367 The French Revolution and Napoleonic Eras (3-0)  
 3368 Nineteenth Century Europe, 1815-1900 (3-0)  
 3369 Twentieth Century Europe, 1900 to the Present (3-0)  
 3374 Modern Germany since 1815 (3-0)  
 3379 European Intellectual History since the French Revolution (3-0)  
 3381 The History of Spain and Portugal (3-0)  
 3390 History, Special Topics (3-0)  
 3391 History of Women (3-0)  
 3399 History and Historians (3-0)

For Graduate Students Only

## STUDIES COURSES

Graduate Studies courses are designed to provide a flexible approach to the study of history in various general areas. The specific topic studied will vary from semester to semester; each semester a brief description will be found in the published time schedule. Generally, studies courses involve reading, discussion, and writing, but depending on the nature of the topic, lectures or other approaches may be employed.

### 3505 Studies in United States History (3-0) +

Focuses in depth on a theme, movement, or period of significance in United States history. Past topics have included the family in colonial America, quantification in history, American slavery, the West in fact and fiction, U.S. foreign policy in Southeast Asia, Progressivism, and great American historians. Historical interpretation is usually emphasized.

### 3509 Studies in Latin American History (3-0) +

Survey of a major topic or period in Latin American history, with special

emphasis on reading and discussion of significant historiographical interpretations. Typical topics include the Indian in Mexican history, the history of underdevelopment in Latin America, and women and the family in Latin America.

### 3516 Studies in European History (3-0) +

Focuses in depth on a theme, movement, or period of significance in European history. Topics could include problems such as: The Renaissance, the Reformation, the Industrial Revolution, the French Revolution, Nazism, modern social history methods; or could be focused on specific countries during a particular period such as Soviet Russia, modern Germany, Tudor-Stuart England, ancient Greece, medieval France, and the like. Historical interpretation is usually emphasized.

### 3518 Studies in African History (3-0) +

Survey of a major theme in African history through analysis of various interpretations and comparisons of developments in different geographical areas. Possible topics include: the growth of states in the pre-colonial era, slavery and the slave trade, imperialism and the African response, colonial society, racism, economic change and development, and decolonization. Reading and discussion.

### 3521 Studies in East Asian History (3-0) +

Reading and discussion of major interpretative works on specific topics in the significant social, cultural, political, legal, and economic issues in the history of East Asia.

### 3540 Teaching History in Secondary and Elementary Schools (3-0)

An examination of the major problems and alternative methods in the teaching of history at the elementary and secondary levels. Focuses on history as a discipline in the humanities and social sciences, and history as a part of the social studies school curriculum. Term project required.

### 3545 Independent Reading (3-0)

Exploration of an historical theme or topic mutually agreeable to the professor and student. Substantial reading and writing required; periodic conferences with the professor.

## SEMINARS

Graduate seminars usually involve discussion of research methodologies and some background reading. But primary emphasis is on research in original resources, with students expected to write a substantial seminar paper based on the research.

### 3570 Seminar in United States History (3-0) +

Focuses in depth on a theme, movement or period of significance in United States history. Areas from which topics have been chosen in the past include Colonial and Revolutionary America, American Foreign Relations, The Chicano, American Intellectual History, Modern America, the American South, the Civil War and Reconstruction Period, Texas History, the American West, and American Military History.

### 3575 Seminar in Latin American and Border History (3-0) +

Focuses in depth on a theme, movement, or period of significance in Latin American or Border history. Areas from which topics have been chosen in the past include all aspects and time periods of Mexican history, nineteenth and twentieth-century problems in other Latin American countries, Central American history, and major aspects of the U.S.-Mexican border experience.

### 3579 Seminar in African History (3-0) +

Introductory readings and research on themes in nineteenth or twentieth century African history. Particular focus on the relations between Africa and Europe and the United States.

### 3581 Historical Method and Historiography (3-0)

The development of historical writing from the Bible and Herodotus to scientific history and the contemporary scene. Research tools in history, analysis of historical documents, and mechanics of the research paper, and the problems of historical composition.

### 3582 Seminar in European History (3-0) +

Focuses on a theme, movement, or period of significance in European history. Topics could include themes in European history, such as military history, religion and society, family history, women's history or

revolution; or they could concern a particular area and time period such as modern Britain, Soviet Russia, modern Germany, and the like.

## THESIS AND INDEPENDENT RESEARCH

### 3593 Independent Research

(Open only to Plan II and Plan IV graduate students in history in the final semester of work.)

### 3595 Problems in Historical Research

Emphasizes research, with writing and discussion. To be taken in conjunction with History 3593, 3598 or 3599. Students will be required to make a formal presentation of the results of their ongoing research. Grading will be pass/fail; this course cannot be used for credit toward the M.A. degree. *Prerequisite:* consent of the graduate advisor.

### 3598 Thesis

### 3599 Thesis

+ May be repeated for credit when topic varies.

# Master of Arts in Interdisciplinary Studies

203 Worrell Hall  
(915) 747-5213

PROGRAM DIRECTOR: David Hall

The M.A.I.S. program is designed for individuals who, having completed a baccalaureate program or professional degree program at an accredited college or university, wish to expand their knowledge in areas outside of their previous training or present profession. To this end, each student will participate in the design of a plan of study consisting of courses offered by a variety of departments and including core seminars designed specifically for students in the program.

### Basic Requirements for Admission

1. A bachelor's degree from an accredited institution in the United States (or proof of equivalent training in a foreign institution).
2. A satisfactory grade-point average in upper-division (junior and senior level) work and in any graduate work already completed.
3. A satisfactory score on the Graduate Record Examination.
4. Submission to the M.A.I.S. Advisory Committee of an acceptable Plan of Study.
5. Acceptance by the M.A.I.S. Advisory Committee and by the Graduate School.

### Specific Requirements for the M.A.I.S. Degree

1. Thirty-nine semester hours of coursework, no more than 9 of which may be in a single disciplinary area, and of which no more than 9 may be outside of the College of Liberal Arts. Exceptions to the 9-hour limitations may be made under unusual circumstances. Exceptions must be approved by the M.A.I.S. Advisory Committee and by the Graduate Dean.
2. A minimum of 30 semester hours of graduate courses (those listed 3500 and above); the remaining 9 hours may be selected from among graduate level courses and/or upper division undergraduate courses (those listed at the 3300 or 3400 level), if approved for graduate credit.

3. A minimum of six semester hours of coursework from among the M.A.I.S. core seminars.
4. Successful completion of M.A.I.S. 3593: Final Project. The Final Project will be submitted to the committee conducting the student's final oral examination. Upon successful completion of the final examination, two copies of the Final Project will be bound and submitted to the Graduate School.
5. Successful completion of the final oral examination, and approval of the Dean of the Graduate School.

### M.A.I.S. Core Seminars:

#### 3550 The History of an Idea (3-0)

The historical consideration of a seminal idea or concept drawn from art, ethics, politics, science, religion or philosophy, and an assessment of its contemporary social and cultural importance. This course may be team-taught and cross-listed with a participating department. May be repeated once for credit when the topic varies.

#### 3560 Contemporary Issues (3-0)

The detailed examination of a contemporary social or cultural concern from a multi-disciplinary perspective. This course may be team-taught and cross-listed with a participating department. May be repeated once for credit when topic varies.

### M.A.I.S. Final Project

#### 3593 Final Project

The Final Project consists of either: 1) two substantially revised or extended papers originally prepared for two of the graduate level courses taken as part of the M.A.I.S. program, one of which must have been written for MAIS 3550 or MAIS 3560; or 2) a new interdisciplinary paper which is based on two or more papers prepared for graduate level courses taken as a part of the M.A.I.S. program.

Open only to M.A.I.S. students in the final semester of their work. If the project is not completed in one semester, students will register for MAIS 3593 during each semester or summer session in which work on the final project is being done, but only three hours of credit will count toward the degree.

# Languages and Linguistics

136 Liberal Arts  
(915) 747-5767, 5801

CHAIRPERSON: Jon Amastae

PROFESSORS EMERITI: Lurline H. Coltharp, Jacob L. Ornstein-Galicia, Ray Past, Edgar T. Ruff, John McCarty Sharp, Joseph R. Smiley

GRADUATE FACULTY: Aguilar, Amastae, Armengol, Bagby, Blansitt, Colton, Elerick, Ewton, Ford, Garcia, Goodall, Manley, Mellen-Webking, Natalicio, Perez, Phinney-Liapis, Teschner

The department offers the M.A. in Applied English Linguistics and in Spanish. In addition, selected courses can be taken for graduate credit in French, German, and Portuguese.

### Admission to the Programs.

#### Applied English Linguistics:

1. Fulfillment of all general requirements for admission to the Graduate School.
2. B.A./B.S. in Linguistics, English, Language, or other field related to linguistics.

#### Spanish:

1. Fulfillment of all general requirements for admission to the Graduate School.
2. A satisfactory score on the Advanced Spanish Test of the Graduate Record Examination.

Students seeking conditional admission with deficiencies will be required to complete advanced level undergraduate courses as directed by the Graduate Advisor. Such courses will not count toward the degree.

### Requirements

#### M.A. in Applied English Linguistics:

- 36 semester hours, of which 6 hours may be 3400-level courses. A minor of 6-12 hours may be presented with the approval of the graduate advisor. A written comprehensive examination is required of all candidates and must be passed before enrollment in LING 3598.  
*And 2. or 3.*
- Option 1 (Non-thesis): Submit two graduate seminar papers, suitably bound, as required by the Graduate School. A prospectus outlining each proposed paper must be approved by the Graduate Advisor and the student's supervising committee. The papers will be defended orally.
- Option 2 (Thesis): Complete LING 3598-3599, Thesis, which counts for 6 of the required 36 hours of work. The procedure for proposing and completing the thesis must follow the requirements of the Graduate School and the current regulations for graduate students in the linguistics program.

#### M.A. in Spanish:

- Complete 36 hours of work, including the appropriate options chosen from "Required Courses and Subject Areas" listed below. With the approval of the Committee on Graduate Studies, a student may present a minor consisting of 6 to 12 hours in a related field.
- Complete course 3202 (fourth semester) in a second foreign language with a grade of at least B, or demonstrate equivalent proficiency.  
*And 3. or 4.*
- Plan I (Non-Thesis Option): Submit two graduate seminar research papers, suitably bound, as required by the Graduate School. A prospectus outlining each proposed paper must be approved by the Committee on Graduate Studies. The papers will be defended orally.
- Plan II (Thesis Option): Complete Spanish 3598-3599, Thesis, which counts for 6 of the required 36 hours of work. A prospectus outlining the proposed thesis must be approved by the Committee on Graduate Studies. The thesis will be defended orally.

#### Required Courses and Subject Areas:

In order to ensure a balanced course of study, all students must complete 21 credit hours distributed as follows:

- Required Course: Spanish 3501
- Required subject areas:
  - Spanish peninsular literature:
    - One course in Golden Age (Spanish 3553, 3555, 3556, or 3557)
    - One course in Twentieth Century (Spanish 3565, 3570, or 3572)
  - Spanish American literature:
    - One course in Prose Fiction (Spanish 3519 or 3521)
    - One course in Poetry (Spanish 3515 or 3517)
  - Hispanic linguistics:
    - One course. Students who have not taken Spanish/Linguistics 3309 (or the equivalent) prior to undertaking M.A. coursework will be required to take this course, which will count for credit toward the M.A. Those who have completed 3309 before entering the master's program will be required to complete one of the following: 3472, 3585, or 3588.
- One course selected from among the following:
  - Spanish 3523
  - Spanish 3557
  - A second course in Hispanic linguistics

For Undergraduate and Graduate Students

### FRENCH

- 3401 Methods of Foreign Language Instruction (3-0)
- 3487 Poetry (3-0)
- 3488 Prose (3-0)
- 3489 Theater (3-0)
- 3490 Topics in French (3-0)

### GERMAN

- 3401 Methods of Foreign Language Instruction (3-0)
- 3487 Poetry (3-0)
- 3488 Prose (3-0)
- 3489 Theater (3-0)
- 3490 Topics in German (3-0)

### LINGUISTICS

- 3401 Methods of Foreign Language Instruction (3-0)
- 3448 Analyses of Second Language Acquisition (3-0)
- 3471 Studies in Linguistics (3-0)
- 3472 Contrastive Linguistics: Spanish/English (3-0)
- 3473 The Spanish Language in the Americas (3-0)
- 3481 Translation into English (3-0)
- 3482 Translation into Spanish (3-0)
- 3490 Studies in the Spanish Language (3-0)
- 3491 Topics in Translation (3-0)
- 3492 Professional Translation (3-0)

### PORTUGUESE

- 3490 Topics in Portuguese (3-0)

### SPANISH

- 3309 Structure of Spanish (3-0)
- 3401 Methods of Foreign Language Instruction (3-0)
- 3402 Spanish for Teachers (3-0)
- 3424 The Literature of Mexico (3-0)
- 3428 Golden Age Drama (3-0)
- 3432 Golden Age Prose (3-0)
- 3435 Nineteenth Century Spanish Novel (3-0)
- 3439 The Short Story (3-0)
- 3441 Modern Drama (3-0)
- 3458 Twentieth Century Spanish Drama (3-0)
- 3461 Don Quixote (3-0)
- 3463 Spanish American Poetry (3-0)
- 3472 Contrastive Linguistics: English/Spanish (3-0)
- 3473 The Spanish Language in the Americas (3-0)
- 3481 Translation into English (3-0)
- 3482 Translation into Spanish (3-0)
- 3490 Topics in Spanish (3-0)
- 3491 Topics in Translation (3-0)
- 3492 Professional Translation (3-0)
- 3493 Introduction to Simultaneous Translation (3-0)

For Graduate Students Only

### FRENCH

- 3590 Topics in French (3-0)

### GERMAN

- 3590 Topics in German (3-0)

### LINGUISTICS

- 3508 Second Language Teaching—English (3-0)

A study of the principles underlying modern second-language teaching, and their application, with particular reference to English as a second language. Includes use of audio-visual equipment.

- 3509 English Linguistics (3-0)

The structure of modern English from the viewpoint of a number of recent grammatical models.

**3519 English Historical Linguistics (3-0)**

A study of the changes in English. The focus is on the language, not the literature.

**3520 Phonology (3-0)**

The phonetic basis of modern phonological analysis; phonological systems and structures; theory and practice in phonological analysis.

**3540 Child Language Acquisition and Development (3-0)**

Investigation of recent research on the acquisition and development of first and second languages by the child.

**3541 Psycholinguistics and Reading (3-0)**

An inquiry into the fundamental aspects of the reading process—linguistic, psychological, and physiological.

**3570 Study in Language (3-0)**

Topic to be discussed will be selected. May be repeated for credit when topic varies.

**3573 Linguistic Variation (3-0)**

A study of linguistic varieties and variation; particular attention to methods and hypotheses of different approaches.

**3574 Language Testing (3-0)**

A study of the principles of effective language testing, with special attention to second-language testing.

**3578 Language Universals (3-0)**

A study of recent research in language typology and universals.

**3588 Bilingualism (3-0)**

Study of social and linguistic aspects of bilingualism.

**3589 Problems in Language Instruction (3-0)**

A course designed for language teachers involving study of psychological, linguistic and methodological aspects of language instruction and testing, especially with reference to English. May be repeated for credit when topic varies.

**3590 Research Methodology and Bibliography for Applied English Linguistics (3-0)**

A thorough examination of bibliographies, abstracts, catalogues, indexes, and other serial/non-serial research tools, along with research design and investigative theories in applied linguistics. *Prerequisite:* 15 semester hours of approved graduate-level coursework.

**3598 Thesis****3599 Thesis****SPANISH****General****3501 Critical Approaches to Hispanic Literature (3-0)**

Examination of historical and contemporary literary analysis, techniques and theories, and their application to Spanish-language prose, poetry, theater, and essays. Required of all M.A. candidates.

**3502 Independent Study (3-0)**

Subject to be determined in consultation with the Graduate Advisor.

**3503 Special Topics (3-0)**

An examination of a particular area of Hispanic languages or literature. May be repeated for credit as topic changes.

**3598 Thesis****3599 Thesis****SPANISH AMERICAN LITERATURE****3511 Indigenous and Colonial Literature of Spanish America (3-0)**

Readings in Spanish translations of important works of the Mayan, Nahuatl and Incan cultures. Selected works of Hispanic discoverers, conquistadors, and literati from 1442 through the eighteenth century.

**3514 Nineteenth Century Spanish-American Literature (3-0)**

Study of major Spanish-American works of the nineteenth century exclusive of Modernism; notably, Neoclassic and Romantic poetry, Romantic and Realist narrative, and Gauchesque poetry.

**3515 Premodernist and Modernist Poetry (3-0)**

Readings in the works of major Spanish poets of the nineteenth and early twentieth century, with special attention placed upon Ruben Dario and his school.

**3517 Postmodernist and Contemporary Poetry (3-0)**

Readings in the works of major Spanish-American poets from approximately 1910 to the present.

**3519 Spanish-American Short Story (3-0)**

Development of the short story form in Spanish America from its origin in the nineteenth century to the present.

**3521 Twentieth Century Spanish-American Novel (3-0)**

Readings from selected works of contemporary Spanish-American novelists.

**3523 The Hispanic Essay (3-0)**

The development and influence of the essay in the Hispanic world. Included in the readings are both Peninsular and Latin American writers.

**SPANISH LITERATURE****3553 Golden Age Drama (3-0)**

Readings in major works of Spain's classical theater, by authors such as Lope de Vega, Tirso de Molina, Calderon de la Barca.

**3555 Golden Age Prose (3-0)**

The evolution of the prose genre in Spain in the sixteenth and seventeenth centuries. Emphasis will be on the novel, with possible reference to didactic, philosophic, or historical works.

**3556 Golden Age Poetry (3-0)**

Representative readings from Spain's major poets of the sixteenth and seventeenth centuries. Garcilaso de la Vega, Fray Luis de Leon, Gongora, Quevedo and others.

**3557 Don Quixote (3-0)**

Careful reading and study of Cervantes' masterpiece, and examination of critical opinion regarding it.

**3561 Nineteenth Century Spanish Poetry and Drama (3-0)**

Representative works of poetry and the theater with special emphasis on the Romantic movement.

**3563 Nineteenth Century Spanish Novel (3-0)**

Regionalism, realism, and naturalism in the novel as typified by the works of such authors as Perez Galdos, Pereda, Valera, and Blasco Ibanez.

**3565 The Generation of 1898 (3-0)**

Selections from the writings of important members of this literary generation, including Unamuno, Azorin, Ortega y Gasset, Baroja, and Antonio Machado.

**3570 Twentieth Century Spanish Novel (3-0)**

Readings from the contemporary Spanish novel, with emphasis on works written after the Generation of '98.

**3572 Twentieth Century Spanish Poetry (3-0)**

Readings in the works of modern Spanish poets, from Juan Ramon Jimenez and Federico Garcia Lorca to the present.

**HISPANIC LINGUISTICS****3585 History of the Spanish Language (3-0)**

The development of the language from vulgar Latin to modern Spanish, with selected readings from different periods.

**3586 Spanish Dialect Studies (3-0)**

Study of regional and social dialects in Spain and Spanish America. May be repeated once for credit when the topic varies.

**3588 Studies in Bilingualism (3-0)**

Study of social and linguistic aspects of bilingualism. May be repeated once for credit when topics vary.

**3589 Problems in Language Instruction (3-0)**

A course designed for language teachers involving study of psycholog-

ical, linguistic and methodological aspects of language instruction and testing. Same as LING 3589. May be repeated once for credit when topics vary.

### 3590 Research Methodology and Bibliography for Applied Linguistics (3-0)

A thorough examination of bibliographies, abstracts, catalogues, indexes, and other serial/non-serial research tools, along with research design and investigative theories in applied linguistics. *Prerequisite:* 15 semester hours of approved graduate-level coursework. Same as LING 3590.

## Music

301M Fox Fine Arts  
(915) 747-5606

CHAIRPERSON: Marcia Fountain

PROFESSOR EMERITUS: Richard Henderson

GRADUATE FACULTY: Cardon, Chavez, Fountain, Hufstader, Loftin, Paul, Reed, Ross, Stannard, Trimble

### Master of Music

The Master of Music degree is offered in two programs: Performance, which specializes in the study of a performing medium; and Music Education, which is designed for advanced training in the teaching profession. All instrumental and vocal media and conducting are available for study.

#### Specific Requirements for the Master of Music in Performance

1. A Bachelor's degree in Music or its equivalent.
2. Acceptance into the performance program via audition with a 3-person panel of area faculty. Vocal majors must demonstrate knowledge of Italian, French, German, Latin and English Diction.
3. Completion of the following required courses with a B or above:
 

3 hours	3571	Bibliography and Research
3 hours	3596	Pedagogy of Vocal Music, OR
	3597	Pedagogy of Instrumental Music
2 hours	2517	Theory of Twentieth Century Music
2 hours	2511	Music History
9 hours	3591	Applied Music
3 hours	3598	Thesis
3 hours	3599	Thesis
6 hours		Electives (Upper level undergraduate courses may be accepted)

31 hours TOTAL

Two semesters of participation in ensemble and a final oral examination are required. One thesis course is a recital.

#### Specific Requirements for the Master of Music in Music Education

1. A Bachelor's degree in Music or its equivalent, and certification to teach music in the Public Schools.
  2. Acceptance into the music education program via the approval of a 3-person panel of area faculty after appropriate interviews and/or auditions.
  3. Completion of the following required courses with a B or above:
 

3 hours	3571	Bibliography and Research
3 hours	3596	Pedagogy of Vocal Music, OR
	3597	Pedagogy of Instrumental Music
2 hours	2517	Theory of Twentieth Century Music
2 hours	2511	Music History
3 hours	3531	Music Education
3 hours	3535	Music Education
4 hours	2581	or 2561 Applied Music
3 hours	3598	Thesis
3 hours	3599	Thesis
6 hours		Electives
- 32 hours TOTAL

Two semesters of participation in ensemble are required. Final oral examination required.

For Undergraduate and Graduate Students

The following undergraduate courses may be included in the Graduate Programs with permission of the Graduate Advisor:

- 2311, 2312 Counterpoint (2-0)  
 3313, 3314 Seminar: Composition (3-0)  
 2315, 2316 Form and Analysis (2-0)  
 2411 Choral Arranging (2-0)  
 2412 Instrumentation and Orchestration (2-0)  
 3413, 3414 Advanced Composition (3-0)  
 3415 Pedagogy of Music Theory (3-0)  
 2319 Music in the Middle Ages and Renaissance (2-0)  
 2320 Music in the Baroque and Early Classic Era (2-0)  
 2321 Music in the Classic Era and Romantic Era (2-0)  
 2322 Music in the Late Romantic Era and Twentieth Century (2-0)  
 2323 History of Fretted Instruments (2-0)  
 3325 Music on the Border (3-0)  
 2343, 2344 History of Ballet (2-0)  
 3333 Advanced Conducting Techniques (3-0)  
 3434 Marching Band Techniques and Arranging (3-0)  
 3444 Choreography  
 3531 Problems in Music Education  
 3535 Field Work in Music  
 2353, 2354 Music Theatre Workshop (2-0)  
 2375 Music Recording and Audio Techniques (2-0)  
 2493 Pedagogy of Voice (2-0)  
 2494 Piano Pedagogy and Literature (2-1)

For Graduate Students Only

## Applied Music (MUSA)

### 2581 Applied Lessons

It can be used as: 1) a secondary applied area for a performance major; 2) the principal applied area for a music education major; or BOTH 1 and 2. 3) an elective by graduate students in fields other than music. Admission requires proficiency of upper-level undergraduate major as certified either by audition or the previous undergraduate upper-level number admission.

### 3581 Applied Lessons

It can be used as: 1) a secondary applied area for a performance major; 2) the principal applied area for a music education major; or BOTH 1 and 2. 3) an elective by graduate students in fields other than music. Admission requires proficiency of upper-level undergraduate major as certified either by audition or the previous undergraduate upper-level number admission.

### 2591 Applied Lessons

For performance majors. Requires acceptance into degree program by a three-person committee of area faculty.

### 3591 Applied Lessons

For performance majors. Requires acceptance into degree program by a three-person committee of area faculty.

## Education (MUSE)

### 3531 Problems in Music Education

Educational research in the elementary and secondary school fields. Students may conduct research on a problem of their own selection in a field of major interest. May be taken for credit in supervision, if desired. *Prerequisites:* Twelve semester hours of advanced courses in Music and a bachelor's degree. May be repeated for credit.

### 3596 Pedagogy of Vocal Music

A study of pedagogical materials and methods for use in teaching vocal music at various instructional levels.

### 3597 Pedagogy of Instrumental Music

A study of pedagogical materials and methods for use in teaching instrumental music at various instructional levels.

## General (MUSG)

### 3535 Field Work in Music

The student works individually on a selected topic with an assigned specialist in that area under supervision of department head. *Prerequisites:* Twelve semester hours of advanced courses in Music and a bachelor's degree. May be repeated for credit.

### 3536 Independent Study

Independent academic study for performance majors in the Master of Music Degree.

### 3598 Thesis

### 3599 Thesis

## Theory (MUST)

### 2517 Theory of Twentieth Century Music

A study of significant examples of twentieth century literature. Survey of important compositional and analytical systems including those of Schoenberg, Hindemith and Schenker.

### 3513 Survey of Music Theory

Theory of the common practice period in western music. Includes figured bass realization, soprano harmonization, ear-training, harmonic analysis, and form. Will not count for Master of Music degree.

## Literature and History (MUSL)

### 2511 Selected Topics in Music History

Historical examination of important musical documents selected from the Medieval, Renaissance, Baroque, Classic, Romantic and Contemporary periods.

### 3514 Music History Survey

Music history survey from Middle Ages to twentieth century. Emphasis on stylistic identification of scores and performances. Will not count for Master of Music degree.

### 3571 Bibliography and Research

A study of research methods and materials designed to equip the student for scholarly research. Includes research project.

# Philosophy

203 Worrell Hall  
(915) 747-5213

CHAIRPERSON: Mimi R. Gladstein  
GRADUATE FACULTY: Haddox, Hall, Springer

The Philosophy Department does not offer a graduate-level degree, but it regularly offers graduate courses that may be used towards graduate degrees in other disciplines.

For Graduate Students Only

### 3503 Seminar in the Philosophy and History of Science (3-0)

A detailed study of the development of science or of one of the sciences and of scientific methods or of important historical figures such as Galileo, Newton, Darwin, Marx or Freud. The interrelationships among philosophical, theological and scientific theories are emphasized. May be repeated when content varies.

### 3551 World Historical Philosophers (3-0)

A detailed study of the life, writings and influence of one or a few selected philosophers. Usually Plato, Aristotle, Kant, and Hegel are treated in a sequence of offerings of this course. May be repeated when the course content varies.

### 3552 Basic Philosophical Issues (3-0)

Contemporary philosophical theories of perception and cognition, phil-

osophical anthropology, the technological society and new religious sensibilities have been topics.

### 3553 Independent Study (3-0)

Student research under supervision of the faculty. Permission of instructor required.

# Political Science

206 Benedict Hall  
(915) 747-5227, 5528

CHAIRPERSON: Roberto Villarreal  
PROFESSOR EMERITUS: Joseph Malchus Ray  
GRADUATE FACULTY: Agor, Bath, Graves, Kruszewski, Neighbor, Peterson, Price, Segal, Staudt, Valencia, Villarreal, Webking  
PROGRAMS

Political Science graduate students may pursue one of three graduate programs, choosing among two Master of Arts degrees and a Master in Public Administration degree.

## MASTER OF ARTS IN POLITICAL SCIENCE

PLAN I—Master of Arts, Thesis: The Master of Arts with thesis requires thirty (30) credit hours, twenty-four (24) hours of coursework and six (6) hours for the thesis. There must be a minimum of twenty-one (21) hours, including POSC 3598 and 3599, of graduate level courses (those numbered 3500 and above), and these courses must be from at least three (3) subfields of Political Science. Only nine (9) hours of 3300 and 3400 courses are permitted in a program and no more than six (6) of these hours may be included in either the major or the minor. The thesis program is recommended for students who wish to study for a Ph.D. in Political Science.

PLAN II—Master of Arts, Non-Thesis: The Master of Arts without thesis requires thirty-six (36) hours of coursework in at least three (3) subfields of Political Science and the submission of two (2) suitably bound graduate research papers of more substantial quality than ordinary seminar papers from two (2) subfields of Political Science. Only nine (9) hours of 3300 and 3400 courses are permitted in a program and no more than six (6) of these hours may be included in either the major or the minor. The two papers will be submitted to an examining committee which will include the professors under whose guidance they are prepared. The non-thesis program is recommended for students not intending to continue work toward the Ph.D.

### Under either Plan I or Plan II.

Upon the occasion of petitioning for candidacy, each graduate student will declare either the thesis or non-thesis Master of Arts. Subsequently, graduate students may change from the non-thesis program to the thesis program, but not from thesis to non-thesis.

An optional six (6) hour minor is permitted in either program. The courses are to be selected in consultation with the Graduate Advisor.

## MASTER IN PUBLIC ADMINISTRATION

The Master in Public Administration (MPA) degree provides professional education for students interested in public service careers. The program is designed to stress the knowledge, skills, values and behavior essential to the successful public servant. Some flexibility in curriculum is permitted to meet the diverse educational needs of pre-entry and in-career students, changing career students, and students in different career specialties in public administration. The curriculum components are designed to produce professionals capable of intelligent and creative analysis, communication, and action in the public sector context.



**BASIC REQUIREMENTS FOR ADMISSION TO THE MPA PROGRAM**

1. Satisfactory GRE or GMAT score;
2. Satisfactory GPA (3.0) in all upper division work;
3. All students must have the course equivalent of 3 hours of Public Administration and 3 hours of American Government as a prerequisite to the graduate seminars in the MPA Program;
4. In-career students may be requested to submit vitae of their professional work and letters of recommendation to complete the evaluation for admission and eligibility to enroll in certain courses.

**SPECIFIC REQUIREMENTS FOR THE MPA DEGREE**

Completion of at least 42 semester hours of coursework consisting of the following:

1. At least 24 hours of courses in the theoretical, methodological, and technical components of public management science:  
Accounting 3501—Financial Accounting  
Political Science 3500—Administrative Theory  
Political Science 3501—Advanced Research Methods  
Political Science 3502—Advanced Research Methods in Public Administration  
Political Science 3503—Financial Management and Administration  
Political Science 3504—Public Policy Analysis  
Political Science 3506—Public Personnel Administration  
Political Science 3507—Administrative Law and Regulation  
Selected MBA core courses may be substituted for some of these courses, depending on course offerings by each program. Advance approval of MPA director is required for substitution.
2. Completion of an additional 15 hours of approved electives. No more than 6 hours of electives can be at the 3300 and 3400 level in courses approved for graduate level credit.
3. Satisfactory performance in a comprehensive written final examination of 6 hours length, in the core subject areas of public administration. Students are required to enroll in and successfully complete POSC 3594 before being permitted to take the exam. (POSC 3594 is not included in either the 24 hours of requirements or the 15 hours of electives.) A student may repeat the comprehensive exam only once if failed and must also re-enroll in POSC 3594 before doing so.
4. Upon admission, the M.P.A. Director may direct students who do not already possess significant administrative experience to enroll in POSC 3593 (Internship in Public Administration) as part of their 15 hour elective requirement.

Those students who want to take courses in Criminal Justice to satisfy the 15 hour elective requirement for the MPA degree will select four (4) courses from the following:

Criminal Justice 3500—Seminar in Criminal Justice Administration;  
Criminal Justice 3508—Seminar in Juvenile Justice;  
Criminal Justice 3510—Seminar in Law Enforcement;  
Criminal Justice 3520—Seminar in Corrections;  
Criminal Justice 3540—Seminar in Selected Topics.

**TWO DEGREE OPTION—MPA/MBA**

Students may also enroll in a two-degree option MPA-MBA program. The objective of this program is to permit students with broad interest in both the public and private sectors to double register in both the MPA and MBA programs. With the increasing interdependence of the public and private sectors, this option is attractive to those students wishing to pursue careers in positions responsible for working with their counterparts in private or public organizations. In order to be admitted into the two-degree option, the applicant must specify the option at the time of application to the Graduate School. Students who wish to enter either the MPA or MPA-MBA programs should consult with the Director of the MPA program with regard to admission, required courses, ap-

proved electives, petition for candidacy, and comprehensive examinations.

**SPECIFIC REQUIREMENTS FOR THE MPA-MBA TWO-DEGREE OPTION**

1. Students must meet all requirements for admission to both programs.
2. The same leveling work required of an MBA student without a B.B.A. will be required, subject to the waiver procedures currently operative in the MBA program.
3. The program consists of 24 hours of core MPA courses, 24 hours of core MBA courses, POSC 3594 and a comprehensive written exam in the core subject areas of public administration, plus any additional required courses. The number of hours necessary to complete the two-degree option will vary depending upon each student's background and previous academic work, but will in any case involve a minimum of 57 hours and a maximum of 78 hours.
4. The core curriculum in each of the separate degree programs must be satisfactorily completed.
5. Electives must be approved by the academic advisor of both programs; upon such approval, the core courses of one program may be used to meet the elective requirements of the other.
6. Successful completion of the M.B.A. Professional Report is required.
7. Admission and continuance decisions are handled separately by the MPA and MBA graduate committees and by the Graduate School.

**REGISTRATION**

No student may be registered as a graduate student of the Department of Political Science without the advice of, and signed approval of his program by the Graduate Advisor for M.A. students or the Director of the MPA program for MPA students. This applies not only to the initial registration, but to all subsequent enrollments.

**SATISFACTORY PERFORMANCE**

Satisfactory performance in all graduate programs of the Department of Political Science is defined as maintaining a 3.0 grade average. A student in any of these programs receiving a grade of C or lower in two courses taken for graduate credit will be dismissed from the graduate program.

**For Graduate Students Only**

ALL SEMINARS may be repeated for credit when the topic varies.

**3500 Seminar in Administrative Theory (3-0)**

Basic introduction to the major theories and approaches which form the basis for the practice of public administration. (MGMT 3507 or 3511 may be substituted, with permission of M.P.A. director.)

**3501 Seminar in Advanced Research Methods in Political Science (3-0)**

Basic introduction to quantitative and methodological techniques in the field for students in both the MA and MPA programs. Required of all graduate Political Science majors. The seminar usually will be taken during the first semester of graduate study. (ECON 3501 or QMB 3511 may be substituted, with permission of M.P.A. director.)

**1501 Political Science Laboratory (1-0)**

Computer applications of political science data procurement and analysis techniques taught in 3501.

**3502 Seminar in Advanced Research Methods in Public Administration (3-0)**

Practical in-the-field application of quantitative and methodological techniques by government agencies, with special emphasis on microcomputers. The seminar usually will be taken during the second semester of graduate study.

**3503 Seminar in Financial Management and Administration (3-0)**

Analysis of the concepts and theories of public fiscal administration. Emphasis is placed on budgeting, accounting, purchasing and debt administration. (FIN 3505 may be substituted, with permission of M.P.A. director.)

**3504 Seminar in Public Policy Analysis (3-0)**

The study of the politics of the policy-making process. Emphasis is on the actors involved in public policy-making, their interactions, and the outputs of the policy process.

**3505 Seminar in Program Implementation and Evaluation (3-0)**

The study of the politics and economics of public policy implementation and evaluation. Emphasis is on the actual effects of government policies and programs.

**3506 Seminar in Public Personnel Administration (3-0)**

Includes subjects such as collective bargaining, civil service system, organizational development, and other modern personnel processes, using both case studies and simulation exercises. (MGMT 3522 may be substituted, with permission of M.P.A. director.)

**3507 Seminar in Administrative Law and Regulation (3-0)**

The legal problems of the administrative process, including the uses of administrative discretion, fact-finding and hearing procedures, and the methods and scope of judicial review of administrative decisions.

**3508 Seminar in Comparative Public Administration (3-0)**

A comparative view of government administration in developed and developing countries. Examines both the effects of culture on government bureaucracy and the efforts of governments to promote socioeconomic development. May include emphasis on U.S.-Mexico border administration.

**3509 Seminar in Nonprofit Sector Administration (3-0)**

Examines the special administrative challenges in the nonprofit sector, with attention to practical management and problem-solving. Includes topics such as the nature and scope of the nonprofit sector, fundraising, volunteer management, government and public relations, and the organization of nonprofit institutions.

**3510 Seminar in American Government (3-0)**

Research, writing, and discussion.

**3511 Seminar on the American Constitution Bicentennial (3-0)**

Examines the nation's founding document and its evolution. Offered in conjunction with the bicentennial of the U.S. Constitution.

**3512 Seminar in Science, Technology, and Public Policy (3-0)**

A study of selected political issues which involve scientific or technological questions. Specific topics to be investigated will vary, but may include problems such as energy, the environment, modern communications and the right to privacy, and government support of scientific research.

**3515 Seminar in Southwestern Border Politics (3-0)**

Research, writing, and discussion of Southwest Border politics. The course will put emphasis on United States-Mexico relations, political leadership, and ethnicity.

**3521 Seminar in Comparative Politics (3-0)**

Study of comparative political systems, including comparative political cultures. Emphasis on the methodology of comparative politics. Course content may vary with professor.

**3522 Seminar in the Politics of Modernizing Nations (3-0)**

Research, writing, and discussion.

**3523 Seminar in Communist Politics (3-0)**

Research, writing, and discussion.

**3525 Seminar in Latin American Studies (3-0)**

Research, writing, and discussion.

**3526 Seminar in Political Parties and Politics (3-0)**

Research, writing, and discussion.

**3528 Seminar in Public Law (3-0)**

Research, writing, and discussion.

**3530 Seminar in International Politics (3-0)**

Research, writing and discussion.

**3533 Seminar in International Organizations and Law (3-0)**

Research, writing and discussion.

**3536 Seminar in Political Theory (3-0)**

Research, writing and discussion.

**3540 Seminar in Foreign Policy Decision Making (3-0)**

Research, writing and discussion.

**3550 Seminar in Public Administration (3-0)**

Research, writing and discussion.

**3553 Seminar in Regional and Urban Planning (3-0)**

Research, writing and discussion.

**3554 Seminar in Urban Politics (3-0)**

Research, writing and discussion.

**3555 Seminar in Urban Administration (3-0)**

Research, writing and discussion.

**3580 Selected Problems in Government (3-0)**

Research, writing and discussion.

**3591 Internship in Public Administration**

As part of this course, the student will successfully prepare and defend a prospectus for the M.P.A. internship report. The prospectus must be approved by the student's report committee, and failure to meet this requirement within two long semesters will preclude continuation of the student in the M.P.A. program.

**3592 Internship in Public Administration**

Successful completion of POSC 3591 is a prerequisite for enrollment in this course.

**3593 Internship in Public Administration (3-0)**

Practical internship experience with a public or nonprofit sector agency, selected in consultation with the MPA Director. The experience will consist of at least twenty hours of work per week with the selected agency. The experience will be under close supervision by the agency and the MPA Director.

**3594 Comprehensive Integration of Public Administration (3-0)**

This course is designed to prepare the student for the final comprehensive examination in public administration. Key management concepts, issues, and value concerns in the core subject areas of public administration will be reviewed and integrated. This course is to be taken in a student's final semester in the MPA program.

**3598 Thesis**

As part of this course, the student will successfully prepare and defend a prospectus for the M.A. thesis. The prospectus must be approved by the student's thesis committee, and failure to meet this requirement within two long semesters will preclude continuation of the student in the M.A. program.

**3599 Thesis**

Successful completion of POSC 3598 is a prerequisite for enrollment in this course.

## Psychology

212 Psychology  
(915) 747-5551

CHAIRPERSON: Randolph H. Whitworth  
GRADUATE FACULTY: Barrientos, Coleman, Devine, Edwards, Goggin, Himelstein, Hosch, Lucker, Miller, Moss, Whitworth

DEPARTMENTAL REQUIREMENTS FOR M.A.—Before being admitted to the graduate program, a psychology major must include a course in psychological statistics and in experimental psychology in the undergraduate preparation.

The department offers two programs leading to the M.A. degree: General Experimental Psychology and Clinical Psychology.

For the General Experimental Psychology program, there must be a minimum of twenty-four hours of coursework and the thesis. It is the responsibility of the student to be sure to complete the

required core for the M.A. degree in General Experimental Psychology. Information on required courses, which may change from year to year, may be obtained from the Graduate Advisor.

The M.A. in Clinical Psychology requires the completion of forty-five hours, including twenty-one hours of required courses, six hours of internship, and six hours of thesis in the total hours.

For both programs, a student may include only those courses approved by the Departmental Committee on Graduate Studies and no more than six hours of advanced undergraduate courses. Students receiving a grade of C or lower in three courses or a grade of D or F in two courses taken for graduate credit will be dismissed from the program. All students are required to take both a written and an oral examination. The written examination is a comprehensive examination on a variety of topic areas in psychology. The comprehensive examination is given twice a year, in the Fall and Spring semesters. Students are required to take the comprehensive examination prior to completion of the thesis. The oral examination is the final defense of the thesis before the thesis committee members.

For Undergraduate and Graduate Students

- 3401 Psychological Testing (2-2)
- 3410 Clinical Psychology (3-0)
- 3412 Advanced Abnormal Psychology (3-0)
- 3416 Psychology of Language (3-0)
- 3417 Advanced Statistics (3-0)
- 3424 Psychobiology (3-0)
- 3440 Advanced Industrial/Organizational Psychology (3-0)
- 3441 Motivation and Emotion (3-0)
- 3452 Independent Research (3-0)

For Graduate Students Only

**1501 Research Applications (0-3)**

Supervised research in designated laboratories. Students may repeat course for credit. *Prerequisite:* Permission of instructor.

**3502 Applied Sensation and Perception (3-0)**

The basic principles of sensory and perceptual processes as they are involved in human performance in applied settings. Applications may include advertising, highway safety, symbolic representations in multicultural environments, audio-visual effectiveness, sensory evaluation in clinical settings, and computer graphic display systems.

**3503 Advanced Experimental Psychology II (3-0)**

A survey of experimental methods and findings in the study of human learning, memory, and information processing.

**3509 Seminar in Psychopathology (3-0)**

An examination of the research related to problems in etiology, diagnosis, and prognosis of the major disorders. *Prerequisite:* PSYC 3212, or PSYC 3412, or the equivalent.

**3511 Advanced Statistics: Experimental Design (3-0)**

Consideration of problems of analysis and design commonly encountered in psychological research. *Prerequisite:* PSYC 3417 or equivalent.

**3513 Seminar in Personality Theory (3-0)**

Intensive study in selected aspects of the various theories of personality.

**3515 Psychopharmacology (3-0)**

A study of current topics and recent developments in the biochemical basis of psychopathology and related strategies of psychopharmacological intervention; efficacy evaluation; evaluation of toxicity and side effects.

**3520 Seminar in Learning Theory (3-0)**

Intensive study and analysis of systematic conceptions of the learning process. *Prerequisite:* PSYC 3420 or equivalent.

**3521 Seminar in Personality Assessment (3-0)**

Introduction to methods and issues in the evaluation of personality and to the projective and objective instruments to assess personality. *Prerequisite:* PSYC 3401 or permission of instructor.

**3522 Theories and Methods of Psychotherapy (3-0)**

An analysis of theory, technique and research methods used in various current psychotherapies. *Prerequisite:* Permission of instructor.

**3523 Psychometrics (3-0)**

Principles of psychological evaluation, including intellectual, academic, neuropsychological, personality, attitude, and interest measures; reliability and validity; principles, methods, statistical procedures employed in developing new psychometric instruments, especially with respect to different cultural/ethnic minorities.

**3524 Seminar in Development Psychology (3-0)**

An examination of issues pertaining to human development across the life span.

**3526 Seminar in Industrial/Organizational Psychology (3-0)**

An in-depth examination of psychological theory and research methods in applied organizational settings.

**3527 Human Psychophysiology (3-0)**

Recent research on basic psychological processes (e.g., learning, emotion, sleep, language) and physiological correlates (e.g., autonomic, electroencephalographic, and event-related responses).

**3531 Cross-Cultural Research Methods (3-0)**

In-depth analysis of the problems inherent in cross-cultural research. Particular emphasis is given to group vs. individual approaches, issues in translation, norming of instruments and culturally sensitive interviewing techniques.

**3535 Applied Correlation and Regression Methods (3-0)**

Reviews correlation techniques, simple and multiple regression and discusses their applications for psychological research in applied settings. *Prerequisite:* PSYC 3103.

**3543 Psychology and the Criminal Justice System (3-0)**

A study of legal (forensic) psychology. Topics include a survey of the U.S. legal system (and comparison to Mexican legal system); the psychology of jury analysis; the psychological factors in evidence; and cross-cultural comparisons of U.S. minorities in the legal system.

**3547 Advanced Behavior Technology (3-0)**

Examines behavioral programming for a wide variety of problems and settings involving behavior changes for both normal and deviant individuals. *Prerequisite:* PSYC 3347 or 3420 or the equivalent.

**3550 Seminar in General Psychology (3-0)**

Advanced study of contemporary problems and issues in selected topics in psychology. May be repeated with different instructors.

**3560, 6560 Clinical Internship (0-3, 0-6)**

Supervised experience with clinical techniques in an approved agency other than the department's clinic. Each 150 clock hours is equivalent to 3 credit hours. May be repeated until 9 hours are accumulated; however, no more than 9 credit hours of PSYC 3560 or a combination of 3560 and 3570 will count towards the M.A. degree in Clinical Psychology. Grades in this course will not be utilized in computing grade point average. *Prerequisites:* Permission of instructor and PSYC 3521 or 3523. Psychology majors only.

**3570 Psychology Clinic (0-6)**

Supervised experience in the department's clinic. Each 150 clock hours is equivalent to 3 credit hours. May be repeated until 9 hours are accumulated; however, no more than 9 credit hours of PSYC 3570 or a combination of 3560 and 3570 will count towards the M.A. degree in Clinical Psychology. Grades in this course will not be utilized in computing grade point average. *Prerequisites:* Permission of instructor and PSYC 3521 or 3523. Psychology majors only.

**3598 Thesis**

**3599 Thesis**

# Religious Studies

302 Graham Hall  
(915) 747-5236

Religious Studies does not offer a graduate-level degree, but it regularly offers upper-division undergraduate courses that may be used towards graduate degrees in other disciplines, notably the Master of Arts in Interdisciplinary Studies (upon approval of the M.A.I.S. advisor).

- 3303 *Archaeology of the Old Testament* (3-0)
- 3304 *Christian and Other Religious Traditions in America* (3-0)
- 3305 *Introduction to Christian Ethics* (3-0)
- 3306 *Survey of World Religions* (3-0)
- 3307 *Contemporary Religious Studies* (3-0)
- 3308 *Psychology of Religion* (3-0)
- 3450 *Special Topics in Advanced Biblical and Religious Studies* (3-0)

# Sociology and Anthropology

102 Old Main  
(915) 747-5740

INTERIM CHAIRPERSON: John C. Hedderson  
PROFESSOR EMERITUS: Paul Wershub Goodman  
GRADUATE FACULTY: Daudistel, Eyde, Gerald, Hedderson, Rivera, Stoddard, Young

## Graduate Program

**M.A. DEGREE PREREQUISITES:** Twelve semester hours of advanced courses in Sociology, a bachelor's degree, graduate standing, or consent of the advisor. The units presented should include theory and methods. The advisor may recommend that six semester hours of advanced courses in Anthropology be substituted for six of the *Sociology hours*.

**M.A. DEGREE REQUIREMENTS:** There are two options leading to the M.A. degree in Sociology:

The following are the requirements of the 30-hour thesis M.A. degree program: 1) at least 21 of the 30 hours will be in 3500 level courses (that is, only nine hours of 3300 and 3400 work will be allowed for graduate credit); 2) each candidate must take one course in research methods (3512, 3520, or 3580), Sociology 3525 (Seminar in Sociological Theory), plus eighteen semester hours from the list of courses below; 3) enroll for at least one semester each in Sociology 3598 and 3599 (Thesis) and successfully defend the thesis before a committee while enrolled in Sociology 3599; 4) the student will be encouraged, but not required, to take six hours' coursework in some discipline other than Sociology as a minor; if the student elects to take a minor in another department or discipline, coursework in Sociology will be reduced accordingly; 5) student will submit a suitably bound thesis which must be approved by the student's committee and placed on file in the Department and in the Office of the Graduate Dean.

The following are the requirements of the 36-hour non-thesis M.A. degree program: 1) at least 27 of the 36 hours will be in 3500 level courses (that is, only nine hours of 3300 and 3400 work will be allowed for graduate credit); 2) the student will be encouraged, but not required, to take six hours' coursework in some discipline other than Sociology as a minor; 3) the student will submit a suitably bound graduate research paper, beyond regular semester papers, which must be approved by the student's committee and placed on file in the Department and in the Office of the Graduate Dean.

Students will be allowed only one grade lower than a B in coursework taken for graduate credit, and must maintain a 3.0 grade average.

For Undergraduate and Graduate Students

- 3301 *Sociology of Educational Institutions* (3-0)
- 3303 *Sociology of Urban Life* (3-0)
- 3306 *Comparative Social Systems* (3-0)
- 3307 *Folk Religion and Magic* (3-0)
- 3311 *Methods of Research* (3-0)
- 3318 *Folk Societies of Eurasia and Africa* (3-0)
- 3319 *Indian Societies of the Americas* (3-0)
- 3322 *Collective Behavior and Social Movements* (3-0)
- 3327 *Majority/Minority Relations in the United States* (3-0)
- 3333 *Juvenile Delinquency* (3-0)
- 3336 *Multi-Cultural Society in the Southwest* (3-0)
- 3341 *Special Undergraduate Topics* (3-0)
- 3342 *Sociology of Deviance* (3-0)
- 3346 *Sociology of Religion* (3-0)
- 3348 *Criminology* (3-0)
- 3349 *The Family as a Social Institution* (3-0)
- 3352 *Sociology of Poverty* (3-0)
- 3357 *Sociolinguistics* (3-0)
- 3362 *Medical Sociology* (3-0)
- 3361 *Mexican Folk Society and Culture* (3-0)
- 3363 *Sociology of Aging* (3-0)
- 3370 *Sociology of Sex Roles* (3-0)
- 3380 *Society and Personality* (3-0)
- 3381 *Complex Organizations* (3-0)
- 3401 *General Sociological Theory* (3-0)
- 3425 *Social Class and Stratification* (3-0)
- 3440 *Independent Study* (3-0)
- 3447 *Population Analysis and Problems* (3-0)
- 3455 *Social Change and Social Action* (3-0)

For Graduate Students Only

## 3510 Seminar in Social Organization (3-0)

An examination of size and complexity, vertical and horizontal processes, organizational effectiveness, and command and communication systems within bureaucratic and non-bureaucratic structures.

## 3512 Seminar in Advanced Measurement and Inference (3-0)

Introduction to techniques of multivariate analysis commonly used in sociology including multiple regression, factor analysis and discriminant function analysis.

## 3513 Research Uses in Social Data (3-0)

Data analysis techniques, statistical analysis and management of large data sets; the use of computer and Statistical Package for the Social Sciences. *Prerequisite:* SOCI 3212 or equivalent.

## 3515 Seminar in Sociology of Deviance (3-0)

Critical analysis of sociological theories, current research and applied approaches relevant to deviance.

## 3518 Seminar in Social Differentiation (3-0)

Social stratification theory and research; contributions of Marx, Weber, Davis, Bendix, Lipset and others; methods of stratification measurement.

## 3520 Seminar in Methodology (3-0)

The field research process from initial project proposal to the final report including the integration of the planning, execution and analysis phases.

## 3525 Seminar in Sociological Theory (3-0)

The role and utility of theory within the discipline, the processes of theorizing, reconceptualizing and theory testing, theorists and theoretical trends.

## 3540 Seminar in Demography (3-0)

Causes and consequences of trends in fertility, mortality and migration.

## 3541 Special Graduate Topics (3-0)

A course organized to investigate special topics and current issues of significance to sociologists. May be repeated for credit when content varies.

**3544 Seminar in Social Anthropology/Ethnology (3-0)**

Important theoretical perspectives in ethnology; including biological evolutionary, ecological, structural-functional, and cognitive viewpoints.

**3548 Seminar in Criminology (3-0)**

Social context of criminal law and criminal justice; theories of crime and treatment programs.

**3561 Graduate Research and Intern Practicum (3-0)**

A course designed to give students supervised experience in conducting sociological research as interns in community agencies. (May be repeated for a maximum of six credit hours.)

**3562 Seminar in Health Services Delivery (3-0)**

Health and medical occupations and the organization of care, cure and prevention systems; social and cultural factors affecting sick roles and community health policies and practices.

**3565 Seminar in Sociology of Education (3-0)**

Application of sociological theory and research to American education; present educational problems and possible solutions.

**3575 Seminar in Southwestern Cultures (3-0)**

An anthropological, ethnohistorical and sociological examination of salient Southwestern cultures; Mexican-Americans, Indian societies, Blacks, Orientals, etc.

**3580 Seminar in Evaluation Research (3-0)**

Evaluation and policy related research; research techniques, including experimental, quasi-experimental; descriptive and cost-benefit analysis; the impact of political issues on the research process.

**3581 Seminar in Social Psychology (3-0)**

Comparison of major theories of social psychology, including symbolic interactionism, exchange theory, and cognitive development theory; their assumptions and explanatory power.

**3590 Individual Studies****3598 Thesis****3599 Thesis**

## Theatre Arts

371 Fox Fine Arts  
(915) 747-5146

CHAIRPERSON: Charles E. Fensch

PROFESSOR EMERITUS: Robert Milton Leech

GRADUATE FACULTY: Alkofer, Eastman, Etheridge, Pomo, Ronke, Wingate

**M.A. DEGREE PREREQUISITES:** Twelve advanced semester hours (3300, 3400) of undergraduate credit in Theatre Arts.

**M.A. DEGREE REQUIREMENTS:**

- A. Each candidate for the M.A. degree will be required to make a satisfactory score on a comprehensive examination; at the discretion of the department chairman, a portion of the examination may be a performance or a laboratory demonstration.
- B. Majors in Theatre Arts must take a minimum of eighteen semester hours in Theatre Arts included in a total of thirty semester hours, of which at least twenty-one hours must

be in courses numbered 3500-3599. Students in Theatre Arts must do either a research or a production thesis, for which they will receive six hours of credit (THEA 3598-99: Thesis) toward these minimum requirements.

For Undergraduate and Graduate Students

Courses which may be taken for graduate credit with approval of the graduate advisor. These are to be used to strengthen areas in which the student may be deficient and to enrich the graduate offerings.

- 3301 Reader's Theatre
- 4313 Acting II
- 3325 Directing I
- 3332 Scene Design
- 3335 Chicano Theatre & Drama
- 3336 Theatre in Spanish
- 3340 A History of Costume
- 3342 Lighting Design
- 3350 Creative Drama
- 3351 History of the Theatre I
- 3352 History of the Theatre II
- 3353 History of the Theatre III
- 3354 The American Theatre
- 3355 The Musical Theatre
- 3355 Women in Drama
- 3415 Practicum in Theatre
- 3418 Playwriting
- 3426 Directing II
- 3440 Selected Topics in Drama and Theatre
- 3442 Advanced Lighting Design

## THEATRE ARTS

For Graduate Students Only

**3500 Graduate Projects in Drama**

Individual research in aesthetics, criticism, history, creative dramatics, and playwriting under the direct supervision of a faculty member in the student's area of specialization. May be taken more than once with a change in emphasis.

**3518 Methods of Graduate Theatre and Drama Research**

Survey of the essential tools of graduate research and creation in theatre and drama—including bibliography, aesthetics, and creative and scholarly procedure—culminating in the preparation of a scholarly paper. Required of all majors.

**3520 Graduate Projects in Theatre Production**

Individual research in theatre technology and performance under the direct supervision of a faculty member in the student's area of specialization. May be taken more than once with a change in emphasis.

**3522 Seminar in Theatre Technology**

Studies of production design and methods of staging in the unfolding pattern of western theatre. Required of all majors.

**3523 Seminar in Theatre History**

The study of man's theatrical impulse as it manifests itself in the theatres and other social institutions of western civilization. Required of all majors.

**3527 Seminar in Performance: Acting and Directing**

Study of the strategies of theatrical presentation: the modes, styles, and techniques of acting and directing in their cultural context. Required of all majors.

**3598 Thesis****3599 Thesis**

## The College of Nursing and Allied Health—Introduction

The College of Nursing and Allied Health has master's programs in Nursing and Speech Pathology and Audiology. Students enrolling in the Master's of Science degree program in nursing can elect a clinical concentration in adult, maternal-child or psychiatric-mental health nursing and minor in either nursing education or nursing administration. These master's degree programs are fully accredited by the National League for Nursing.

The Master of Science degree in Speech Pathology and Audiology is designed for students who wish to enhance their knowledge in communication disorders.

## Nursing

101 N. Campbell  
(915) 544-1880

DEAN: Lynne B. Welch

PROFESSOR EMERITA: Eileen M. Jacobi

ASSOCIATE PROFESSOR EMERITA: Elizabeth A. Bregg

GRADUATE FACULTY: Alexander, Alvarez, Brands, Castillo, Corona, Dunkley, Lantican, Mahr, Pontious, Reynolds, Rivera, Wetborn-Brown, Welch

The Graduate Program in Nursing is designed to permit students to earn the degree of Master of Science in Nursing. The mission of the College is to prepare professional practitioners to respond to the health needs of individuals, families and groups in society. The curriculum of the graduate program is intended to prepare professional nurses for advanced leadership through enhanced clinical practice, research and role expansion. The student selects an area of clinical concentration as a major and a functional nursing minor in teaching or clinical supervision and administration. The enhancement of clinical practice occurs through the expansion and refinement of knowledge and the testing of theory. Role expansion occurs through advanced practice, teaching, and management functions as they relate to health care delivery and increasing professional responsibilities to society. In addition, through the functional roles, the nurse enhances the performance of others by contributing to the improvement of human functioning.

The degree of Master of Science in Nursing provides the graduate the opportunity to:

1. Synthesize theoretical formulations from nursing and other disciplines and make applications in the care of patients, clients, families, and groups.
2. Evaluate the use of theoretical formulations in direct nursing care and related activities and selected clinical area.
3. Provide advanced nursing care in an area of clinical concentration.
4. Use research methods as a base to investigate nursing care problems.
5. Analyze theoretical and conceptual frameworks from nursing and other disciplines to implement the practice of clinical nursing, teaching, supervision and administration.

### PROCEDURES AND REQUIREMENTS FOR ADMISSION

Applicants for admission apply to the Office of the Dean of the Graduate School. (Forms may be obtained from the Office of the Graduate School or from the College of Nursing and Allied Health Student Office.) *In addition* to the Graduate School's general requirements for admission, the prospective nursing graduate student must provide the following documentation:

1. Evidence of satisfactory completion of an NLN accredited baccalaureate nursing program or proof of equivalent education, e.g., at a foreign institution.
2. Evidence of successful completion of an undergraduate statistics course or must take it concurrently in the first semester.

3. Evidence of a complete and satisfactory physical examination.
4. Current liability insurance in the amount of \$200,000-\$600,000.
5. Current licensure or a temporary permit to practice as a Registered Nurse in one of the states or territories. Students from other countries must be authorized to practice nursing in their own country.
6. Current basic Cardiac Life Support Certification.

Applications are considered on an individual basis and may be reviewed by the college's committee on graduate studies.

### DEGREE REQUIREMENTS FOR THE MASTER OF SCIENCE IN NURSING

A total of 36 credits is required for completion of the master's program. The first 12 credits are core course requirements, which focus on developing the relationships between nursing theory, nursing practice, and nursing research. Nine credits must be completed in an area of clinical concentration. Six credits are required in a functional area. The remaining nine credits are chosen in accordance with the thesis or non-thesis options.

Students select an area of clinical concentration from Medical-Surgical Nursing, Psychiatric-Mental Health Nursing or Maternal-Child Nursing. In the Medical-Surgical area, clinical sub-specialist options (e.g., cardiovascular nursing) are available. All clinical courses include a practicum. Course offerings are contingent upon adequate enrollment.

The student may choose from two functional areas: a) Teaching, or b) Supervision and Administration. Practicums are included in both of these areas.

Students may select the thesis or non-thesis option. If the thesis option is chosen, the research proposal completed as a part of the core research course may be used as the basis for the thesis proposal. Each student choosing the thesis option enrolls in the Advanced Research course. Students choosing the non-thesis option complete nine credits of graduate electives in nursing which have been approved by the academic advisor.

A comprehensive examination is required for completion of the degree.

### STUDENT EMPLOYMENT

Student employment is a personal decision; however, it is up to the student to arrange the work schedule so as not to interfere with classes and clinical practicum requirements. Classes are offered in a variety of time periods throughout the year to assist the students in alleviating conflicts.

### DEGREE PLAN FOR MASTER OF SCIENCE IN NURSING

#### REQUIRED CORE COURSES:

- 3501 Issues and Problems in Health Care
- \*3505 Community Health: Community Mental Health Nursing
- \*3510 Nursing Theories and Processes
- 3570 Fundamentals of Nursing Research

#### CLINICAL CONCENTRATION:

##### MEDICAL-SURGICAL:

- 3519 Advanced Human Physiology
- \*3520 Medical-Surgical Nursing I
- \*3521 Medical-Surgical Nursing II

##### PSYCHIATRIC-MENTAL HEALTH:

- \*3525 Psychiatric-Mental Health Nursing I
- \*3527 Psychiatric-Mental Health Nursing II
- \*3531 Psychiatric-Mental Health Nursing III

##### MATERNAL-CHILD HEALTH:

- \*3511 Family Health Care During Pregnancy
- \*3512 Maternal Intensive Care
- \*3513 Neonatal Intensive Care

##### NURSING CARE OF CHILDREN:

- \*3515 Child Health in the Family Setting
- \*3516 Nursing Care of Ill Children
- \*3517 Nursing in School Health

##### FUNCTIONAL AREAS:

For Students Planning to Teach:

- \*3545 Curriculum and Instruction in Nursing Education

**\*3547 Roles and Functions of the Teacher in Nursing**

For Students Planning for Administrative Positions:

\*3535 Nursing Administration

\*3541 Supervision and Administration of Nursing Services in Health Care Agencies

**THESIS OPTION**

3571 Advanced Research in Nursing

3598 Thesis

3599 Thesis

**NON-THESIS OPTION**

Electives 9 credits in the College of Nursing and Allied Health  
\*Course includes a practicum.

For Graduate Students Only

**3501 Issues and Problems in Health Care**

Assessment of issues and problems in meeting health needs of society and their relevance to nursing and health care.

**3503 Historical and Philosophical Study of Nursing**

The study of the historical basis of nursing with special emphasis on the development of a philosophical base applied to contemporary nursing practice.

**3505 Community Health: Community Mental Health Nursing**

Analyzes social issues influencing community health and mental health nursing. Focuses on continuity of health care with emphasis on physiological and psychosocial problems of patients/clients and families. Complex community systems, strategies of primary prevention, social intervention and health maintenance are emphasized. Includes practicum.

**3510 Nursing Theories and Processes**

Focuses on critical analysis of current nursing theories and related nursing process conceptualizations with application to selected clients/patients and families. Includes practicum.

**3511 Family Health Care During Pregnancy**

An analysis and evaluation of theories and concepts used by nurses to promote a high level of wellness for families during the mother's pregnancy. The relationship of the health status of the family after delivery to the health status of the family prior to and during the pregnancy will be analyzed. *Prerequisite:* Core courses. Includes practicum.

**3512 Maternal Intensive Care**

Focuses on the nursing management of the high risk woman during pregnancy, delivery, and postpartum. Nursing measures dealing with psychosociological and physiological factors will be analyzed and evaluated. *Prerequisite:* NURS 3511. Includes practicum.

**3513 Neonatal Intensive Care**

Focuses on the provision of intensive care of the high-risk newborn. Involves analysis and evaluation of nursing measures utilized to maintain or modify adaptive behaviors of neonates and their families. *Prerequisites:* Core courses and consent of instructor. Includes practicum.

**3515 Child Health in the Family Setting**

Nursing management of specific health problems of children in the family. Focuses on the analysis and evaluation of developmental theories in relation to family health. Collaborative roles and relationships with other health team members and program planning are studied. *Prerequisite:* Core courses. Includes practicum.

**3516 Nursing Care of Ill Children**

Nursing management of the acutely or chronically ill child. Factors affecting growth, development and rehabilitation are analyzed and evaluated. *Prerequisite:* NURS 3515. Includes practicum.

**3517 Nursing in School Health**

Evaluation of the nursing process within the school health program. Current issues and trends in school health, administrative patterns and policies, and the nurse's role in an educational setting are analyzed. *Prerequisite:* NURS 3515. Includes practicum.

**3519 Advanced Human Physiology**

Provides opportunities to acquire expanded knowledge related to the normal physiological systems. Relationships between inter and intra cellular metabolism are considered.

**3520 Medical-Surgical Nursing I**

Focuses on the application of nursing conceptual framework to selected clients/patients who manifest deviations from health. Physiological, psychological and sociological concepts basic to advanced nursing are included. *Prerequisites:* NURS 3519 and core courses. Includes practicum.

**3521 Medical-Surgical Nursing II**

Focuses on providing continuity of health care for selected clients/patients/families who manifest deviations from health. *Prerequisite:* Core courses. Includes practicum.

**3525 Psychiatric-Mental Health Nursing I**

Systematic study of the theoretical foundations of psychotherapeutic nursing practice. Work with members of other disciplines. Clinical practicum focuses on individual therapy with patients/clients. *Prerequisite:* Core courses. Includes practicum.

**3527 Psychiatric-Mental Health Nursing II**

Social systems approach to the study of mental health and mental illness. Emphasis is on the group approach to treatment. *Prerequisite:* NURS 3525. Includes practicum.

**3531 Psychiatric-Mental Health Nursing III**

Concentration is on the multi-problem family in crisis or impending crisis and therapeutic interventions required in these situations. Focuses on cultural aspects of family interactions, dynamics of family functioning, and the use of psychodynamic nursing interventions. *Prerequisite:* NURS 3527. Includes practicum.

**3533 Legal and Leadership Responsibilities in Nursing**

Comprehensive study of ethical and legal processes, the role of the nurse, and the role of the professional organization in resolving legal, ethical and moral issues.

**3535 Nursing Administration**

Theories and principles of administration and management as they are utilized in nursing service supervision and administration. Assessment of management tools and methods related to human resources and health institutions. *Prerequisite:* Core courses. Includes practicum.

**3541 Supervision and Administration of Nursing Services in Health Care Agencies**

Analyzes nursing within the health care system. Focuses on supervision, organization and administration of nursing services for patient/client care. *Prerequisite:* NURS 3535. Includes practicum.

**3545 Curriculum and Instruction in Nursing Education**

Principles, issues and problems of curriculum design in nursing education. Curriculum patterns, programs and strategies in curriculum development and instruction. *Prerequisite:* Core courses. Includes practicum.

**3547 Roles and Functions of the Teacher in Nursing**

Focus is on content delineation, planning, organizing, delivering and evaluating and teaching-learning process in nursing. *Prerequisite:* NURS 3545. Includes practicum.

**3550 Seminar on International Health**

Focuses on major international health programs as they relate to cultural, ecological, and economic factors. The roles of the local, state, national and international agencies in relationship to health are studied. *Prerequisite:* Core courses.

**3560 Automated Systems in Nursing (3-0)**

Identify current and potential uses and constraints of computerized hospital information systems and microcomputer software used in nursing practice. Develop, use and evaluate software in professional nursing practice and education.

**3570 Fundamentals of Nursing Research**

An introduction to the methods of scientific inquiry, research design and techniques of data collection, analysis and presentation of data. *Prerequisite:* Course in statistics.

**3571 Advanced Research in Nursing**

In-depth study of the conceptual, empirical and interpretive phases of scientific inquiry. Special emphasis on research design, methodological problems and data analysis and interpretation with consideration of the

ethical and legal factors affecting nursing research. *Prerequisite:* NURS 3570. Required of all students selecting thesis option.

**3594 Independent Study**

A course designed by the student to meet an individual learning need. *Prerequisites:* Consent of advisor, instructor and Dean.

**3598 Thesis****3599 Thesis**

# Speech, Hearing and Language Disorders

111 University Avenue  
(915) 747-5250

DEAN: Lynne B. Welch

DIRECTOR: Joseph A. Perozzi

GRADUATE FACULTY: Middleton, Perozzi

The Master of Science degree in Speech Pathology and Audiology is designed for students who wish to enhance their knowledge of communicative disorders and expand their employment opportunities. Students who successfully complete the course of study outlined below are eligible for certification by the American Speech-Language, Hearing Association in Speech-Language Pathology. Students who have a strong undergraduate background in Audiology may, with the approval of the graduate advisor, design a course of study which will lead to certification by the American Speech-Language, Hearing Association in Audiology. Recipients of the Master of Science Degree qualify for a Texas License which is awarded by the State Committee of Examiners for Speech-Language Pathology and Audiology.

**Requirements for Admission:**

In addition to Graduate School requirements, a minimum of 24 semester hours of undergraduate upper-division course work in disorders of communication is required for admission to the M.S. degree program.

**M.S. Degree Requirements:**

Majors in Speech Pathology and Audiology must complete:

1. A minimum of thirty-nine semester hours, thirty of which are in required courses (see below) and nine of which are electives selected with the approval of the graduate advisor;
2. A minimum of 150 clock hours of supervised clinical practicum; and
3. Comprehensive written and oral examinations are required for students who choose not to write a thesis. Students who write a thesis are required to defend the thesis in an oral examination.

When engaged in clinical practicum, students must be simultaneously enrolled in PATH 3569 or 3573. However, only one enrollment in each course may be counted toward the M.S. degree. Students who choose to write a thesis must enroll in PATH 3598 and 3599. Those six hours will count toward the minimum of thirty-nine hours as electives.

**Required Courses (30 hours)**

- PATH 3557 Articulation Disorders
- PATH 3558 Cleft Palate
- PATH 3559 Fluency Disorders
- PATH 3560 Aphasia
- PATH 3561 Seminar in Speech Pathology
- PATH 3562 Disorders of Language
- PATH 3563 Disorders of Voice
- PATH 3564 Motor Speech Disorders
- PATH 3565 Advanced Audiology
- PATH 3569 Advanced Clinical Practicum in Speech Pathology

For Undergraduate and Graduate Students

These courses may be taken for graduate credit with the

approval of the graduate advisor. They are to be used to strengthen areas in which the student may be deficient and to enrich the graduate offerings.

- 3409 Audiology
- 3410 Aural Rehabilitation
- 3418 Voice Science

For Graduate Students Only

**3557 Articulation Disorders (3-0)**

Study of the process of diagnosis and management of functionally and organically based articulation disorders in children and adults.

**3558 Cleft Palate (3-0)**

Diagnosis and management of articulation and resonance disorders related to cleft palate and other cranio-facial abnormalities.

**3559 Fluency Disorders (3-0)**

Etiology, diagnosis and treatment of childhood and adult stuttering and other disfluencies.

**3560 Aphasia (3-0)**

Etiology, diagnosis and treatment of communication disorders related to adult aphasia.

**3561 Seminar in Speech Pathology (3-0)**

Discussion of research methods. Investigation of various topics related to normal and/or deviant aspects of speech and language. May be taken more than one time with a change in area of emphasis.

**3562 Disorders of Language (3-0)**

Standardization, reliability, and validity of language tests. Advanced techniques in diagnosis and remediation of language disorders of children.

**3563 Disorders of Voice (3-0)**

Diagnosis and management of organic and hyperfunctional voice disorders.

**3564 Motor Speech Disorders (3-0)**

Study of the dysarthrias and apraxia of speech.

**3565 Advanced Audiology (3-0)**

Assessment of auditory function by utilizing conventional and special hearing tests and measurements.

**3566 Medical Audiology (3-0)**

Differential diagnosis as related to the site of lesion and medical implications.

**3567 Conservation of Hearing (3-0)**

Public school and industrial hearing conservation programs.

**3568 Seminar in Audiology (3-0)**

Group discussion of selected areas in clinical or industrial audiology or audio prosthology. May be taken more than once with a change in area of emphasis.

**3569 Advanced Clinical Practicum in Speech Pathology (3-0)**

Supervised clinical practicum in providing services for the speech and language impaired.

**3571 Hearing Aids (3-0)**

The study of hearing aids including but not limited to their acoustical design; hearing aid evaluation, selection, fitting, and follow-up of clients.

**3572 Problems and Projects in Speech Pathology (3-0)**

May be taken more than once with a change in area of emphasis.

**3573 Advanced Clinical Practicum in Audiology (3-0)**

Supervised clinical practicum in providing audiological services.

**3574 Problems and Projects in Audiology (3-0)**

Special projects under faculty supervision dealing with specific problems or projects. May be taken more than once with a change in area of emphasis.

**3598 Thesis****3599 Thesis**



## The College of Science—Introduction

The College of Science is the home of the University's first doctoral-level degree program, the Doctor of Geological Sciences, which was approved in 1974. Its first degree was conferred in 1979. In addition to that program, the College offers Master of Science degrees in Biology, Chemistry, Geology, Geophysics, Mathematics, and Physics. Also, the Department of Chemistry offers a five-year B.S.-M.S. Program, and the Department of Mathematical Sciences offers the Master of Arts in Teaching with a major in mathematics.

Students who wish to undertake interdisciplinary graduate work which cannot be accommodated within the confines of the normal programs of the University's academic departments may pursue the Master of Science in Interdisciplinary Studies degree. Curricula under this program are individually tailored to the needs of each student.

## Biology

226 Biology Building  
(915) 747-5164

CHAIRPERSON: Albert G. Canaris

GRADUATE FACULTY: Arenaz, Bristol, Canaris, Drow, Ellzey, Freeman, Goldstein, Harris, Hunter, Johnson, Jones, Lieb, Mansfield, Mayberry, Metcalf, Munyon, Rael, Redetzke, Reid, Robertstad, Ting, Veit, Webb, Weir, Worthington, Zuckerman

### DEPARTMENTAL REQUIREMENTS FOR THE M.S. DEGREE

In addition to general catalog prerequisites for entering students, 8 semester hours of General Chemistry are required in both options listed below.

**Thesis Option:** Thirty semester hours are required for this degree. Nine semester hours of undergraduate upper division courses (0300 or 0400) may be counted for graduate credit. A minimum of 21 of the 30 semester hours must be in graduate courses (0500), of which six hours of Thesis (Biology 3598-3599) will be counted towards the 30 semester hour requirement. Biology 3502 (Research in the Biological Sciences) may be taken for not more than a total of six hours of credit toward the 30 semester hour requirement. Each student is required to take Seminar (1530) once a year with two hours counting towards the degree. Six hours in a supporting area minor may be accepted by the department. A thesis describing original work is required and must be defended orally. The student should decide on an area of specialization and select a supervising professor within the first semester or 12 semester hours of admission. The supervising professor will act as chairperson of the thesis committee, which will be comprised of a minimum of three graduate faculty members, including one from outside the Department of Biological Sciences.

**Non-Thesis Option:** This program is limited to certified teachers. The total of credit hours required for the degree is 36. Fifteen hours of upper division undergraduate courses (0300-0400) are the maximum acceptable. No more than three hours of Research in the Biological Sciences (3502) may be counted towards the degree. Each student is required to take Seminar (1530) twice for two hours of credit toward the degree. A minor of not more than nine hours from outside of the Biological Sciences may be included if approved. One scholarly paper is required by the department. An oral examination is required prior to conferral of the degree.

### BIOLOGY

For Undergraduate and Graduate Students

- 3318 Developmental Biology (3-0)
- 1319 Experimental Embryology (0-3)
- 3320 Genetics (3-0)

- 3321 Evolutionary Theory (3-0)
- 3326 Animal Ecology (3-0)
- 3341 Plants in Southwest Cultures (3-0)
- 3422 Biological Ultrastructure Interpretation (3-0)
- 2423 Transmission Electron Microscopy (0-4)
- 3424 Animal Behavior (3-0)
- 3426 Bioarchaeology (2-3)
- 6425 Field Biology (3-0)
- 3490 Biological Practicum (0-6)
- 1498-3498 Special Problems (0-2, 0-4, 0-6)

### MICROBIOLOGY

For Undergraduate and Graduate Students

- 3343 Pathogenic Microbiology (3-0)
- 1344 Diagnostic Bacteriology (0-3)
- 2347 Determinative Microbiology (2-0)
- 2348 Determinative Techniques (0-6)
- 3328 Microorganisms in Ecosystems (3-0)
- 1328 Microbial Ecosystems Techniques (0-3)
- 3345 Microbial Physiology (3-0)
- 1346 Microbial Physiology Methods (0-3)
- 3349 Prokaryotic Molecular Genetics (3-0)
- 3350 Food Microbiology (3-0)
- 1350 Food Microbiology Techniques (0-3)
- 3451 General Virology (3-0)
- 1452 General Virology Techniques (0-3)
- 3453 Immunology (3-0)
- 1454 Immunology Techniques (0-3)
- 3455 Medical Mycology (3-0)
- 1456 Medical Mycology Techniques (0-3)
- 3459 Public Health (3-0)
- 3460 Industrial Microbiology (3-0)
- 3461 Soil and Geomicrobiology (3-0)

### BOTANY

For Undergraduate and Graduate Students

- 3324 Introductory Plant Ecology (3-0)
- 3330 Comparative Plant Morphology (3-0)
- 2337 Plant Taxonomy (2-0)
- 2338 Plant Identification Techniques (0-4)
- 3472 Phycology (3-0)
- 1473 Phycological Methods (0-3)

### ZOOLOGY

For Undergraduate and Graduate Students

- 2364 Medical Parasitology (2-0)
- 1365 Identification of Human Parasites (0-3)
- 4366 Invertebrate Zoology (3-3)
- 2370 Animal Distribution (2-0)
- 3454 Paleozoic and Mesozoic Vertebrate Paleontology (3-0)
- 1455 Vertebrate Paleontology Techniques (0-3)
- 3456 Cenozoic Vertebrate Paleontology (3-0)
- 1457 Advanced Vertebrate Paleontology Techniques (0-3)
- 3470 Protozoology (3-0)
- 1471 Protozoological Methods and Techniques (0-3)
- 3476 Lower Vertebrates (3-0)
- 1477 Lower Vertebrate Identification Techniques (0-3)
- 3478 Natural History of Birds and Mammals (3-0)
- 1479 Bird and Mammal Research Techniques (0-3)
- 3480 Vertebrate Physiology (3-0)
- 1481 Vertebrate Physiology Methods (0-3)

For Graduate Students Only

### 3501 Selected Advanced Topics in the Biological Sciences (3-0)

Topics vary; course in the form of formal classes. May be repeated for credit.

**3502-4502 Research in the Biological Sciences**

Emphasizes research, with writing and discussion. Not given as a formal class. May be repeated, but no more than six hours of credit will be counted towards degree. Laboratory Fee: \$8.

**3504 Developmental Cytology (3-0)**

Cellular and molecular aspects of plant and animal development.

**3505 Herpetology (2-3)**

A study of the morphology, taxonomy and life histories of reptiles and amphibians. Laboratory Fee: \$8.

**3506 Cytogenetics (3-0)**

Study of chromosome structure, function and behavior. Emphasis on segregational mechanisms in mitosis and meiosis, and genetic consequences of chromosomal aberrations. *Prerequisite:* BIOL 3320.

**3507 Biology of the Pleistocene (3-0)**

A study of the organisms of the Pleistocene.

**3509 Regulation of the Eukaryotic Genome (3-0)**

The molecular biology of eukaryotes including genetic engineering, structure and organization of the eukaryotic genome, regulating the expression of eukaryotic genes and role of oncogenes in eukaryotes. *Prerequisites:* Graduate Standing; BIOL 3320 or equivalent, or approval of instructor.

**3510 Animal Virology (3-0)**

The molecular biology and pathogenesis of animal viruses. Recent discoveries and new directions of research will be emphasized. *Prerequisites:* MICR 3451 and 1452 or approval of instructor.

**3511 Biotechnology (3-0)**

A comprehensive lecture course in modern methods utilized for growth, product formation and recovery by microbes, plant and animal tissues.

**3512 Recent Advances in Microbiology (3-0)**

Current topics in Microbiology.

**3513 Biogeography (3-0)**

Geographic distribution of plants and animals, and analysis of causative factors.

**3514 Physiological Ecology (2-3)**

Physiological adaptations of organisms to different environments; desert adaptations emphasized. Laboratory Fee: \$8.

**3516 Biosystematics (3-0)**

Methods and principles of taxonomy, classification, and systematics.

**3517 Plant Ecology (3-0)**

Plant communities and factors determining them.

**3518 Identification and Ecology of Desert Plants (2-3)**

The identification and adaptation of desert plants. Laboratory Fee: \$8.

**3520 Endocrinology (2-3)**

A study of the effects and actions of vertebrate hormones with an emphasis on neuroendocrine control. Laboratory Fee: \$8.

**3521 Ornithology (2-3)**

Anatomy, morphology, ecology, physiology, evolution, behavior and taxonomy of birds. Laboratory Fee: \$8.

**3523 Ultrastructure (3-0)**

Current research advances in cellular biology.

**3524 Mammalogy (2-3)**

Class Mammalia, with emphasis on morphological, physiological, ecological, and behavioral adaptations to past and present environments. Laboratory Fee: \$8.

**3525 Biology of Fungi (3-0)**

A modern approach to fungal regulation, development and ecology emphasizing current literature and research techniques.

**3526 Advances in Immunological Concepts (3-0)**

Study of immunological and immunochemical concepts. Emphasis will be placed on recent experimental advances in immunology. *Prerequisites:* MICR 3453 and 1454 or approval of instructor.

**3527 Ecological Theory and its Application (3-0)**

Recent advances in ecological theory and their application to questions in adaptation, community structure, and environmental science.

**3528 Determinative Methods in Biological Sciences (3-0)**

Study and application of specialized determinative methods in the biological sciences. The digital computer is utilized. *Prerequisites:* CS 3110 and MATH 3280 or equivalent training.

**3529 Physiology of the Bacterial Cell (3-0)**

The study of the biochemical and physiological processes occurring in the bacterial cell. Emphasis will be placed on recent experimental approaches that are in current use in microbial physiology research. *Prerequisite:* Approval of instructor.

**1530 Seminar (1-0)**

Topics vary and are presented by enrollees and other speakers.

**3531 Microbiological Problems in the Hospital Environment (3-0)**

An examination of the role of the microorganisms in hospital environment infections.

**3598 Thesis****3599 Thesis**

## Chemistry

209A Physical Science Building  
(915) 747-5701, 5720

CHAIRPERSON: Cyril Párkányi

PROFESSOR EMERITUS: Lewis F. Hatch

GRADUATE FACULTY: Becvar, Cabaness, Chang, Davis, Eastman, Ellzey, Herndon, Lloyd, Pannell, Párkányi, Whalen

ADJUNCT AND RESEARCH GRADUATE FACULTY: Del Valle, Freiha, Mayr, Vincenti, Watts, Williams

The Department of Chemistry offers studies leading to the degree of Master of Science in Chemistry with experimental and/or theoretical research in the following fields of specialization: analytical, biochemistry, environmental, inorganic, organic, organometallic, physical, and chemical physics. Through a cooperative program with the Department of Geological Sciences, an M.S. degree in geochemistry is offered. In collaboration with the Department of Geological Sciences, a program that can lead to the doctoral degree can be offered (for details concerning the doctoral program, see the listing for the Department of Geological Sciences).

**General Departmental Requirements**

The normal prerequisite to graduate studies in the Department of Chemistry is the bachelor's degree in Chemistry with a B average in chemistry courses taken at the junior and senior level. Any deficiencies must be removed before the petition is made for candidacy for the M.S. degree.

**Master of Science in Chemistry**

In addition to the institutional requirements for a Master of Science degree, which include a thesis, the candidate must also meet the following stipulations: A minimum of 21 of the required 30 hours of credits must be in courses at the 0500 level. Credits must include at least one graduate level course in three of the five areas of organic chemistry, physical chemistry, inorganic chemistry, analytical chemistry, or biochemistry. The candidate must also enroll in Chemistry 1595 during each semester of residence. Not more than one hour of Chemistry 1595 may be counted toward the 30 credit hour requirement. The normal program for the M.S. degree in Chemistry may include 6 hours of supporting work from approved fields. A program of specialization in chemical physics may be elected with the permission of the graduate advisor. Such a program may include within the required 30 hours of credits an excess of 6 hours but not more than 12 hours in the related fields (e.g., Physics, Mathematics).

Courses of study are designed for each student in consultation with the advisor. Each student must confer with the graduate advisor prior to each registration. The thesis presented for this degree must describe original work related to a research problem of some importance. The thesis must be defended orally.

Requirements for the degree in geochemistry are summarized in the listing for the Department of Geological Sciences.

#### Five-Year B.S.-M.S. Program

The curriculum for the B.S. degree in Chemistry can be completed in three and one-half years. After admission to the Graduate School of the University, it is possible to obtain the M.S. degree at the end of the fifth year of study in Chemistry. Qualified students should consult their academic advisor about the course of study, and about the various forms of financial assistance obtainable through this program.

#### Master of Science in Interdisciplinary Studies (M.S.I.S.)

The requirements for this degree are described under "Master of Science in Interdisciplinary Studies" in this catalog. The program is designed for individuals possessing a bachelor's degree and wishing to work in areas outside of their previous training. The program is interdisciplinary and involves 36 hours of approved coursework in at least three different departments. A maximum of 6 hours of research problem work are included in the 36 hours; however, no thesis is required in this program.

For Undergraduate and Graduate Students

3321-3322	Organic Chemistry
2321-2322	Laboratory for Chemistry 3321-3322
3310	Analytical Chemistry
1310	Laboratory for Chemistry 3310
3351-3352	Physical Chemistry
1351-1352	Laboratory for Chemistry 3351-3352
3326	Physical Chemistry (not for Chemistry majors)
3428	Advanced Topics in Organic Chemistry
3430	Topics in Biochemistry
3432	Biochemistry
2411	Instrumental Methods of Analytical Chemistry
2412	Laboratory for Chemistry 2411
3454	Advanced Topics in Physical Chemistry
3462	Structure of Matter
3465	Inorganic Chemistry
1465	A Laboratory Course in Inorganic Chemistry
3468	Inorganic Biochemistry (not for Chemistry majors)
1476-3476	Introduction to Research

For Graduate Students Only

#### 3501-3502 Modern General Chemistry (3-0; 3-0)

An intensive course intended for school teachers which presents a thorough grounding in the basic principles of chemistry. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 1501 Advanced Experimental Chemistry (0-3)

For school teachers. Laboratory techniques demonstrating the principles of chemistry. Topics chosen from analytical, inorganic, organic, physical and biological chemistry. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3503 Progress in Analytical Chemistry (3-0)

For school teachers. Contemporary introduction to separation science. Discussion of chemical equilibrium, quantitative measurements, and analysis. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3504 Progress in Organic Chemistry (3-0)

For school teachers. Contemporary presentation of the structure and reactivity of organic molecules. Discussion of functional groups, reaction mechanisms and, stereochemistry. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3505 Progress in Biological Chemistry (3-0)

For school teachers. Contemporary survey of metabolism, the properties of enzymes, membrane function, and molecular biochemistry. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3506 Progress in Physical Chemistry (3-0)

For school teachers. Principles of quantum chemistry and thermodynamics. Discussion of energy, physical equilibria, kinetics, and properties of substances. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3507 Progress in Inorganic Chemistry (3-0)

For school teachers. Contemporary presentation of the principles of molecular structure and reactivity of inorganic compounds. Discussion of chemical bonding, coordination chemistry, and mechanisms of inorganic reactions. May not be counted toward the M.S. Degree in Chemistry. *Prerequisite:* 18 semester hours of undergraduate Chemistry.

#### 3518 Advanced Analytical Chemistry (3-0)

Chemical equilibrium and its applications to separation and analysis.

#### 3519 Contemporary Topics in Analytical Chemistry\* (3-0)

Selected topics of current interest in modern analytical chemistry.

#### 3521 Advanced Organic Chemistry I (3-0)

A survey of the more important types of reactions in organic chemistry; reaction mechanisms, stereochemistry of intermediates and products; current structural theory. *Prerequisite:* CHEM 3322.

#### 3522 Advanced Organic Chemistry II (3-0)

A continuation of Chemistry 3521. *Prerequisite:* CHEM 3521.

#### 3529 Contemporary Topics in Organic Chemistry\* (3-0)

Selected topics of current interest in descriptive and theoretical organic chemistry.

#### 3531 Advanced Biological Chemistry (3-0)

A survey of metabolism, enzyme catalysis, membrane function, and molecular biochemistry.

#### 3539 Contemporary Topics in Biochemistry\* (3-0)

Selected topics of current interest in organic or physical aspects of biological chemistry.

#### 3551 Advanced Physical Chemistry I (3-0)

Schrodinger wave mechanics; atomic and molecular quantum states; applications to the treatment of wave functions for atoms and molecules.

#### 3552 Advanced Physical Chemistry II (3-0)

Classical and statistical thermodynamics; applications to physical and chemical systems.

#### 3559 Contemporary Topics in Physical Chemistry\* (3-0)

Selected topics of current interest in experimental and theoretical fields of physical chemistry.

#### 3561 Advanced Inorganic Chemistry (3-0)

Ionic, metallic and covalent bonding; valence bond, molecular orbital and ligand field theories; structure and properties of coordination compounds, metal carbonyls and complexes.

#### 3569 Contemporary Topics in Inorganic Chemistry\* (3-0)

Selected topics in Inorganic Chemistry.

#### 1595 Graduate Seminar (1-0)

#### 1596-3596 Graduate Research in Chemistry (3-0)

*Prerequisite:* Graduate standing and staff consent.

#### 3598 Thesis

#### 3599 Thesis

\*May be repeated for credit when topics vary.

# Geological Sciences

201C Geology  
(915) 747-5501

CHAIRPERSON: G. Randy Keller, Jr.  
PROFESSOR EMERITUS: John M. Hills  
GRADUATE FACULTY: Bronson, Clark, Cornell, Doser, Dyer, Fuentes, Goodell, Harris, Hinojosa, Hoffer, Hoffer, James, Keller, LeMone, Peeples, Pingitore, Porter, Powers, Roy, Schmidt

## GRADUATE PROGRAMS IN GEOLOGICAL SCIENCES

General requirements for the Master of Science degree can be found in the "General Information" section of this catalog.

### M.S. DEGREE—GEOLOGY

**Departmental Requirements**—Students must have accomplished the equivalent of the B.S. degree requirements in geology, including those required courses in supporting disciplines. A satisfactory score on the Geology Subject (advanced) test of the Graduate Record Examination (GRE) is also required for admission. For the M.S. degree program, students must present 30 hours including a thesis (6 hours). At least 21 hours must be in courses numbered 3500 or above. Work in supporting fields (a minor) is not specifically required. However, coursework in supporting fields will often be included in a student's program of study with the approval of the Graduate Advisor and the Graduate Dean. All candidates are required to enroll in Geology 1501 every semester they are in residence. All candidates are required to pass an oral examination concerning their thesis investigation.

### M.S. DEGREE—GEOPHYSICS

**Departmental Requirements**—Students must have accomplished the equivalent of the B.S. requirements in geophysics, including the required courses in supporting disciplines. A satisfactory score on the appropriate Subject (advanced) test of the Graduate Record Examination (GRE) may also be required for admission. For the M.S. degree program, students must present 30 hours including a thesis (6 hours). At least 21 hours must be in courses numbered 3500 or above. Work in supporting fields (a minor) is not specifically required. However, coursework in supporting fields will often be included in a student's program of study with the approval of the Graduate Advisor and the Graduate Dean. All candidates are required to enroll in Geology 1501 every semester they are in residence. All candidates are required to pass an oral examination concerning their thesis investigation.

For those prospective M.S. students in the geological sciences whose B.S. degree was not in the geological sciences, the basic geological training can be acquired by taking the 12-hour summer remedial courses (6501-6502) plus field camp (6465). Thereafter, these students can proceed to the 30 hours of coursework in the selected area, as shown above.

## DOCTOR OF GEOLOGICAL SCIENCES

**Requirements for Admission**—The Graduate Record Examination in Geology must be taken by all incoming graduate students. Students aspiring to the doctorate in Geological Sciences fall into three categories:

A Provisional Doctoral Student is one who holds a master's degree from an accredited institution in one of the following areas: biology, chemistry, mathematics, physics, computer science, or engineering, and intends to make up all deficiencies in geological background. Students holding the baccalaureate from an accredited institution in one of the above areas are encouraged to contact the Graduate Advisor to discuss procedures leading to acceptance as a Provisional Doctoral Student.

A Doctoral Student is one who (1) holds a master's degree in Geological Sciences from an accredited institution, or (2) holds a bachelor's degree in Earth Sciences from an accredited institution and has no deficiencies in science courses required for the B.S. degree in Geological Sciences at UT El Paso and has

completed 30 hours of post-bachelor's study in geological sciences, or (3) has been removed from the Provisional Doctoral Student category by removing any deficiencies, completing 18 graduate hours in Geological Sciences, and receiving recommendations for Doctoral Student status from the Advisory Committee.

A Doctoral Candidate is one who (1) has removed all academic deficiencies, (2) has satisfied the provisions of the Foreign Language requirement, (3) has completed at least three-fourths of the required credit hours in Geological Sciences and supporting fields, (4) has passed the prescribed Comprehensive Examination, and (5) has been approved for Candidacy by the Graduate Dean, upon the recommendation of the Comprehensive Examination Committee.

**Course Requirements**—The Doctor of Geological Sciences degree requires 60 semester hours of graduate study above the baccalaureate or 30 semester hours of graduate study above the master's degree. A dissertation is required. Not more than one-fifth of the required graduate hours can be earned in Special Problems courses.

Technical Sessions (Geology 1501) is a required course.

**Foreign Language Requirement**—Each doctoral candidate is required to possess a comprehensive knowledge of one language other than his native tongue. Proficiency in a foreign language must be demonstrated by (1) passing a comprehensive examination, or (2) completing four semesters of college courses in the selected language, or (3) showing that the undergraduate degree was obtained in courses taught using a language other than English.

**Committees**—For each provisional doctoral student or doctoral student, the Graduate Advisor shall appoint an Advisory Committee consisting of three members of the graduate faculty.

For each doctoral candidate, a Doctoral Committee will consist of the dissertation advisor, two professors of geology, and one other scientist or engineer—all of whom are members of the graduate faculty and are approved by the Dean of the Graduate School.

The Graduate Advisor will appoint a Comprehensive Examination Committee to administer the Comprehensive Examination.

**Examinations**—The department's Comprehensive Examination Committee shall administer a comprehensive examination at least once each year. The Comprehensive Examination will normally be taken after removal of all deficiencies and completion of most of the coursework. Any student who fails the Comprehensive Examination twice shall be barred from further consideration for Doctoral Candidacy.

**Dissertation**—A doctoral dissertation is required. This dissertation must demonstrate the candidate's capacity for originality and independence in recognizing a significant geological problem, in carrying out an effective investigation, and in interpreting and reporting the results. The subject of the dissertation is to be selected in consultation with the dissertation advisor, and it must be approved by the student's Doctoral Committee and by the Graduate Dean. The dissertation advisor is to supervise the research work and to consult with other members of the Doctoral Committee on the progress of the work.

The candidate is required to defend the dissertation before the faculty of the University in an open meeting under the supervision of his Doctoral Committee.

Draft copies of the dissertation must be submitted to the Doctoral Committee six days before the defense and any suggested corrections must be made. Prior to commencement, two copies of the final bound dissertation, and the unbound original, must be submitted to the Graduate School Office. Two bound copies must also be submitted to the Graduate Advisor.

**Microfilming of Dissertation**—The doctoral candidate who has successfully completed all requirements for the degree is required to pay the cost of microfilm reproduction of the complete dissertation. The signed original copy (unbound) of the doctoral dissertation is sent from the Office of the Graduate School to University Microfilms, Ann Arbor, Michigan, for reproduction.

With the dissertation the student must also submit to the Dean of the Graduate School two copies of an abstract, not to exceed

two pages in length (double-spaced) which has been approved in final form by the supervising committee. This will be published in *American Dissertations Abstracts*.

Publication by microfilm does not preclude subsequent publication of the dissertation, in whole or in part, as a monograph or in a journal. Copyright at the author's expense may be arranged, if desired, by completing a special form to be secured in the Graduate School Office. In order to protect patent or any other rights, the Graduate Dean may be requested to delay publication by microfilm for a period of one year. This request must be supported by a written recommendation of the supervising professor.

**Time Limits and Catalog Changes**—All requirements for a Doctor of Geological Sciences degree must be completed within one eight year period. Work more than eight years old is lost and can be reinstated only by special permission of the Graduate Dean upon recommendation of the Departmental Committee on Graduate Studies. Further, all requirements for the doctorate must be completed within five years after passing the comprehensive examination.

General and specific requirements for degrees in the Graduate School may be altered in successive catalogs. Provided the requisite course continues to be offered, the student is bound only by the course requirements of the catalog in force at the time of admission or re-admission within an eight year limit, unless, with the approval of the Graduate Dean, he or she elects to be bound by the course requirements of a subsequent catalog. This regulation applies to course requirements only.

**Departmental Requirements**—Doctoral candidates in Geological Sciences who intend to specialize in Geology, Geophysics, Geochemistry, or Geobiology must have an M.S. degree in the fields shown above. M.S. degree students in other scientific fields or Engineering must make up the basic geological training. This includes the 12-hour summer remedial course (6501, 6502) plus Field Camp (6465) plus any other coursework recommended by the Graduate Studies Committee. Thereafter these students can proceed to the 30 hours coursework in their selected area of Geological Sciences. Of the 60 (post-baccalaureate) hours required for the Doctoral degree, no more than 9 hours may be at the upper division level.

For Undergraduate and Graduate Students

- 3308 Remote Sensing
- 3310 Geomorphology
- 3325 Sedimentology
- 3422 Principles of Geochemistry
- 3424 Applied Geochemistry
- 3432 Exploration Geophysics, Seismic Methods (formerly 3332)
- 3434 Exploration Geophysics, Non-Seismic Methods (formerly 3334)
- 3454 Paleozoic & Mesozoic Vertebrate Paleontology
- 1455 Vertebrate Paleontology Techniques
- 3456 Cenozoic Vertebrate Paleontology
- 1457 Advanced Vertebrate Paleontology
- 4458 Geology Applied to Petroleum
- 3462 Stratigraphy
- 3464 The Geology of Groundwater
- 1466-3466 Special Problems
- 1467-3467 Special Problems/Geophysics

NOTE: There is a limit of 9 credit hours of courses listed above for graduate degree programs.

For Graduate Students Only

#### 1501 Technical Session (1-0)

Required of all graduate students. Discussion of various geological topics by the faculty, graduate students, and speakers from industry and other institutions. *Prerequisite*: Senior or graduate standing

### PALEONTOLOGY

#### 3530 Paleobotany (3-3)

Study of the morphology, paleoecology, biostratigraphy, taxonomy and evolution of higher plant macroflora in terrestrial systems. Paleophycological studies will concentrate on paleoecological interpretation and biostratigraphic application of the benthic calcareous

algae in marine systems. *Prerequisite*: Graduate standing in Geology or Biology, or permission of instructor. Laboratory Fee: \$8.

#### 3533 Plant Micropaleontology (3-3)

Study of geologically significant plant microfossils, including planktonic algae and spores and pollen of terrigenous plants. Lectures will stress essentials of morphology, taxonomy, and biostratigraphy. Laboratory includes techniques of collection, preparation, and study of these microfossils. *Prerequisite*: Graduate standing in Anthropology, Biology, Geology, or permission of instructor. Laboratory Fee: \$8.

#### 3535 Animal Micropaleontology (3-3)

Study of animal microfossils including foraminifera, ostracoda, and conodonts, emphasizing morphology, taxonomy, paleoecology, and biostratigraphy. Laboratory will stress techniques of collection, preparation, and study. *Prerequisite*: GEOL 3214, or equivalent. Laboratory Fee: \$8.

## PETROLOGY

#### 3541 Petrology of Carbonate Rocks (2-3)

Description and classification of carbonate rocks, recrystallization, dolomitization, depositional environments, major groups of lime-secreting organisms, energy interpretations; diagenesis, and porosity formation. *Prerequisites*: GEOL 3325 and permission of instructor. Laboratory Fee: \$8.

#### 3542 Petrography of Clastic Sedimentary Rocks (1-6)

Thin section and hand specimen studies of conglomerate, sandstone, and mud rocks with emphasis on interpretation of primary and secondary processes, porosity development, and classification. *Prerequisite*: GEOL 3325 or permission of instructor. Laboratory Fee: \$8.

#### 3545 Advanced Igneous Petrology (2-3)

Study of igneous rocks and processes in the light of field, theoretical, and experimental considerations. Laboratory studies include the interpretation of petrologic data and petrographic work on plutonic and volcanic rocks. *Prerequisite*: GEOL 3315 or equivalent, CHEM 3351-52 recommended. Laboratory Fee: \$8.

## GEOPHYSICS

#### 3551 Electrical Methods In Geophysics (3-0)

Theory and application of electrical and electromagnetic techniques for geophysical exploration. Includes resistivity, magnetotelluric and electromagnetic methods to determine the electrical properties and hence geological parameters for exploration targets. *Prerequisite*: PHYS 3441, or EE 3321, or consent of instructor.

#### 3552 Geophysical Inverse Theory (3-0)

The quantitative study of mathematical methods used to interpret geophysical measurements and determine earth structure. Techniques for both linear and non-linear geophysical problems are studied to determine the resolution and precision of a geophysical model from a given set of data. *Prerequisites*: GEOL 3432, 3434, and MATH 3323, or consent of instructor.

#### 3553 Geophysical Data Processing (3-0)

The application of computers for the analysis of geophysical data to determine as much as possible about the constitution of the earth's interior. The construction, analysis and interpretation of mathematical and statistical models of geophysical phenomena for massive amounts of data are studied using the techniques of Fourier analysis and digital filters. *Prerequisite*: GEOL 3432.

#### 3554 Seismology (3-0)

A study of earthquake seismology, seismotectonics, and the use of seismological methods to determine earth structure. A theoretical foundation is provided by the study of wave propagation in homogenous and isotropic media from the standpoint of both ray and wave theory. *Prerequisites*: GEOL 3432, MATH 3436 and PHYS 3351, or consent of instructor.

**2556, 3556 Topics in Geophysics**

Study of advanced topics in the fields such as exploration geophysics, geothermics, theoretical seismology, potential field, data analysis, inversion, seismotectonics, crustal studies, and global tectonics. *Prerequisite:* Permission of instructor. May be repeated when the topic varies.

**3557 Geothermics (3-0)**

Principles of heat conduction in solids, emphasizing the measurement of the thermal properties of geologic materials. Heat flow from the interior of the earth and the distribution of heat sources. Geothermal energy and exploration. *Prerequisite:* MATH 3226 or permission of instructor.

**3558 Advanced Seismic Prospecting (2-3)**

A survey of the most recent techniques and developments in seismic prospecting with an emphasis on digital processing. The mathematical and physical basis for techniques such as convolution, correlation, and the calculation of synthetic seismograms will be established. Laboratory will stress computer programming of the techniques studied during lectures. *Prerequisites:* A working knowledge of FORTRAN and MATH 3226, or consent of the instructor. Laboratory Fee: \$8.

**3559 Physics of the Earth (3-0)**

Physics of the earth's interior including seismic velocity and density structure, seismic wave propagation and gravitational and magnetic fields. Thermal history of the earth. Chemical and mineralogical composition of the earth, radioactivity, isotopes and geochronology. Magma generation, crystal evolution and tectonic models. *Prerequisite:* MATH 3112 or equivalent or permission of instructor.

**1563-3563 Special Problems in Geophysics**

*Prerequisites:* Graduate standing and permission of instructor.

**GENERAL GEOLOGY****6501-02 Advanced General Geology (6-0)**

A sequence of courses designed to remedy deficiencies in the geologic background of science or engineering students who did not major in the Geological Sciences on the undergraduate level. Physical and historical geology, mineralogy, petrology, sedimentation, structural geology, and plate tectonics will be taught. The rigorous treatment of this material will include lectures, problem solving, laboratory activities, and field work. No prior geology courses required, but a science or engineering background is necessary.

**1515-2515-3515 Selected Topics in the Geological Sciences**

Study of advanced topics in such fields as structural geology, economic geology, paleontology, petrology, and geochemistry. *Prerequisite:* Permission of instructor. May be repeated when the topic varies.

**4505 Biostratigraphy (3-3)**

The systematic analysis of the separation and differentiation of rock units on the basis of the assemblages of fossils which they contain; special emphasis will be placed on the evolution of biohermal systems through time and problems of the establishment and utilization of biostratigraphic units and chronostratigraphic boundaries. *Prerequisite:* Graduate standing in Geology or Biology, or permission of instructor. Lab Fee: \$5.

**3561 Advanced Historical Geology (3-0)**

*Prerequisites:* Senior or graduate standing and permission of instructor.

**1562-3562 Special Problems in Geology**

*Prerequisites:* Graduate standing and permission of instructor.

**3564 Depositional Environments and Systems (3-0)**

Analysis of layer geometry, sedimentary processes and rock types, diagnostics of major depositional environments and systems. Occurrence of natural resources in depositional systems. *Prerequisite:* GEOL 3325 or equivalent or permission of instructor.

**3565 Tectonics and Sedimentation (3-0)**

Sedimentary basin evolution within a plate tectonic framework is discussed from the standpoint of siliclastic and carbonate sedimentologic/stratigraphic, and diagenetic variations. Field trips are included. *Prerequisite:* GEOL 3325 or permission of instructor.

**3566 Seismic Stratigraphy (2-3)**

Interpretation of geologic parameters from seismic reflection data. Emphasis on recognition and mapping of stratigraphic units and lithologic facies. Comparison of reflection characteristics and geologic resolution. *Prerequisite:* GEOL 3564, or permission of instructor. Laboratory Fee: \$8.

**3567 Advanced Stratigraphy (2-3)**

The history, usage and subtleties of stratigraphy will be investigated through lectures, assigned readings, and examples. You will have your chance in the field to see it you agree with those who have defined real stratigraphic units. *Prerequisite:* GEOL 3462, or permission of instructor. Laboratory Fee: \$8.

**3568 Evaporite Geology (3-3)**

Evaporite deposits are important as mineral sources, as a lithology associated with hydrocarbon basins, and for applied purposes such as oil storage and radioactive waste isolation. The processes of evaporite formation, deformation, and diagenesis will be examined. Methods of evaporite investigation will be covered in lab and lecture. *Prerequisite:* GEOL 3462, or permission of instructor. Laboratory Fee: \$8.

**3570 Tectonics (3-0)**

Extensive readings on selected topics in and a broad review of the major principles and theory of tectonics. *Prerequisites:* GEOL 4323 and graduate standing.

**3572 Regional Structural Geology (3-0)**

A survey of regional structural styles. Extensive reading of key papers will highlight the similarity and differences of similar structural provinces worldwide, with emphasis given to western North America. Structural styles to be examined include: rift systems, fold and thrust belts, foreland uplifts, passive margins, accreted terranes, and strike-slip provinces. *Prerequisite:* GEOL 4323.

**3574 Physical Processes in Geology—Rock Mechanics and Rheology (3-0)**

Introduction to geological applications of linear elasticity, linear elastic fracture mechanics, steady state heat and viscous flow, and plasticity. Plane analytic boundary value solutions will be developed to examine geological examples of folding, faulting, fracturing and intrusion. *Prerequisites:* MATH 3213, PHYS 4211 and GEOL 4323, or permission of the instructor.

**3575 Quantitative Techniques in the Geological Sciences (2-3)**

Introduction to techniques for quantitative analysis of geologic data. Emphasis on the extraction of maximum information from large data matrices. Specific applications to petroleum and mineral exploration. Laboratory Fee: \$8.

**3577 Principles of Geochemistry (3-0)**

Chemical processes involved in the distribution and migration of the elements on the earth through space and time. Principles of solution and mineral equilibria in surficial, sedimentary, hydrothermal, and igneous environments. *Prerequisite:* Graduate standing.

**3579 Petroleum Geochemistry (3-0)**

Examination of the biologic, chemical, and geologic processes involved in the accumulation of petroleum-source rocks, including diagenesis, catagenesis, and metagenesis of petroleum prone organic matter; of migration, accumulation, and maturation of liquid hydrocarbons; and of geochemical parameters useful in hydrocarbon exploration. *Prerequisite:* Graduate standing or permission of instructor.

**3580 Analytical Methods in Geology**

Theory and application of x-ray diffraction, x-ray fluorescence, atomic absorption, differential thermal analysis, DCP, and spectrophotometry to chemical analyses of geological materials. *Prerequisite:* Graduate standing, and/or permission of instructor. Laboratory Fee: \$8.

**3581 Remote Sensing (2-3)**

Microprocessor-based techniques for digital analysis of remotely sensed imagery and other spatial data sets in the geosciences. Applications demonstrated in resource exploration and environmental-land use assessment. *Prerequisite:* GEOG 3308, or permission of the instructor.

**1589-6589 Graduate Research in Geological Sciences**

Cannot be used to satisfy minimum degree requirements. Grade of S or U. *Prerequisites:* Graduate standing and permission of instructor.

**3590 Seminar in Geology (3-0)**

Seminar sections (non-concurrently) in paleontology and stratigraphy, mineralogy, petrology, and geochemistry; structural geology and geomorphology; economic geology, and subsurface correlation. *Prerequisites:* Graduate standing and permission of instructor. May be repeated for credit when topics vary.

**3598 Thesis**

**3599 Thesis**

For Doctoral Students Only

**1615-2615-3615 Advanced Topics in the Geological Sciences**

Advanced topics in paleontology and stratigraphy, mineralogy, petrology, geochemistry, structural geology, economic geology, and geophysics. *Prerequisite:* Doctoral graduate standing and permission of instructor. May be repeated when the topic varies.

**3605 Special Problems, Geology**

**3610 Special Problems, Geophysics**

**3620 Dissertation**

**3621 Dissertation**

**3696 Doctoral Research in Geological Sciences**

Cannot be used to satisfy minimum degree requirements. Grade of S or U. *Prerequisite:* Doctoral standing and permission of instructor.

**ECONOMIC GEOLOGY**

**3578 Applied Geochemistry (2-3)**

Application of geochemical principles and techniques to environmental and exploration problems. *Prerequisite:* GEOL 3577 or equivalent.

**3593 Genesis of Mineral Deposits (3-0)**

Studies of mineral deposits emphasizing geochemical and mineralogical relationships pertinent to genetic interpretations. *Prerequisite:* Graduate standing

**3594 Mining Geology (3-1)**

Geologic mapping, sample drilling, reserve calculations and economic evaluation of actively exploited and potential economic mineral deposits. Mine visits required. *Prerequisite:* GEOL 4591 or 4592, or permission of instructor.

**3595 Economic Geology of Fuels (3-1)**

Origin, distribution, processing and economic aspects of coal, uranium, oil shale, tar sands, and geothermal resources in terms of energy supplies. *Prerequisite:* GEOL 3470 or equivalent, or consent of instructor.

**3597 Geology and Mineral Resources of Mexico (3-0)**

Stratigraphic and structural framework of the Republic of Mexico with particular reference to the distribution of mineral resources. Field excursion required. *Prerequisite:* GEOL 3470 or permission of instructor.

**4591 Economic Mineral Deposits (3-1)**

Occurrence, distribution, characteristics, and genesis of ores, industrial minerals and rocks exclusive of fuels. Laboratory work includes reflected light examination of polished ore sections. Field excursions, mine visits and reports are required. *Prerequisite:* GEOL 3470 or permission of instructor. Laboratory Fee: \$8.

# Master of Science in Interdisciplinary Studies

213 Physical Science  
(915) 747-5176

PROGRAM DIRECTOR: Rufus E. Bruce

The M.S.I.S. program is designed to satisfy the need for interdisciplinary graduate programs of study which cannot be accommodated within the confines of the normal graduate programs of the university's academic departments. Typical interdisciplinary courses of study include Arid Region Studies, Atmospheric Environmental Studies, Environmental Science, Resource Management, Engineering Management, curricula in Computer Applications, Science Education, and others. All such interdisciplinary programs require courses from the offerings of several different departments. The curricula under the M.S.I.S. program are individually tailored to the needs of each student.

**Requirements for Admission**

In addition to the other Graduate School entrance requirements, applicants to the M.S.I.S. program must submit a letter outlining their proposed areas of study and their graduate education goal. Upon the receipt of the application documents and letter, an evaluation is made to determine the Program's ability to satisfy the needs of the applicant, and the applicant is subsequently advised. Upon acceptance of the applicant into the program, a Guidance Committee, made up of at least three graduate faculty members from different departments, is selected by the Program Director to guide the student in his or her program. Faculty selected normally will have interests and expertise in the student's proposed field of study. Courses for the individual study plan are determined by the committee in consultation with the student. This committee normally also acts as the student's examination committee.

**Special Requirements for the M.S.I.S. Degree**

The M.S.I.S. degree requires 36 hours of graduate credit coursework; at least 24 of these hours must be selected from 0500 or higher level courses. The individually designed curriculum must include courses from the offerings of at least three different departments with no more than 15 hours in the department of highest course concentration and no more than 12 hours of credit from any other single department. At least half of all semester hours credited toward the degree must be selected from graduate credit courses offered by science and/or engineering departments.

Up to six hours of individual instruction graduate-level problem solving courses may be used to satisfy degree requirements. Students enrolled in such courses are expected to submit a report of the work accomplished. If the student desires and the Guidance Committee concurs, this report may be bound and presented in the form of a thesis.

The individualized curricula are made from courses listed under the various individual departmental offerings in this catalog.

# Mathematical Sciences

124 Bell Hall  
(915) 747-5761

INTERIM CHAIRMAN: Leslie L. Foged

GRADUATE FACULTY: Boyer, Foged, Gregory, Guthrie, Jelihovschi, Kaigh, Ng, Nymann, Przymusinski, Rojo, Schuster, Sewell, Srinivasan

## DEPARTMENTAL REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE IN MATHEMATICS OR STATISTICS

For students electing to write a thesis, the program involves a minimum of 24 semester hours of acceptable coursework and 6 hours of credit for thesis. For those not writing a thesis, at least 36 hours of acceptable coursework are required. All but 9 hours must be graduate coursework. Those students working toward the M.S. degree in Mathematics should include Mathematics 3531, 3541, and 3551 in their program. For students desiring the M.S. degree in Statistics, 3580, 3581, 3585, and 3588 are required. The particular course of study for each student must be approved by the departmental committee on graduate studies. A comprehensive examination is required.

## DEPARTMENTAL REQUIREMENTS FOR THE MASTER OF ARTS IN TEACHING DEGREE WITH A MAJOR IN MATHEMATICS

**Requirements for Admission**—In addition to the general requirements for admission to the Graduate School, students must have completed the calculus sequence together with 12 semester hours of advanced courses in mathematics. Since the degree is intended for high school teachers of mathematics, two years of classroom experience are required for admission to this program.

The Master of Arts in Teaching degree with a major in Mathematics requires 36 semester hours of coursework. Six to nine of these hours must be taken in the College of Education. The remaining hours must be taken in mathematical sciences or computer science. A maximum of 18 of these hours may be chosen from 3300 or 3400 level courses. Each student must have his or her courses approved by the Graduate Advisor in order to ensure adequate breadth of courses in the mathematical sciences. All students are required to take MATH 3571 after completing at least 24 hours of their program. A comprehensive examination is required.

### For Undergraduate and Graduate Students

- 3300 History of Mathematics
- 3319 Elementary Number Theory
- 3323 Matrix Algebra
- 3325 Principles of Mathematics
- 3327 Applied Algebra
- 3328 Foundations of Mathematics
- 3330 Probability
- 3335 Applied Analysis I
- 3341 Introduction to Analysis
- 3353 Mathematical Programming
- 3380 Sampling Techniques
- 3381 Nonparametric Statistical Methods
- 3425 Modern Algebra
- 3426 Linear Algebra
- 3429 Numerical Analysis
- 3436 Applied Analysis II
- 3441 Real Analysis I
- 3443 Advanced Topics from Differential Equations
- 3480 Statistics I

### For Graduate Students Only

#### 3511 Applied Mathematics I (3-0)

Mathematics 3511 and 3512 are designed to introduce the student to those areas of mathematics, both classical and modern, which are useful in engineering and science. Topics are chosen from variational calculus, optimization, tensor analysis, elliptic integrals, partial differential equations, and the theory of finite fields with applications to coding

theory. The courses may be taken in either order, and they may be repeated once as content changes. *Prerequisites:* MATH 3226 and 3323. MATH 3335 and 3436 are desirable, but not necessary.

#### 3512 Applied Mathematics II (3-0)

See MATH 3511.

#### 3529 Numerical Analysis (3-0)

Introduction to approximation theory, interpolation, numerical differentiation and integration, solutions of linear and non-linear equations, numerical solution of differential equations, optimization. Emphasis is on error analysis and stability. Several practical examples and computer programs will be covered. *Prerequisites:* The analysis equivalent of MATH 3341 and a working knowledge of a high level programming language.

#### 3530 Computational Methods of Linear Algebra (3-0)

Numerical methods involved in the computation of solutions of linear systems of equations, eigenvalues, singular values, generalized inverses; linear programming, error analysis. *Prerequisites:* The linear algebra equivalent of MATH 3323 and a working knowledge of the FORTRAN programming language.

#### 3531 Real Variables I (3-0)

Measurable sets and functions, Lebesgue-Stieljes integration, Baire categories, Lp spaces and various types of convergence. *Prerequisite:* MATH 3441 or its equivalent as approved by the instructor.

#### 3532 Real Variables II (3-0)

A continuation of MATH 3531. *Prerequisite:* MATH 3531 or its equivalent as approved by the instructor.

#### 3542 Algebraic Topology (3-0)

An introduction to algebraic methods in topology. Topics include homotopy, covering spaces, homology, and manifolds. *Prerequisites:* MATH 3328 and 3425 or their equivalents as approved by the instructor.

#### 3543 Numerical Solution to Partial Differential Equations (3-0)

Introduction to finite difference and finite element methods for the solution of elliptic, parabolic and hyperbolic partial differential equations. *Prerequisites:* MATH 3226 and 3429 or their equivalents and knowledge of a high level programming language.

#### 3551 Complex Variables I (3-0)

Complex integration and the calculus of residues. Analytical continuation and expansions of analytic functions. Entire, meromorphic, and periodic functions. Multiple-valued functions and Riemann surfaces. *Prerequisite:* MATH 3441 or its equivalent as approved by the instructor.

#### 1570-3570 Seminar

Various topics not included in regular courses will be discussed. May be repeated once for credit as the content changes. *Prerequisite:* Consent of instructor.

#### 3571 Seminar for Teachers in Mathematics (3-0)

This course will take a sophisticated look at various topics in the pre-university mathematics curriculum. May be repeated as content varies. May not be counted in fulfilling the requirements for the M.S. degree.

#### 3580 Mathematical Statistics I (3-0)

The probability foundation of mathematical statistics. Probability spaces, random variables, probability distributions, expectation, generating functions, multivariate transformations, law of large numbers, central limit theorem. *Prerequisite:* Consent of the instructor.

#### 3581 Mathematical Statistics II (3-0)

The theory of point and interval estimation and hypothesis testing for parametric models based on the principles of sufficiency, maximum likelihood, least squares, and the likelihood ratio. *Prerequisite:* MATH 3580.

#### 3582 Probability Theory I (3-0)

A mathematical study of the notions of probability spaces, measurable functions and random variables, modes of convergence and limit theorems. *Prerequisite:* Consent of the instructor.

#### 3583 Probability Theory II (3-0)

A mathematical study of central limit theorems for sequences of inde-



pendent and dependent random variables; multivariate limit theorems, conditional expectation and Martingale theory; introduction to the theory of stochastic processes, in particular, Brownian motion. *Prerequisite:* MATH 3582.

#### 3584 Linear Statistical Models (3-0)

The theory of estimation and hypothesis testing for linear statistical models with application to experimental design. Includes discussion of generalized inverses. *Prerequisites:* Linear algebra and consent of the instructor.

#### 3585 Statistics in Research (3-0)

The fundamental concepts and applications of statistical analysis in research. Following a review of basic one and two-sample procedures the concentration is on multiple linear regression and analysis of variance. Emphasis on use and interpretation of output from statistical computer packages. *Prerequisites:* A basic statistics course and consent of the instructor.

#### 3586 Stochastic Processes I (3-0)

A study of the theory and applications of stochastic processes. The role of stochastic processes, elements of stochastic processes. Markov chains, limit theorems, Poisson processes. *Prerequisite:* Consent of the instructor.

#### 3587 Stochastic Processes II (3-0)

A study of the theory and applications of stochastic processes; birth and death processes, renewal processes, Brownian motion, branching processes, queueing processes. *Prerequisite:* MATH 3586.

#### 3588 Multivariate Data Analysis (3-0)

The multivariate normal distribution, multiple correlation and regression analysis, principal components, discriminant analysis, factor analysis. Emphasis on use and interpretation of output from statistical computer packages. *Prerequisite:* MATH 3585 or consent of the instructor.

#### 3590 Nonparametric Statistics (3-0)

Distribution-free statistical methods, nonparametric one and two sample tests and analysis of variance; goodness-of-fit tests; nonparametric measures of association; robust procedures. *Prerequisites:* MATH 3280 or equivalent and MATH 3330.

#### 3591 Time Series Analysis (3-0)

Identification, estimation, and forecasting of stationary and nonstationary models; special analysis, analysis of trend and seasonal variation; Box-Jenkins methodology. Computer packages for time series data analysis will be employed. *Prerequisite:* MATH 3330.

#### 3592 Statistical Computing (3-0)

At study of stochastic simulation and select numerical methods used in statistical software. *Prerequisites:* A high level programming language, linear algebra, and MATH 3480 or equivalent.

#### 1595 Graduate Seminar

Conferences and discussions of various topics in mathematics and statistics by faculty, graduate students, and outside speakers. Required of all graduate students during each semester of full-time enrollment. May not be counted more than once toward the degree requirement.

#### 3598 Thesis

#### 3599 Thesis

## Physics

214 Physical Science  
(915) 747-5715

CHAIRPERSON: Rufus Bruce, Jr.

PROFESSOR EMERITUS: C. Sharp Cook

GRADUATE FACULTY: Bruce, Davies, Dean, Ho, Lawson, McIntyre

The Department of Physics offers studies leading to the degree of Master of Science in Physics with experimental and/or theoretical physics research in acoustics, astrophysics, atmospheric physics and optics, condensed matter physics, energy resources, geophysics, health physics, and radiation physics. Through a cooperative program with the Geological Sciences Department, the Master of Science in Geophysics is offered. The department also offers other cooperative plans that can lead to the doctorate degree. For details please write to the Graduate Advisor of the Physics Department.

### General Departmental Requirements

The normal prerequisite to graduate studies in the Department of Physics is the bachelor's degree in physics with a "B" average in physics courses taken at the undergraduate level. The bachelor's degree coursework should include advanced undergraduate courses in Mechanics, Electromagnetics, Modern Physics, Quantum Mechanics, Thermal Physics, and advanced laboratory practice. Any deficiency must be removed before the petition is made for candidacy for the M.S. degree.

### Master of Science in Physics

The department offers a program of courses and research leading to the M.S. degree in physics. Two routes are available. Plan 1 is the usual route to be taken and requires 30 semester hours of credit: 24 hours of coursework plus a six-hour thesis (Physics 3598 and 3599). Plan 2 is an alternative route and requires the favorable recommendation of the Physics Department Graduate Studies Committee and 36 hours of coursework including the successful completion of a research problem (Physics 3591) with a report being submitted to the department in lieu of a thesis.

Requirements for Plan 1 are a minimum of 21 semester hours of graduate work at the 0500 level including thesis. Specific courses required are Physics 3521, 3525, 3541, 3561, 3598, and 3599.

Requirements for Plan 2 are a petition stating the reason for the alternate route and a minimum of 27 semester hours of graduate work at the 0500 level. Specific courses required are Physics 3521, 3525, 3541, 3542, 3561, and 3591.

Students must have their course program approved by the graduate advisor each semester. The student will choose, in consultation with the graduate advisor, a chairperson of the research committee and at least two additional committee members, who will supervise the thesis or research problem. One member of this committee must be from outside the Physics Department. These choices will be made before the student has completed two semesters of graduate work.

The candidate for the M.S. degree in Physics may have no more than two grades of "C" for courses used to fulfill the requirements of the degree and must pass a final examination which will include an oral defense of the thesis or research problem.

### Master of Science in Geophysics

Physics graduate students may elect to obtain the M.S. degree in Geophysics. This degree requires 30 semester hours including a six-hour thesis. A minimum of 21 hours must be at the 0500 level or above. For physics students, specific courses required are Physics 3521, 3525, 3541, 3598, and 3599. At least 12 hours of approved coursework must be selected from Geology-Geophysics courses offered by the Geological Sciences Department. All physics graduate students with deficiencies in Geology undertak-

ing this route to the Geophysics M.S. degree are expected to enroll in Geological Sciences 6501 and 6502 during the first summer after they enter the program.

Thesis supervisory committees will have at least two geophysics representatives from the Geological Sciences Department.

#### For Undergraduate and Graduate Students

A maximum of 9 semester hours of the following undergraduate courses in physics may, with the approval of the graduate advisor, be counted toward a M.S. in Physics: (An asterisk indicates that the course will only be approved in exceptional cases.)

- 3323 Physical Optics
- \*3325 Survey of Modern Physics (3-0)
- \*3331 Thermal Physics (3-0)
- 2343 Advanced Laboratory Practice
- \*3351 Analytical Mechanics
- 3352 Advanced Mechanics
- \*3359 Astrophysics
- \*3360 Biophysical Mechanics
- 3428 Theoretical Geophysics
- 3432 Statistical Physics
- \*3441 Electromagnetics I
- 3442 Electromagnetics II
- 2446 Experimental Physics
- \*3448 Fundamentals of Acoustics
- \*3453 Methods of Mathematical Physics
- 3455 Modern Physics I (3-0)
- 3456 Modern Physics II (3-0)
- \*1475-6475 Special Topics in Physical Science for Teachers
- 3478 Undergraduate Special Topics in Physics

#### For Graduate Students Only

##### 3502 Mechanics for Teachers (3-0)

Mechanics and Thermodynamics for Physics and Physical Science teachers. Enrollment limited to teachers.

##### 3503 Electricity and Magnetism for Teachers (3-0)

Electricity, Magnetism and Wave motion for Physics and Physical Science teachers. Enrollment limited to teachers.

##### 3504 Modern Physics for Teachers (3-0)

Modern Physics Topics for Physics and Physical Science teachers. Enrollment limited to teachers.

##### 3506 Physics of the Upper Atmosphere (3-0)

Upper atmospheric circulation influences on photochemical equilibrium. State changes, involving water vapor, ozone, oxides and ionized and neutral components of the atmosphere and their relation to formation and destruction processes and equilibrium conditions. Interactions between the gravitational, magnetic, flow and plasma fields. Sources, sinks and propagation characteristics relative to a spectrum of wave motions ranging from acoustic waves to diurnal tides. *Prerequisite:* PHYS 3470 or equivalent as determined by the instructor.

##### 3521 Mechanics (3-0)

Lagrange's equations, nonholonomic constraints, Hamilton's principle, two-body central force, rigid body dynamics, Lagrangian relativistic mechanics, Hamilton and Hamilton-Jacobi equations, canonical transformations. *Prerequisite:* PHYS 3352. Offered fall semester.

##### 3525 Mathematical Physics (3-0)

Linear systems, special functions, complex variables, and tensor problems in Physics. Offered fall semester.

##### 3532 Plasma Physics (3-0)

Physics of fully ionized gases. Waves and instabilities. Transport properties. Interaction of charged particles with electromagnetic fields. *Prerequisite:* PHYS 3432, 3442 or consent of instructor.

##### 3541 Electrodynamics I (3-0)

Boundary value problems, polarization and stress tensor. Conservation laws and energy-momentum tensor. Relativistic electrodynamics. Covariant form of field equations. Potentials and gauge invariance. *Prerequisite:* PHYS 3442. Offered spring semester.

##### 3542 Electrodynamics II (3-0)

A continuation of PHYS 3541.

##### 3546 Atmospheric Radiation Processes (3-0)

The theory of radiative transfer including gaseous absorption and emission, aerosol extinction, atmospheric fluxes and heating rates, airflow and other atmospheric radiative phenomena. Applications are made to remote sensing of planetary atmospheres.

##### 3551 Nuclear Physics (3-0)

Systematics of nuclei, binding energy, nuclear models, scattering of protons and neutrons, nuclear reactions, passage of charged particles and gamma rays through matter. *Prerequisite:* PHYS 3457 or consent of instructor.

##### 3561 Quantum Mechanics (3-0)

Solution of the Schroedinger wave equation for discrete and continuous energy eigenvalues, representation of physical variables as operators and the matrix formulation of quantum mechanics; approximation methods. *Prerequisite:* PHYS 3456. Offered spring semester.

##### 3565 Advanced Statistical Mechanics (3-0)

Classical and quantum statistics of systems in equilibrium. Treatment of fluctuations and transport phenomena. Introduction to many-body problems. *Prerequisite:* PHYS 3432 or equivalent as determined by the instructor.

##### 3571 Solid State Physics (3-0)

Electromagnetic, elastic and particle waves in periodic lattices as applied to the electrical, magnetic and thermal properties of solids. *Prerequisite:* PHYS 3456 or consent of instructor.

##### 3591 Research Problems In Physics (3-0)

Required course for the 36-hour non-thesis option. Requires two copies of a type-written report. May be repeated for credit; maximum credit allowed six hours. May not be counted as thesis research but may be taken one time as a preparatory investigation course prior to the beginning of thesis research. *Prerequisites:* Submission of the Petition of Candidacy and consent of Chairperson of Supervisory Committee.

##### 3593 Special Topics in Physics (3-0)

Topics to be announced. May be repeated for credit.

##### 1596-6596 Graduate Research In Physics (1-0, 2-0, 3-0, 4-0, 5-0, 6-0)

This course may be taken as often as needed, but no more than 3 semester credit hours may be applied to satisfy the requirements for the master's degree. *Prerequisite:* Consent of Graduate Advisor.

##### 3598 Thesis

##### 3599 Thesis

# The Graduate Faculty

- \***WESTON AGOR**, Professor of Political Science, 1982  
B.A., St. Lawrence University; M.P.A., University of Michigan;  
Ph.D., University of Wisconsin
- \***RICARDO D. AGUILAR**, Associate Professor of Languages and  
Linguistics, 1977  
B.A., M.A., The University of Texas at El Paso; Ph.D., University  
of New Mexico
- MARY LOUISE ZANDER AHO**, Associate Professor Emerita of  
Teacher Education, 1963  
M.S.E., University of Florida; M.A., The University of Texas at El  
Paso; Ph.D., Florida State University
- PATRICIA ADKINS AINSA**, Associate Professor of Educational  
Leadership and Counseling, 1977  
B.A., The University of Texas at El Paso; M.S., Eastern New  
Mexico University; Ph.D., University of Colorado at Boulder
- CONSTANTINE ALAFODIMOS**, Assistant Professor in the De-  
partment of Electrical Engineering, 1984  
Dip., Technological Institute of Athens; B.S., New York Institute  
of Technology; B.S.E.E., M.S.E.E., Ph.D., New Mexico State  
University
- DOREENE ALEXANDER, R.N.**, Assistant Professor in Nursing,  
1984  
B.S.N., University of Arizona; M.S.N., University of Texas Health  
Center, School of Nursing at San Antonio; Ph.D., University of  
Texas at Austin
- BARBARA ALKOFER**, Assistant Professor of Theatre Arts, 1984  
B.A., M.A., Baylor University; M.F.A., University of Iowa
- MARIA ROSARIO ALVAREZ, R.N.**, Assistant Professor in Nursing,  
1979  
B.S.N., The University of Texas at El Paso; M.S., Texas Woman's  
University
- JON AMASTAE**, Associate Professor of Languages and Linguis-  
tics, 1980  
B.A., University of New Mexico; Ph.D., University of Oregon
- CHARLES H. AMBLER**, Assistant Professor of History, 1984  
B.A., Middlebury College; M.A., Ph.D., Yale University
- KENT ANDERSON**, Visiting Assistant Professor of English, 1984  
B.A., University of North Carolina; M.F.A., University of Montana
- \***HOWARD GEORGE APPLIGATE**, Professor in the Department  
of Civil Engineering, 1970  
B.S., M.S., Colorado State University; Ph.D., Michigan State  
University
- \***PABLO ARENAZ**, Assistant Professor of Biological Sciences,  
1984  
B.S., M.S., University of Nevada at Reno; Ph.D., Washington  
State University
- ARMANDO ARMENGOL**, Associate Professor of Languages and  
Linguistics, 1977  
B.A., M.A., Ph.D., University of Illinois
- JOHN CLEVELAND ARNOLD**, Associate Professor of Art, 1965  
B.A., University of Minnesota; M.F.A., Arizona State University
- \***MICHAEL EVAN AUSTIN**, Professor of Electrical Engineering,  
1963  
B.S.E.E., M.S.E.E., Ph.D., The University of Texas at Austin
- WALTER G. AUSTIN, JR., C.P.A.**, Associate Professor of Ac-  
counting, 1979  
B.B.A., M.B.A., Texas Tech University; Ph.D., The University of  
Texas at Austin
- \***ALBERTO IAN BAGBY, JR.**, Associate Professor of Languages  
and Linguistics, 1973  
A.B., Baylor University; M.A., University of Missouri; Ph.D.,  
University of Kentucky
- \***KENNETH KYLE BAILEY**, Professor of History, 1960  
B.A., M.A., Ph.D., Vanderbilt University
- STANLEY EUGENE BALL**, Associate Professor of Educational  
Leadership and Counseling, 1964  
B.S., University of Wyoming; M.S., University of Arizona; Ph.D.,  
New Mexico State University
- WILLIAM GERALD BARBER**, Professor Emeritus of Educational  
Leadership and Counseling, 1966  
B.S., M.S., East Texas State University; Ed.D., University of  
Houston
- MARIE ESMAN BARKER**, Associate Professor of Teacher Edu-  
cation, 1968  
B.A., M.A., The University of Texas at El Paso; Ed.D., New  
Mexico State University
- GUIDO ALAN BARRIENTOS**, Associate Professor of Psychology,  
1963  
B.A., Universidad de San Carlos (Guatemala); M.A., Ph.D.,  
University of Kansas
- \***CHARLES RICHARD BATH**, Professor of Political Science, 1966  
B.A., University of Nevada; M.A., Ph.D., Tulane University
- JAMES EDGAR BECVAR**, Associate Professor of Chemistry,  
1978  
A.B., College of Wooster; Ph.D., University of Michigan
- RAYMOND BELL**, Lecturer in the Department of Computer Sci-  
ence, 1985  
B.A., Texas Western College; M.A., U.C.L.A.
- ANDREW BERNAT**, Assistant Professor of Computer Science,  
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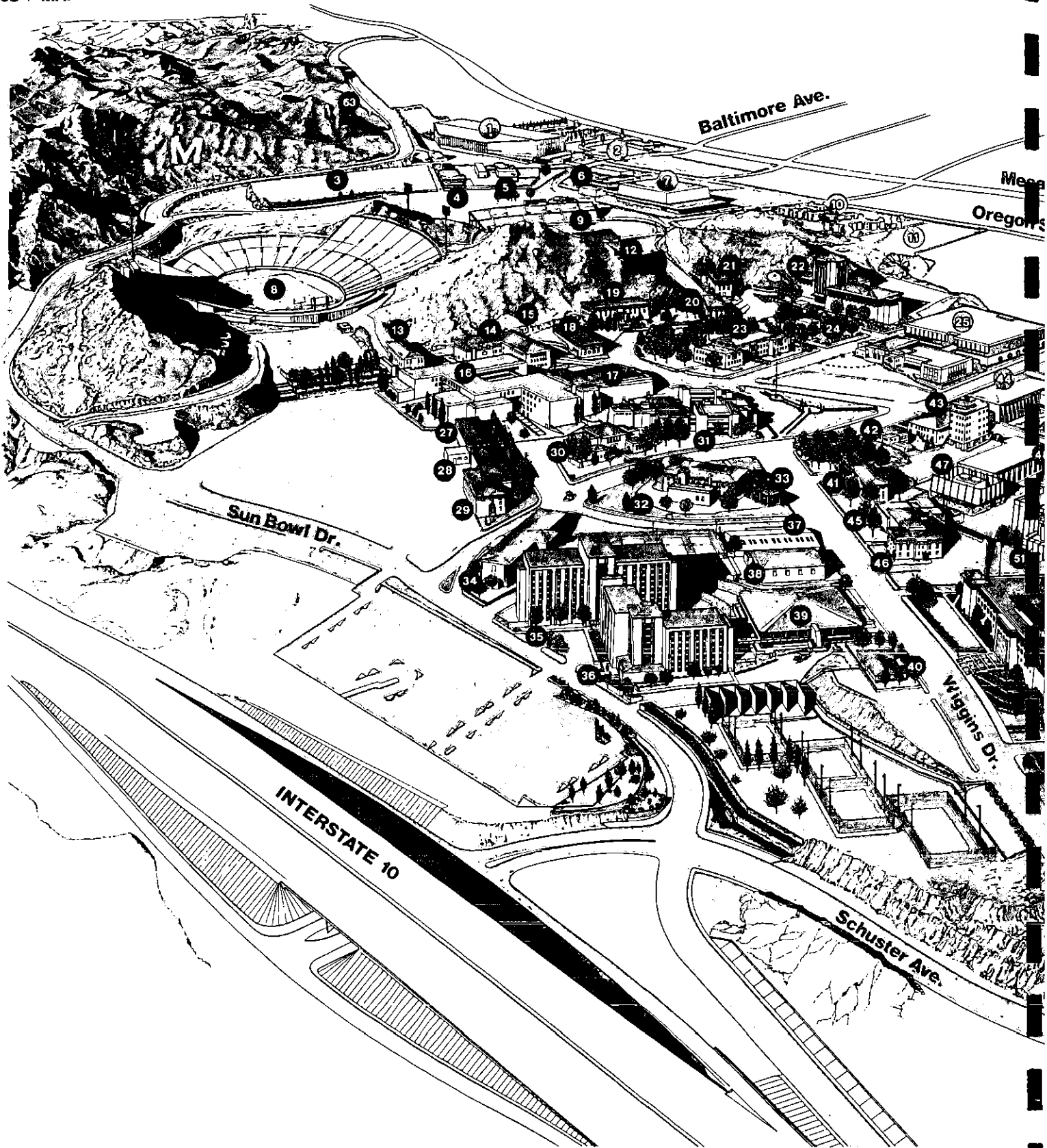
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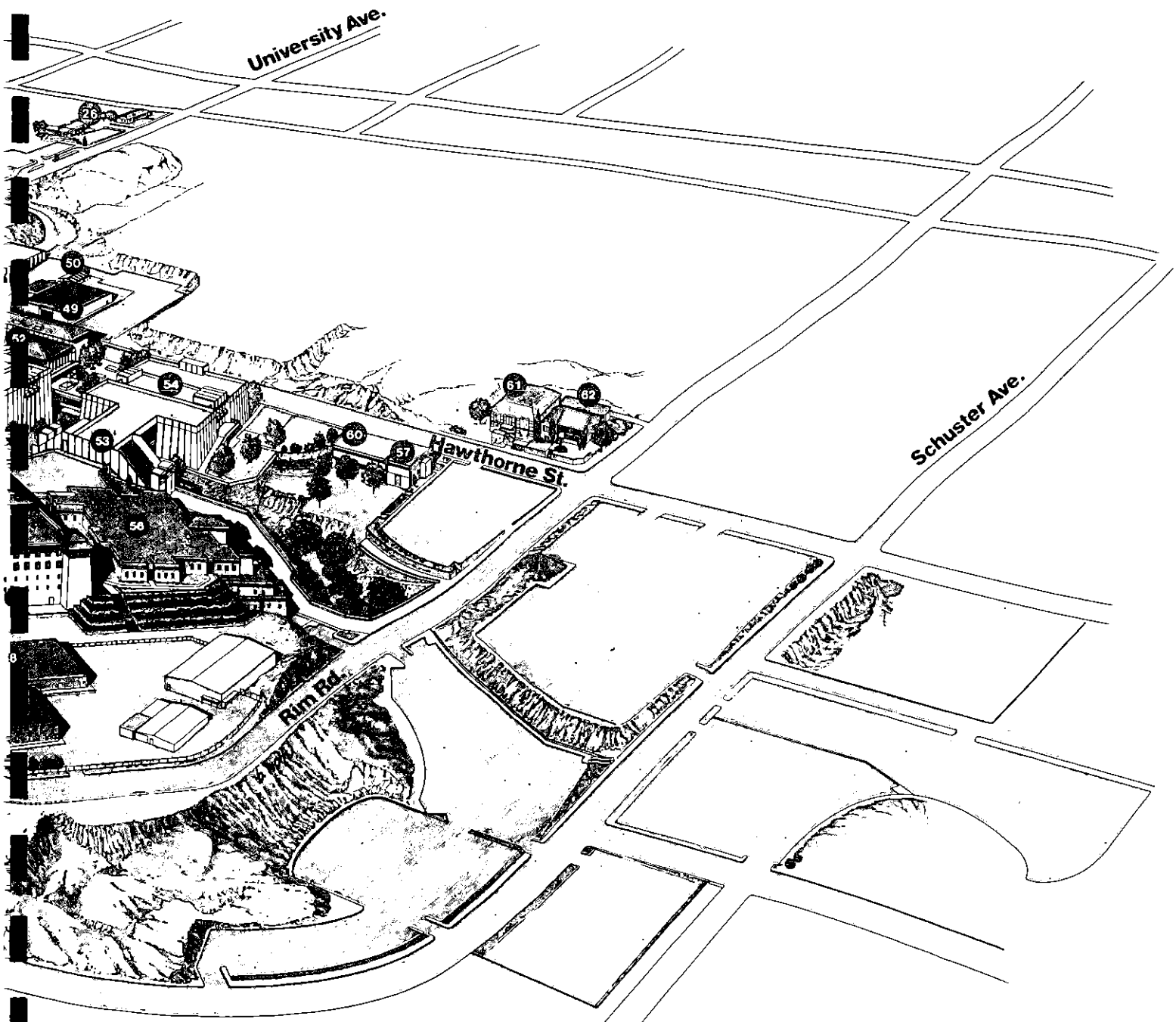


# Campus Map

Academic Services Center (49)  
 Administration Annex (Development/Alumni) (42)  
 Administration Bldg. (43)  
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 Bell Hall (46)  
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Burges Hall (Dormitory) (34)  
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 Central Energy Plant (47)  
 Classroom Bldg. (52)  
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 Cotton Memorial Bldg. (30)  
 Education Bldg. (22)

Engineering Bldg. (54)  
 Fox Fine Arts Center (16)  
 Geology Bldg. (14)  
 Graham Hall (21)  
 Health Service (40)  
 Holiday Hall (12)  
 Housing, Student Family (10)  
 Hudspeth Hall (29)  
 Kelly Hall (Dormitory) (36)  
 Kidd Field (9)



- Kidd Seismic Observatory (15)
- Liberal Arts Bldg. (44)
- Library, Old Bldg. (31)
- Library, Central (55)
- Magoffin Auditorium (17)
- Math Annex (62)
- Memorial Gym (7)
- Metallurgy Bldg. (53)
- Military Science Bldg. (4)
- Miners Hall (27)
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- \*Nursing and Allied Health,  
College of
- Old Engine #1 (33)
- Old Main (19)
- Oregon St. Intramural Field (11)
- Physical Plant (59)
- Physical Plant (future site) (63)
- Physical Science Bldg. (48)
- Police, Campus (61)
- Print Shop (58)
- Psychology Bldg. (23)

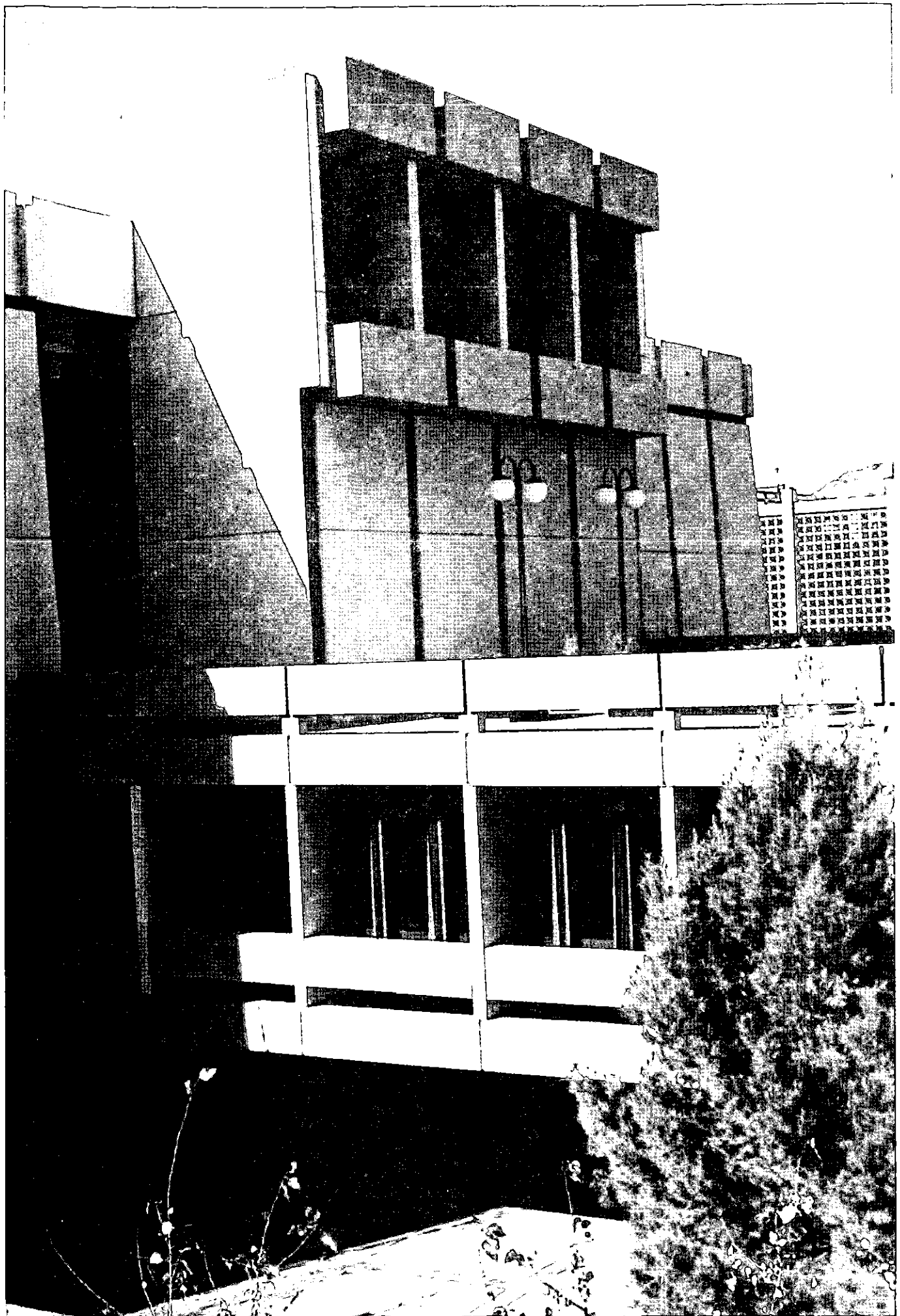
- Quinn Hall (18)
- Seamon Hall (13)
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- Special Projects Ctr. (24)
- Speech, Hearing and  
Language Clinic (26)
- Sun Bowl Stadium (8)

- Swimming Pool (37)
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- Ticket Ctr. (2)
- Union Bldg. (25)
- Upper Intramural Field (3)
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- Women's Gym (38)
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\*The College of Nursing and Allied Health is located at 1101 N. Campbell St., corner of Campbell and Arizona streets.

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GRADUATE

THE UNIVERSITY OF TEXAS AT EL PASO ADMISSION APPLICATION

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The U.S. Social Security Number is used for matriculation and record identification only. If you do not furnish your Social Security Number, a student number will be assigned to you.

2. Last (Family) Name First Name Middle or Maiden Name

3. Current Mailing Address: No. & Street Apt. Country City State or Country ZIP Telephone

4. Permanent Mailing Address: No. & Street Apt. County City State or County ZIP Telephone

5. Birthdate Birthplace 6. Sex: ( ) Male ( ) Female 7. Your citizenship

8. If you are not a U.S. citizen, are you a permanent resident of the United States? ( ) Yes ( ) No Alien registration number Date of issue Port of entry

9. Ethnicity: Check one. This item is used to satisfy state/federal reporting requirements ONLY and in no way affects the admission decision. (1) White/Non-Hispanic (2) Black/Non-Hispanic (3) Hispanic (4) Asian/Pacific Islander (5) American Indian/Alaskan Native (6) International Student

10. Semester for which you are applying (Application valid beginning this semester only): ( ) Summer I ( ) Summer II ( ) Fall ( ) Spring 19

11. Are you a Texas resident? ( ) Yes ( ) No How long have you lived in Texas? Years Months

Answer the following questions as they pertain to: (a) your parent or legal guardian IF YOU ARE 18 YEARS OF AGE OR YOUNGER or if you are dependent upon this person. (b) yourself IF YOU ARE 19 YEARS OF AGE OR OLDER and independent. (c) yourself or your spouse IF MARRIED.

Name Relationship to you

Address for the last 24 months:

Table with 5 columns: Number & Street, City, State, Beginning Mo./Yr., Ending Mo./Yr.

Employment for the last 24 months:

Table with 5 columns: Employer, City & State, Part- or Full-Time, Beginning Mo./Yr., Ending Mo./Yr.

Are you, your parent or guardian, or your spouse currently on active U.S. military duty in Texas? ( ) Yes ( ) No

Stationed at Home of Record Expected date of separation

If your military Home of Record is not Texas, attach a written statement from the appropriate commanding or personnel officer certifying that you (or one of the above-mentioned persons) are now assigned to active duty in Texas and will be so assigned at the time you enroll at U.T. El Paso. This may enable you to pay resident tuition.

12. You must submit a complete, official transcript from EACH school attended and cannot disregard any portion of your academic career. List ALL colleges or universities attended and give dates of attendance and credit (specify semester or quarter hours) received from each. If you are a returning U.T. El Paso student, you must submit an official transcript from each school attended since your last enrollment here.

Table with 5 columns: College or University, State, Dates Attended, Credit, Academic Standing

13. Have you previously attended U.T. El Paso? ( ) Yes ( ) No  
 If yes, name under which you were last enrolled: Last \_\_\_\_\_ First \_\_\_\_\_ Middle \_\_\_\_\_  
 Student number \_\_\_\_\_ Dates of attendance: \_\_\_\_\_ to \_\_\_\_\_

14. College or university from which you received your baccalaureate degree \_\_\_\_\_  
 Degree received \_\_\_\_\_ Major \_\_\_\_\_ Date Received \_\_\_\_\_

15. What are your GRE scores? \_\_\_\_\_ Date \_\_\_\_\_ GMAT scores? \_\_\_\_\_ Date \_\_\_\_\_

16. INTERNATIONAL STUDENTS:  
 Will you need an I-20 to attend U.T. El Paso? ( ) Yes ( ) No If you currently have a student visa, which school issued your I-20? \_\_\_\_\_  
 \_\_\_\_\_ If you are currently in the United States and do not have a student visa, what type of visa do you have? \_\_\_\_\_  
 Your TOEFL (Test of English as a Foreign Language) score \_\_\_\_\_ Examination Date \_\_\_\_\_

17. Check one of the following majors or program objectives:

a. If you are working toward a DEGREE, check one of the following:  
**MAJOR FIELDS:**

( ) 100 Accounting	M.Ac.	( ) 146 Clinical	M.A.
( ) 122 Biological Sciences	M.S.	( ) 206 Experimental	M.A.
( ) 132 Business Administration	M.B.A.	( ) 295 Public Administration	M.P.A.
( ) 138 Chemistry	M.S.	( ) 312 Sociology	M.A.
( ) 168 Drama	M.A.	( ) 314 Spanish	M.A.
( ) 170 Drama and Speech	M.A.	( ) 318 Speech	M.A.
( ) 174 Economics	M.A.	( ) 324 Speech Pathology & Audiology	M.A.
		( ) 326 Statistics	

*Education:*

( ) 182 Education	M.A., M.Ed.	b. If you are working toward CERTIFICATION (either instead of, or in addition to, a degree) check one of the following:
( ) 144 Classroom Teaching	M.Ed.	PROVISIONAL CERTIFICATES (available for any undergraduate or graduate student)
( ) 162 Curriculum & Instruction	M.A.	( ) 188 Elementary Level
( ) 164 Curriculum Development	M.Ed.	( ) 306 Secondary Level
( ) 178 Educational Administration	M.Ed.	( ) 116 Both Levels: Art Education
( ) 176 Educational Psychology & Guidance	M.Ed.	( ) 270 Both Levels: Music Education
( ) 180 Educational Diagnostician	M.Ed.	( ) 282 Both Levels: Physical Education
( ) 188 Elementary Education	M.Ed.	( ) 322 Both Levels: Speech/Hearing Therapy
( ) 190 Elementary Supervision	M.Ed.	( ) 166 Both Levels: Deaf/Severely Hard of Hearing
( ) 220 Guidance & Counseling	M.Ed.	PROFESSIONAL CERTIFICATES (requires completed master's degree or concurrent registration for masters)
( ) 224 Health Education	M.S., M.Ed.	( ) 189 Elementary Level
( ) 282 Physical Education	M.S., M.Ed.	( ) 307 Secondary Level
( ) 298 Reading Education	M.Ed.	( ) 152 Counselor
( ) 306 Secondary Education	M.Ed.	( ) 264 Mid-Management
( ) 308 Secondary Supervision	M.Ed.	( ) 302 School Superintendent

*Engineering:*

( ) 142 Civil	M.S.	( ) 190 Elementary Supervision
( ) 150 Computer Science	M.S.	( ) 308 Secondary Supervision
( ) 186 Electrical	M.S.	( ) 298 Both Levels: Reading
( ) 184 Electrical, Computer Engineering	M.S.	( ) 283 Both Levels: Physical Education
( ) 194 Engineering, Undifferentiated	M.S.	( ) 269 Both Levels: Music
( ) 228 Industrial	M.S.	c. If you are working toward an ENDORSEMENT (either instead of, or in addition to, a degree) check one of the following:
( ) 250 Mechanical	M.S.	( ) 120 Bilingual Education
( ) 256 Metallurgical	M.S.	( ) 172 Early Childhood for the Handicapped

*English:*

( ) 196 British & American Literature	M.A.	( ) 205 English as a Second Language
( ) 198 Creative Writing	M.A.	( ) 238 Kindergarten
( ) 202 Professional Writing & Rhetoric	M.A.	( ) 328 Visually Handicapped
( ) 214 Geology (Master's)	M.S.	d. If you are earning credits for CAREER LADDER TEACHING (either instead of, or in addition to, a degree) check the following (available only for teachers who are already certified):
( ) 215 Geological Sciences (Doctorate)	D.G.S.	( ) 134 Career Ladder Teaching
( ) 216 Geophysics	M.S.	e. ( ) 999 Unclassified, non-degree
( ) 226 History	M.A.	
( ) 346 History: Border History	M.A.	
( ) 230 Interdisciplinary Studies, Liberal Arts	M.A.I.S.	
( ) 232 Interdisciplinary Studies, Science	M.S.I.S.	
( ) 112 Linguistics, Applied English	M.A.	
( ) 246 Mathematics	M.S., M.A.T.	
( ) 270 Music Education	M.M.	
( ) 271 Music Performance	M.M.	

*Nursing:*

( ) 350 Medical/Surgical	M.S.N.
( ) 352 Psychiatric/Mental Health	M.S.N.
( ) 354 Maternal/Child	M.S.N.
( ) 349 Nursing, undecided	M.S.N.
( ) 284 Physics	M.S.
( ) 286 Political Science	M.A.

*Psychology:*

ALL REQUIRED OFFICIAL DOCUMENTS MUST BE RECEIVED BY THE GRADUATE SCHOOL BEFORE AN ADMISSION DECISION CAN BE MADE. THE HEALTH FORM IS REQUIRED OF ALL INTERNATIONAL STUDENTS. PROOF OF APPROPRIATE IMMUNIZATIONS IS REQUIRED OF ALL STUDENTS ENROLLING FALL, 1985 AND THEREAFTER.

I certify that I have read and understand all the above information and that all questions on this application have been answered completely and correctly. Signature \_\_\_\_\_ Date \_\_\_\_\_

**STATEMENT OF EQUAL EDUCATIONAL OPPORTUNITY**

With respect to the admission and education of students, with respect to the availability of student loans, grants, scholarships, and job opportunities, with respect to the student and faculty housing situated on premises owned or occupied by the University, The University of Texas at El Paso shall not discriminate either in favor of or against any person on the basis of his or her race, sex, religion, color, creed, age, national origin, physical or mental handicaps. Rev. 1/85

**Directory of further Information and Correspondence:**

The mailing address for correspondence to all offices:

The University of Texas at El Paso (Department) El Paso, Texas 79968

Location and telephone numbers for academic deans and departments, and for many other offices, are shown in the appropriate section of this catalog. For other numbers, the University directory operator can be reached at (915) 747-5005.

Academic Advising	Academic Advising Center Academic Services Building (915) 747-5290
Admission, Undergraduate Evaluation of Transfer Credit Residency Determination	Office of Admission and Evaluation Academic Services Building (915) 747-5576
Admission, Graduate	Graduate School 209 Administration Building (915) 747-5491
Counseling and Guidance Testing	University Counseling Service 103 West Union (915) 747-5568
Financial Aid	Office of Financial Aid 202 West Union (915) 747-5204
Financial Information	Cashier's Office - Bursar Academic Services Building (915) 747-5105
Health Services	Student Health Service Wiggins Drive (915) 747-5624
Housing Information	Housing Business Office Barry Hall, First Floor (915) 747-5352
Registration, Records, Schedule Book and Transcript Information	Office of the Registrar Academic Services Building (915) 747-5544
Scholarships	Office of Undergraduate Recruitment and Scholarships Academic Services Building (915) 747-5890
New Student Information	Office of Undergraduate Recruitment and Scholarships Academic Services Building (915) 747-5896
New Student Orientation	Academic Advising Center Academic Services Building (915) 747-5290
Student Affairs	Dean of Students 102 West Union (915) 747-5648
Student ID Information	Office of the Registrar Academic Services Building (915) 747-5100
Veterans Information	Office of the Registrar Academic Services Building (915) 747-5342

The University of Texas at El Paso  
Office of The Graduate Dean  
El Paso, Texas 79968-0566

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