1971-72

THE
GRADUATE SCHOOL

GRADUATE SCHOOL

1971-1972

BEAUMONT, TEXAS

The courses, tuition and fees, and other policies explained in this 1971-72
catalog shall remain in effect with such conditions and alterations as may be
authorized by the Board of Regents, until a new graduate catalog is issued.

BOARD OF REGENTS

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CALENDARS FOR 1971 AND 1972

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LAMAR STATE COLLEGE OF TECHNOLOGY
College Calendar for 1971-72
Fall Semester, 1971

Aug. 25	Wednesday		Registration of students who have completed entrance procedures
Aug. 26-27	Thurs.-Fri.		Continued registration
Aug. 30	Monday	8 a.m.	Classes begin
			Late registration (penalty fee charged).
Sept. 1	Wednesday		Last date for registration or for adding courses.
Oct. 18-22	Mon.-Fri.		Mid-semester week
Nov. 3	Wednesday		Foreign Language Examination
Nov. 5	Friday		Last date for dropping courses or for withdrawing without penalty.
Nov. 8-Dec. 3			Period for Comprehensive Oral Examinations.
Nov. 12	Friday		Last date for filing application for graduation in December.
Nov. 18	Thursday	1-4 p.m.	Comprehensive Written Examinations.
Nov. 19	Friday		Last date for approval of December graduation.
Nov. 24	Wednesday	10 p.m.	Thanksgiving holidays begin.
Nov. 29	Monday	8 a.m.	Classes resume.
Dec. 7	Tuesday		Last date for dropping courses or withdrawing.
Dec. 17	Friday		Last class day.
Dec. 18	Saturday		Commencement exercises

Spring Semester, 1972

Jan. 12	Wednesday		Registration of students who have completed entrance procedures
Jan. 13-14	Thurs.-Fri.		Continued registration
Jan. 17	Monday	8 a.m.	Classes begin
			Late registration (penalty fee charged).
Jan. 19	Wednesday		Last date for registration or for adding courses.
Feb. 25	Friday		Last day for filing application for graduation in May.
Mar. 1	Wednesday		Foreign Language Examination
Mar. 3	Friday		Last date for approval of May graduation.
Mar. 6-10	Mon.-Fri.		Mid-semester week.
Mar. 24	Friday		Last date for dropping or withdrawing without penalty.

Mar. 24	Friday	10 p.m.	Spring holidays begin.
April 3.	Monday	8 a.m.	Classes resume.
April 7	May 28		Period for Comprehensive Oral Examinations.
April 13	Thursday	1-4 p.m.	Comprehensive Written Examination.
May 2	Tuesday		Last date for dropping courses or withdrawing.
May 13	Saturday		Commencement Exercises.
May 19	Friday		Last class day.

Summer Session, 1972

First Term

June 5	Monday		Registration
June 6	Tuesday	8 a.m.	Classes begin.
			Late registration (penalty fee charged).
June 7	Wednesday		Last date for registration or for adding courses.
June 23	Friday		Last date for filing application for August graduation.
June 27	Tuesday		Last date for dropping courses or withdrawing without penalty.
June 29	Thursday	1-4 p.m.	Comprehensive Written Examination.
June 30	Friday		Last date for approval of August graduation.
July 4	Tuesday		Independence Day holiday.
July 10-Aug. 18			Period for Comprehensive Oral Examinations.
July 11	Tuesday		Last date for dropping courses or withdrawing.
July 12	Wednesday		Last class day.

Second Term

July 13	Thursday		Registration.
July 14	Friday	8 a.m.	Classes begin.
			Late registration (penalty fee charged).
July 17	Monday		Last date for registration or for adding courses.
July 26	Wednesday		Foreign Language Examination.
July 27	Thursday	1-4 p.m.	Comprehensive Written Examination.
Aug. 1	Tuesday		Last date for dropping courses or withdrawing without penalty.
Aug. 14	Monday		Last date for dropping courses or withdrawing.
Aug. 18	Friday		Last class day.
Aug. 19	Saturday		Commencement exercises.

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ROGER E. YERICK, Professor of Chemistry—Assistant Dean, School of Sciences

> B.S., Texas A & I University
> Ph.D., Iowa State University

FRED M. YOUNG, Associate Professor of Mechanical Engineering

> B.S., M.S., Ph.D. Southern Methodist University

DAVID D. ZINK, Associate Professor of English

> B.A., The University of Texas
> M.A., Ph.D., University of Colorado

Associate Members

ARNOLD C. ANDERSON, Associate Professor of Speech

> B.S., Northern State College
> M.A., University of South Dakota

JOSEPH ADAM BAJ, III, Associate Professor of Mathematics

> B.A., Kent State University
> M.A., The University of Texas

GEORGE BERZSENYI, Assistant Professor of Mathematics

> B.A., University of Dallas
> M.S., Ph.D., Texas Christian University

JAMES J. BRENNAN, Associate Professor of Industrial Engineering

> B.S., University of Northern Iowa
> M.S., University of Arkansas

JOHN A. BRUYERE, Associate Professor of Mechanical Engineering

> B.S., M.S., University of Texas
> Registered Professional Engineer

CHARLES M. BURKE, Assistant Professor of Elementary Education

> B.A., Southeastern Louisiana College
> M.Ed., Louisiana State University
> Ed.D., University of Southern Mississippi

VERNON ROY CROWDER, Assistant Professor of Health and Physical Education for Men

> B.S.,Lamar State College of Technology
> M.S., Ph.D., Louisiana State University

KEITH C. HANSEN, Assistant Professor of Chemistry

> B.S., Lamar State College of Technology
> Ph.D., Tulane University

RICHARD C. HARREL, Assistant Professor of Biology
>B.S., East Central State College
>M.S.Ed., University of Georgia
>Ph.D., Oklahoma State University

JACK R. HOPPER, Assistant Professor of Chemical Engineering
>B.S., Texas A & M University
>M.S., University of Delaware
>Ph.D., Louisiana State University

JOHN M. KRAMER, Assistant Professor of Mechanical Engineering
>B.S., M.S., Ph.D., University of Wisconsin

BOYD LEE LANIER, Assistant Professor of Government
>B.A., M.S., Ph.D., Florida State University

WILLIAM W. MacDONALD, Assistant Professor of History
>B.S., Boston University
>M.A., Ph.D., New York University

LEON McGRAW, JR., Assistant Professor of Biology
>B.S., Lamar State College of Technology
>M.S., Ph.D., Texas A & M University

J. DALE ORTEGO, Assistant Professor of Chemistry
>B.S., University of Southwestern Louisiana
>Ph.D., Louisiana State University

WILLIAM M. PEARSON, Assistant Professor of Government
>B.S., Sam Houston State University
>M.A., Texas A & M University
>Ph.D., Louisiana State University

PHILIP B. ROBERTSON, Assistant Professor of Biology
>B.S., Concord College
>M.S., Ph.D., University of Miami

WILLIAM C. RUNNELS, Assistant Professor of Biology
>B.S., M.S., Texas A & I University
>Ph.D., Texas A & M University

RAMON S. SATTERWHITE, Assistant Professor of Electrical Engineering
>B.S., University of Arkansas
>M.S., University of New Mexico
>Ph.D., Ohio State University

ALFRED F. STEIERT, Assistant Professor of Business Administration
>B.B.A., M.B.A., University of Florida

RICHARD E. SWAIN, III, Assistant Professor of Secondary Education
>B.S., M.Ed., Ed.D., North Texas State University

MICHAEL E. WARREN, Assistant Professor of Biology
>B.A., M.A., Ph.D., The University of Texas

JOHN A. WHITTLE, Assistant Professor of Chemistry
>B.Sc., University of Glasgow
>Ph.D., University of London

SAM M. WOOD, JR., Associate Professor of Mathematics
B.A., The University of Texas
M.S., Texas A & M University

DIRECTORY FOR CORRESPONDENCE

To obtain prompt attention, address inquiries to the following persons or agencies at Lamar Tech Station, Box 10004, Beaumont, Texas 77705:

Academic Program—Admissions. . . . . .E.B. Blackburn, Jr.
Dean, Graduate School
Academic Records and Transcripts . . . . Norris H. Kelton
Dean, Admissions and Records
Graduate Record Examination . . . . Joe B. Thrash
Placement Office
Master of Arts—English . . . . Harry L. Frissell
Head, Department of English
Master of Arts—Government . . . . .William R. Tucker
Head, Department of Government
Master of Arts—History . . . . Howard Mackey
Graduate Counselor, Department of History
Master of Business Administration—Business . . . . .J.D. Landes
Dean, School of Business
Master of Science—Biology . . . . Edwin S. Hayes
Dean, School of Sciences
Master of Science—Chemistry. . . . . Harold T. Baker
Head, Department of Chemistry
Master of Science—Health and Physical Education . . . . . . Belle Mead Holm
Head, Department of Health and Physical Education for Women
Master of Science—Speech . . . . W. B. Brentlinger
Dean, School of Fine and Applied Arts
Master of Science—Mathematics . . . . Jeremiah M. Stark
Head, Department of Mathematics
Master of Engineering . . . . Lloyd B. Cherry
Dean, School of Engineering
Master of Education . . . . M. L. McLaughlin
Dean, School of Education
Doctor of Engineering . . . . Bruce Rogers
Coordinator
Professional Certification . . . . Howard W. Adams
Director, Certification and Graduate Studies in Education
Housing, Dormitory Reservations . . . . John Shirley
Student Affairs Office
Research Center. . . . . .Charles P. Turco
Director
Tuition, Fees, Expenses . . . . Finance Office
Veteran's Affairs . . . . Joe B. Thrash
Placement Office

PART I

GENERAL COLLEGE INFORMATION

GENERAL INFORMATION

Location

Lamar State College of Technology is a state-supported institution located in the center of industrial Southeast Texas at Beaumont. Principal industries in the area are oil refining, shipping, shipbuilding, rubber manufacturing and chemical production. Surrounding the urban communities are ranches and rice farms.

The campus is adjacent to the Beaumont-Port Arthur Highway in southeastern Beaumont. With a population of approximately 120,000, Beaumont has modern schools, churches, and shopping districts to serve the thriving industrial community.

In the metropolitan Beaumont area are the cities of Port Arthur, Orange, Vidor, Port Neches, Nederland and Groves, all within 25 miles and forming the heart of the Gulf Coast area with an estimated population of more than 300,000.

History

South Park Junior College was established in 1923. The college was organized and controlled by the South Park Independent School District, and classes were conducted in the South Park High School Building. Enrollment increased from about 125 in 1923 to 300 in 1931.

In 1932, the name of the institution was changed to Lamar College. At this time separate facilities were provided, additional equipment was purchased and new policies were instituted. By 1939, enrollment was approximately 640.

In 1940, Lamar Union Junior College District was created, and Lamar College was separated from the South Park Independent School District. Bonds were voted and new facilities were constructed on the site of the present main campus.

A movement to expand Lamar College into a four-year state-supported school culminated in the creation of Lamar State College of Technology on September 1, 1951. Since that time the curriculum has been expanded and liberalized to include many areas of study, and many additional facilities have been provided. Enrollment has increased until there are now more than 10,000 students.

The College offered graduate work in specified fields beginning in the academic year of 1960-61.

Government

The government of the College is vested in a board of nine regents appointed by the Governor and approved by the Senate for terms of six years. The direction of academic affairs is delegated by the Board of Regents to the President, administrative officers, and faculty.

The general policies of the Graduate School are determined and administered by the Graduate Council.

Accreditation and Approval

Lamar State College of Technology is fully accredited by the Association of Texas Colleges and Universities and by the Southern Association of Colleges and Schools. The Graduate School is a member of the Council of Graduate Schools in the United States.

Several departments have been accredited by professional agencies. In the School of Engineering, the departments of Chemical, Civil, Electrical, Industrial, and Mechanical Engineering are accredited by the Engineers' Council for Professional Development. Other accreditations include the Department of Chemistry, which is accredited by the American Chemical Society; the Department of Music, which is accredited by the National Association of Schools of Music; and the Departments of Elementary and Secondary Education, which are accredited by the National Council for the Accreditation of Teacher Education.

The Texas Education Agency has approved Professional Certification programs in a number of areas.

The Library

In support of the continuously expanding academic programs, the Lamar Library has developed a strong collection. Approximately 25,000 volumes are added annually to the present 220,000 volumes, and over 3,000 periodicals are received. Library resources are further enriched by some 25,000 state and federal documents and microform materials. Additional resources are available to faculty, graduate students, and advanced research students through the library's membership in a statewide information network with teletype communication.

Library hours are as follows:

7:30 a.m. to 11 p.m. Monday through Thursday
7:30 a.m. to 5 p.m., Friday
8:00 a.m. to 5 p.m. Saturday
2:00 p.m. to 11 p.m. Sunday

Research Center

The Research Center was formally organized in 1956. It is administered by a director who serves as the chairman of the faculty research committee. All state financed research projects are awarded through the research committee.

The Center also provides means for industrial organizations to obtain faculty assistance in solving their research needs.

Computer Center

The college operates a computer center as a service to faculty, administration, students, researchers, and others. The computer center has modern, high-speed digital and analog equipment valued in excess of three-quarters of a million dollars.

Testing and Placement Service

The Testing and Placement Center is located in the Educational Services Center and is open 8:00 a.m. to 5:00 p.m. Monday through Friday.

This Center provides testing service for entering students and for others who want it. Non-students wishing to use this service pay a fee depending upon the testing program desired.

Placement service is also provided at this Center and is available to all students, faculty and former students.

Health Center

The College maintains a Health Center for the use of students during the long term or summer session.

Two types of service are available: (1) out-patient service for those who have minor ailments but who do not require constant supervision, and (2) infirmary service for those who are in need of the continued attention of the College physician or of nursing care.

It is not possible for the College to provide unlimited medical service. Special medicines, examinations, treatments, X-rays, and laboratory tests are not furnished by the College. However, no charge is made for care in the Health Center up to ten days each semester. A small fee for drugs, supplies, and special services may be charged students required to remain the the Health Center for more than ten days.

The Health Center, located on East Virginia near Combs Hall, is adequately staffed and equipped for treating illnesses and injuries, but the Center does not provide care for students requiring surgery or the services of specialists. In these cases, every effort will be made by the College physician or nurse to notify the parents or guardians of the students' needs.

The College assumes no responsibility for continued medical care for students having chronic diseases. These students should arrange for the care of a private physician located in Beaumont or vicinity.

In the event the Health Center is filled to capacity, the College is not under obligation to provide hospital service elsewhere. However, the Health Center has a sufficient number of beds for all normal needs.

Students who are ill should report promptly to the Center for diagnosis and treatments. They will not be treated in the dormitory or in rooming houses. The College will take appropriate disciplinary action against students who refuse to report for medical advice when ill.

Veterans Education

Lamar is approved for educational training under all of the Veterans Educational Assistance programs.

Veterans and their dependents who are interested in attending Lamar under federal laws which provide educational assistance are directed to secure information and aid in planning their college work by consulting the Office for Veteran's Education, Educational Services Center.

Loan Funds and Scholarships

Financial assistance in the form of loans and scholarships is available for a limited number of students. Details may be obtained on request from the Director of Student Financial Aid.

Teaching Fellowships

A number of teaching fellowships are available in the various department of the Graduate School. Application forms and additional information may be obtained from the Dean of the Graduate School.

The stipend for a teaching fellowship varies in accordance with the number of college courses taught, and the student must reduce his academic load in relation to his teaching assignment.

Tuition and fees are not waived for teaching fellows, but non-residents (out of Texas) are not required to pay out-of-state tuition.

Teacher Certification

Lamar State College of Technology has been approved by the Texas Education Agency to offer professional certification programs in Elementary, Special and Secondary Education, and Counseling and Guidance. Specific information concerning certification may be found in the "Education" section of this catalogue or may be obtained from the Director of Certification in the School of Education.

FEES AND EXPENSES

Payment of Fees

Lamar State College of Technology reserves the right to change fees in keeping with acts of the Texas Legislature.

A student is not registered until his fees are paid in full. Payment may be made by check, money order, or currency. Checks and money orders, not in excess of total fees, should be made payable to Lamar State College of Technology and will be accepted subject to final payment.

Fees Summary

Resident Students (Texas)

Semester Hours	Tuition	S.S. Fee	Bldg. Use Fee	Total + Laboratory Fees	
12 or more	$50.00	$30.00	$26.00	$106.00	Lab Fee
11	47.00	30.00	26.00	103.00"	" "
10	43.00	30.00	26.00	99.00"	" "
9	39.00	30.00	26.00	95.00"	" "
8	35.00	30.00	26.00	91.00"	" "
7	31.00	16.00	13.00	60.00"	" "
6	27.00	16.00	13.00	56.00"	" "
5	23.00	16.00	13.00	52.00"	" "
4	19.00	16.00	13.00	48.00"	" "
3 or less	15.00	16.00	13.00	44.00"	" "

Non-Resident Students (out of Texas)

Semester Hours	Tuition	S.S. Fee	Bldg. Use Fee	Total + Laborotory Fees	
12 or more	$200.00	$30.00	$26.00	$256.00 +	Lab Fee
11	183.00	30.00	26.00	239.00"	" "
10	167.00	30.00	26.00	223.00"	" "
9	150.00	30.00	26.00	206.00"	" "
8	133.00	30.00	26.00	189.00"	" "
7	117.00	16.00	13.00	146.00"	" "
6	100.00	16.00	13.00	129.00"	" "
5	83.00	16.00	13.00	112.00"	" "
4	66.00	16.00	13.00	95.00"	" "
3 or less	50.00	16.00	13.00	79.00"	" "

For summer session students the student service fee is $10.00 per term.

These fees have been approved by appropriate acts of the Legislature of the State of Texas.

Parking Fee

Each student who pays the necessary fee is issued a car decal which permits parking on the campus. This decal is numbered and is to be displayed as instructed in official parking and traffic regulations, which are issued when automobiles are registered. Strict observance of traffic and parking regulations is necessary for the safe, orderly flow of vehicles in the campus area.

Charges for parking on campus are made at the time a student is registered. In each instance, a student's parking fee is honored up to the end of the current fiscal year, which is August 31.

Registration of an automobile in September is $10.00. The February fee is $6.00. A student registering for the first Summer Session is charged $4.00, and for the second Summer Session is $2.00.

Only one registration is required for one school year.

Returned Check Fees

If a check is returned unpaid, the student is automatically suspended from college, but may re-enter upon redemption of the check plus payment of the return check fee of $2.00.

Miscellaneous Fees

Binding Thesis (3 copies)	$15.00
Master's Diploma	6.50
Cap, Gown, and Hood Rental (Master's)	8.50
Late Registration	5.00
Returned Checks	2.00
Re-entry Fee	5.00
Transcript Fee	.50

Health and Accident Insurance

Additional health and accident coverage providing protection over and beyond that given by the Health Center is available at registration for students carrying 9 or more semester hours. The fee is $25.00 (estimated). For their protection and welfare this (or similar) insurance is required of all foreign students.

Refund of Fees

Any student withdrawing officially will receive a refund on tuition, student service, laboratory and private lesson fees according to the following schedule.

Long Session

1. During the first two weeks of the semester, 80 per cent.

2. During the third week of the semester, 60 per cent.

3. During the fourth week of the semester, 40 per cent.

4. During the fifth week of the semester, 20 per cent.

Summer Session

1. During the first week of the semester, 60 per cent.

2. After first week no refund.

No refunds are made when dropping courses.

Application for refund must be made to the Vice-President of Finance after the student has officially withdrawn, but not later than the end of the current semester or summer session.

It takes about 30 days to process these refunds.

Fine and Breakage Loss

All library fines, breakage or loss of equipment charges, or other charges must be paid before a transcript of credit or a permit to re-enter college will be issued.

Student Responsibility for Residence Classification

The responsibility of registering under the proper residence classification is that of the student, and if there is any possible question of his right to classification as a resident of Texas, it is his obligation, prior to or at the time of his registration, to raise the question with the Dean of Admissions and Records and have his status officially determined.

Every student who is classified as a resident student but who becomes a non-resident at any time by virtue of a change of legal residence by his own action or by the person controlling his domicile is required to notify the Dean of Admissions and Records.

STUDENT HOUSING

The student housing program at Lamar is designed to supplement the academic program of instruction by providing opportunities for social and intellectual development and recreation in a pleasant living environment. A professional staff is on hand to work with students in planning and executing residence hall programs and to serve as advisors and counselors to students.

A variety of room accommodations and meal plans are available to meet the needs of the individual student.

Students who do not feel that the residence hall programs meet their personal needs may elect to find living accommodations off-campus.

Policies

The following policies will govern the operation of residence halls in 1971-72.

1. Students may request private rooms, or rooms with one or two roommates. Unfurnished rooms will be available at reduced cost in selected housing units. All students who live in college housing must participate in one of the three meal plans offered. Rates for room and board are given below.

2. Residence hall room assignments will be made on a contract lease basis, cancellable by the student at the end of any given semester. If a student removes himself from the housing system prior to the end of the semester, no refund of room rent or deposit will be made and the student will honor his contractural agreement for food service for the balance of the semester. Except for fractional parts of a month, rent refunds will be made to occupants moving from the married students apartments.

3. Under the guidance of the Student Affairs Division, the various residence halls councils, elected by the residents, will have the responsibility for enacting, and enforcing rules and regulations governing their respective residence halls.

4. Within certain limitations, rooms may be decorated to suit individual tastes, including the painting of walls in some units. Prior approval of the Assistant Dean of Students for Housing is required.

5. A $50 deposit will be required of all residents, to serve as a guarantee of reservations and to be applied against any damage in college facilities chargeable to the student. The amount of the deposit must total $50 at the start of each semester: i.e., any charges against the deposit must be reimbursed to the deposit fund to bring it up to $50 prior to occupancy for the ensuing semester.

Direct inquiries regarding all housing (accommodations, charges, room reservations, board, etc.) to: Housing Officer, Lamar State College of Technology, P. O. Box 10041, Lamar Tech Station, Beaumont, Texas 77705.

6. Dormitory residents will be responsible for replacement or repair of any college property entrusted to them which may be damaged whether such damage is caused by the occupant or a guest.

7. Payment for damages to any area of the dormitory will be required of the individual student responsible for the damages.

8. In the event responsibility for damages to lounges, hallways, stairways, and other areas cannot be determined, all residents will share equally in the cost of replacement or repair.

9. Women's housing units normally close at 12 midnight Sunday through Thursday and at 2 a.m. on Friday and Saturday nights.

10. Residents of the Lamar Apartments will be allowed to have visitors of the other sex in their apartments during prescribed hours. This so-called "open housing" plan is available only in the apartments. In addition to married couples, apartment units may be leased by juniors, seniors, and graduate students who are 21 years of age, or whose parents sign an "open housing consent" form.

11. Rules governing "open housing" will be drafted and enforced by the residence hall council of the Lamar Apartments, in cooperation with the Student Affairs staff.

12. Possession and/or use on campus of alcoholic beverages, marijuana, or any illegal drug is violation of college regulations, and violators will be subject to disciplinary action, including removal from the institution and prosecution through the civil and/or criminal courts.

13. Students whose general behavior warrants disciplinary action may forfeit their privilege of remaining in the college residence halls.

14. The college reserves the right to inspect student rooms at any time.

Rates

Room rent for the semester must be paid in advance, but may be paid in installments (see below). If an installment plan is chosen, the initial payment is due at check-in. Students may not alternate board plan during the semester.

Type of Facility (Cost per Student per Semester)	With Air-conditioning	Without Air-conditioning
Regular dormitories:		
Single occupancy	$325.00	$300.00
Double occupancy	220.00	200.00
Triple occupancy	160.00	145.00
Two-room suites:		
2 students per suite	325.00	300.00
3 students per suite	255.00	233.00
Apartments (with kitchen):		
Married student	375.00	350.00
Two students (each)	250.00	225.00
One student	None	350.00
Apartments (without kitchen):		
Two students (each)	220.00	200.00
One student	375.00	350.00

(A reduction of $45 per year per room will be allowed for rooms rented un-furnished.)

Meal Plans *

A. **Full Board Plan:** Provides three meals per day, except Sunday evening. Meal stickers are not transferrable. Lost stickers will be replaced for a small fee. Payment may be made in advance for the semester, or the student may elect to follow a payment schedule. The total cost for either the fall or spring semester is $262.50.

B. **Partial Board Plan:** The student contracts to purchase a minimum of four meal coupon books per semester. Each book contains coupons for 41 meals, priced at $50 per book, for a total of 164 meals at $200 per semester. Coupons may be used at any meal, in any dining hall (Plummer & Gentry Halls by invitation only).

C. **Cash Coupon Plan:** The student contracts to purchase four cash coupon books, each valued at $50, for a total of $200 per semester. Coupons will be of varying denominations and may be used in any campus manual food service facility for purchases at a la carte prices. (Plummer and Gentry Halls by invitation only.)

* All meal prices subject to 4¼ per cent sales tax.

Conditions Governing the Partial Board Plan and Cash Coupon Plan: Coupons are transferrable and may be used to "treat" guests. No refunds will be made for books lost or damaged beyond recognition. Coupons must be used in the semester of issue. Unused coupons are not redeemable. Coupons purchased during the fall semester will expire on December 17, 1971: coupons purchased during the spring semester will expire on May 19, 1971. Coupon books may be purchased at any time prior to the dates listed below, but purchases must be made by the dates indicated:

Payment Schedule for Partial Board/Cash Coupon Plans

Fall Semester *		Spring Semester *	
No. 1-August (check-in)	$50.00	No. 1-January (check-in)	$50.00
No. 2-September 21	50.00	No. 2-February 8	50.00
No.3-October 19	50.00	No. 3-March 7	50.00
No.4-November 16	50.00	No. 4-April 4	50.00
Total Fall	$200.00	Total Spring	$200.00

RESERVATIONS AND ASSIGNMENTS

Reservations

To reserve a room in the residence halls or an apartment, direct a request to the Housing Office, Lamar State College of Technology, P. O. Box 10041, Lamar Tech Station, Beaumont, Texas 77705. A check or money order for $50.00 must accompany the reservation request. Reservations may be cancelled with full refund until three weeks prior to the first day of classes. No refunds will be issued on cancellations received after this date.

All unclaimed rooms will be declared vacant and the deposit forfeited at 6:00 p.m. on the last day of registration unless the student gives the Student Housing Office written instructions to hold the room for a longer period. Residents will be refunded deposits, less any breakage or cleaning charges, at the end of a semester on proper withdrawal from the housing unit. The deposit will not be refunded if the student moves from the housing system prior to the end of a semester.

Assignments

Permanent assignments cannot be made until the student reports for check-in. The College reserves the right to assign students to specific apartments, dormitories, and rooms. Students may request certain apartments, dormitories, and rooms, and all possible consideration will be given each request. Students already living in college-owned housing units have the first choice of rooms and apartments the following semester.

* All meal prices subject to 4¼ per cent sales tax

SUMMER SCHOOL HOUSING

Dormitories

Brooks Hall (women) and Shivers Hall (men) are utilized by the college for the two summer sessions. Room and board charges (to be paid at the beginning of each session) are as follows:

	Full Board Plan	**Cash Coupon Plan**
Double occupancy (with air conditioning)		
Room rent	$ 73.50	$ 73.50
Board	94.43 + Tax	72.00 + Tax
Total (each session)	$167.93 + Tax	$145.50 + Tax
Single occupancy (with air conditioning)		
Room rent	$108.50	$108.50
Board	94.43 + Tax·	72.00 + Tax
Total (each session)	$202.93 + Tax	$180.50 + Tax

Apartments

A limited number of apartments for single men, women and married students are available in the summer. Charges are as follows:

	With Air-Conditioning	**Without Air-Conditioning**
Single students (each session)		
Double occupancy	$ 77.00	$ 62.00
Single occupancy	None	116.50
Married students (each session)	$125.00	$116.50

Board plans are optional for apartment residents. An apartment occupant interested in a board program should consult the board rates for dormitory residents to get an estimate of the cost.

Direct inquires regarding all housing (accommodations, charges, room reservations, board, etc.) to: Housing Office, Lamar State College of Technology, P.O. Box 10041, Lamar Tech Station, Beaumont, Texas 77705.

ACADEMIC REGULATIONS

Course Numbering

Semesters of a course are numbered separately, and each number contains three or more figures. The first digit indicates the rank of the course: 1 means that it is for freshmen; 2, for sophomores; 3, for juniors; 4, for seniors; and 5, for graduates. The second figure indicates the number of semester hours credit. The third figure (or figures) indicates the order in which the course is taken. The letter a, b, c, or d following course numbers indicates partial credit in each case; full credit for such numbered courses will be granted only when the series is complete.

Changing Schedules

No course may be added, changed or dropped without permission of the department head of the student's major field. Usually a course may not be added after the first week of the semester (first two days of summer session). See college calendar.

Dropping Course

A student may drop a course without penalty during the first ten weeks (three weeks of the summer session) of the semester.

For drops after this penalty free period, grades are recorded as **Drop** or **F** indicating that the student was passing or failing at the time of the drop.

A student may not drop a course within three days of the beginning of the final examination week.

Withdrawals

A student wishing to withdraw for the remainder of a semester, or term, should fill out a Withdrawal Petition in triplicate, after clearing all financial obligations and returning all uniforms, books, laboratory equipment, and other materials to the point of original issue.

The Withdrawal Petition is signed by the Dean of the Graduate School and, together with a withdrawal notice for each class, is then presented to the Dean of Admissions and Records by the student.

On application before the end of the semester or summer term, the Vice-President of Finance will return such fees as are returnable according to the schedule shown under the "Fees" section of this bulletin. This refund is made only to the person withdrawing and only if requested before the end of the current semester or summer term.

If a withdrawal is made before the end of the first ten weeks (three weeks of summer term) or if the student is passing at the time of withdrawal, a grade of W is issued for each course so affected. A grade of F is issued for all courses not being passed at time of withdrawal after this penalty-free period.

A student who leaves without an official withdrawal will receive a grade of F in all courses and will forfeit all returnable fees.

Enforced Withdrawal Due to Illness

The Director of the Health Center and the Vice-President of Student Affairs on the advice of competent medical personnel may require withdrawal, or deny admission, of a student for health reasons (mental or physical).

GENERAL REGULATIONS

Official Summons

An official summons from any administrative office takes precedence over all other college activities of the student and should be answered promptly on the day and hour designated.

Discipline

It is assumed that any student eligible for admission to the College is familiar enough with the ordinary rules of conduct for ladies and gentlemen to need no definite discipline regulations. The College reserves the right to place on disciplinary probation or to dismiss any student at any time for sufficient cause.

Disciplinary procedures, specific college rules and regulations, and statements of student rights and responsibilities are published each year in the Student Handbook, available from the office of the Vice-President of Student Affairs.

Penalty for False Statements

A student who makes a false statement to any college official or on any official form submitted to the College is subject to immediate dismissal.

Student Debts

The college is not responsible for debts contracted by individual students or student organizations and will not act as a collection agency for organizations, firms, or individuals to whom students may owe bills.

Students and student organizations are expected to honor contractual obligations promptly.

Penalty for failure to clear up these obligations may be: a) no readmission; b) withholding of grades and transcripts; c) withholding of degree.

Parking Regulations

At registration time each student who pays the necessary fee is issued a car decal which permits parking on the campus. This decal is numbered and is to be placed in a specific place on the back window of the car.

PART II
GRADUATE SCHOOL INFORMATION

THE GRADUATE SCHOOL

History

The Graduate School was instituted in the fall, 1960, with the offering of the Master of Arts degree in the fields of history and English.

In 1962, master's degrees were begun in mathematics, engineering, and elementary education; in 1965, in business administration, chemistry, special education and secondary education; in 1968, in health and physical education, government, speech, guidance and counseling; in 1969, in biology, and in 1970, in education supervision. Also in 1970, a doctor's degree in engineering was authorized.

Objectives

The objectives of the Graduate School are as follows:
1. Advancement of knowledge through research.
2. Intensification within a student's chosen field of specialization and allied areas.
3. Development of the student's skill in the methodology of research.
4. Promotion of the power of independent thought by making the student responsible for his own scholarship.

Degrees Offered

Master of Arts
  Master of Arts in English
  Master of Arts in Government
  Master of Arts in History
Master of Business Administration
Master of Education
  Master of Education in Elementary Education
  Master of Education in Guidance and Counseling
  Master of Education in Secondary Education
  Master of Education in Special Education
  Master of Education in Supervision
Master of Engineering
Master of Engineering Science
Master of Science
  Master of Science in Biology
  Master of Science in Chemistry
  Master of Science in Health and Physical Education
  Master of Science in Mathematics
  Master of Science in Speech
  Master of Science in Speech Pathology/Audiology
Doctor of Engineering

ENROLLMENT

Admission

Applicants seeking admission to the Graduate School must present evidence that their academic record and personal attributes indicate the ability to pursue graduate work successfully. Admission to the Graduate School is administered by the Graduate Council. In general, the policies set forth by this Council for admission are as follows:

1. An applicant must hold a bachelor's degree from an institution approved by a recognized accrediting agency.

2. The following official credentials should be filed with the Dean of the Graduate School at least four weeks before registration.

    A. Two official transcripts sent directly from each college previously attended.
    B. Two completed copies of the application for admission to the Graduate School.
    C. Scores on the aptitude and the appropriate subject matter area of the Graduate Record Examination (sent directly to the Dean of the Graduate School by the Educational Testing Service). The Lamar Testing and Placement Center, located in the Educational Services Building, administers the Graduate Record Examination. Application forms and information about the Graduate Record Examination are available at this Center.
    D. Applicants for the Doctor of Engineering degree should also write a letter to the coordinator of engineering graduate students. This letter should include information about the applicant, engineering experience, present employment, and chief interests. The applicant should also indicate what type of work he would like to undertake for his field study.

3. The applicant's undergraduate grade point average and Graduate Record Examination scores must be above the minimum standard established by the Graduate School. These standards are:

    A. For regular admission *both* of the following requirements must be met:

        (1) A minimum overall grade-point average of 1.5 on a three-point scale.
        (2) A minimum composite score (verbal & quantitative) of 720 on the aptitude section of the Graduate Record Examination and a minimum verbal score of 350.

B. For admission on probation *one* of the following requirements must be met:

    (1) A minimum grade-point average of 1.5 on junior and senior work and acceptable scores on the Graduate Record Examination—a composite (V + Q) of 720 and a minimum verbal score of 350.

    (2) A grade-point average lower than 1.5, but with a score of at least 540 on an appropriate section of the G.R.E. aptitude test. (Some departments use the verbal score; some use the quantitative score; and some use either.)

    (3) A minimum overall grade-point average of 2.0 and a minimum verbal score od 350 on the G.R.E.

NOTE: Probation is removed automatically without notification after the student completes nine semester hours of graduate work with grades of B or better.

C. Admission requirements for foreign students are evaluated on an individual basis after the following information is received:

    (1) Official transcripts from colleges previously attended.
    (2) Scores on the Graduate Record Examination, and
    (3) Scores on the Test of English as a Foreign Language. In general, a foreign student whose native language is not English is expected to score over 500 on the TOEFL and fulfill the composite requirement (V + Q = 720) on the G.R.E.

4. A student who wishes to pursue graduate work in any area for which he has not had the prerequisites will be required to make up deficiencies as prescribed by the Graduate Council. In general, the student is required to have a minimum of twenty-four semester hours (twelve of which must be on the junior-senior level) of undergraduate work in the subject chosen as the graduate major. For a minor, twelve semester hours of undergraduate work are required.

5. Admission to the Graduate School does not imply candidacy for a master's degree.

6. The Dean of the Graduate School will notify the applicant of his admission to the Graduate School. All transcripts, certificates, etc., become the property of the Graduate School and are not returnable.

Special Students

An applicant who wishes to register for graduate work without enrolling in a degree program may do so under the following conditions:
1. He must hold a bachelor's degree.
2. He must be approved for admission by the Dean of the Graduate School.
3. With departmental approval, courses taken by a special student may be used for graduate degree credit under the following conditions:

(a) If requirements for admission to a degree program are met during his initial semester of enrollment.

(b) If requirements for admission are met in a subsequent semester, a maximum of six semester hours previously completed may be approved for degree credit.

Registration

1. A student who has been admitted to the Graduate School may register in August or January for the long sessions, or in June or July for the summer terms.

2. A graduate student who has completed all course work, but is working on his thesis, must be registered if he wishes to obtain professional assistance from a faculty member.

GRADUATE SCHOOL REQUIREMENTS

General

1. All the course work applied toward a given degree (except the doctor of engineering) must be completed within a period of six years. Time spent in active military service will not be used in computing the six-year limit.
2. No graduate student is permitted to carry more than fifteen semester hours of graduate work during one semester of the long term nor more than twelve semester hours of graduate work during the summer session of twelve weeks.
3. With the approval of the head of the major·department and the Graduate Dean, an undergraduate student within twelve semester hours of graduation may take not more than six semester hours of graduate courses to be applied toward the master's degree, provided the total academic load does not exceed fifteen semester hours.
4. With the approval of the head of the major department and the Graduate Dean, the student may transfer as much as six semester hours of graduate work (with grades of A or B) completed at another institution.
5. A maximum of three semester hours of extension work taken at this institution may count for graduate credit on a thirty semester hour degree program; six semester hours of extension work may be counted on a thirty-six hour program.
6. A maximum of six semester hours of work done in Institutes may be approved for graduate credit on a degree program.
7. A student may be required to drop either from any course or from the college temporarily, or permanently, for any of the following reasons:
   A. Academic work below the standard as specified by the Graduate Council.
   B. Academic dishonesty or misconduct on the part of the student.
8. The grading system for graduate students is A, B, C, D, F, I, Drop, Withdrawal—graduate credit being allowed for grades of A, B, and C. An over-all grade-point average of B (2.0) is required for graduation; however, a thesis grade may not be averaged with course grades to provide the required 2.0 average. Incomplete work must be made up within twelve months or the grade of I automatically becomes an F. Under unusual circumstances, the student may apply, through the instructor, for an extension. The extension may be granted by the Dean of the Graduate School.
9. When a graduate student with regular admission status falls more than three grade points below a 2.0 (B) average, he is placed on probation. If he makes progress toward eliminating the grade-point deficiency during the next semester in which he is registered, he is removed from probation. If he does not make progress toward eliminating the deficiency, his case is referred to the Academic Standards Committee of the Graduate School for a recommendation.

10. The student admitted on probation whose grade-point average falls more than three grade points below a 2.0 (B) average is referred to the Academic Standards Committee.
11. Resignation from the Graduate School should be made in writing to the Dean.
12. The college reserves the right to change any of its rules, requirements, or course regulations without notice.

DEGREE REQUIREMENTS

General

1. A graduate student must earn thirty to thirty-six semester hours of graduate credit, depending upon the plan he is following, and must complete a residence requirement of at least one academic year or its equivalent in summer terms.
2. A minimum of eighteen semester hours of the required thirty to thirty-six hours must be courses numbered 500 or above. Courses numbered 300 may be used for graduate credit if extra academic work is required and if prior written approval is secured from the department head, the head of the department in which the work is taken, and the Graduate Dean.
3. All candidates must pass a comprehensive oral examination if a thesis is written. If a thesis is not written, a comprehensive written examination is required.
4. The student must meet the specific requirements as set forth in this catalog for his particular degree program.

Master of Arts

1. Meet all general degree requirements.
2. Complete thirty semester hours of graduate work: eighteen in the major field, six in thesis, six in an approved minor or six additional hours in the major.
3. Present evidence of a reading knowledge of at least one foreign language. This requirement may be satisfied by examination or by submitting college credit equivalent to that required for the degree of Bachelor of Arts in this institution.
4. If a thesis is not written, complete 36 hours of approved course work.

Master of Business Administration

1. Meet all general degree requirements.
2. Complete thirty semester hours of graduate work as follows: a minimum of twelve semester hours of undifferentiated and specialized course work numbered 500 or above in the major field, six in thesis, and twelve additional hours on the senior or graduate level in the major field.
3. If a thesis is not written, complete thirty-six hours of approved course work.

Master of Science
1. Meet all general degree requirements.
2. Complete thirty semester hours of graduate work: fifteen to eighteen semester hours in the major field, six in thesis, and six to nine semester hours in the minor field. On approval by the head of his major department a student may elect to take all of his work in his major field.
3. If a thesis is not required, complete thirty-six hours of approved course work.

Master of Engineering Science
1. Meet all general degree requirements.
2. Complete thirty semester hours of graduate work as follows: a minimum of twelve semester hours in engineering courses, six semester hours in thesis, a minimum of nine semester hours in a combination of science and mathematics, and three semester hours of electives.

Master of Engineering
1. Meet all general degree requirements.
2. Complete thirty-six semester hours of graduate work or complete thirty hours of graduate work plus a three-hour design project.

Master of Education
1. Meet all general degree requirements.
2. Complete thirty semester hours of graduate work if a thesis is written or thirty-six semester hours if a non-thesis program is selected.
3. Meet specific requirements that are listed in the Education section of this catalog for each degree program.

Doctor of Engineering
1. Obtain credit for all courses required by the student's doctoral committee. The number and extent of these courses will depend upon the student's diagnostic examination, his engineering experience, and educational objectives.
2. In general a minimum of thirty semester hours beyond the equivalent of a master's degree will be required.
3. Satisfactorily pass candidacy examinations as devised by the student's doctoral committee.
4. Complete a field study involving some technological innovation.
5. Submit and defend a formal engineering report on the field study.

ADMISSION TO CANDIDACY
Master's Degree
1. Prior to the time that a graduate student is admitted to candidacy, the head of the major department or a person designated by him acts as the student's adviser.
2. A student may be admitted to candidacy after completing one-half of his course work, excluding the thesis, and after removing all undergraduate

deficiencies. During this time he must have demonstrated his ability and inclination to do graduate work.

3. The individual student is responsible for making an application for Admission to Candidacy. This is done in the office of the head of the major department.

4. A departmental recommendation concerning the applicant's degree plan and the appointment of an advisory committee is then submitted to the Dean of the Graduate School. If approved, the student is admitted to candidacy.

5. The advisory committee will include a person designated as the major professor, along with two other members of the faculty.

6. A student must complete at least nine semester hours after admission to candidacy.

Doctor of Engineering

A student will be admitted to candidacy for the doctor of engineering degree only upon the recommendations of his doctoral committee. In general this committee will require the following:

1. Satisfactory progress in all course work.

2. Continuously pursuing his course work by earning at least three semester hours credit in two consecutive long terms. Failure to do so will require the student to make application to the graduate engineering faculty for permission to continue.

3. Prepare a proposal for a field study involving a technological innovation and defend this proposal to his doctoral committee as part of his candidacy examinations.

4. Satisfactorily pass other examinations designed to determine if the student is ready to do the field study.

A student who fails to be admitted to candidacy on his first attempt may take additional courses or otherwise prepare himself for additional attempt as may be recommended by his doctoral committee. Failure to meet minimum requirements as estimated by the student's doctoral committee may require the student to withdraw from the doctoral program.

THESIS REQUIREMENTS

A thesis is optional in all Master of Arts degree plans and may be a departmental requirement or option in other programs. A student who is required or elects to write a thesis must:

1. Register for the thesis course after he has been admitted to candidacy and has obtained the approval of the head of the department. The first registration is for Thesis Course 669A, subsequent registrations are for Thesis Course 669B. The grade of "I" is assigned for each registration until the thesis is finally approved.

2. Register for a thesis course each semester or term that he works on the thesis under active supervision.

3. Secure a copy of the approved manual of instructions for preparing a thesis and follow it explicitly.

4. Write a thesis under the direction of his supervising professor. The thesis must be approved by his advisory committee and the Graduate Dean. Six semester hours of credit will be granted for the successful completion of the thesis. No credit will be reported for the thesis course until the final copy of the thesis has been approved.
5. Submit a single, unbound copy of the thesis to the Dean of the Graduate School at least thirty days prior to the expected date of graduation.
6. Submit three copies (four if a personal copy is desired) of the finished thesis to the Graduate Dean no later than ten days prior to the graduation date.
7. Pay the thesis binding fee to the Lamar Bookstore no later than ten days prior to the graduation date.

FINAL EXAMINATION

1. Each candidate for a master's degree is required to pass a final oral or written examination. This examination must be taken at least fifteen days prior to the conferring of the degree.
2. A student presenting a thesis as a part of the degree requirement must take an oral examination. This examination is confined to the thesis and background subject matter pertaining to the thesis.
3. A candidate not presenting a thesis as a part of the degree requirement must take a written examination.
4. If all requirements for graduation except the comprehensive examination are completed during a semester, the oral or written examination may be administered the following semester without the student being enrolled in Graduate School.
5. A calendar showing scheduled dates for oral and written examinations is prepared by the Dean of the Graduate School.

CONFERRING OF DEGREES

Degrees earned in the Graduate School or conferred in December, May and August. The candidate must be present to receive the degree, unless he has been excused by the Graduate Dean.

1. A candidate for the Master's degree or Doctor of Engineering degree must file an application for graduation in the office of the Graduate Dean. This application must be made in accordance with the calendar published in this bulletin.

2. Requests to receive a degree in absentia must be filed in the Graduate Dean's office at least four weeks before commencement date.

PART III
FIELDS OF STUDY

DEPARTMENT OF BIOLOGY

The Department of Biology offers a program of study leading to the Master of Science in Biology degree. It is designed to enhance the professional competence of graduates in biology or closely related disciplines who are presently engaged in or planning to enter secondary school or college teaching, or who expect to be employed by private or governmental agencies in biologically oriented fields. Applicants must have completed a minimum of twenty-four semester hours in the biological sciences, or remove any deficiencies as provided in the section on Admission.

Degree Requirements

The candidate for the M.S. in Biology degree must meet all the Graduate School general requirements as listed in this catalog. Additional specific requirements are:
1. Twenty-four semester hours of graduate credit which may include a maximum of twelve semester hours in approved 400 level biology courses with augmented requirements.
2. A thesis (6 semester hours)
3. Program of study to be approved by graduate supervisor and Department Head.

GRADUATE FACULTY

Members

Professor Edwin S. Hayes
Cytology

Professor Russell J. Long
Mammalogy, histology, embryology

Associate Professor Jed J. Ramsey
Ornithology, comparative physiology

Professor W. Russell Smith
Microbiology

Associate Professor Charles P. Turco
Parasitology, helminthology

Professor Henry T. Waddell
Mycology, genetics

Associate Members

Assistant Professor Richard C. Harrel
  Limnology, environmental science

Assistant Professor J. Leon McGraw, Jr.
  Ichthyology, cellular biology, invertebrate zoology

Assistant Professor Philip B. Robertson
  Marine biology

Assistant Professor William C. Runnels
  Botany, algology

Assistant Professor Michael E. Warren
  Entomology, biochemical systematics

Biology courses may be selected from the following list:

510—Materials and Techniques of Research. Survey of laboratory and library research techniques, instrumentation and materials requisite to scientific investigation. Required of all entering graduate students. Class: 1 hour. Credit 1 semester hour.

511—Graduate Seminar. Current topics in biological research. May be repeated for credit. Class: 1 hour. Credit: 1 semester hour.

530—Ornithology. Natural history, taxonomy and ecology of birds. Lecture: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

531—Seminar in Biological Sciences. Designed as a resource area course for the M.Ed. in Elementary Education degree, and is so restricted. Relevant biological concepts, library research, and synoptic reports. Class: 3 hours. Credit: 3 semester hours.

532—Mycology. Isolation, cultivation and identification of fungi with special emphasis on those of economic importance. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours

533—Ichthyology. Natural history, taxonomy and ecology of freshwater and marine fishes. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

534—Herpetology. Natural history, taxonomy and ecology of amphibians and reptiles. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

535—Mammalogy. Natural history, taxonomy and ecology of mammals. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

536—Marine Invertebrate Zoology. Field study and identification of area species; current research. Required field trips. Recommended prerequisites: Bio 346 or 445. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

537—Advanced Limnology. Analysis of freshwater communities with emphasis on effects of pollution. Prerequisite: Bio 443. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

538—Helminthology. Biology of free-living and parasitic worms. Prerequisite: Bio 346 or 441. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

539—Comparative Physiology. Fundamental physiological processes in animals from the phylogenetic viewpoint. Prerequisite: Bio 344, Chm 342. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

5101, 5201, 5301, 5401—Special Problems. Research in areas other than thesis. Prerequisite: approval of graduate supervisor. Time arranged. Credit: 1-4 semester hours; maximum of 4 semester hours.

669A-669B. Thesis. Prerequisite: admission to candidacy. Credit: 6 semester hours.

From list below, a maximum of twelve semester hours of senior level undergraduate courses with augmented requirements may be taken for graduate credit, subject to approval by the graduate supervisor and Department Head.

Bio 440 Ornithology   Bio 445 Marine Biology
Bio 441 Parasitology   Bio 446 Terrestrial Ecology
Bio 442 Entomology   Bio 447 Cellular Biology
Bio 443 Limnology   Bio 449 - Protistology
Bio 444 Vertebrate Natural History

SCHOOL OF BUSINESS

The School of Business offers a program of study leading to the Master of Business Administration degree. Persons seeking admission to this program must meet the general requirements for admission that are outlined in the Graduate Catalog. An applicant must also have completed the equivalent of the following undergraduate course in business: accounting, six semester hours; business law, three semester hours; business statistics, three semester hours; principles of economics, six semester hours; industrial management, three semester hours; principles of marketing, three semester hours; principles of finance, three semester hours; business communications, three semester hours, or a substitution approved by the Dean of the School of Business.

Degree Requirements

The candidate for the Master of Business Administration degree must meet all the Graduate School general degree requirements as listed in this catalog. The student may follow either of two plans. Plan I requires twenty-four hours of course work and a thesis. Plan II requires thirty-six hours of course work, including BA 5312 for students who do not write a thesis. More than 50% of work must be 500 level courses. Specific degree requirements are as follows if a thesis is written:

1. Undifferentiated Business Courses—six semester hours selected from the following:
   Acc 534—Seminar in Accounting
   BA 530—Seminar in Management
   BA 531—Seminar in Marketing
   BA 5310—Advanced Statistical Analysis
   BA 5311—Seminar in Financial Management
   BA 5312—Business Analysis
2. Specialization—six semester hours selected from the following courses:
   Acc 536—Advanced Accounting Problems
   Acc 537—Managerial Accounting
   BA 532—Problems in Business Finance
   BA 538—Business Problems and Organization
   BA 539—Quantitative Analysis Control
3. Six hours Thesis:
   669A-669B—Thesis in Business Administration
4. Six hours selected from the following courses in economics:
   Eco 530—Seminar in Monetary and Fiscal Policy
   Eco 531—Advanced Macroeconomics
   Eco 532—Advanced Economic Theory.
   Eco 533—Contemporary Literature and Thought
   Eco 534—Seminar in Labor Economics
   Eco 535—Seminar in Economics

Eco 536—American Economic Growth and Development
Eco 537—Managerial Economics

5. Approved electives—six semester hours in accounting, business administration, or economics. If a thesis is not written, eighteen hours of approved courses must be completed in addition to those selected from 1, 2, and 4 above.

Requirements for Applicants With Degrees in Non-business Fields

Students whose baccalaureate degrees are in non-business fields may earn the Master of Business Administration degree by completing sixty semester hours of work in the School of Business. The first year of work (30 semester hours) will consist of the following undergraduate core courses or their equivalents. Descriptions of these courses may be found in the undergraduate catalog of this institution.

Acc 231 and 232—Principles of Accounting or equivalent
BA 331—Business Law
BA 332—Principles of Finance
BA 334—Marketing
BA 335—Industrial Management
BA 3302—Business Statistics

Business Communications—three semester hours (or a substitution approved by the Dean of the School of Business)

Requirements for the second year of work leading to the MBA degree for non-business majors are as outlined above for business graduates.

GRADUATE FACULTY

Members

Professor Richmond O. Bennett
  Accounting, Business Administration

Professor Walter W. Bennett
  Business Administration

Professor Richard T. Cherry
  Business Administration, Economics

Associate Professor Hi K. Kim
  Economics

Professor C. D. Kirksey
Business Administration

Professor J. D. Landes
Accounting, Business Administration

Associate Professor Mietzl Miller
Economics

Associate Professor Claude Monroe
Economics

Professor Sam F. Parigi
Economics

Professor Charles A. Partin
Economics

Associate Professor Norman L. Weed
Economics

Associate Members

Assistant Professor Alfred F. Steiert
Business Administration

Accounting courses will be selected from the following list:

534—Seminar in Accounting. A course designed to broaden the student's concept of current accounting theory and problems. Class: 3 hours. Credit: 3 semester hours.

536—Advanced Accounting Problems. An intensive study of accounting techniques and problems with emphasis placed on the concepts of income determination, asset valuation, and cost analysis. Contemporary developments are reflected through a study of research materials and professional publications. Class: 3 hours. Credit: 3 semester hours.

537—Managerial Accounting. Application of accounting data in decision-making; cost analyses as applied in the development of budgets and standards; accounting as a tool for cost control and pricing; case problems. Class: 3 hours. Credit: 3 semester hours.

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Business administration courses must be selected from the following:

530—Seminar in Management. A course designed to give students an integrated theory of management which incorporates the significant contributions of the various approaches. Research papers are presented by each student as an inquiry in depth of certain sub-theories. Prerequisite: approval of professor. Class: 3 hours. Credit: 3 semester hours.

531—Seminar in Marketing. An intensive study of specific marketing problems with emphasis on research methodology and marketing decision-making; a critical evaluation of research procedures and utilization of research findings. Prerequisite: approval of professor. Class: 3 hours. Credit: 3 semester hours.

532—Problems in Business Finance. A comprehensive study of how financial problems affect all areas of business management. The case study approach is utilized in order to stimulate analysis and discussion of forms of organization, promotion of new firms, short-term and long-term sources of funds and financing, dividend policies, mergers, refinancing and recapitalization, reorganization, and comprehensive financial planning. Prerequisite: BA 5311. Class: 3 hours. Credit: 3 semester hours.

538—Business Problems and Organization. Managerial decision-making in the areas of marketing, finance, production, and labor-management relations. General management perspectives are stressed in determining objectives, establishing policies, and planning and organizing the use of facilities, materials, and manpower; motivation of individuals and groups. The case-study approach is utilized. Class: 3 hours. Credit: 3 semester hours.

539—Quantitative Analysis Control. A course designed to help the student examine the decision-making function through the use of model building and other mathematical procedures. Emphasis is on the selection of a model or a tool for a particular business problem. Problem areas are drawn from the major functions of an organization. The techniques covered include decision making under uncertainty, inventory analysis, linear programming, Markov analysis, and project-planning models. Prerequisite: BA 3302 and mathematical competence. Class 3 hours. Credit: 3 semester hours.

5310—Advanced Statistical Analysis. Further development of the application of statistical methods to the process of making decisions in the face of uncertainty. The use of quantitative methods and models for management is emphasized. Topics include multiple correlations, sampling theory, queuing theory, and statistical quality control. Prerequisites: BA 3302 and mathematical competence. Class: 3 hours. Credit: 3 semester hours.

5311—Seminar in Financial Management. A study of selected topics in financial management, including capital budgeting and optimum financial

structure. Research papers are presented by each student for critical analysis and discussion. Class: 3 hours. Credit: 3 semester hours.

5312—**Business Research.** The student will design and carry out an individual research project under the supervision of a faculty member. Emphasis will be placed on research design and methodology, sources of business and economic data, and the use of quantitative techniques to achieve substantive research results. Time arranged. Credit: 3 semester hours.

669A-669B—**Thesis.** Prerequisite: Admission to candidacy for the master's degree. Credit: 6 semester hours.

Economics courses must be selected from the following:

530—**Seminar in Monetary and Fiscal Policy.** A study of the theory and practice of monetary management and the taxing-borrowing-spending program of the government as they affect growth, output, employment, prices and resource allocation. Prerequisite: Graduate standing and Eco 131, 132, or 133. Class: 3 hours. Credit: 3 semester hours.

531—**Advanced Macroeconomics.** A study in depth of the dynamic forces reacting to determine the aggregate level of economic activity; employment, output, and income; prices, cycles, and growth. Prerequisites: Graduate standing and Eco 238. Class: 3 hours. Credit: 3 semester hours.

532—**Advanced Economic Theory.** Advanced economic analysis and methodology; price and distribution theory; perfect and imperfect competition and allied subjects. Prerequisites: Eco 237 and graduate standing. Class: 3 hours. Credit: 3 semester hours.

533—**Contemporary Literature and Thought.** Readings, special projects, studies, and research in the current professional literature. The student will become acquainted with learned journals, economists, their current thinking, present issues and emphases in the field. Class: 3 hours. Credit: 3 semester hours.

534—**Seminar in Labor Economics.** Lectures, readings, and research projects on contemporary labor issues and theory: manpower development programs, collective bargaining, productivity, composition of the labor force, and labor legislation. Class: 3 hours. Credit: 3 semester hours.

535—**Seminar in Economics.** A seminar for non-majors with considerable emphasis placed on independent study and student research. Nature and scope of economics; structure and workings of the American economy; international economics; economic problems and issues. Class: 3 hours. Credit: 3 semester hours.

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536—**American Economic Growth and Development.** An advanced level study and analysis of the major forces which contributed to American economic development; regional development theory and actual growth patterns; theories of growth applied to America's economic development, past, present, and potential. Prerequisites: graduate standing. Class: 3 hours. Credit: 3 semester hours.

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537—**Managerial Economics.** A study in depth of the principles and techniques of economic analysis applicable to the problems of business management. Prerequisites: graduate standing. Class: 3 hours. Credit: 3 semester hours.

DEPARTMENT OF CHEMISTRY

The Department of Chemistry offers a program of study leading to the Master of Science degree in Chemistry. Those seeking admission to this program must meet the general requirements as set forth in this catalog for admission to the Graduate School. In addition, the applicant must offer the substantial equivalent of the courses in general chemistry, inorganic chemistry, analytical chemistry, organic chemistry, and physical chemistry required of undergraduate students in the chemistry curriculum. The applicant must also have completed one year of college physics and mathematics through integral calculus.

Students working towards the graduate degree in chemistry will take a set of four proficiency examinations, one in each of the fields of chemistry: analytical, inorganic, organic, and physical. These examinations are taken on entrance and are offered in the fall and again during the beginning of the spring semester. The results of these examinations are used for orientation and guidance.

Degree Requirements

The candidate for the M.S. degree in Chemistry must meet all the Graduate School general degree requirements as listed in this catalog. Additional specific degree requirements are as follows:

1. Fifteen to eighteen semester hours of course work in Chemistry which must include Chm 531, 533, 535 and 537 and at least one 500 level Selected Topics course in Chemistry.
2. Presentation of a thesis.
3. Six to nine additional semester hours of senior or graduate work in an approved field of study.
4. A reading knowledge of one of the following modern foreign languages: German, French, or Russian.

GRADUATE FACULTY

Members

Professor Harold T. Baker
    Physical Chemistry

Professor Margaret D. Cameron
    Organic Chemistry

Associate Professor Kenneth L. Dorris
  Physical Chemistry

Professor Ewin A. Eads
  Environmental Science

Professor Roger E. Yerick
  Analytical Chemistry

Associate Members

Assistant Professor Keith C. Hansen
  Organic Chemistry

Assistant Professor J. Dale Ortego
  Inorganic Chemistry

Assistant Professor John A. Whittle
  Organic Chemistry, biochemistry

The graduate student will select his **chemistry** courses from the following list:

433—Modern Physical. Selected topics in modern physical chemistry. Prerequisite: Chm 432 (or parallel). Class: 3 hours. Credit: 3 semester hours.

436—Inorganic. Study of the quantized atom, periodicity, characteristics of the extra-nuclear structure. Valency and the chemical bond, complex ions and coordination compounds. Prerequisites: Chm 432 (or parallel). Class: 3 hours. Credit: 3 semester hours.

443—Biochemistry. Principles of biochemistry. Current theories of chemistry as applied to biochemical materials. Prerequisites: Chm 241, 342 (or parallel). Class: 3 hours. Laboratory: 3 hours. Credit: 4 semester hours.

446—Instrumental Methods of Analysis. Instrumental techniques in modern analytical chemistry. Theory and practice in optical, electrometric, and chromatographic methods. Prerequisites: Chm 241, 432, (or parallel), Mth 231, Phy 142 or 241. Class: 3 hours. Laboratory: 4 hours. Credit: 4 semester hours.

531—Advanced Analytical. Prerequisites: Graduate standing or consent of instructor. Class: 3 hours. Credit: 3 semester hours.

532—Kinetics. Rate equations developed by the application of statistical methods to the kinetic theory of gases will be compared with experimental

reaction rate determinations. The development and significance of partition functions, the collision theory, and the theory of absolute reaction rates will be presented. May be taken for graduate credit in chemistry or engineering. Class: 3 hours. Credit: 3 semester hours.

533—Advanced Inorganic. Prerequisite: Graduate standing or consent of instructor. Class: 3 hours. Credit: 3 semester hours.

535—Advanced Organic. Prerequisite: Graduate standing or consent of instructor. Class: 3 hours. Credit: 3 semester hours.

536—Thermodynamics. The basic laws of thermodynamics are derived and their applications to physical phenomena presented. The treatment of the thermodynamics of surfaces, and of systems in gravitational, centrifugal, electric, or magnetic fields is given. The course may be taken for credit in engineering or chemistry. Class: 3 hours. Credit: 3 semester hours.

537—Advanced Physical. Prerequisite: Graduate standing or consent of instructor. Class: 3 hours. Credit: 3 semester hours.

538—History of Chemistry. The development of chemistry as related to the men of science who contributed to its progress. Prerequisite: Graduate standing. Class: 3 hours. Credit: 3 semester hours.

5101, 5201,5301, 5401, 5501, 5601—Chemistry for Teachers. Designed to advance the professional competence of participants. For each course, a description of the particular area of study will appear in the printed schedule. May be repeated for credit when nature of course differs sufficiently from one previously taken. Class: 1-6 hours and/or laboratory 0-6 hours. Credit: 1-6 semester hours.

5311—Selected Topics in Analytical Chemistry. May be repeated for a maximum of six semester hours when topic varies. Description of course content will appear in schedule of classes. Prerequisite: Chm 531 or equivalent. Class: 3 hours. Credit: 3 semester hours.

5331—Selected Topics in Inorganic Chemistry. May be repeated a maximum of six semester hours when topic varies. Description of course content will appear in schedule of classes. Prerequisite: Chm 533 or equivalent. Class: 3 hours. Credit: 3 semester hours.

5351—**Selected Topics in Organic Chemistry.** May be repeated for a maximum of six semester hours when topic varies. Description of course content will appear in schedule of classes. Prerequisite: Chm 535 or equivalent. Class: 3 hours. Credit: 3 semester hours.

5352—**Modern Synthetic Organic.** Selected topics in modern synthetic organic chemistry. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5371—**Selected Topics in Physical Chemistry.** May be repeated a maximum of six semester hours when topic varies. Description of course content will appear in schedule of classes. Prerequisite: Chm 537 or equivalent. Class: 3 hours. Credit: 3 semester hours.

669A, 669B—**Thesis.** Prerequisite. Admission to candidacy for the master's degree. Credit: 6 semester hours.

SCHOOL OF EDUCATION

Departments of Education

The Departments of Education offer programs of study leading to the Master of Education degree and/or certification in Elementary Education, Secondary Education, Supervision, Special Education, and Guidance and Counseling.

Master of Education Degree (M.Ed.)

General Requirements:

1. The student must fulfill the general requirements for admission and the general degree requirements that are stated elsewhere in this bulletin.

2. The applicant in elementary education must have completed twenty-four semester hours in education, including twelve semester hours in elementary education methods and materials courses.

3. The applicant in special education must have completed a minimum of twenty-four semester hours in education, including six semester hours in special education.

4. The applicant in secondary education must have completed a minimum of eighteen semester hours in education and twenty-four hours in the discipline to be pursued at the graduate level, including a minimum of nine hours at the 300 level or higher.

5. The applicant in guidance and counseling must hold a provisional teaching certificate, or its equivalent.

6. The student in fields other than guidance and counseling may elect to write a thesis. If so, he is required to complete a minimum of twenty-four hours in addition to a thesis.

7. The student who does not choose to write a thesis must earn a minimum of thirty-six hours of graduate credit and is required to complete successfully a written examination.

Degree Plan in Elementary Education

To meet individual needs, considerable flexibility is allowed in planning the student's program; however, the usual pattern of course work is as follows:

1. **Specialization Area.** Six semester hours of courses must be taken for graduate credit in one of the following disciplines: history, English, foreign languages, mathematics, science, art, music, speech, or health and physical education. To fulfill requirements concurrently for a Master's degree and for a Professional Certificate, a student may complete six additional hours in the area of specialization and substitute these hours for six hours in the resource area. He should also elect a 36 hour non-thesis program.

2. **Professional Development.** Twenty-one semester hours must be selected from the following courses (eighteen semester hours if the student elects to write a thesis):

   A. Nine semester hours (or three if the thesis is written) must be selected from the following courses:
   (1) Edu 530—Structure and Organization of Public Education
   (2) Edu 531—Research (Required)
   (3) Edu 532—Current Issues in Education
   (4) Edu 533—Contemporary Philosophies of Education
   (5) Edu 535—The Learning Process
   (6) Edu 5321—Technology

   B. Twelve semester hours (or nine if the thesis is written) must be selected from the following courses:
   (1) Edu 534—Advanced Study in Human Development
   (2) Edu 536—Problems in Teaching Language Arts and Social Studies
   (3) Edu 537—The Elementary School Curriculum
   (4) Edu 538—Problems in Teaching Arithmetic and Science
   (5) Edu 539—Developmental Reading
   (6) Edu 5325—Instructional Processes in Learning Disabilities
   (7) Edu 5329—Corrective Reading

   C. Thesis. Six semester hours credit:
   (1) Edu 699A-699B—Thesis

3. **Resource Area.** Nine semester hours must be selected from the following courses (six semester hours if the student elects to write a thesis):
   A. Bio 531—Seminar in Biological Sciences
   B. Eco 535—Seminar in Economics
   C. Edu 5301—Current Literature for Children and Adolescents
   D. Geo 530—Earth Science Seminar
   E. Mth 530—Seminar in Mathematics for Elementary Teachers
   F. Phy 530—Seminar in Physical Sciences
   G. Soc 531—Seminar in Principles of Sociology
   H. Spc 539—Seminar in Fine Arts

Program Leading to Professional Certificate—Elementary

To be eligible to receive the Professional Certificate, the prerequisites and requirements must be met as follows:

1. The student must hold or be eligible for the Provisional Certificate—Elementary.
2. The student must complete the following program of study:
    A. **Specialization Area.** Twelve semester hours of courses must be taken for graduate credit in one of the following disciplines: English, foreign language, history, mathematics, science, art, music, health and physical education, and speech.

    B. **Resource Area.** Six semester hours must be selected as follows:

       (1) Three semester hours are selected from the following seminars:
          (a) Bio 531—Seminar in Biological Sciences
          (b) Eco 535—Seminar in Economics
          (c) Geo 530—Earth Science Seminar
          (d) Mth 530—Seminar in Mathematics for Elem. Teachers
          (e) Phy 530—Seminar in Physical Sciences
          (f) Soc 531—Seminar in Principles of Sociology
          (g) Spc 539—Seminar in Fine Arts

       (2) Three semester hours are selected from the following courses:
          (a) Edu 5301—Current Literature for Children and Adolescents
          (b) Edu 536—Problems in Teaching Language Arts and Social Studies
          (c) Edu 538—Problems in Teaching Arithmetic and Science
          (d) Edu 539—Developmental Reading

    C. **Professional Development Area.** Six semester hours must be taken from the following courses:

       (1) Edu 531—Research (Required)
       (2) Edu 537—The Elementary School Curriculum
       (3) Edu 534—Advanced Study in Human Development

    D. **Electives.** The student selects six semester hours from the following courses, or additional courses from (2) under Resource Area:

       (1) Edu 530—Structure and Organization of Public Education
       (2) Edu 532—Current Issues in Education
       (3) Edu 533—Contemporary Philosophies of Education
       (4) Edu 535—The Learning Process
       (5) Edu 5321—Technology
       (6) Edu 5325—Instructional Processes in Learning Disabilities
       (7) Edu 5329—Corrective Reading

Note: Requirements for the Professional Certificate follow an outline prescribed by the Texas Education Agency; consequently, the format for the certificate and the format for the degree are not identical. By selecting a non-thesis program and with careful planning, a student may fulfill concurrently requirements for the Master's degree and requirements for a Professional Certificate.

Degree Plan in Special Education

To meet individual needs, considerable flexibility is allowed in planning the student's program; however, the usual pattern of course work is as follows:

1. **Specialization Area.** Twelve semester hours must be selected from the following courses:

   A. Edu 5311—Prescriptive Teaching with the Mentally Retarded
   B. Edu 5312—Learning Potentials in the Neurologically Involved
   C. Edu 5313—Learning Potentials in Mentally Retarded Children
   D. Edu 5314—Instructional Processes with the Mentally Retarded
   E. Edu 5315—Problems and Issues in Mental Retardation
   F. Edu 5325—Instructional Processes in Learning Disabilities
   G. Edu 5326—Problems and Issues in Education of the Physically Handicapped
   H. Edu 5331—Curriculum Development for the Physically Handicapped

2. **Professional Development.**

   A. Nine semester hours must be selected from the following courses. (Three semester hours if the student elects to write a thesis):

      (1) Edu 530—Structure and Organization of Public Education
      (2) Edu 531—Research (Required)
      (3) Edu 532—Current Issues in Education
      (4) Edu 533—Contemporary Philosophies of Education
      (5) Edu 534—Advanced Study in Human Development
      (6) Edu 535—The Learning Process
      (7) Edu 5316—Administration and Supervision of Special Education Programs
      (8) Edu 5321—Technology
      *(9) Edu 430—Education of the Mentally Retarded
      *(10) Edu 431—Psychology of Exceptional Children
      *(11) Edu 439—Methods and Materials for Learning Disabilities
      (12) Edu 5323—Occupational and Vocational Guidance

* This course may be taken only by special permission.

B. Thesis. Six semester hours credit:
   Edu 669A-669B—Thesis

3. **Resource Area.** Fifteen semester hours of senior or graduate courses are required as follows (nine semester hours if a thesis is written):

   A. Six semester hours of senior or graduate level courses must be taken in one of the following disciplines: history, English, foreign languages, mathematics, sciences, art, music, speech, or health and physical education.

   B. Nine semester hours must be selected from the following seminars (three semester hours if a thesis is written):

      (1) Bio 531—Seminar in Biological Sciences
      (2) Eco 535—Seminar in Economics
      (3) Geo 530—Earth Science Seminar
      (4) Mth 530—Seminar in Mathematics for Elementary Teachers
      (5) Phy 530—Seminar in Physical Sciences
      (6) Soc 531—Seminar in Principles of Sociology
      (7) Spc 539—Seminar in Fine Arts
      (8) Edu 5301—Current Literature for Children and Adolescents

Program Leading to Professional Certificate—Mental Retardation

To be eligible to receive the Professional Certificate, the prerequisites and requirements must be met as follows:

1. The student must hold or be eligible for the Provisional Certificate—Mental Retardation.

2. The student must complete the following program of study: (Note that with careful planning, a student may complete requirements concurrently for a Professional Certificate and for a Master's degree.)

   A. **Specialization Area.** Twelve semester hours of graduate level courses must be taken in the field of mental retardation, as follows:

      (1) Edu 5311—Prescriptive Teaching with the Mentally Retarded
      (2) Edu 5313—Learning Potentials in Mentally Retarded Children
      (3) Edu 5314—Instructional Processes with the Mentally Retarded
      (4) Edu 5315—Problems and Issues in Mental Retardation

B. **Professional Development Area.** Six semester hours must be selected from the following courses:

(1) Edu 530—Structure and Organization of Public Education
(2) Edu 531—Research (Required)
(3) Edu 532—Current Issues in Education
(4) Edu 533—Contemporary Philosophies of Education
(5) Edu 534—Advanced Study in Human Development
(6) Edu 535—The Learning Process
(7) Edu 5316—Administration and Supervision of Special Education Programs
(8) Edu 5321—Technology
(9) Edu 5323—Occupational and Vocational Guidance

C. **Resource Area.** Six semester hours of senior or graduate level courses must be taken in one of the following disciplines: history, English, foreign languages, mathematics, sciences, art, music, speech, and health and physical education.

D. **Electives.** Six semester hours must be selected from senior or graduate level courses as approved by the advisor.

Program Leading to Professional Certificate—Physically Handicapped

To be eligible to receive the Professional Certificate, the prerequisites and requirements must be met as follows:

1. The student must hold or be eligible for the Provisional Certificate—Physically Handicapped.

2. The student must complete the following program of study: (Note that with careful planning, a student may complete requirements concurrently for a Professional Certificate and for a Master's degree.)

A. **Specialization Area.** Twelve semester hours of graduate level courses must be taken in the field of physically handicapped, as follows:

(1) Edu 5312—Learning Potentials in the Neurologically Involved
(2) Edu 5325—Instructional Processes in Learning Disabilities
(3) Edu 5326—Problems and Issues in Education of the Physically Handicapped
(4) Edu 5331—Curriculum Developed for the Physically Handicapped

B. **Professional Development Area.** Six semester hours must be selected from the following courses:

(1) Edu 530—Structure and Organization of Public Education
(2) Edu 531—Research (Required)
(3) Edu 532—Current Issues in Education.
(4) Edu 533—Contemporary Philosophies of Education
(5) Edu 534—Advanced Study in Human Development
(6) Edu 535—The Learning Process
(7) Edu 5316—Administration and Supervision of Special Education Programs
(8) Edu 5321—Technology
(9) Edu 5323—Occupational and Vocational Guidance

C. **Resource Area.** Six semester hours of senior or graduate level courses must be taken in one of the following disciplines: history, English, foreign languages, mathematics, sciences, art, music, speech, and health and physical education.

D. **Electives** Six semester hours must be selected from senior or graduate level courses as approved by the advisor.

Degree Plan in Secondary Education

To meet individual needs, considerable flexibility is allowed in planning the student's program: however, the usual pattern of course work is as follows:

1. **Specialization Area.** Eighteen hours of graduate level courses must be taken in one of the following disciplines. A minimum of twelve hours must be taken at the 500 level.

   Biology

   Bio 440 — Ornithology

   Bio 441 — Parasitology

   Bio 442 — Entomology

   Bio 443 — Limnology

   Bio 444 — Vertebrate Natural History

   Bio 445 — Marine Biology

   Bio 446 — Terrestrial Ecology

Bio 447 — Cellular Biology

Bio 449 — Protistology

Bio 510 — Materials and Techniques of Research

Bio 511 — Graduate Seminar

Bio 530 — Ornithology

Bio 532 — Mycology

Bio 533 — Ichthyology

Bio 534 — Herpetology

Bio 535 — Mammalogy

Bio 536 — Marine Invertebrate Zoology

Bio 537 — Advanced Limnology

Bio 538 — Helminthology

Bio 539 — Comparative Physiology

Bio 5101, 5201, 5301, 5401 — Special Problems

Chemistry

Chm 443 — Biochemistry

Chm 444 — Qualitative Organic Analysis

Chm 4101, 4201, 4301, 4401 — Special Topics

Chm 538 — History of Chemistry

Chm 5101, 5201, 5301, 5401, 5601 — Chemistry for Teachers

The following courses are recommended for those with strong backgrounds:

Chm 431 — Physical

Chm 432 — Physical

Chm 413 — Physical Lab

Chm 414 — Physical Lab

Chm 436 — Inorganic II

Chm 446 — Instrumental Methods of Analysis

Chm 531 — Advanced Analytical

Chm 533 — Advanced Inorganic

Chm 535 — Advanced Organic

English

Required:

Eng 3312 — Introduction to Linguistics (unless taken as undergraduate)

One three-hour course in Recent Trends in English Education

Electives:

The 400 level courses are listed in the English section of this graduate catalog. At least 9 hours must be selected from the following. Three hours must be taken in American literature.

Eng 535 — Special Topics in Renaissance and Seventeenth Century English Literature

Eng 536 — Special Topics in Restoration and Eighteenth Century English Literature

Eng 537 — Special Topics in Nineteenth Century English Literature

Eng 539 — Special Topics in American Literature

Eng 5311 — Special Topics in Comparative Literature

Government

Required

Gov 530 — Scope and Method of Political Science

Electives

The 400 level courses are listed in the Government section of the graduate catalog. At least 9 hours must be selected from the following.

Gov. 531 — Seminar in Political Theory

Gov 534 — Seminar in American Government and Politics

Gov 535 — Seminar in the Theory and Practice of Public Administration

Gov 536 — Seminar in International Politics

Gov 537 — Seminar in Comparative Study of Political Systems

Health and Physical Education

HPE 434 — Health and Human Ecology

HPE 435 — Adapted Physical Education

HPE 436 — Organization and Administration of Physical and Health Education

HPE 439 — History and Theory of Dance

HPE 530 — Probelms in Physical and Health Education

HPE 531 — Cultural Foundations of Physical Education

HPE 532 — Seminar in Physical Education

HPE 533 — Organization and Administration of the School Health Program

HPE 534 — Scientific Basis of Exercise

HPE 535 — Trends and Issues in Health and Physical Education

HPE 536 — Research Methods in Health and Physical Education

HPE 5101, 5201, 5301, 5601 — Institute in Health and Physical Education

History

Required

The eighteen-hour History specialization must include at least two fields of study with 12 hours from one field of study.

Electives

The 400 level courses are listed in the History section of the graduate catalog. At least 12 hours must be selected from the following.

His 532 — Readings in American History

His 533 — Readings in European History Before 1815

His 534 — Readings in European History Since 1815

His 535 — Seminar in Texas History

His 536 — Seminar in Southern History

His 537 — Seminar in United States History

His 539 — Seminar in the American West

His 5311 — Seminar in European History

His 5101, 5201, 5301, 5401, 5501, 5601 — Institute in History

Mathematics

Mth 431 — Introduction to Functions of a Complex Variable

Mth 432 — Introduction to Functions of a Complex Variable

Mth 531 — Theory of Functions of Real Variable

Mth 532 — Modern Algebra

Mth 533 — Calculus of Variations

Mth 534 — Topology

Mth 535 — Introduction to Advanced Analysis

Mth 536 — Integral Equations

Mth 537 — Methods of Applied Mathematics

Mth 539 — Infinite Series

Mth 5301 — Operational Mathematics

Mth 5302 — Operational Mathematics

Mth 5311 — Foundations of Geometry

Mth 5312 — Linear Algebra

Mth 5313 — Abstract Algebra

Mth 5314 — History of Mathematics

Mth 5315 — Probability and Statistics

Mth 5316 — Data Processing

Mth 5317 — Number theory

Physics

Phy 414, 415 — Experimental Projects

Phy 416, 417 — Seminar

Phy 431 — Classical Mechanics

Phy 432 — Introductory Quantum Mechanics

Phy 433 — Solid State Physics

Phy 436 — Nuclear Physics

Phy 437 — Astrophysics

Phy 448 — Optics

Phy 531 — Theoretical Physics

Phy 532 — Relativity

Phy 533 — Seminar

Phy 5101, 5201, 5301, 5401, 5601 — Institute in Physics

2. Professional Development. Twelve semester hours must be taken as follows:

Required

Edu 531 — Research

Edu 5317 — Secondary School Curriculum

Electives

Edu 530 — Structure and Organization of Public Education

Edu 532 — Current Issues in Education

Edu 533 — Contemporary Philosophies of Education

Edu 534 — Advanced Study in Human Development

Edu 535 — The Learning Process

Edu 5321 — Technology

Edu 669A 669-B — Thesis

3. Resource Area. Six hours of graduate level study in academic fields which support the area of specialization.

4. Thesis. If the student chooses to write a thesis, the number of specialization hours is reduced to twelve, which must include a minimum of six semester hours taken at the 500 level.

Program Leading to Professional Certificate—Secondary

To be eligible to receive the Professional Certificate, the prerequisites and requirements must be met as follows:

1. A student must hold or be eligible for the Provisional Certificate— Secondary, in the designated area.

2. The student must complete the following program of study.

A. Specialization Area. Twelve semester hours of graduate courses must be completed in a professional level teaching field.

B. Resource Area. Six semester hours of graduate level study in academic areas which support the discipline or which constitute a second teaching field interest.

C. Professional Development. Six semester hours of approved courses in professional education must be completed.

D. Electives. Six semester hours may be selected from graduate level courses as approved by the person in charge of the certificate.

Degree Plan in Guidance and Counseling

To meet individual needs, some flexibility is allowed in planning the student's program; however, because of requirements for certification the usual pattern of course work is as follows:

1. **The Guidance Program. 3 semester hours.**

   Edu 5322—Organization and Administration of Guidance Program

2. **The Pupil Served. 6 semester hours.**

   Edu 431—Psychology of Exceptional Children
   Edu 534—Advanced Study in Human Development
   Edu 535—The Learning Process

3. **Resource Areas. 27 semester hours.**

   Required (21 semester hours)

   Edu 531—Research
   Edu 5323—Occupational and Vocational Guidance
   Edu 5324—Individual and Group Counseling
   Edu 5328—Practicum in Guidance and Counseling
   Edu 5333—Individual Counseling Theories and Techniques
   Edu 5335—Individual Testing

   Electives (6 semester hours)

   Edu 5325—Instructional Processes in Learning Disabilities
   Edu 5332—Guidance and Counseling in the Elementary School

    Psy 432—Abnormal Psychology
    Soc 339—Juvenile Delinquency
    Swk 532—Group Work

    4. Thesis. Not required or permitted.

Professional Counselor's Certificate

A student who completes requirements for a Master of Education degree in Guidance and Counseling will have fulfilled all curriculum requirements for a Professional Counselor's Certificate. A student who desires the certificate without fulfilling all degree requirements should check with the Director of Guidance and Counseling for specific information. Usually such a student who is otherwise eligible can meet these requirements by completing thirty semester hours. The Texas Education Agency issues a Professional Counselor's Certificate based upon completion of an approved program in guidance and counseling and three years of teaching experience in an accredited school system.

Degree Plan in Supervision

Requirements for a Master of Education in Supervision may be met by completing a 36 semester hour non-thesis program or by completing a 30 semester hour plan that includes a thesis. The student is allowed some flexibility in planning his program; however, the usual pattern of course work is as follows:

1. **Specialization Area.** 9 semester hours.

    Edu 5336—Leadership and Evaluation of Instruction (Required)
    Edu 5337—Seminar: Supervision and Curriculum Development
            (Required)
    Edu 5338—Administration and Supervision - Elementary
    Edu 5339—Administration and Supervision - Secondary

2. **Professional Development.** 6 semester hours.

    Edu 531—Research (Required)
    Edu 5316—Administration and Supervision of Special Education
    Programs
                          OR
    Edu 5334—Interpretation and Analysis of Tests and Measurement

3. **Resource Area.** 21 semester hours (15 if thesis is written).

 a. Learning Process. 3 semester hours.

  Edu 534—Advanced Study in Human Development
  Edu 535—The Learning Process
  Edu 5325—Instructional Processes in Learning Disabilities

 b. Electives. 18 semester hours (12 if thesis is written).

  Edu 530—Structure and Organization of Public Education
  Edu 532—Current Issues in Education
  Edu 533—Contemporary Philosophies of Education
  Edu 536—Problems in Teaching Language Arts and Social Studies
  Edu 537—The Elementary School Curriculum
  Edu 538—Problems in Teaching Arithmetic and Science
  Edu 539—Developmental Reading
  Edu 5313—Learning Potentials in Mentally Retarded Children
  Edu 5315—Problems and Issues in Mental Retardation
  Edu 5317—Secondary School Curriculum
  Edu 5319—Problems in Secondary School Instruction
  Edu 5321—Technology
  Edu 5322—Organization and Administration of the Guidance Program
  Edu 669A-669B—Thesis

If the student chooses to write a thesis, the number of electives is reduced to six hours in course work plus six hours in thesis. With approval, other graduate level courses applicable to professional certification sequences may be selected.

Professional Supervisor's Certificate

Curriculum requirements for a Professional Certificate in supervision may be met by completing a Master of Education degree in Supervision. A student who desires the certificate without fulfilling all degree requirements should consult with the Director of Certification for specific information.

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**General Information Concerning
Professional Certificates**
</p>

Validity

The Professional Certificate is valid for life unless canceled by lawful authority and gives the holder legal authority to perform duties in the public schools of Texas in the specialized areas designated on the face of the certificate.

Requirements:

1. Have completed the requirements for a Provisional Certificate.

2. Have at least three years of teaching experience.

3. Have completed an approved teacher education program.

4. Be of good moral character.

5. Be a citizen, or in the process of becoming a naturalized citizen of the United States.

6. Believe in and uphold the Constitution of the United States and the State of Texas.

7. Have completed, in a Texas institution of higher learning, a course or courses in which the Constitutions of the United States and the State of Texas have been given special emphasis.

8. Have completed at least six semester hours of American History or three semester hours in American History plus three semester hours in Texas History.

9. Pay an application fee of $3.00.

Course Load for Full-Time Teachers

Full time teachers may enroll for as much as six semester hours of graduate credit for one semester during an academic year; however, the load of such students shall not exceed nine semester hours for the academic year.

GRADUATE FACULTY

Members

Professor Howard W. Adams
   Secondary Education, education research

Professor E.B. Blackburn, Jr.
   Elementary Education, elementary curriculum

Associate Professor Kenneth R. Briggs
   Educational Psychology

Associate Professor Claude W. Cheek
   Special Education, physically handicapped

Associate Professor Betty Fay Coody
Elementary Education, elementary curriculum

Associate Professor Walter Dezelle, Jr.
Special Education, mental retardation

Associate Professor Vernon H. Griffin
Elementary Education, elementary curriculum

Professor W. Richard Hargrove
Elementary Education, foundations of education

Professor Bradley B. Hogue
Elementary Education, educational psychology

Professor Conrad Dell Mang
Elementary Education

Professor M. L. McLaughlin
Elementary Education, contemporary education

Professor Oliver P. Monk
Secondary Education, mathematics education

Professor Thomas T. Salter
Elementary Education, elementary curriculum

Professor E. Lee Self
Secondary Education, public education

Associate Members

Assistant Professor Charles M. Burke
Elementary Education

Assistant Professor Richard E. Swain, III
Secondary Education, science education

The graduate student will select his **education** courses from the following list:

430—Education of the Mentally Retarded. Problems in the selection, preparation, development, and use of curriculum materials. Use of resource, selection of equipment, employment opportunities, and a review of recent

research. Opportunities provided for functional experiences. Class: 3 hours. Credit: 3 semester hours.

431—Psychology of Exceptional Children. Social and emotional characteristics and adjustment problems of children and youth who are exceptional. Class: 3 hours. Credit: 3 semester hours.

439—Methods and Materials for Learning Disabilities. Classroom management and teaching procedures for children with learning disabilities due to possible minimal brain injury. Discussion of behavioral characteristics and problems in diagnosis. Class: 3 hours. Credit: 3 semester hours.

530—Structure and Organization of Public Education. Analysis of the operation and function of public education at the local, state, and national levels. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

531—Research. Introduction to skills and techniques necessary for research and problems solving in education. Emphasis on terminology, methodology, and spirit of systematic research. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

532—Current Issues in Education. Current controversies and trends in public education. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

533—Contemporary Philosophies of Education. Influence of recent philosophies on education. Schools of educational philosophy and implications for curriculum development and teaching methods. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

534—Advanced Study in Human Development. A study of the development and nature of the human personality. Emphasis on recent psychological and biological experiments. Prerequisite: graduate standing. Class: 3 hours. Credit 3 semester hours.

535—The Learning Process. Dynamics, processes, and systems of learning. Theoretical emphasis. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

536—Problems in Teaching the Language Arts and Social Studies. Recent developments and trends with primary consideration given to individual teaching problems and individual research. Prerequisite: graduate standing. Class 3 hours. Credits: 3 semester hours.

537—The Elementary School Curriculum. Analysis of the objectives, organization, and content of the different areas of the elementary school

curriculum. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

538—**Problems in Teaching Arithmetic and Science.** Study of current developments and trends with emphasis upon individual teaching problems. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

539—**Developmental Reading.** Methods for extending and refining fundamental reading habits and attitudes, and for increasing reading efficiency. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5101, 5201, 5401, 5501, 5601—**Institute in Education.** Designed to advance the professional competence of participants. For each institute, a description of the particular area of study will be indicated. May be repeated for credit when nature of institute differs sufficiently from one previously taken. Class: 1 to 6 hours. Credit: 1 to 6 semester hours.

5301—**Current Literature for Children and Adolescents.** Survey of recent literature for children and adolescents. Emphasis given to non-fiction in such areas as earth science and social science. Extensive reading of actual literature. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5311—**Prescriptive Teaching with the Mentally Retarded.** Extrapolate psychological and sociological data into individual teaching prescriptions for mentally retarded children; applied experience. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5312—**Learning Potentials in the Neurologically Involved.** Determining the degree of modifiability of pupil behaviors, identifying functioning levels, and devising appropriate teaching strategies; individual projects. Prerequisite: graduate standing. Class 3 hours. Credit: 3 semester hours.

5313—**Learning Potentials in Mentally Retarded Children.** Determining the degree of modifiability of pupil behaviors, identifying functioning levels, and devising appropriate teaching strategies; individual project. Prerequisite: graduate standing. Class 3 hours. Credit: 3 semester hours.

5314—**Instructional Processes with the Mentally Retarded.** Translating the behaviors of mentally retarded children into child development categories and applied behavior modification processes in child study projects. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5315—**Problems and Issues in Mental Retardation.** Appraisal of current problems, trends and practices in the education and care of exceptional children. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5316—Administration and Supervision of Special Education Programs. Analysis of the functions of special education in the administrative structure of the school; the principles and practices in administration and supervision in special education. Project: A school survey. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5317—Secondary School Curriculum. Analysis of the objectives, organization, and content of the different areas of the secondary school curriculum. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5319—Problems in Secondary School Instruction. Consideration of the instructional problems encountered by experienced teachers in the secondary schools. Prerequisite: graduate standing and two years of teaching experience. Class: 3 hours. Credit: 3 semester hours.

5321—Technology. Application of present technology to the production of educational materials and to direct instruction. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5322—Organization and Administration of the Guidance Program. Essential services and management functions of guidance and counseling services for schools. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5323—Occupational and Vocational Guidance. Survey of occupational fields, requirements and rewards. Concepts of vocational guidance. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5324—Individual and Group Counseling. Processes of individual study. Counseling procedures and techniques for individuals and groups. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5325—Instructional Processes in Learning Disabilities. Investigation of current remedial techniques and their application to individual differences in learning processes. Consideration of various programs and their benefit in altering behavioral characteristics. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5326—Problems and Issues in Education of the Physically Handicapped. Appraisal of current problems, trends and practices in the education and care of exceptional children. Prerequisite: graduate standing. Class 3 hours. Credit: 3 semester hours.

5327—College Teaching. Designed for graduate students with little or no pedagogial training or experience. Application of learning principles and

pedagogical procedures in college classes. Prerequisite: permission of instructor. Class 3 hours. Credit: 3 semester hours.

5328—Practicum in Guidance and Counseling. Supervised observation and practice of guidance and counseling in a school setting. Prerequisite: approval of department head. Class: the number of hours equivalent to 8 hours per week for 16 weeks. Credit: 3 semester hours.

5329—Corrective Reading. Causes of reading disability, methods of diagnosis, and remedial instruction. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5331—Curriculum Development for the Physically Handicapped. Lectures, reports, discussion, and practicum in special areas of interest dealing with learning processes of the orthopedically handicapped, and neurologically involved. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5332—Guidance and Counseling in the Elementary School. A course designed to provide an understanding of guidance principles and techniques applicable to the elementary school. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5333—Individual Counseling Theories and Techniques. Opportunities are provided for the student to enrich his background and experience in interviewing and in dealing with human relations problems in the counseling situation. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5334—Interpretation and Analysis of Tests and Measurement. Analysis and evaluation of types of tests and measurement devices will be conducted. Methods of determining the reliability and validity of tests are investigated. Designs for testing programs and selection of appropriate tests will be included. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5335—Individual Testing. Theoretical and practical study emphasizing the administration, scoring, and basic interpretation and practice in the use of individual psychological tests. Students will be trained to administer the Wechsler tests, the Stanford Binet, or other subsequently developed individual intelligence scales. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5336—Leadership and Evaluation of Instruction. Investigation of the leadership role of the supervisor. Techniques of evaluation and interpersonal relationships leading to instructional improvement are considered. Class: 3 hours. Credit: 3 semester hours.

5337—Seminar: Supervision and Curriculum Development. Investigation of the role of the supervisor with emphasis on curriculum development. Investigations will center around problems in supervision, curriculum theory, and educational experimentation. Class: 3 hours. Credit: 3 semester hours.

5338—Administration and Supervision-Elementary. Study of school administrative and supervisory practices and policies relating to program development and instructional improvement in the elementary school. Class: 3 hours. Credit: 3 semester hours.

5339—Administration and Supervision-Secondary. Study of school administrative and supervisory practices and policies relating to program development and instructional improvement in the secondary school. Class: 3 hours. Credit: 3 semester hours.

669A-669B—Thesis. Prerequisite: admission to candidacy for the Master of Education degree. Credit: 6 semester hours.

GRADUATE RESOURCE COURSES

Soc 531—Seminar in Sociology. Basic concepts and principles of sociology as applied to the study of selected topics. Designed for education majors or other non-sociology majors. Class: 3 hours. Credit: 3 semester hours.

Swk 532— Group Work The structures and processes of groups—both formal and informal—as sources of support and of modification of the behavior of group members. Prerequisite: graduate standing in the School of Education. Class: 3 hours. Credit: 3 semester hours.

DEPARTMENT OF HEALTH AND PHYSICAL EDUCATION FOR WOMEN
DEPARTMENT OF HEALTH AND PHYSICAL EDUCATION FOR MEN

Degree Requirements:

The Master of Science degree in Health and Physical Education requires the completion of thirty semester hours of graduate work: eighteen in Health and Physical Education, six in thesis, and six in an approved supporting field. The supporting field must be approved by the student's graduate committee or with its approval six additional hours in Health and Physical Education may be substituted for the supporting field.

With the approval of the student's graduate committee in Health and Physical Education, twelve semester hours of course work may be substituted for the thesis. If the non-thesis option is selected, six hours must be taken in an approved supporting field.

HPE 536, Research Methods in Health and Physical Education, is required of all students.

GRADUATE FACULTY

Members

Associate Professor Mary Jane Haskins
   Physical Education, research

Professor James B. Higgins
   Physical Education

Professor Belle Mead Holm
   Health Education, curriculum, administration

Associate Professor Mattie Londow
   Health Education, physical education, research

Associate Professor Leonard A. Yates
   Physical Education, curriculum, administration

Associate Members

Assistant Professor Vernon R. Crowder
   Exercise Physiology

The graduate student will select his courses in **health and physical education** from the following:

434—Health and Human Ecology. Emphasis on the interaction of the human organism with the many aspects of environment and the implication in each area with regard to health. Class: 3 hours. Credit: 3 semester hours.

439—History and Theory of Dance. Chronological summary of characteristics and forms of dance from primitive rites to contemporary art forms; origins and evaluation of classic and contemporary dance forms. Class: 3 hours. Credit: 3 semester hours.

530—Problems in Health and Physical Education. Biological, physiological, social, psychological, and other purposes and outcomes; selection and distribution of activities; teaching methods; facilities; teacher preparation; literature; research problems. Time arranged. Credit: 3 semester hours.

531—Cultural Foundations of Physical Education. A study of history and cultural foundations of sport and physical education activities, their origin and influence upon modern man. Class: 3 hours. Credit: 3 semester hours.

532—Seminar in Physical Education. Designed to develop abilities in locating and evaluating literature and research in physical education and in allied fields. Course may be repeated for a maximum of six semester hours as the topic varies. Class: 3 hours. Credit: 3 semester hours.

533—Organization and Administration of the School Health Program. Administrative relationships and procedures in conducting school health programs. Class: 3 hours. Credit: 3 semester hours.

534—Scientific Basis of Exercise. A study of the role physical activities and their effects on the human organism through the use of professional literature and laboratory experimentation. Class: 3 hours. Credit: 3 semester hours.

535—Trends and Issues in Health and Physical Education. Designed to assist the student to become knowledgeable on current trends and issues in the areas of health and physical education. Study will include historical, analytical, and projective approaches. Course may be repeated for a maximum of six semester hours as the topic varies. Class: 3 hours. Credit: 3 semester hours.

536—Research Methods in Health and Physical Education. Familiarity with types of research in Health and Physical Education with emphasis on tools and techniques of research and research design. Class: 3 hours. Credit: 3 semester hours.

5101, 5201, 5301, 5601—Institute in Health and Physical Education. This course is designed to advance the professional competence of graduate students in health and physical education. Topic will vary. A description of the particular area of study will be indicated. May be repeated for credit when nature

of course differs sufficiently from one previously taken. Class: 1-6 hours. Credit: 1-6 semester hours.

669A-669B-Thesis. Prerequisite: admission to candidacy for the Master of Science degree. Credit: 6 semester hours.

SCHOOL OF ENGINEERING

The School of Engineering offers a program of study leading to the Master of Engineering Science degree (M.E.S.), a Master of Engineering degree (M.E.), and Doctor of Engineering (D. Egr.). The Department of Mathematics offers a Master of Science degree is Mathematics (M.S.). (See Department of Mathematics, this Catalog.)

MASTER OF ENGINEERING SCIENCE

The Master of Engineering Science degree plan requires the completion of thirty semester hours of graduate work, including thesis. For admission to the program, the student must meet the following requirements:

1. The general requirements for admission to the Graduate School.

2. Hold a bachelor's degree in a field of engineering or applied science.

3. Have credit equivalent to that required for undergraduate engineering students at Lamar.

It is assumed that all graduate students are proficient in the use of digital computers.

Degree Requirements

The candidate for the M.E.S. degree must meet all the Graduate School general degree requirements as listed in this catalog. Thirty semester hours of graduate work are required with the following restrictions:

1. A minimum of eighteen semester hours of credit in engineering courses, including:

   a. Six semester hours in thesis.
   b. Three semester hours of engineering courses from those designated as graduate core courses, and
   c. Nine additional semester hours of engineering courses of which at least six semester hours must be on the 500 level.

2. From approved senior-graduate courses, nine semester hours in a combination of mathematics and science.

3. Three hours of electives.

4. All course work presented for the M.E.S. degree must have the approval of the candidate's committee.

MASTER OF ENGINEERING

The Master of Engineering (M.E.) degree is designed to suit the needs of the practicing engineer. This program recognizes the value of, and the initiative required for, professional registration.

For admission to the program, the student must meet the following requirements:

1. The general requirements for admission to the Graduate School.

2. Hold a bachelor's degree with credit substantially equivalent to that required for an engineering degree at Lamar.

Degree Requirements:

1. The candidate for the M.E. degree must meet all the general requirements of the Graduate School as listed in this catalog.

2. The general requirement is thirty-six semester hours of graduate work. At least eighteen semester hours of this work must be engineering courses at the 500 level. The remainder will be selected by the graduate student through consultation and agreement with his graduate committee.

3. A graduate student holding an Engineer-in-Training (EIT) certificate or a graduate student who is a Professional Engineer registered in the State of Texas (or registered in another state where requirements do not conflict with the provisions of the Texas Engineering Practice Act and are of a standard not lower than those specified in Section 12 of that Act) may satisfy course requirements by completing thirty-three semester hours of graduate work providing EGR 631 (Design Project) is included.

DOCTOR OF ENGINEERING

The Doctor of Engineering degree is designed as an extension of the Master of Engineering to allow a practicing engineer to work on practical engineering problems of considerable complexity.

For admission to the program, these requirements must be met:

1. Hold a master's degree in engineering or at least thirty semester hours of engineering, science, or mathematics courses at the graduate level.

2. Submit a letter of application to the Coordinator of Engineering Graduate Studies. This letter should include information about the applicant's engineering experience, present employment, chief interests, and type of work he might undertake for his field study.

An applicant who has been accepted into the Graduate School and whose application indicates he might be admitted to the program, will be notified and a graduate faculty committee will review the applicant's transcripts, test scores, and letter of application. The committee will then determine if a diagnostic examination is warranted. If such an examination is approved, the committee will then prepare and administer the examination.

Diagnostic Examination

The objectives of the diagnostic examinations are threefold: (1) to determine the appropriateness of the student's background, (2) to help determine the student's qualifications for a doctoral program, and (3) to provide guidance for the selection of a study program. The committee may decide to do any one of the following: (1) accept the student into the doctoral program, (2) not accept the student, or (3) accept the student conditionally. If the student is accepted conditionally, the committee will specify what additional preparation the student must make. The committee will also specify whether the student is to retake the diagnostic exams, a portion of these exams, or may be accepted into the doctoral program upon completion of the additional preparation.

STUDY PROGRAM

After a student is accepted into the doctoral program he will meet with his committee to outline a program of study. This program of study would normally consist of a minimum of 30 semester hours of course work beyond the equivalent of a master's degree.

The study program would be chosen in consultation with the student to suit his interests and abilities as nearly as the standards of the doctoral program and the interests of the faculty will allow. In addition to his study program the student will be expected to demonstrate a proficiency in at least one computer language.

The student is expected to pursue his study program in a continuous manner by earning 3 semester hours credit in 2 consecutive long terms. Failure to do so will require an application to the Graduate Engineering Faculty to continue his study program.

Candidacy Examination

Near the end of the study program the student would make written application to his doctoral committee to be allowed to take the candidacy examinations. The purposes of the candidacy examinations are threefold: (1) to test the ability of the student to comprehensively relate the subjects of his study program (2) to verify that the time taken to complete the study program has not been so long as to disassociate the student's graduate education, and (3) ascertain the student is ready to do the field study. The committee may again make any one of three decisions upon evaluation of theses exams: (1) pass, (2) fail, or (3)conditional pass. A conditional pass would be accompanied by the requirements of the committee and the action to be taken upon the fulfillment of these requirements.

FIELD STUDY

After the student is admitted to candidacy he would be required to submit a formal engineering proposal conforming to a standard format outlining his field study. This field study would normally be expected to take a minimum of one man-year and should involve some technological innovation. A unanimous vote of the doctoral committee shall be required to approve a field study. During the course of the field study the student would normally register for 30 semester hours of Field Study. Upon completion of the field study a formal engineering report with a standard format shall be submitted to the members of the doctoral committee and defended in an oral examination.

GRADUATE FACULTY

Members

Associate Professor Ali M. Ali
    Operations research, quality control

Professor Luther A. Beale
    Structural analysis, design, marine structures

Professor Wendell C. Bean
Automatic control systems, bioengineering

Professor Otto G. Brown
Fluid mechanics in turbulent flow; bioengineering

Professor Lloyd B. Cherry
Electronic instrumentation and control

Professor James L. Cooke
Process control; power system analysis

Professor Floyd M. Crum
Solid state devices in electronic circuits

Professor Andre P. Del Flache
Soil mechanics, foundations, ocean engineering, geophysics

Associate Professor Edwin O. Eisen
Liquid-liquid equilibria, nuclear engineering, kinetics

Professor David G. Gates
Decision-making processes; plant layout, human factors

Professor Frederic C. Jelen
Corrosion, economic analysis

Professor Robert A. McAllister
Transport properties, fluid mechanics

Associate Professor Eugene P. Martinez
Gas dynamics

Professor Harry T. Mei
Heat transfer, humidity control

Professor Irvin L. Reis
Probabilistic design, mathematical models, management engineering

Professor Bruce G. Rogers
Ultimate load characteristics of structures, stress analysis

Professor George B. Tims, Jr.
Engineering management

Associate Professor Bobby R. Waldron
Mathematical statistics, computer science

Professor Richard E. Walker
    Rheology, analog-hybrid computers

Associate Professor Joseph T. Watt
    Adaptive control; optimization; operation analysis

Associate Professor Fred M. Young
    Heat transfer, compressible flow

Associate Members

Associate Professor James J. Brennan
    Engineering statistics, hospital systems, operative research

Associate Professor John A. Bruyere
    Material science

Assistant Professor Jack R. Hopper
    Reaction, kinetics, catalysis

Assistant Professor John M. Kramer
    Solid mechanics

Assistant Professor Ramon S. Satterwhite
    Electromagnetic fields and waves

The graduate student will select his **engineering** courses from the following:

*531—Materials Science. Principles underlying the behavior of materials existing in the solid, liquid, and gaseous phases. Class: 3 hours. Credit: 3 semester hours.

532—Kinetics. Rate equations are developed by the application of statistical methods and the theory of absolute reaction rates. Partition functions and potential energy surfaces will be introduced. Considerable attention will be given to the measurement of reaction rates and the interpretation of experimental data. May be taken for graduate credit in chemistry or engineering. Class: 3 hours. Credit: 3 semester hours

*533—Computer Methods in Engineering Analysis. Computer techniques will be introduced and employed. Numerical methods for solving transcendental equations, polynomials, simultaneous linear algebraic equations,

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*Core Course: A core course may be repeated one time for graduate credit, upon prior approval, where course content varies.

and partial differential equations. Monte Carlo method, random numbers and simulation of engineering systems will be introduced. Class: 3 hours. Credit: 3 semester hours.

534—Nonlinear Analysis. Various methods of solving nonlinear differential equations are studied. Analytical, graphical, and computer solutions are included. Class: 3 hours. Credit: 3 semester hours.

*535—Control Theory. Introduction to state variables; multiple-input-multiple-output systems; controllability; performance criteria; choice of control strategy. Class: 3 hours. Credit: 3 semester hours.

*536—Thermodynamics-Process Industry. Thermodynamic laws are derived and applied to physical chemical phenomena. Ideal and non-ideal gas, liquid, and solid solution behavior are developed for physical and chemical equilibra. Statisical and irreversible thermodynamics are introduced. Course credit in chemistry is optional. Class: 3 hours. Credit: 3 semester hours

*537—Thermodynamics-Energy Conversion. The basic laws of thermodynamics are derived and applied in the analysis of power cycles, energy conversion, and specific processes. Basic principles of irreversible thermodynamics and phenomenological relations are presented. An elementary statistical approach is presented with simple examples of the calculation of the transport properties of gases, liquids, and solids. Class: 3 hours. Credit: 3 semester hours.

538—Sampled Data Control Systems. Principles of digital and sampled-data control systems. Analysis of response, stability, and compensation by transforms and other methods; special topics as time permits. Prerequisite: Mth 4301. Class: 3 hours. Credit: 3 semester hours.

539—Seminar. Investigation of current engineering practices, research, and literature. The course may be repeated for credit when the subject matter differs. Class: 3 hours. Credit: 3 semester hours.

5303—Regression Analysis. Review of regression analysis; theory of least squares; multivariate analysis; theory of the general linear hypothesis model. Class: 3 hours. Credit: 3 semester hours.

5304—Nonlinear Programming. Theory of linear and nonlinear programming; the lambda and delta-form of the approximating problem; quadratic programming; gradient methods. Class: 3 hours. Credit: 3 semester hours.

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* Core Courses. A core course may be repeated one time for graduate credit, upon prior approval, where course content varies.

5305—Reliability. Statistical theories pertinent to solution of engineering problems in reliability; distribution and failure theory including failure rate and mean time to failure for the exponential, log normal, gamma, and Weibull distributions. Class: 3 hours. Credit: 3 semester hours.

5311—Heat Transfer Analysis. Fundamental principles of heat transfer by conduction, convection and radiation. Emphasis will be given to the analysis of problems combining the various heat transfer mechanisms. Class: 3 hours. Credit: 3 semester hours.

5312—Heat Transfer Mechanisms. This course will be concerned with individual mechanisms of heat transfer. The mechanisms studied will be conduction, radiation, convection, or boiling. The course may be repeated for credit as the mechanism studied varies. Class: 3 hours. Credit: 3 semester hours.

5313—Fluid Mechanics. Fluid statics, fundamentals of fluid motion, systems and control volumes, basic laws, irrotational flow, similitude and dimensional analysis, incompressible viscous flow, boundary layer theory, and an introduction to compressible flow. Vector methods will be employed. Class: 3 hours. Credit: 3 semester hours.

5314—Distillation. Modern methods are surveyed for distillation-column calculations. Material and energy balance relationships are reviewed for multicomponent fractionation equipment and for batch stills. Various plate designs are presented including hydraulic factors of pressure drop and flooding, and plate efficiency is treated in detail. Class: 3 hours. Credit: 3 semester hours.

5315—Theory of Elasticity. General analysis of stress and strain, equations of equilibrium and compatibility, stress and strain relations, two dimensional stress problems, elastic energy principles, thermoelastic problems. Class: 3 hours. Credit: 3 semester hours.

5316—Operations Research I. The use of advanced mathematical models for optimizing engineering problems with emphasis on management decisions. Includes special techniques based on systems analysis, design of experiments, linear programming, queueing, simulation, and probabilistic analysis. Class: 3 hours. Credit: 3 semester hours.

5317—Micromeritics. Shape and size-distribution of particles. Theories of sieving, grading and grinding. Surface properties. Chemical properties. Packing mechanics of particulate matter (statics, dynamics, behavior under stress, thermodynamics). Electrical, optical and sonic properties. Diffusion, transport, collection and separation of small particles. Class: 3 hours. Credit: 3 semester hours.

5318—Stress Analysis. Use of reflection and refraction photoelastic apparatus to determine state of stress in opaque and transparent structural models. Demonstration of brittle coating techniques. Comparison of electrical resistance and mechanical strain gages. Investigation of dynamic loading with oscilloscopes and other recording apparatus. Class: 3 hours. Credit: 3 semester hours.

5319—Design of Experiments. Experimental design and analysis of experiments are developed as tools of the manufacturing and process industries. Exploratory and evolutionary (EVOP) designs, analysis of variance (ANOVA), error, and regression are treated in some detail. Prerequisite: Course in statistics or equivalent. Class: 3 hours. Credit: 3 semester hours.

5321—Quality Control Systems. Application of statistical methods to industrial problems; regression and correlation theory; analysis of variance; use of control charts for control of manufacturing operations. Class: 3 hours. Credit: 3 semester hours.

5322—Rheology. A study of non-Newtonian liquids with emphasis on principles and fundamentals. Methods of measuring rheological properties of non-elastic and elastic liquids and prediction of laminar and turbulent flow. Class: 3 hours. Credit: 3 semester hours.

5323—Catalysis and Reactor Design. The mechanisms of catalytic processes will be considered in detail. The evaluation of catalyst effectiveness and selection of catalysts will be discussed. The design of catalytic and non-catalytic reactors will be considered. Class: 3 hours. Credit: 3 semester hours.

5324—Wave Mechanics in Particulate Matter. Propagation of elastic waves in semi-infinite media. Surface waves and body waves. Behavior of particulate masses under the effect of dynamic loading, impact and transient phenomena. Effect on substructures of waves from industrial, seismic and nuclear sources. Mechanical and electronic recording. Class: 3 hours. Credit: 3 semester hours.

5325—Information Theory. Aspects applicable to all fields of engineering. Entropy as a measure of information; signal processing, channel capacity and coding theory. Class: 3 hours. Credit: 3 semester hours.

5326—Waves and Coastal Processes. Hydrodynamics of waves, wave generation, reflection, energy transmission and dissipation. Coastal phenomena, harbors and breakwaters. Analysis of tides and tidal currents. Salt water, fresh water interaction and diffusion in estuaries; erosion and shoaling in tidal waters. Class: 3 hours. Credit: 3 semester hours.

5327—Marine Structures. Analysis of wind and wave forces acting on marine structures. Consideration of design techniques and design requirements

for offshore structures. Application of computer methods. Class: 3 hours. Credit: 3 semester hours.

5328—Inelastic Theory of Structures. Investigation of structural behavior under conditions of overload. Design of structures using principles of ultimate strength and plastic design theories. Consideration of load and safety factors, stress redistribution, and shakedown. Class: 3 hours. Credit: 3 semester hours.

5331—Similitude and Model Design. Dimensional analysis, data processes, prediction equations and model design, including a study of distorted and dissimilar models. Models studied include structural fluid flow, thermal, electrical, magnetic, acoustical, and illumination types. Various analogues from second-order ordinary and partial differential equations are also discussed. Prerequisite: Mth 434 recommended. Class: 3 hours. Credit: 3 semester hours.

5332—Operations Research II. Advanced topics in operations research-linear programming, non-linear programming, advanced topics in queueing and inventory theories, sensitivity analysis, and dynamic programming. Prerequisite: EGR 5316 or equivalent. Class: 3 hours. Credit: 3 semester hours.

5333—Production Control. Advanced topics in techniques employed in different types of manufacture for planning and controlling production. Class: 3 hours. Credit: 3 semester hours.

5334—Salary Administration for Engineers and Scientists. A study of salary incentives, job evaluation, and merit rating for engineering and scientific personnel, executive and managerial compensation. Class: 3 hours. Credit: 3 semester hours.

5335—Engineering Administration. The qualitative and quantitative responsibilities of the engineer as an administrator. The planning, organization and control of engineering functions. Class: 3 hours. Credit: 3 semester hours.

5336—Operations Research III. Recent advances in the methodology and philosophy of Operations Research. Prerequisite: Consent of instructor. Class: 3 hours. Credit: 3 semester hours.

5337—System Simulation. Study of the design, construction, testing, and operation of process models for simulation. Starting with simple hand-computed simulations, the student progresses to relatively complex models requiring the use of a high-speed digital computer. Class: 3 hours. Credit: 3 semester hours.

5343—Industrial Waste Treatment. pocedures for analysis of the industrial waste problem, methods of collecting experimental data, and process design for required treatment. Case studies and special laboratory problems for

translating experimental data to prototype design. Class: 3 hours. Credit: 3 semester hours.

5344—Unit Operations and Processes of Sanitary Engineering. Theory of fluid and slurry movement under gravity and pressure systems, mixing processes, coagulation and flocculation of chemical treatment, separatory processes including flotation and sedimentation, and gas transfer and absorption of the biological systems. Selected laboratory assignments for model studies of these unit operations. Class: 3 hours. Credit: 3 semester hours.

5345—Materials Technology. Study of materials specifications, standards, and their evaluation. A critical review of current specifications, how they were developed, and how they should be applied in engineering practice. Discussion of the proper use of mill reports, independent testing laboratories, and consultants. Class: 3 hours. Credit: 3 semester hours.

5347—Manufacturing Analysis. The course is designed to provide the background analysis required to understand manufacturing operations and to predict manufacturing behavior. It includes material behavior, metal cutting, metal forming, new and unconventional cutting and forming techniques, machine tool vibration, and manufacturing cost optimization. Class: 3 hours. Credit: 3 semester hours.

5348—Probabilistic Design. Application of algebra of normal function to engineering design. Distributive nature of stresses, strengths, and times. Realistic versus idealized design procedures. Class: 3 hours. Credit: 3 semester hours.

5351, 5352, 5353—Electric Power Systems Analysis I, II, III. A three-semester sequence, selected from: symmetrical components, impedance and fault-current calculations, load-flow studies, economic operation, stability and control, system modelling, non-fossil fuel energy conversion. Both analytical and digital-computer methods may be employed as appropriate. Class: 3 hours. Credit: 3 semester hours each.

5354—Nuclear Power Plants. Nuclear reactor neutron kinetics; core reactivity effects of control poisons, coolant and fuel temperatures, fission product poisons; self regulation, automatic control; startup and shut-down; types of nuclear plants forseen in electric power generation; special problems and benefits of nuclear power plants. Class: 3 hours. Credit: 3 semester hours.

5355—Random Signal Theory. Basic concepts of probability theory, correlation functions, power-density spectrum and mean-square error criteria as applied to stationary stochastic processes in linear systems; optimum filtering and prediction and other special topics depending upon class interest and time available, such as: nonlinear devices, time-varying systems, non-stationary processes. Class: 3 hours. Credit: 3 semester hours.

5356—**Modern Control Theory.** Review of state variables; determining mathematical models from input-output data; on-off control systems; optimal control. Class: 3 hours. Credit: 3 semester hours.

5357—**Electromagnetic Fields and Waves.** Brief review of basic field theory; solutions of the wave equations in several coordinate systems with various boundary conditions; study of plane waves in various media; study of transmission systems including transmission lines and waveguides. Class: 3 hours. Credit: 3 semester hours.

5358—**Scientific Writing and Editing.** Supervised presentation of technical and scientific projects for students proficient in exposition. Projects subject to department's and instructor's approval. Prerequisite: Instructor's consent and departmental approval. Class: 3 hours. Credit: 3 semester hours.

5359—**Seminar In Engineering Administration.** Direct reading, analysis and research in the classic and modern literature of engineering administration. Class: 3 hours. Credit: 3 semester hours.

5360—**Case Problems In Engineering Administration.** The case method applied to complex administration problems encountered by engineers. Class: 3 hours. Credit: 3 semester hours.

5361—**Microelectronic Integrated Circuits.** A basic study of the synthesis of semiconductor and thin film integrated circuits using passive and active elements. The application of such devices to computers, signal processors and instruments. Class: 3 hours. Credit: 3 semester hours.

5362—**Decision-Making Processes.** A study of the bases and philosophical implications of executive decision-making. Elementary game theory, minimax and other strategies. Bayesian interference, subjective probability, teleology of measurement. Prerequisite: Consent of instructor. Class: 3 hours. Credit: 3 semester hours.

5363—**Administrative Control Systems.** Problems affecting the engineer in his design, analysis and control of information systems. Class: 3 hours. Credit: 3 semester hours.

5364—**Digital System Engineering.** Review of combinational and sequential logic; organization of digital computers; data representation and transfer; arithmetic operations; storage and access; control functions. Class: 3 hours. Credit: 3 semester hours.

5371—**Seminar In Administrative Practices.** Study of the interrelationships between the fields of economics, politics, physical science and social science and the effects upon the management of engineering work. Class: 3 hours. Credit: 3 semester hours.

5375—5390—Special Topics. The course is designed to meet special needs of students. Each topic is offered on an irregular schedule as the demand requires. Example topics include:

1. Kinetic Theory of Gases
2. Transients in Compressible Flow
3. Non-linear Vibrations
4. Protective Construction
5. Absorption and Extraction
6. Stagewise Mass Transfer
7. Properties of Gases and Liquids
8. Nuclear Engineering
9. Hybrid and Analog Computers
10. Adaptive Control
11. Optimization Techniques
12. Sampling Techniques

Class: 3 hours. Credit: 3 semester hours.

5391—Work Systems Engineering. Study of current research in methods engineering and work measurement; work design; work systems, systems of standard data and predetermined motion time data, statistical treatment of work measurement. Class: 3 hours. Credit: 3 semester hours.

5399—Human Factors Engineering. The specialized adaptation of engineering designs to the human operator's role in man-machine systems. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

5101, 5201, 5301, 5401, 5501, 5601—Institute in Engineering. Designed to advance the professional competence of participants. For each institute, a description of the particular area of study will be indicated. May be repeated for credit when nature of institute differs sufficiently from one previously taken. Class: 1-6 hours. Credit: 1-6 hours.

669A-669B—Thesis. Prerequisite: admission to candidacy. Credit: 6 semester hours.

631—Design Project. Prerequisite: admission to candidacy. Credit: 3 semester hours.

DEPARTMENT OF ENGLISH

Degree Requirements

The degree of Master of Arts in English requires the completion of thirty semester hours of graduate work: eighteen in English, six in thesis, and six in an approved minor. With the approval of the Head of the Department of English, twelve semester hours of course work may be substituted for the thesis. At least eighteen semester hours, including the thesis, must be in English courses numbered 500 or above. The minor must be approved by the Head of the Department of English or with his approval six additional hours in English may be substituted for the minor.

Professional Certification Requirements (Texas) in English

The plan for the Professional Certificate—Secondary requires the completion of thirty semester hours of graduate work: eighteen in English, six in resource areas, and six in approved teacher education. At least twelve semester hours must be in English courses numbered 500 or above. The courses in the resource areas must be approved by the Head of the Department of English; such approval will be given on the basis of the support they can give to the major and on the specific needs of the graduate student. The six semester hours of teacher education must be taken in courses specifically approved for the Professional Certificate—Secondary.

Depending on the student's undergraduate course work, his graduate program in English will include Eng 4327, 533, and 539, and one course from either 535, 536, 537, 538, or 5311.

GRADUATE FACULTY

Members

Professor Robert J. Barnes
   British and Continental literature: 1840 to the present

Professor George W. de Schweinitz
   Modern American literature, creative writing

Professor Winfred S. Emmons, Jr.
   Middle English language and literature, American literature

Professor Harry L. Frissell
   Renaissance and seventeenth century British literature

Professor Robert C. Olson
   Eighteenth century British literature

Associate Professor Jack N. Renfrow
   Renaissance literature

Professor Henry B. Rule
   American literature: 1840 to the present

Associate Professor Robert Blaine Thomas
   Seventeenth and eighteenth century British literature, short story

Professor Alvice W. Yeats
   British literature: 1840 to the present

Associate Professor David D. Zink
   Nineteenth century American and British literature

The graduate student will select his English courses from the following list:

430—History of the English Language. Theory and nature of language. Studies in the growth of English and American forms. Prerequisite: foreign language through 232. Class: 3 hours. Credit: 3 semester hours.

432—Studies in Sixteenth Century Literature. Critical study in the poetry, prose, and drama of the age. May be taken for credit more than once if the topic varies. Class: 3 hours. Credit: 3 semester hours.

434—Shakespeare. Intensive study of selected major plays. Prerequisite: English 333 or permission of the instructor. Class: 3 hours. Credit: 3 semester hours.

435—Studies in Seventeenth Century Literature. Critical studies in the poetry, prose, and drama of the period 1600-1660. May be taken for credit more than once if the topic varies. Class: 3 hours. Credit: 3 semester hours.

438—Studies in Eighteenth Century Literature. Critical studies in the poetry, prose, and drama of the period 1660-1800. May be taken for credit more than once if the topic varies. Class: 3 hours. Credit: 3 semester hours.

439—Studies in Romantic Literature. Critical studies in the poetry, prose, and drama of the Romantic Period. May be taken for credit more than once if the topic varies. Class: 3 hours. Credit: 3 semester hours.

4311—**Studies in Victorian Literature.** Critical studies in the poetry and prose of the Victorian Period. May be taken for credit more than once if the topic varies. Class: 3 hours. Credit: 3 semester hours.

4313—**The American Literary Renaissance:** 1820-1860. An intensive study of the major authors of the period from Poe to Melville. Class: 3 hours. Credit: 3 semester hours.

4314—**The Development of American Realism:** 1860-1900. An intensive study of the major authors of the period from Whitman to Norris. Class: 3 hours. Credit: 3 semester hours.

4317—**Contemporary Drama.** A study of dramatic trends and representative plays from Ibsen to the present. Class: 3 hours. Credit: 3 semester hours.

4318—**Contemporary Poetry.** A study of poetic developments in England and America with emphasis on representative poets from Hardy to the present. Class: 3 hours. Credit: 3 semester hours.

4319—**Contemporary Fiction.** A study of prose fiction representative of modern ideas and trends, with emphasis on English and Continental authors. Class: 3 hours. Credit: 3 semester hours.

4322—**Russian Literature.** Selected works from nineteenth and twentieth century Russian literature in translation, Pushkin to Sholokov. Class: 3 hours. Credit: 3 semester hours.

4123, 4223, 4323, 4423, 4523, 4623—**Institute in English.** The theory and practice of traditional structural and generative grammar; the theory and practice of composition; and the critical analysis of literature. Class: 1-4 hours. Laboratory: 2-4 hours. Credit: 1-6 semester hours.

4325—**Language: Sound and Meaning.** Theory of language for non-English majors. A study of meaning as related to words and to grammatical features. English phonology as applied to orthography. May not be counted for English major credit. Class: 3 hours. Credit: 3 semester hours.

4326—**Expository Writing.** The practical application of the techniques of mature exposition; classification, explanation, evaluation. Class: 3 hours. Credit: 3 semester hours.

4327—**Bibliography and Methods of Research.** An introduction to research methods and sources. Recommended for those planning or beginning graduate study. Class: 3 hours. Credit: 3 semester hours.

4328—Colonial American Literature. A survey of all significant writers from the beginnings to the American Revolution. Class: 3 hours. Credit: 3 semester hours.

4329—Modern American Literature. A critical survey of major American writers of the twentieth century. Class: 3 hours. Credit: 3 semester hours.

4331—Advanced Survey of British Literature. Intensive survey of British literature from the beginnings to 1800, with wide collateral reading in literary history. Class: 3 hours. Credit: 3 semester hours.

4332—Advanced Survey of British Literature. Intensive survey of British literature from 1800 to the present, with wide collateral reading in literary history. Class: 3 hours. Credit: 3 semester hours.

4333—Studies in a Particular Author. Intensive critical study of a major writer such as Chaucer, Milton, Hawthorne, Faulkner. May be taken for credit more than once when the topic varies. Class: 3 hours. Credit: 3 semester hours.

4334—Critical Studies in Literature. Intensive critical study of a particular genre or theme in comparative literature or criticism. May be taken more than once for credit when the topic varies. Class: 3 hours. Credit: 3 semester hours.

533—Special Topics In Old And Middle English Language And Literature. Intensive study of the language necessary for reading literature of the period focused on. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing and Eng 430 or 431. Class: 3 hours. Credit: 3 semester hours.

535—Special Topics In Renaissance And Seventeenth Century English Literature. An intensive study of an author or related authors selected from the period. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

536—Special Topics In Restoration And Eighteenth Century English Literature. An intensive study of an author or related authors selected from the period. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

537—Special Topics In Nineteenth Century English Literature. An intensive study of an author or related authors selected from the period. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

538—**Special Topics In Twentieth Century Literature.** An intensive study of an author or related authors selected from the period. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

539—**Special Topics In American Literature.** An intensive study of an author or related authors selected from the period. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5311—**Special Topics In Comparative Literature.** Intensive study of an author or authors, genre, or period selected from the range of world literature. Emphasis on analysis and literary method. Course may be repeated for a maximum of six semester hours credit when the topic varies. Class: 3 hours. Credit: 3 semester hours.

669A-669B—**Thesis.** Prerequisite: admission to candidacy for the master's degree. Credit: 6 semester hours.

DEPARTMENT OF GEOLOGY

The Department of Geology offers the following graduate courses to be used primarily as support to other advanced degree programs.

GRADUATE FACULTY

Members

Professor H. E. Eveland
  Geomorphology, glacial geology

Professor William H. Matthews, III
  Paleontology, stratigraphy

Associate Professor William R. Pampe
  Paleontology, meterorology, stratigraphy

530—**Earth Science Seminar.** A survey of earth materials and processes, earth history, astronomy, and meteorology. Identification of mineral, rock and fossil specimens, and cloud formations. Demonstrations of topographic, geologic, and weather maps. Field trip required. Designed for non-science majors. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5301, 5601—**Institute in Earth Science.** Summer, in-service or other institute for earth science teachers, with emphasis on Earth Science Curriculum Project materials and techniques. Class: 3-6 hours. Laboratory: 3-9 hours. Credit: 3 or 6 semester hours.

DEPARTMENT OF GOVERNMENT

Degree Requirements

The degree of Master of Arts in Government requires the completion of thirty semester hours of graduate work: eighteen in Government, six in thesis, and six in an approved minor. With the approval of the Head of the Department of Government, twelve semester hours of course work may be substituted for the thesis. At least eighteen semester hours, including the thesis, must be in Government courses numbered 500 or above. The minor must be approved by the Head of the Department of Government or with his approval six additional hours in Government may be substituted for the minor.

The student's graduate program must include Government 530 or 438.

GRADUATE FACULTY

Members

Professor Manfred Stevens
    Comparative Government, Europe

Professor William R. Tucker
    Political Thought

Associate Members

Assistant Professor Boyd Lanier
    International Relations

Assistant Professor William M. Pearson
    Public Administration

The graduate student will select his **government** courses from the following list:

430—**Organizational Theory and Behavior.** A study of the structural and management aspects of public administration; theory and practices; policy formation processes and techniques. Class: 3 hours. Credit: 3 semester hours.

431—**History of Political Thought I.** The chief concepts of outstanding political thinkers from the Greeks through the Reformation. Class: 3 hours. Credit: 3 semester hours.

432—**History of Political Thought II.** A continuation of Government 431 from the Reformation through Karl Marx. Class: 3 hours. Credit: 3 semester hours.

Delete

433—History of Political Thought III. A continuation of Government 432 from Karl Marx to the present with attention given to modern American thought. Class: 3 hours. Credit: 3 semester hours.

Delete

434—The Administrative Process. A study of the nature of government administration in areas of economic policy; causes, scope and methods of administration regulation. Class: 3 hours. Credit: 3 semester hours.

435—The International System. The study of the legal bases of the modern international system and the political and legal characteristics of the developing world order. Class: 3 hours. Credit: 3 semester hours.

436—American Constitutional Law and Development. Development of the American Constitution through judicial interpretations, with particular emphasis on cases dealing with federalism, commerce, Congress, and the executive. Class: 3 hours. Credit: 3 semester hours.

437—American Constitutional Law and Development. A continuation of Government 436 with particular emphasis upon cases dealing with due process and civil rights. Class: 3 hours. Credit: 3 semester hours.

438—Approaches to the Study of Politics. A systematic introduction to the various methodological approaches and research techniques used by contemporary political scientists, focusing particularly on the integration of research findings and the design of research models. Class: 3 hours. Credit: 3 semester hours.

439—Comparative Public Administration. A study of bureaucratic structures and functions of advanced and developing nations, emphasizing comparison of relationships between environments and administrative processes. Class: 3 hours. Credit: 3 semester hours.

530—Scope and Method of Political Science. The study in depth of selected topics concerning the theoretical foundations underlying a scientific approach to the study of political phenomena and analytical techniques to be applied to a study of political behavior. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

531—Seminar in Political Theory. Selected issues in political thought with emphasis on the classical thinkers and their relationship to contemporary political, economic and social problems. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

534—Seminar in American Government and Politics. A survey of the literature in the field of American government and politics. Classical and contemporary works are examined, with emphasis on the modern approaches

to the study of American government and politics. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

535—Seminar in the Theory and Practice of Public Administration. An analytical survey of organization, management and problems in public executive organizations: includes study of organizational theory, policy formulation, personnel, finance and administrative leadership. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

536—Seminar in International Politics. The study in depth of selected problems in international relations, both historical and current. Problems of a theoretical and institutional nature as well as specific policies will be dealt with. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

537—Seminar in Comparative Study of Political Systems. Study of the theory and method of comparative political analysis; systematic examination and explanation of the structure and function of Western and non-Western political systems. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

669A-669B—Thesis. Prerequisite: admission to candidacy for the master's degree. Credit: 6 semester hours.

DEPARTMENT OF HISTORY

Degree Requirements

The degree of Master of Arts in History requires the completion of thirty semester hours of graduate work: eighteen in history, six in thesis, and six in an approved minor. With the approval of the Chairman of the Department of History, twelve semester hours of course work may be substituted for the thesis. At least eighteen semester hours, including the thesis, must be in history courses numbered 500 or above. The minor must be approved by the Chairman of the Department of History or with his approval six additional hours in history may be substituted for the minor.

Professional Certification Requirements (Texas) in History

The plan for the Professional Certificate—Secondary requires the completion of thirty semester hours of graduate work: eighteen in history, six in resource areas, and six in approved teacher education. At least twelve semester hours must be in history courses numbered 500 or above. The courses in the resource areas must be approved by the Head of the Department of History; such approval will be given on the basis of the support they can give to the major and on the specific needs of the graduate student. The six semester hours of teacher education must be taken in courses specifically approved for the Professional Certificate—Secondary.

Depending on the student's undergraduate course work, his graduate program in history will include History 530, 531, 532, and one course from 533 or 534. Six additional hours taken from the 500 level courses not already taken, or from 400 level courses specifically approved, are also required.

GRADUATE FACULTY

Members

Associate Professor Howell Holmes Gwin, Jr.
European history, classical and medieval

Professor Paul E. Isaac
United States history, recent, the West

Professor Howard Mackey
Modern European history, Great Britain

Professor L. Wesley Norton
United States history, social and intellectual

Associate Professor R. Beeler Satterfield
United States history, middle period

Associate Professor Walter A. Sutton
United States history, diplomatic

Professor Preston B. Williams
Modern European history, Central and Western Europe

Professor Ralph A. Wooster
United States history, Civil War, the South

Associate Members

Assistant Professor William W. MacDonald
Modern European history, Great Britain

The graduate student will select his history courses from the following list:

430—Era of the Renaissance and Reformation. Western Europe from 1453 to 1610. Class: 3 hours. Credit: 3 semester hours.

431—The Old Regime. Western Europe from 1610 to 1783. Class: 3 hours. Credit: 3 semester hours.

432—The French Revolution and Napoleon. Western Europe from 1783 to 1815. Class: 3 hours. Credit: 3 semester hours.

433—Russia and Eastern Europe to 1860. Russia, Poland, and the Balkans from the period of the Byzantine Empire to 1860. Class: 3 hours. Credit: 3 semester hours.

434—Nineteenth Century Europe. Europe from 1815 to 1914. Class: 3 hours. Credit: 3 semester . hours.

435—Twentieth Century Europe. Europe since 1914. Class: 3 hours. Credit: 3 semester hours.

436—The American West. The American West from colonial times to the present. Class: 3 hours. Credit: 3 semester hours.

437—The Old South. The American South from colonial times to the Civil War. Class: 3 hours. Credit: 3 semester hours.

438—The New South. The American South from the Civil War to the present. Class: 3 hours. Credit: 3 semester hours.

4311—Colonial America. Class: 3 hours. Credit: 3 semester hours.

4312—The American Revolution. Class: 3 hours. Credit: 3 semester hours.

4313—**The Age of Jackson.** Class: 3 hours. Credit: 3 semester hours.

4314—**The American Civil War.** Class: 3 hours. Credit: 3 semester hours.

4315—**Reconstruction and Industrialization: The United States from 1865 to 1898.** Class: 3 hours. Credit: 3 semester hours.

4316—**World Power and Reform: The United States from 1898 to 1920.** Class: 3 hours. Credit: 3 semester hours.

4317—**New Deal and World Leadership: The United States from 1920 to 1940.** Class: 3 hours. Credit: 3 semester hours.

4318—**Classical Civilization.** Greece and Rome from earliest times to the fall of the Roman Empire in the West. Class: 3 hours. Credit: 3 semester hours.

4319—**Medieval Civilization.** Western Europe and the Mediterranean area from the late Roman period to 1453. Class: 3 hours. Credit: 3 semester hours.

4321—**The Far East to 1800.** Japan, China, Indo-China, and India to 1800. Class: 3 hours. Credit: 3 semester hours.

4322—**The Far East Since 1800.** Japan, China, Indo-China, and India since 1800. Class: 3 hours. Credit: 3 semester hours.

4323—**Latin America to 1810.** Class: 3 hours. Credit: 3 semester hours.

4324—**Latin America since 1810.** Class: 3 hours. Credit: 3 semester hours.

4325—**Tudor and Stuart England.** England from 1485 to 1688. Class: 3 hours. Credit: 3 semester hours.

4326—**Eighteenth Century England.** England (Great Britain) from 1688 to 1815. Class: 3 hours. Credit: 3 semester hours.

4327—**Victorian England.** Great Britain from 1815 to 1914. Class: 3 hours. Credit: 3 semester hours.

4328—**Contemporary America: The United States since 1940.** Class: 3 hours. Credit: 3 semester hours.

4329—**Modern European Intellectual History.** An examination of the major European intellectual movements and thinkers from the Renaissance to the present. Class: 3 hours. Credit: 3 semester hours.

4331—**Russia Since 1860.** The development of modern Russia, from 1860 to the present. Class: 3 hours. Credit: 3 semester hours.

4332—Afro-American History to 1865. The black experience in Africa and in the Western hemisphere prior to emancipation. Class: 3 hours. Credit: 3 semester hours.

4333—Afro-American History since 1865. The black experience toward achieving freedom in the United States. Class: 3 hours. Credit: 3 semester hours.

4101, 4201, 4301, 4401, 4501, 4601—Institute in History. Designed to advance the professional competence of participants. For each institute, a description of the particular area of study will be indicated. May be repeated for credit when nature of institute differs sufficiently from one previously taken. Class: 1-6 hours. Credit: 1-6 semester hours.

530—Classical and European Historiography. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

531—American Historiography. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

532—Readings in American History. Course may be repeated for a maximum of six semester hours credit when topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

533—Readings in European History Before 1815. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

534—Readings in European History Since 1815. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

535—Seminar in Texas History. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

536—Seminar in Southern History. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

537—Seminar in United States History. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

539—Seminar in the American West. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5311—Seminar in European History. Course may be repeated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5101, 5201, 5301, 5401, 5501, 5601—Institute in History. Designed to advance the professional competence of participants. For each institute, a description of the particular area of study will be indicated. May be repeated for credit when nature of institute differs sufficiently from one previously taken. Class: 1-6 hours. Credit: 1-6 semester hours.

669A-669B—Thesis. Prerequisite: admission to candidacy for the master's degree. Credit: 6 semester hours.

DEPARTMENT OF MATHEMATICS

The Department of Mathematics offers a program of study leading to the Master of Science degree in Mathematics (M.S.). Those seeking admission to this program must meet the general requirements as set forth in this catalog for admission to the Graduate School. In addition, the applicant's twenty-four semester hours of undergraduate work in Mathematics must include a course in advanced calculus or its equivalent.

Degree Requirements

The Master of Science degree in mathematics requires the completion of thirty semester hours of graduate work of which eighteen semester hours must be in courses listed 500 or higher

Additional specific degree requirements are as follows:
1. Fifteen to eighteen semester hours in mathematics, including nine semester hours of graduate courses (exclusive of thesis)

2. Six semester hours in thesis.

3. Six to nine semester hours in a minor field to be approved by the head of the department. On approval by the head of the department a student may elect to take all of his work in his major field.

GRADUATE FACULTY

Members

Professor Russell W. Cowan
Differential equations, applied mathematics

Professor Sterling C. Crim
Applied mathematics

Associate Professor Philip W. Latimer
Analysis, modern elementary mathematics

Professor Sterling W. McGuire
Mathematical statistics

Professor Jeremiah M. Stark
Analysis, applied mathematics

Associate Members

Associate Professor Joseph A. Baj, II
    Topology, analysis

Assistant Professor George Berzsenyi
    Topology, algebra

Assistant Professor Dock B. DeMent
    Geometry

Associate Professor Sam M. Wood, Jr.
    Analysis, abstract algebra

For **mathematics** majors:

4302—**Advanced Calculus for Engineers.** Bondary-value problems, orthogonal functions, introduced to vector analysis and functions of a complex variable, partial differential equations of mathematical physics. Class: 3 hours. Credit: 3 semester hours.

431, 432—**Introduction to Functions of a Complex Variable.** Review of theorems from analysis and point set theory followed by a study of analytic functions from the Caunchy-Riemann and Weierstrass points of view. Compact sets, uniform convergence, Taylor Expansion Theorem, analytical continuation, Laurent expansions, calculus of residues, conformal mapping. Class: 3 hours. Credit: 3 semester hours.

433—**Vector Analysis.** The algebra and calculus of vectors with applications. Scalar and vector fields, operators, Green's, Stokes's, and Divergence Theorems, curvilinear coordinates. Other topics as time permits. Class: 3 hours. Credit: 3 semester hours.

434—**Partial Differential Equations.** General and particular solutions, boundary conditions, Fourier series, Bessel functions, harmonic analysis, numerical solutions, condition of heat, flow of electricity. Class: 3 hours. Credit: 3 semester hours.

435—**Introductory Topology.** Topological spaces, metric spaces, product spaces, connected spaces, and compact spaces. Open sets, closed sets, limit points, closure, interior, boundary, continuity, homeomorphism, subspaces, components, and open coverings. Some applications to analysis. Class: 3 hours. Credit: 3 semester hours

437, 438—**Probability and Statistics.** Discrete and continuous event spaces, functions of several random variables, independent experiments, Central Limit

Theorem, and properties of special distribution. Introduction to analysis of variance. Class: 3 hours. Credit: 3 semester hours for each course.

4311—**Numerical Solution of Differential Equations.** Analytical foundations. Methods of ordinary and partial differential equations. Class: 3 hours. Credit: 3 semester hours.

4315—**Numerical Analysis.** Approximations, interpolation, finite differnces, numerical integration, curve fitting. Class: 3 hours. Credit: 3 semester hours.

531—**Theory of Functions of Real Variable.** Analytical functions, pathological functions, set functions, Riemann integral, measure theory, Lebesque integral, Riemann-Stieltjes and Lebesque-Stieltjes integral. Class: 3 hours. Credit: 3 semester hours.

532—**Modern Algebra.** Numbers, sets, rings, fields, polynomials, and the theory of fields. The theory of fields includes the study of subfields, prime fields, simple field extensions, algebraic field extensions, and Galois fields. Class: 3 hours. Credit: 3 semester hours.

533—**Calculus of Variations.** The Euler-Lagrange differential equation, necessary conditions of Legendre, Jacobi, and Weierstrass, sufficient conditions for an extreme, brachistrochrome problem, goedesics, surface of revolutions of minimum area, other problems as time permits. Class: 3 hours. Credit: 3 semester hours.

534—**Topology.** Sets, compact spaces, topological spaces, embedding and metrization, and Urysohn lemma. Uniform spaces and function spaces as time permits. Class: 3 hours. Credit: 3 semester hours.

535—**Introduction to Advanced Analysis.** The Riemann mapping theorem, prime number theorem, functions of finite order, Turan's proof of Fabry gap theorem, other topics as time permits. Prerequisite: Mth 431. Class: 3 hours. Credit: 3 semester hours.

536—**Integral Equations.** Fredholm theory. Eigenvalues and eigenfunctions. Volterra integral equation. Degenerate, symmetric, resolvent, iterated, and arbitrary kernels. Neumann series. Use of integral equations theory as a unified approach to boundary value problems, differential equations, and potential theory. Class: 3 hours. Credit: 3 semester hours.

537—**Methods of Applied Mathematics.** The Dirichlet problem, solution of boundary value problems, the Bergman kernel function, method of the

minimum integral, applications of conformal mapping. Prerequisite: Mth 431. Class: 3 hours. Credit: 3 semester hours.

538—Fourier Series. Expansion of functions in Fourier series, Fourier theorems, orthogonal sets of functions, orthonormality, Parseval's theorem. Integration and differentiation of Fourier series. Fourier integrals. Application to boundary value problems arising from partial differential equations of physics and engineering. Class: 3 hours. Credit: 3 semester hours.

539—Infinite Series. Sequences, power series, series of functions complex series, expansion of functions, tests for convergence, uniform convergence, conditions for rearranging terms in a series, Fourier series, Lambert series, Weierstrass theorem on double series, asymptotic expansions, summation of series. Class: 3 hours. Credit: 3 semester hours.

5301—Operational Mathematics. Ordinary differential equations, the Laplace Transform, elementary properties; Inverse Transforms, applications of the Laplace Transform to ordinary differential equations. Class: 3 hours. Credit: 3 semester hours.

5302—Operational Mathematics. Application of LaPlace Transform to partial differential equations, boundary-value problems and characteristics, function representation. Class: 3 hours. Credit: 3 semester hours.

5331—Special Topics for Graduate Students. Advanced topics in mathematics to suit the needs of individual classes of graduate students. Course may be repeated for a maximum of six semester hours credit when the topic varies. Class: 3 hours. Credit: 3 semester hours.

669A-669B—Thesis. Prerequisite: admission to candidacy for the master's degree. Credit: 6 semester hours.

MATHEMATICS-EDUCATION

530—Seminar in Mathematics for Teachers. A review of basic mathematics through description and problem solving techniques. May not be taken for credit by science, engineering, or mathematics students. Class: 3 hours. Credit: 3 semester hours.

5311—Foundations of Geometry. Foundations of geometry, trans- formations, basic concepts, and selected Euclidean topics. Class: 3 hours. Credit: 3 semester hours.

5312—Linear Algebra. Systems of equations, vector spaces, linear trans- formations and matrices. Class: 3 hours. Credit: 3 semester hours.

5313—**Abstract Algebra.** Sets, groups, rings, integral domains, and fields. Class: 3 hours. Credit: 3 semester hours.

5314—**History of Mathematics.** Primitive man's mathematics, Babylonian and Egyptian Mathematics, Pre and Post Euclid Greek Mathematics, Hindu-Arabid Mathematics, and Mathematics from 500 A.D. to the present. Class: 3 hours. Credit: 3 semester hours.

5315—**Probability and Statistics.** Permutation and factorials, elementary principles of probability, mathematical expectations, averages, curve fitting, application. Class: 3 hours. Credit: 3 semester hours.

5316—**Data Processing.** A survey of higher level languages and an assembly language with applications to advanced programming techniques. Syntax, semantics, and numerical techniques as applied to programming applications. Class: 3 hours. Credit: 3 semester hours.

5317—**Number Theory.** A development of the theory of numbers with applications. Class: 3 hours. Credit: 3 semester hours.

DEPARTMENT OF PHYSICS

The Department of Physics offers the following graduate courses to be used primarily to provide and area of specialization for the Master of Education degree in Secondary Education and as support to other advanced degree programs.

GRADUATE FACULTY

Members

Associate Professor Hugh O. Peebles, Jr.
    Astrophysics

Associate Professor Joseph F. Pizzo, Jr.
    Theoretical Physics, relativity

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Professor Carl J. Rigney
    Thermal Physics, electromagnetism

5101, 5201, 5301, 5401, 5501, and 5601—Institute in Physics. Designed to provide credit for participation in summer, in-service or other institutes. Credit varies with duration. The description of the area of study of each institute will appear on the printed schedule. May be repeated for credit when nature of institute differs sufficiently from those taken previously. Class: 1-6 hours. Laboratory: 2-4 hours. Credit: 1-6 semester hours.

530—Seminar in Physical Science. Designed for non-science majors. Measurement, light, the solar system, and stars; force and motion, work and energy, heat, weather, lightning, electric charge and current, magnetism, batteries, atoms and molecules. May not be taken for credit by any student with a major in engineering, mathematics, or a science. Class: 3 hours. Credit: 3 semester hours.

531—Theoretical Physics. The application of typical mathematical techniques, with emphasis on field and potential concepts. Class: 3 hours. Credit: 3 semester hours.

532—Relativity. Brief introduction to the special and general theory followed by detailed study of a particular topic. Class: 3 hours. Credit: 3 semester hours.

533—Seminar. Selected topics pertaining to the research reported in contemporary publications. Course may be repeated for a maximum of six semester hours credit when the topic varies. Class: 3 hours. Credit: 3 semester hours.

DEPARTMENT OF SPEECH

A Master of Science degree in Speech is offered by the Department of Speech and may be obtained through programs of study with an optional emphasis in Public Address, Theatre, and Speech Pathology or Audiology. The master's program is designed to help the student deepen and expand his knowledge of these fields and provide him with the opportunity to develop skills and concepts which may be applied to the several vocational ends relating to the above three fields of study. Persons seeking admission to these programs must meet the general requirements for admission that are outlined in the Graduate Catalog. Generally, an applicant should have completed twenty-four semester hours of undergraduate courses in the speech curriculum.

Master of Science Speech Pathology/Audiology

Degree Requirements

The candidate for the Master of Science degree in Speech must meet all the graduate school general degree requirements as listed in this catalog, plus the special requirements of obtaining a minimum of 100 supervised hours of clincial experience. A total of thirty-six semester hours of course work is required for the degree, including six semester hours of electives. An optional thesis program may be elected by the candidate which would eliminate the six hours of electives.

Professional Certification Requirements of the American Speech & Hearing Association (including undergraduate work):

The certificate of clinical competence in Speech Pathology or Audiology requires the completion of sixty semester hours that includes eighteen hours in fundamentals and forty-two hours in the management of disorders or communication. Of these forty-two hours, twenty-four (not including thesis) must be in courses in either Speech Pathology or Audiology, and no fewer than six in either. Furthermore, thirty of the forty-two semester hours must be in courses acceptable toward a graduate degree. Certification also requires verification of 275 hours of supervised clinical practice.

Master of Science in Public Address Theatre

Thirty semester hours are required to complete programs in these areas, eighteen of which will come as a result of course work in either of these two fields, six hours in thesis, and six hours of course work in an approved minor field. At least twelve semester hours, exclusive of the thesis, must be in speech courses numbered 500 or above. No specific courses are required in either of these programs, and each student should work out his particular program in consultation with an assigned graduate advisor.

GRADUATE FACULTY

Members

Professor Robert F. Achilles
　　Speech Pathology

Professor W. Brock Brentlinger
　　Speech

Professor S. Walker James
　　Theatre

　　　The graduate student may select his courses in **Speech** from the following list:

　　430—**Problems and Projects in Speech.** These problems are discussed and analyzed through discussion and research. Each student elects a project or problem on which he does extensive research and presents a report to the department faculty. Course may be repeated once for credit. Credit: 3 semester hours.

　　431—**Problems and Projects in Theatre.** Students will perform activities in one of the following areas: acting, directing, producing, designing, and constructing costumes and stage settings for the school theatre. Course may be repeated once for credit. Credit: 3 semester hours.

　　4324—**Advanced Audiology.** Assessment of auditory functions by special pure tone techniques and speech audiometry and hearing aid evaluation. Class: 3 hours. Credit: 3 semester hours.

　　4325—**Instrumentation.** A study of the behavior of sound waves, basic recording and analysis of sound, use and maintenance of equipment used in speech and hearing clinics or for research projects. Credit: 3 semester hours.

　　434—**Persuasion.** The psychological and emotional principles involved in influencing individuals and groups. An analysis and practice with the speech devices and techniques in effectively motivating audience reaction. Class: 3 hours. Credit: 3 semester hours.

　　435—**Organic Speech and Voice Disorders.** Diagnosis and therapy of disorders and communication that are organic in nature, with emphasis on structural disorders and disorders of voice. Credit: 3 semester hours.

436—**History of Theatre.** A survey of theatre from 5th C.B.C. to the present day, with emphasis on methods and styles of presentation. Class: 3 hours. Credit: 3 semester hours.

437—**Directing Secondary School Theatre Activities.** Principles involved in extracurricular theatre activities. Practical experience with workshop students constitutes a part of this course. (Offered in summer terms only.) Credit: 3 semester hours.

438—**Directing Secondary School Speech Activities.** Principles involved in extracurricular activities such as debate, extemporaneous speaking, radio and television. Practical experience with workshop students constitutes a part of this course. (Offered in summer terms only.) Credit: 3 semester hours.

439—**Rhetoric And Public Address.** A study and analysis of some of the world's great speeches with application of the principles of original speeches of special types. Class: 3 hours. Credit: 3 semester hours.

4311—**Theory And Practice Of Scenery And Lighting Design.** Study and practice of the principles and techniques of stage scenery and lighting design with an emphasis on coordinating the two. Prerequisite: Spc 334. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

4312—**Costume Design And Construction.** Study and practice of the principles and techniques involved in designing and constructing costumes for the principle periods encountered in theatre production. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

515, 525, 535—**Individual Study.** Independent study of special and/or specific problems in disorders of communication. Credit: 1-3 semester hours.

530—**Seminar in Speech Pathology.** Study of theory and diagnostic procedures with emphasis on educational and vocational aspects as they relate to speech pathology. Credit: 3 semester hours.

531—**Advanced Clinical Practice.** Diagnostic and therapeutic procedures in speech pathology or audiology. One hour of clinical practice per week per credit hour. Credit: 3 semester hours.

5310—**American And British Public Address.** A review of selected famous American and British orators and a comprehensive study of their speeches. Class: 3 hours. Credit: 3 semester hours.

5315—**Advanced Argumentation And Debate.** The application of the principles of logic and motivation to the argumentative process. A review of the place of forensics in the high school and how such a program is developed and maintained. Class: 3 hours. Credit: 3 semester hours.

532—Communication Theory. Development of language, automatic control devices, sensory feedback systems, tonal flow and modulation, and qualitative aspects of sound as related to speech development and dysfunctions. Class: 3 hours. Credit: 3 semester hours.

5321—Seminar in Audiology. Study of theory and diagnostic procedures, with emphasis on educational and vocational aspects as they relate to loss of hearing. Class: 3 hours. Credit: 3 semester hours.

5322—Seminar in Disorders of Language. Etiology, diagnosis and clinical management of language disorders, with emphasis on aphasia. Class: 3 hours. Credit: 3 semester hours.

5323—Neurological Speech and Hearing Disorders. Principles of general neurology with special reference to the functions of the central nervous system, as related to speech and hearing disorders. Class: 3 hours. Credit: 3 semester hours.

5324—Science of Sound. Study of amplification and phonation in relation to electrical theories of audition. Class: 3 hours. Credit: 3 semester hours.

5325—Advanced Problems Of Stage Direction. Theory and problems in directing plays of different periods and styles, including musical comedy, and practice in solving such problems. Prerequisites: graduate standing and Spc 335. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

533—Disorders of Communication: Clinical Management. Study of theory, procedure, and clinical management as they relate to problems in disorders of communication. Class: 3 hours. Credit: 3 semester hours.

534—Disorders of Communication: Administration. Study of procedure, inter and intra agency and professional relationships, supervision, and program development as they relate to administrative practice in the field of disorders of communication. Class: 3 hours. Credit: 3 semester hours.

5340—Studies In Modern Theatre. Trends in theatre production, theory, practice, and techniques from Adolph Appia to the present. Prerequisites: graduate standing and Spc 233. Class: 3 hours. Credit: 3 semester hours.

5341—Seminar In Oral Interpretation. A study of the history of oral interpretation and its contributions to the field of communication. Experimental studies in literary analysis, rhetorical principles, and performance skills. Class: 3 hours. Credit: 3 semester hours.

5345—History And Principles Of Dramatic And Rhetorical Criticism. The development of the theories and criteria of dramatic and rhetorical criticism as

practiced by representative critics from Aristotle to the present. Class: 3 hours. Credit: 3 semester hours.

5350—**Individual Study.** Independent study of special problems in theatre and public address. Course may be repeated for credit. Class: 3 hours. Credit: 3 semester hours.

537—**Medical Audiology.** Differential diagnosis, medical legal implications, testing of infants with emphasis on electro-physiological audiometry. Class: 3 hours. Credit: 3 semester hours.

538—**Hearing Conservation.** Programs in industry and the public schools including study and practicum. Class: 3 hours. Credit: 3 semester hours.

539—**Seminar in Fine Arts.** A study of the areas of art, music, and theatre. Class: 3 hours. Credit: 3 semester hours.

669A, 669B—**Thesis: Prerequisite:** Admission to candidacy to the master's degree. Credit: 6 semester hours.

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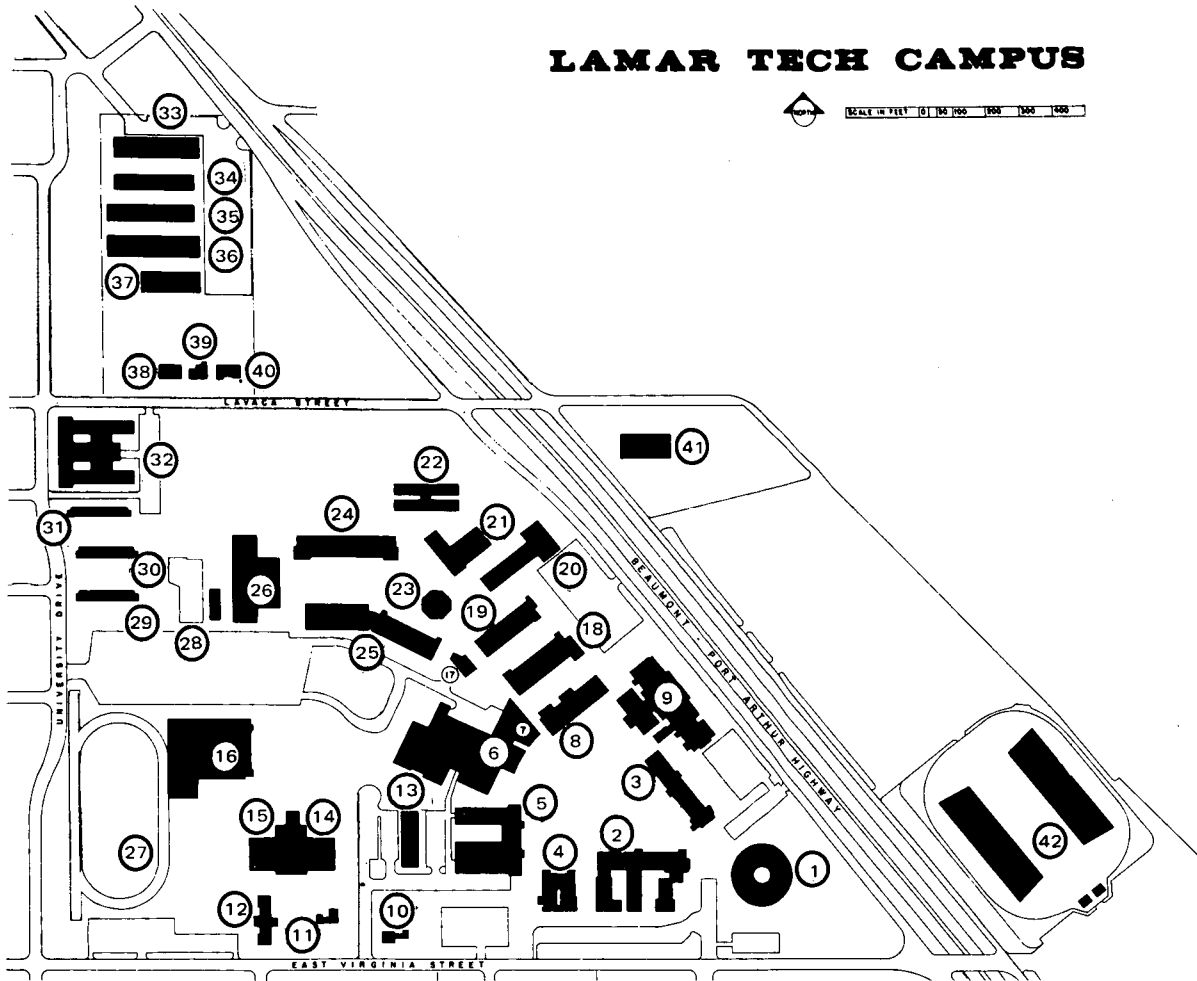
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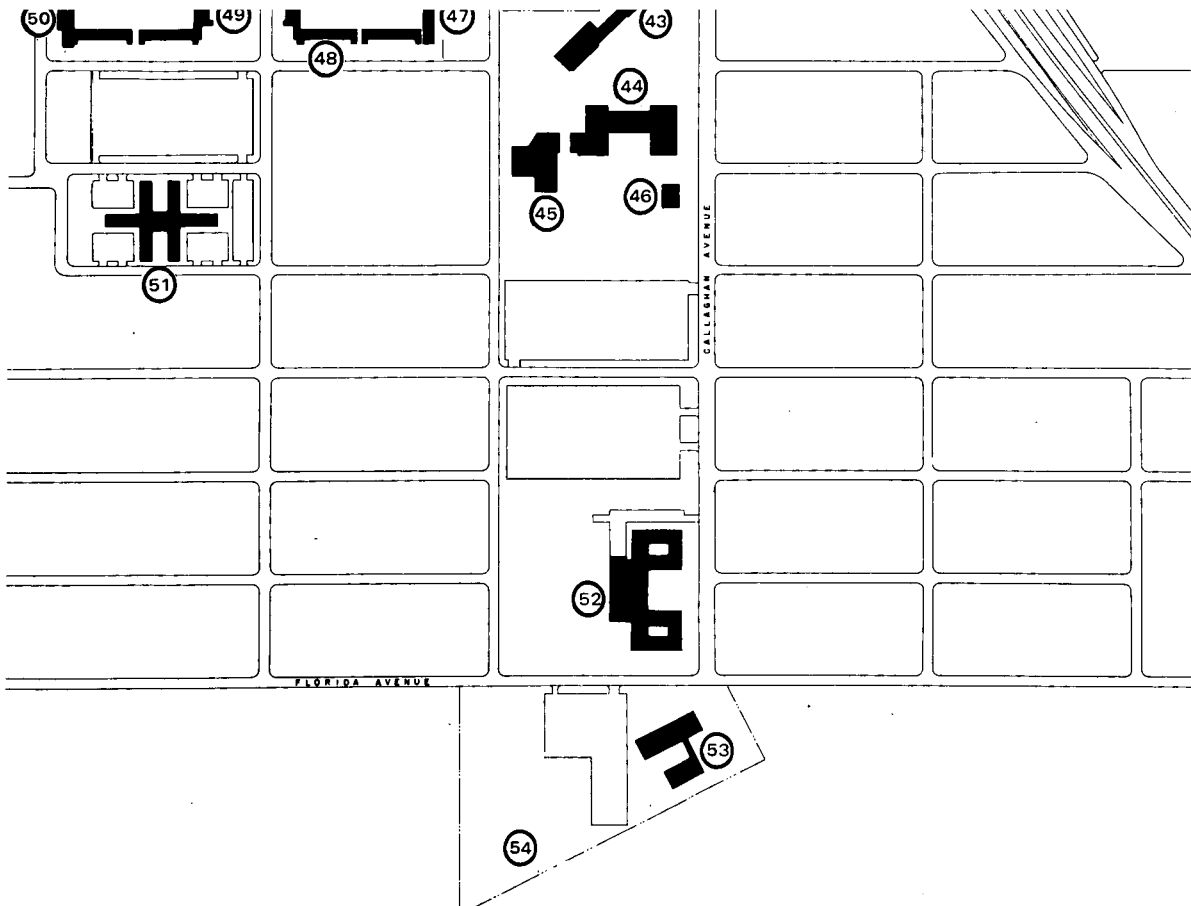
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HOW TO ENTER THE GRADUATE SCHOOL AT LAMAR

1. Complete two application blanks and mail to the Dean of the Graduate School.

2. Ask the Registrar of each college that you attended to send two transcripts to the Dean of the Graduate School.

3. Have Graduate Record Examination scores (aptitude section and the appropriate subject area) sent to the Dean of the Graduate School.

4. If college housing is desired, send request to Vice-President of Student Affairs.