1968-69

THE

GRADUATE SCHOOL

BULLETIN OF

LAMAR STATE COLLEGE OF TECHNOLOGY

Beaumont, Texas

GRADUATE SCHOOL

1968 - 1969

BEAUMONT, TEXAS

The courses, tuition and fees, and other policies explained in this 1968-1969 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

J. B. Morris, Chairman.................................Beaumont, Texas

Otho Plummer, Vice-Chairman..........................Beaumont, Texas

Garland Shepherd, Secretary............................Beaumont, Texas

Cecil Beeson...Orange, Texas

J. G. Bertman...Liberty, Texas

Lee Eagleson.......................................Port Arthur, Texas

Robert A. Mann.....................................Woodville, Texas

A. H. Montagne....................................Orangefield, Texas

Pat Peyton, Jr.....................................Beaumont, Texas

TABLE OF CONTENTS

CALENDARS FOR 1968 AND 1969

JANUARY 1968	MAY 1968	SEPTEMBER 1968
S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4 5 6	1 2 3 4	1 2 3 4 5 6 7
7 8 9 10 11 12 13	5 6 7 8 9 10 11	8 9 10 11 12 13 14
14 15 16 17 18 19 20	12 13 14 15 16 17 18	15 16 17 18 19 20 21
21 22 23 24 25 26 27	19 20 21 22 23 24 25	22 23 24 25 26 27 28
28 29 30 31	26 27 28 29 30 31	29 30

FEBRUARY 1968	JUNE 1968	OCTOBER 1968
S M T W T F S	S M T W T F S	S M T W T F S
1 2 3	1	1 2 3 4 5
4 5 6 7 8 9 10	2 3 4 5 6 7 8	6 7 8 9 10 11 12
11 12 13 14 15 16 17	9 10 11 12 13 14 15	13 14 15 16 17 18 19
18 19 20 21 22 23 24	16 17 18 19 20 21 22	20 21 22 23 24 25 26
25 26 27 28 29	$^{23}_{30}$ 24 25 26 27 28 29	27 28 29 30 31

MARCH 1968	JULY 1968	NOVEMBER 1968
S M T W T F S	S M T W T F S	S M T W T F S
1 2	1 2 3 4 5 6	1 2
3 4 5 6 7 8 9	7 8 9 10 11 12 13	3 4 5 6 7 8 9
10 11 12 13 14 15 16	14 15 16 17 18 19 20	10 11 12 13 14 15 16
17 18 19 20 21 22 23	21 22 23 24 25 26 27	17 18 19 20 21 22 23
$^{24}_{31}$ 25 26 27 28 29 30	28 29 30 31	24 25 26 27 28 29 30

APRIL 1968	AUGUST 1968	DECEMBER 1968
S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4 5 6	1 2 3	1 2 3 4 5 6 7
7 8 9 10 11 12 13	4 5 6 7 8 9 10	8 9 10 11 12 13 14
14 15 16 17 18 19 20	11 12 13 14 15 16 17	15 16 17 18 19 20 21
21 22 23 24 25 26 27	18 19 20 21 22 23 24	22 23 24 25 26 27 28
28 29 30	25 26 27 28 29 30 31	29 30 31

JANUARY 1969	MAY 1969	SEPTEMBER 1969
S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4	1 2 3	1 2 3 4 5 6
5 6 7 8 9 10 11	4 5 6 7 8 9 10	7 8 9 10 11 12 13
12 13 14 15 16 17 18	11 12 13 14 15 16 17	14 15 16 17 18 19 20
19 20 21 22 23 24 25	18 19 20 21 22 23 24	21 22 23 24 25 26 27
26 27 28 29 30 31	25 26 27 28 29 30 31	28 29 30

FEBRUARY 1969	JUNE 1969	OCTOBER 1969
S M T W T F S	S M T W T F S	S M T W T F S
1	1 2 3 4 5 6 7	1 2 3 4
2 3 4 5 6 7 8	8 9 10 11 12 13 14	5 6 7 8 9 10 11
9 10 11 12 13 14 15	15 16 17 18 19 20 21	12 13 14 15 16 17 18
16 17 18 19 20 21 22	22 23 24 25 26 27 28	19 20 21 22 23 24 25
23 24 25 26 27 28	29 30	26 27 28 29 30 31

MARCH 1969	JULY 1969	NOVEMBER 1969
S M T W T F S	S M T W T F S	S M T W T F S
1	1 2 3 4 5	1
2 3 4 5 6 7 8	6 7 8 9 10 11 12	2 3 4 5 6 7 8
9 10 11 12 13 14 15	13 14 15 16 17 18 19	9 10 11 12 13 14 15
16 17 18 19 20 21 22	20 21 22 23 24 25 26	16 17 18 19 20 21 22
$^{23}_{30}$ $^{24}_{31}$ 25 26 27 28 29	27 28 29 30 31	$^{23}_{30}$ 24 25 26 27 28 29

APRIL 1969	AUGUST 1969	DECEMBER 1969
S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4 5	1 2	1 2 3 4 5 6
6 7 8 9 10 11 12	3 4 5 6 7 8 9	7 8 9 10 11 12 13
13 14 15 16 17 18 19	10 11 12 13 14 15 16	14 15 16 17 18 19 20
20 21 22 23 24 25 26	17 18 19 20 21 22 23	21 22 23 24 25 26 27
27 28 29 30	$^{24}_{31}$ 25 26 27 28 29 30	28 29 30 31

LAMAR STATE COLLEGE OF TECHNOLOGY
Graduate School Calendar for 1968-69

Fall Semester, 1968

Sept.	16	Monday	1 p.m.	Registration for the fall semester.
			6 p.m.	Registration of evening students.
	17	Tuesday	8 a.m.	Continued registration.
			6 p.m.	Continued registration of evening students.
	18	Wednesday	8 a.m.	Continued registration.
			6 p.m.	Continued registration.
			6:15 p.m.	Evening classes begin.
	19	Thursday	8 a.m.	Classes begin.
				Late registration (penalty fee charged).
	23	Monday	8 p.m.	Last day for registration or adding courses.
Oct.	29	Tuesday	8 p.m.	Last date for dropping or withdrawing without penalty.
Nov.	13	Wednesday		Foreign Language Examination.
	27	Wednesday	10 p.m.	Thanksgiving holidays begin.
	29	Friday		Last date for filing application for graduation in January (Graduate Dean's office).
Dec.	2	Monday	8 a.m.	Classes resume.
Dec.	2-Jan 13			Period for Comprehensive Oral Examinations.
Dec.	12	Thursday		Comprehensive Written Examinations.
	20	Friday	10 p.m.	Christmas holidays begin.
Jan.	6	Monday	8 a.m.	Classes resume.
Jan.	17-23	Fri.-Thurs.		Final examinations—fall semester.

Spring Semester, 1969

Jan.	28	Tuesday	10 a.m.	Registration for spring semester.
			6 p.m.	Registration of all evening students.
	29	Wednesday	8 a.m.	Continued registration.
			6:15 p.m.	Evening classes begin.
	30	Thursday	8 a.m.	Classes begin.
				Late registration (penalty fee charged).
Feb.	3	Monday	8 p.m.	Last day for registration or adding courses.
Mar.	12	Wednesday	8 p.m.	Last day for dropping or withdrawing without penalty.
				Foreign Language Examination.
	28	Friday	6 p.m.	Spring holidays begin.

Apr.	7 Monday	8 a.m.	Classes resume.
Apr.	7-May 9		Period for Comprehensive Oral Examinations.
Apr.	8 Tuesday		Last day for filing application for graduation in May (Graduate Dean's office).
	17 Thursday	1-4 p.m.	Comprehensive Written Examinations.
May	23-29 Fri.-Thurs.		Final examinations—spring semester.
	31 Saturday	8 p.m.	Commencement Exercises.

Summer Session, 1969

First Term

June	9 Monday	8 a.m.	Registration
		6 p.m.	Registration—evening classes.
	10 Tuesday	7 a.m.	Classes begin. Late registration (penalty fee charged).
	11 Wednesday	7 p.m.	Last date for registration or for adding courses.
	30 Monday	7 p.m.	Last date for dropping courses or withdrawing without penalty.
July	10 Thurs.	1-4 p.m.	Comprehensive Written Examinations.
	17-18 Thurs-Fri.		Final examinations—first term.
July	17 Thursday		Last date for filing application for August graduation (Graduate Dean's office).
July	17-Aug. 15		Period for Comprehensive Oral Examinations.

Second Term

July	21 Monday	8 a.m.	Registration
		6 p.m.	Registration—evening classes.
	22 Tuesday	7 a.m.	Classes begin. Late registration (penalty fee charged).
	23 Wednesday	7 p.m.	Last date for registration or for adding courses.
	24 Thursday	1-4 p.m.	Comprehensive Written Examinations.
	30 Wednesday		Foreign Language Examination.
Aug.	11 Monday	7 p.m.	Last date for dropping courses or withdrawing without penalty.
Aug.	28-29 Thurs.-Fri.		Final examinations—second term.
	30 Saturday	9 a.m.	Commencement Exercises.

LAMAR STATE COLLEGE OF TECHNOLOGY

DIRECTORY 1968-1969

OFFICERS OF ADMINISTRATION

GENERAL

RICHARD W. SETZER. A.B., M.A., Ph.D., President

FRANK A THOMAS, JR., B.S., M.S., Ph.D.. Vice-President of Academic Affairs

G. A. WIMBERLY, B.S., Assistant to the President

H. C. GALLOWAY, JR., B.S., M.Ed., Vice-President of Finance

NORRIS H. KELTON, B.A., M.A., Dean of Admissions

CELESTE KITCHEN, B.A., M.Ed., Registrar

DAVID BOST, B.A., M.J., Ph.D., Dean of Student Life

GEORGE E. McLAUGHLIN, B.S., Dean of Men

MRS. BESS NEAL GENTRY, B.S., M.Ed., Dean of Women

JACK HILL, B.B.A., M.B.A., Director of Evening Classes

JOE B. THRASH, B.S., M.A., Director, Testing and Placement Center

SCHOOLS

M. L. McLAUGHLIN, B.S., M.Ed., Ed.D., Dean of the Graduate School

W. RICHARD HARGROVE, B.S., M.Ed., Ed.D., Dean, School of Education

EDWIN S. HAYES, B.S., Ph.D., Dean, School of Sciences

J. D. LANDES, B.S., M.S., Ph.D., Dean, School of Business

TED SKINNER, B.S., M.A., Ph.D., Dean, School of Fine and Applied Arts

LLOYD B. CHERRY, B.S., B.A., M.A., E.E. Acting Dean, School of Engineering

PRESTON B. WILLIAMS, B.A., M.A., Ph.D., Dean, School of Liberal Arts

THE GRADUATE COUNCIL

M. L. McLAUGHLIN, B.S., M.Ed., Ed.D., Dean of the Graduate School,
Chairman

FRANK A. THOMAS, JR., B.S., M.S., Ph.D., Vice-Presdient of Academic
Affairs

HAROLD T. BAKER, B.S., Ph.D., Head, Department of Chemistry

ROBERT J. BARNES, B.A., M.A., Ph.D., Head, Department of English

RICHMOND O. BENNETT, B.S., M.S., Ph.D., Head, Department of
Business Administration

E. B. BLACKBURN, JR., B.S., M.Ed., Ed.D., Professor of Education

MARGARET D. CAMERON, B.A., M.S., Ph.D., Professor of Chemistry

LLOYD B. CHERRY, B.S., B.A., M.A., E.E., Acting Dean, School of
Engineering

RUSSELL WALTER COWAN, A.B., M.A., Ph.D., Professor of Mathematics

W. RICHARD HARGROVE, B.S., M.Ed., Ed.D., Dean, School of Education

ANDREW J. JOHNSON, B.A., M.A., Ph.D., Director of Library Services

J. D. LANDES, B.S., M.S., Ph.D., Dean, School of Business Administration.

HOWARD MACKEY, B.A., M.A., Ph.D., Professor of History

JEREMIAH M. STARK, B.S., S.M., Ph.D., Head, Department of
Mathematics

RICHARD E. WALKER, B.S., M.S., Ph.D., Professor of Engineering

RALPH A. WOOSTER, B.A., M.A., Ph.D., Head, Department of History

DAVID D. ZINK, B.J., M.A., Ph.D., Associate Professor of English

THE GRADUATE FACULTY

Members

HOWARD W. ADAMS, Professor of Education
B.A., Wayne State Teachers College
M.A., Ed.D., Unversity of Nebraska

MOHAMMED ALI, Associate Professor of Industrial Engineering
B.S., Alexandria University
M.S., Ph.D., Oklahoma State University

HAROLD T. BAKER, Professor of Chemistry—Head, Department of
Chemistry
B.S., University of Minnesota
Ph.D., State University of Iowa

ROBERT J. BARNES, Professor of English—Head, Department of English
B.A., M.A., The University of Kansas
Ph.D., The University of Texas

LUTHER A. BEALE, Professor of Civil Engineering—Head, Department
of Civil Engineering
B.S., M.S., Georgia Institute of Technology
Ph.D., The University of Texas
Registered Professional Engineer

RICHMOND O. BENNETT, Professor of Business Administration, Head—
Department of Business Administration
B.S., M.S., Texas A & M University
Ph.D., The University of Texas

WALTER W. BENNETT, Professor of Business Administration
B.S., University of Maryland
M.B.A., George Washington University
Ph.D., University of Florida

E. B. BLACKBURN, JR., Professor of Education
B.S., North Texas State University
M.Ed., Hardin-Simmons University
Ed.D., University of Colorado

JAY P. BLUMENFELD, Associate Professor of English
B.A., University of Tennessee
M.A., Northwestern University
Ph.D., University of Tennessee

OTTO GEORGE BROWN, Professor of Mechanical Engineering—Head,
Department of Mechanical Engineering
B.S., The University of Oklahoma
M.S., Ph.D., The University of Texas
Registered Professional Engineer

MARGARET D. CAMERON, Professor of Chemistry
B.A., Texas Woman's University
M.S., The University of Houston
Ph.D., Tulane University

RICHARD T. CHERRY, Professor of Business Administration
B.A., Texas A & M University
M.A., Ph.D., The University of Texas

JAMES L. COOKE, Professor of Electrical Engineering
B.S., Texas Technological College
M.S., The University of Texas
Ph.D., Northwestern University
Registered Professional Engineer

RUSSELL WALTER COWAN, Professor of Mathematics
A.B., M.A., Ph.D., University of California (Berkeley)

FLOYD M. CRUM, Professor of Electrical Engineering
B.S., MS., Louisiana State University
Registered Professional Engineer

ANDRE PIERRE DELFLACHE, Professor of Civil Engineering
Civil Engineer of Mines, University of Brussels
D.Sc., University of Brussels
Registered Professional Engineer

GEORGE W. de SCHWEINITZ, Professor of English
       B.A., Unversity of Colorado
       M.A., Ph.D., University of Iowa

EWIN A. EADS, Professor of Chemistry
       B.S., M.S., North Texas State University
       Ph.D., Tulane University

WINFRED S. EMMONS, JR., Professor of English
       B.A., Louisiana Polytechnic Institute
       M.A., University of Virginia
       Ph.D., Louisiana State University

HARRY L. FRISSELL, Professor of English
       B.A., Southwestern University
       M.A., Ph.D., Vanderbilt University

DAVID G. GATES, Professor of Industrial Engineering—Head, Department
       of Industrial Engineering
       B.S., M.S., The University of Arkansas
       Ph.D., Oklahoma State University
       Registered Professional Engineer

W. RICHARD HARGROVE, Professor of Education—Dean, School of
       Education
       B.S., M.Ed., North Texas State University
       Ed.D., George Peabody College

MARY JANE HASKINS, Associate Professor of Health and Physical
       Education for Women
       B.S., M.A., Ph.D., Ohio State University

EDWIN S. HAYES, Professor of Biology—Dean, School of Sciences
       B.S., North Texas State University
       Ph.D., University of Texas

BRADLEY B. HOGUE, Professor of Education
       B.A., M.Ed., Southern Methodist University
       Ed.D., North Texas State University

BELLE MEAD HOLM, Professor of Health and Physical Education for
       Women—Head, Department of Health and Physical Education for
       Women
       B.S., M.A., George Peabody College
       Ph.D., Texas Woman's University

JOSEPH ILIKA, Associate Professor of Education
       B.E., Northern Illinois State University
       M.A., George Peabody College
       Ph.D., University of Michigan

PAUL EDWARD ISAAC, Professor of History
       B.A., Pepperdine College
       M.A., Ph.D., The University of Texas

FREDERIC C. JELEN, Professor of Chemical Engineering
       B.S., S.M., Massachusetts Institute of Technology
       MA., Ph.D., Harvard University
       Registered Professional Engineer (New York, Texas)

ANDREW J. JOHNSON, Associate Professor of History—Director of
Library Services
B.A., The University of Texas
M.A., Ph.D., Indiana University
M.A., The University of Chicago

C. D. KIRKSEY, Professor of Business Administration
B.S., M.S., North Texas State Unviersity
Ph.D., The University of Texas

J. D. LANDES, Professor of Accounting—Dean, School of Business
B.S., M.S., North Texas State University
Ph.D., University of North Carolina

PHILIP W. LATIMER, Associate Professor of Mathematics
B.A., Baylor University
M.S., North Texas State University

RUSSELL J. LONG, Professor of Biology
B.A., Ohio Northern University
M.A., Miami University
Ph.D., Ohio State University

HOWARD MACKEY, Professor of History
B.A., University of Toledo
M.A., Ph.D., Lehigh University

ROBERT A. McALLISTER, Professor of Chemical Engineering—Head,
Department of Chemical Engineering
B.Ch.E., North Carolina State College
M.S., University of Wisconsin
S.M., Massachusetts Institute of Technology
Ph.D., Georgia Institute of Technology
Registered Professional Engineer

MARVIN L. McLAUGHLIN, Professor of Education—Dean, Graduate School
B.S., Sam Houston State College
M.Ed., The University of Texas
Ed.D., The University of Houston

HARRY T. MEI, Professor of Mechanical Engineering
B.S., National Taiwan University
M.S., Ph.D., The University of Texas
Registered Professional Engineer

ROBERT G. MERS, Professor of Chemistry
B.A., Austin College
M.A., Ph.D., The University of Texas

MIETZL MILLER, Associate Professor of Economics
B.A., M.A., Texas Woman's University
Ph.D., Ball State University

OLIVER P. MONK, Associate Professor of Education
B.S., M.Ed., North Texas State University
Ed.D.,University of Houston

L. WESLEY NORTON, Professor of History
B.A., Olivet College
M.A., Ph.D., University of Illinois

SAM F. PARIGI, Associate Professor of Economics
B.S., St. Edward's University
M.B.A., Ph.D., The University of Texas

CHARLES A. PARTIN, Professor of Economics, Head—Department of
Economics
B.S., Stephen F. Austin State College
M.A., Ph.D., The University of Texas

HUGH O. PEEBLES, Associate Professor of Physics
B.S., The University of Texas
M.S., Ph.D., Oklahoma State University

JACK N. RENFROW, Associate Professor of English
B.A., Louisiana Polytechnic Institute
M.A., University of Denver
Ph.D., Louisiana State University

CARL J. RIGNEY, Professor of Physics—Head, Department of Physics
B.S., The University of Louisville
M.S., Ph.D., Northwestern University

BRUCE G. ROGERS, Professor of Civil Engineering
B.S., The University of Houston
M.S., Ph.D., The University of Illinois
Registered Professional Engineer

HENRY B. RULE, Professor of English
B.A., The Universtiy of Texas
M.A., Columbia University
Ph.D., University of Colorado

THOMAS T. SALTER, Professor of Education
B.S., Anderson College
M.Ed., Stephen F. Austin State College
Ed.D., The University of Houston

R. BEELER SATTERFIELD, Associate Professor of History
B.A., M.A., Vanderbilt University
Ph.D., Johns Hopkins University

E. LEE SELF, Professor of Education
B.S., M.S., Northwestern Louisiana State College
Ph.D., Louisiana State University

W. RUSSELL SMITH, Professor of Biology
B.S., M.S., North Texas State University
Ph.D., The University of Texas

JEREMIAH M. STARK, Professor of Mathematics—Head, Department of
Mathematics
B.S., United States Coast Guard Academy
B.S., North Texas State University
S.M., Ph.D., Massachusetts Institute of Technology

FRANK A. THOMAS, JR., Professor of Mechanical Engineering—Vice-
President of Academic Affairs
B.S., Purdue University
M.S., Ph.D., Georgia Institute of Technology
Registered Professional Engineer (Texas and Georgia)

ROBERT BLAINE THOMAS, Associate Professor of English, Director of
Freshman English
B.S., Virginia Polytechnic Institute
M.A., Ph.D., Louisiana State University

HENRY T. WADDELL, Professor of Biology
B.S., M.S., George Peabody College
Ph.D., University of Florida

RICHARD E. WALKER, Professor of Chemical Engineering
    B.S., Purdue University
    M.S., Bucknell University
    Ph.D., Iowa State College
    Registered Professional Engineer

JOSEPH T. WATT, Associate Professor of Electrical Engineering
    B.A., B.S., Rice University
    M.S., Ph.D., University of Texas
    Registered Professional Engineer

PRESTON B. WILLIAMS, Professor of History—Dean, School of Liberal
        Arts
    B.A., M.A., North Texas State University
    Ph.D., The University of Texas

MARCELLA WOODS, Associate Professor of Health and Physical Education
        for Women
    B.S., Illinois State University
    M.Ed., University of North Carolina
    Ph.D., Ohio State University

RALPH A. WOOSTER, Professor of History—Head, Department of History
    B.A., M.A., The University of Houston
    Ph.D., The University of Texas

LEONARD A. YATES, Associate Professor of Physical and Health Edu-
        cation for Men
    B.S., M.S., Louisiana State University
    Ed.D., University of Houston

ALVICE W. YEATS, Professor of English
    B.A., McMurry College
    M.A., Ph.D., The University of Texas

ROGER E. YERICK, Professor of Chemistry
    B.S., Texas College of Arts and Industries
    Ph.D., Iowa State University

DAVID D. ZINK, Associate Professor of English
    B.J., The University of Texas
    M.A., Ph.D., University of Colorado

Associate Members

H. A. BARLOW, Associate Professor of Accounting
    B.S., Louisiana Polytechnic Institute
    M.B.A., Louisiana State University
    Certified Public Accountant

KENNETH R. BRIGGS, Assistant Professor of Education
    B.S., M.Ed., Ed.D., North Texas State University

VERNON R. CROWDER, Assistant Professor of Health and Physical
        Education for Men
    B.S., Lamar State College of Technology
    M.S., Louisiana State University

KENNETH LEE DORRIS, Assistant Professor of Chemistry
    B.S., Ph.D., The University of Texas

EDWIN OTTO EISEN, Assistant Professor of Chemical Engineering
    B.S., M.S., Eng.Sc.D., Newark College of Engineering

MARY JEAN GEORGE, Assistant Professor of Chemistry
B.S., Lamar State College of Technology
M.A., Ph.D., The University of Texas

HOWELL H. GWIN, JR., Assistant Professor of History
B.A., M.A., Ph.D., Mississippi State University

KEITH C. HANSEN, Assistant Professor of Chemistry
B.S., Lamar State College of Technology
Ph.D., Tulane University

JAMES B. HIGGINS, JR., Professor of Health and Physical Education, Head, Department of Health and Physical Education for Men, Athletic Director
B.A., Trinity University
M.Ed., The University of Houston

E. P. MARTINEZ, Associate Professor of Mechanical Engineering
B.S., Lamar State College of Technology
M.S., Rice University

GLORIA MASSEY, Assistant Professor of Education
B.S., M.A., Ph.D., The University of Texas

STERLING W. McGUIRE, Associate Professor of Mathematics
B.S., M.A., Sam Houston State College

JOSEPH F. PIZZO, JR., Assistant Professor of Physics
B.A., University of Saint Thomas
Ph.D., University of Florida

TYRUS TERRELL, Associate Professor of Health and Physical Education for Men
B.S., M.S., Oklahoma State University

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

FRED M. YOUNG, Assistant Professor of Mechanical Engineering
B.S., M.S., Ph.D., Southern Methodist University

DIRECTORY FOR CORRESPONDENCE

To obtain prompt attention, address inquiries to
the following persons or agencies:

Academic Program—Admissions.......................M. L. McLaughlin
Dean, Graduate School

Academic Records and Transcripts......................Celeste Kitchen
Registrar

Business Affairs.......................................H. C. Galloway
Vice-President of Finance

Graduate Record Examination...........................Joe B. Thrash
Placement Office

Master of Arts—English..............................Robert J. Barnes
Head, Department of English

Master of Arts—History..............................Ralph A. Wooster
Head, Department of History

Master of Business Administration—Business................J. D. Landes
Dean, School of Business

Master of Science—Chemistry.........................Harold T. Baker
Head, Department of Chemistry

Master of Science—Mathematics......................Jeremiah M. Stark
Head, Department of Mathematics

Master of Engineering Science—Engineering...........Lloyd B. Cherry
Acting Dean, School of Engineering

Master of Education—Elementary, Secondary, and
Special Education..............................W. Richard Hargrove
Dean, School of Education

Professional Certification..........................W. Richard Hargrove
Dean, School of Education

Housing, Dormitory Reservations......................J. Paul Pederson
Student Life Office

Publications and Information..........................Richard E. Oliver
Director

Research Center ....Lloyd B. Cherry
Director

Tuition, Fees, Expenses..................................Finance Office

Veterans' Affairs..Joe B. Thrash
Placement Office
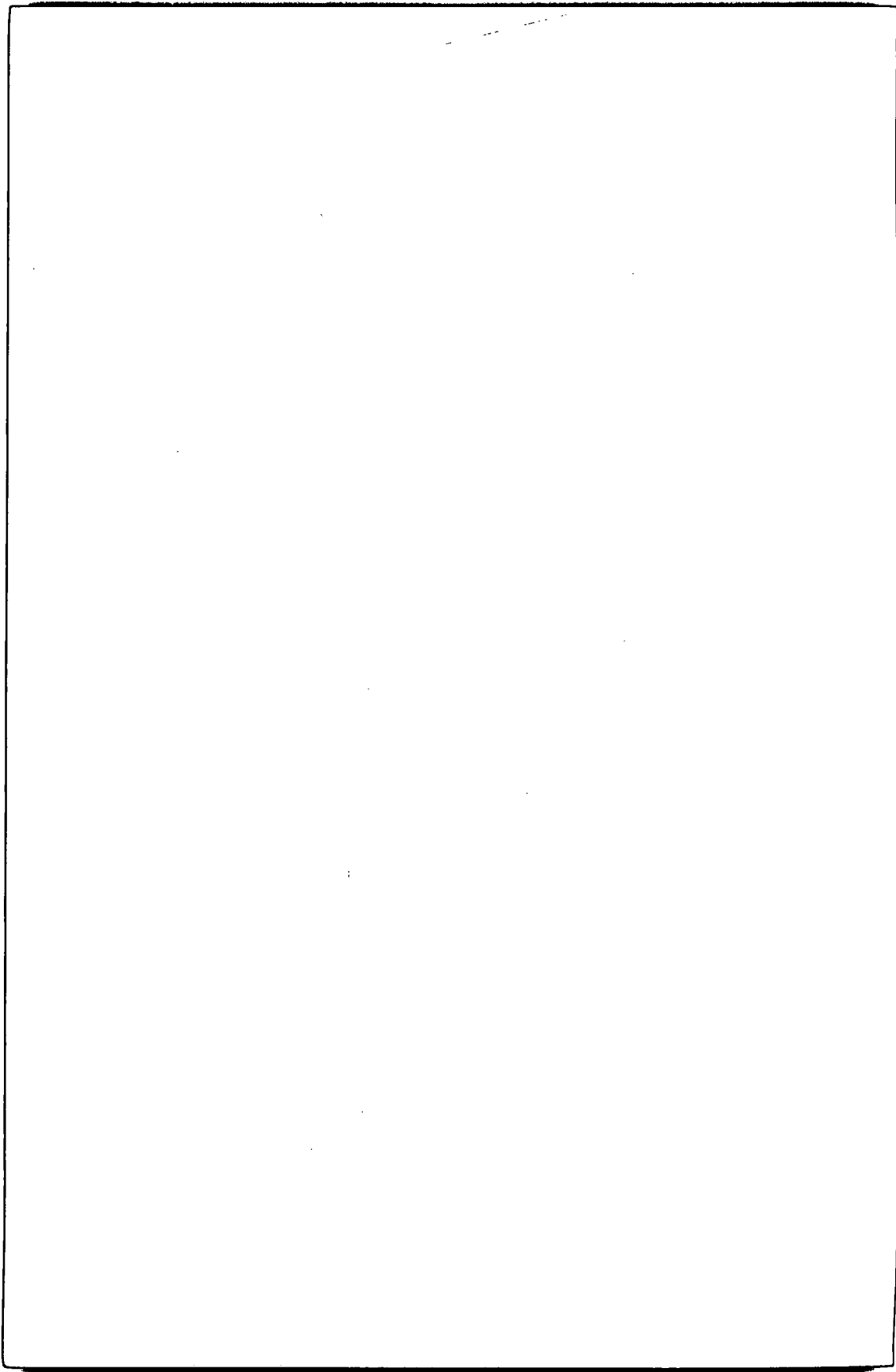
PART I

GENERAL COLLEGE INFORMATION
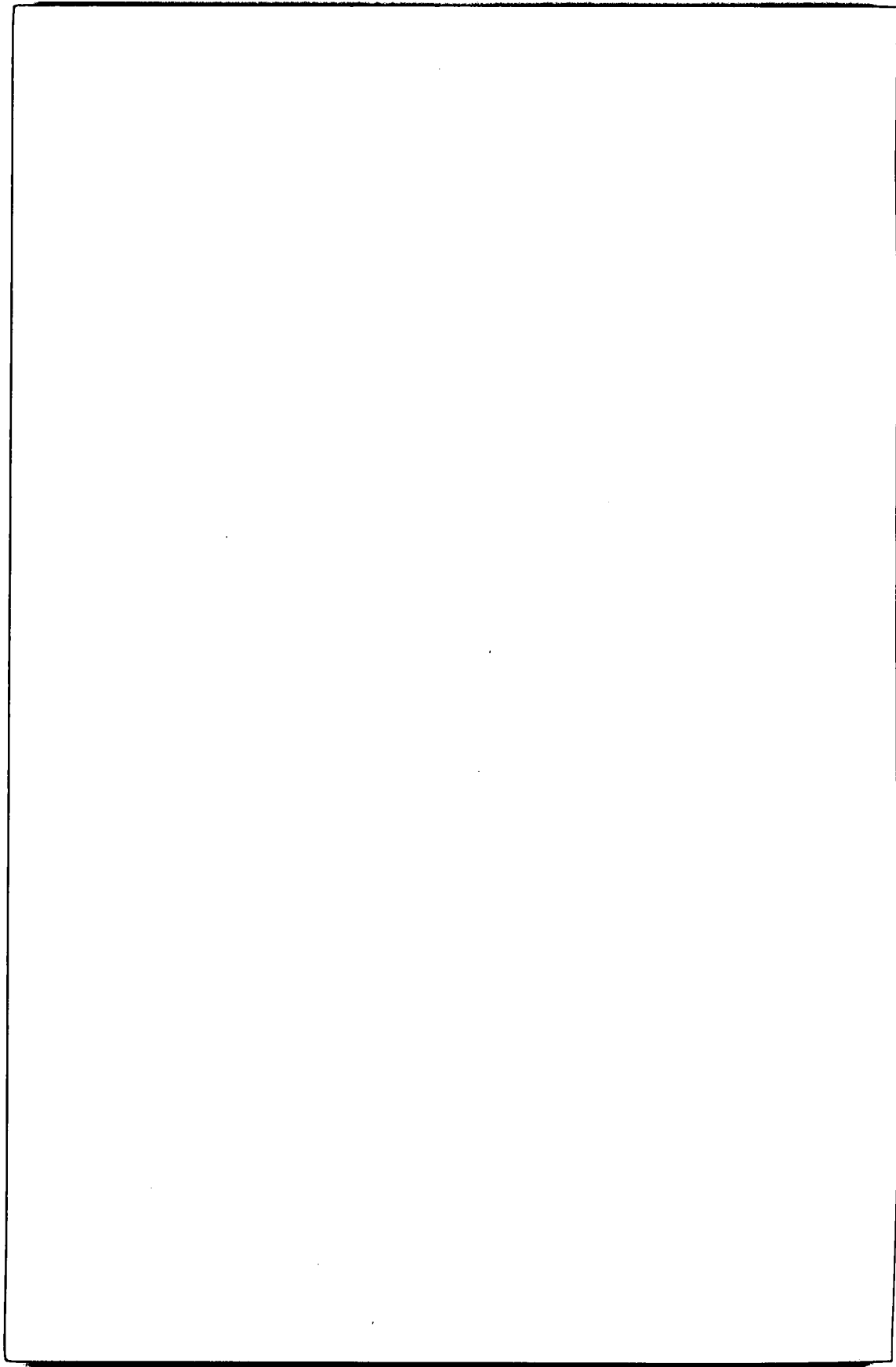
GENERAL INFORMATION

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 faces the Beaumont-Port Arthur Highway in southeastern Beaumont. With a population of approximately 130,000, Beaumont has modern schools, churches, and shopping districts to serve the thriving industrial community.

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 approximately 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.

The departments of Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering are accredited by the Engineering Council for Professional Development; the department of Chemistry is accredited by the American Chemical Society.

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

The Library

A new addition to the Library was occupied in the fall of 1966. This addition more than doubled the space of the Library, providing students and faculty with additional seating capacity, reference rooms, individual carrels, study rooms, space for microfilm, readers and film, and a science and engineering area. The Library has holdings of over 150,000 volumes and subscribes to more than 2,000 periodicals. The annual budget is of sufficient size to increase the number of volumes by more than 20,000 per year.

Library hours are as follows:
   8 a.m. to 10 p.m. Monday through Thursday
   8 a.m. to 5 p.m., Friday and Saturday
   1 p.m. to 10 p.m., Sunday

Research Center

The Research Center was formally organized in 1956. It is administered by a director who serves as chairman of the faculty research committee. Many National Science Foundation grants as well as private foundation grants have been received through this research organization.

Proposed faculty research projects are submitted each year for approval and financing through the Research Center.

The East Texas area is one of the most heavily industrialized sites of the world, and many industrial research problems are referred by industries of the area to the Lamar Research Center. Faculty members and advanced students often cooperate in seeking the solutions to these industrial problems.

Computer Laboratory

The college has a computing center which provides computing services for students, faculty, and administrative personnel. It also provides services for research and other technological activities.

Equipment in the center is valued at approximately $750,000 and includes a new Control Data Corporation 3300 digital computing system, a TR 48 analog computer, and other allied facilities.

Testing and Placement Service

The Testing and Placement Center is located in Room 102 of the Liberal Arts Building 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 a registered nurse.

It is not possible for the College to provide unlimited medical service. Special medicines, examinations, treatments, X-ray examinations, 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 in the Health Center for more than ten days.

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.

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, Room 102, Liberal Arts Building.

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 Dean of Student Life, Lamar State College, Beaumont, Texas.

Teaching Fellowships

A number of Teaching fellowships are available in the various departments 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. Specific information concerning certification may be found in the "Education" section of this catalog or may be obtained from the Dean of 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	$22.00	$14.00	$86.00 + Lab Fee
11	47.00	22.00	14.00	83.00 " " "
10	43.00	22.00	14.00	79.00 " " "
9	39.00	22.00	14.00	75.00 " " "
8	35.00	22.00	14.00	71.00 " " "
7	31.00	8.00	7.00	46.00 " " "
6	27.00	8.00	7.00	42.00 " " "
5	23.00	8.00	7.00	38.00 " " "
4	19.00	8.00	7.00	34.00 " " "
3 or less	15.00	8.00	7.00	30.00 " " "

Non-Resident Student (out of Texas)

Semester Hours	Tuition	S.S. Fee	Bldg. Use Fee	Total + Laboratory Fees
12 or more	$200.00	$22.00	$14.00	$236.00 + Lab Fee
11	183.00	22.00	14.00	219.00 " " "
10	167.00	22.00	14.00	203.00 " " "
9	150.00	22.00	14.00	186.00 " " "
8	133.00	22.00	14.00	169.00 " " "
7	117.00	8.00	7.00	132.00 " " "
6	100.00	8.00	7.00	115.00 " " "
5	83.00	8.00	7.00	98.00 " " "
4	66.00	8.00	7.00	81.00 " " "
3 or less	50.00	8.00	7.00	65.00 " " "

For summer session students the student service fee is $6.00 per term.

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

Parking Fee

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 the fee 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.

Special Fees

Fees for courses for which special plans must be prepared and for which specialists must be secured as instructors will be set for each such course by the college administration subject to the approval of the president.

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 Comptroller 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 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.

Students failing to comply with the residency provisions of the state tuition bill (Art. 2645c V.C.S. as amended 1957) are subject to penalties as set forth in the law and/or appropriate disciplinary action.

HOUSING

Dormitories

Lamar dormitories offer the latest features in student housing. They are designed for maximum comfort and are conducive to enrichment through community living. The dormitories are organized into units for purposes of self-government, intramural athletics, and social life, offering opportunities for student growth and development in democratic living. Television, game areas, and lounges are available for leisure-time activities. Each dormitory room has telephone service through the campus switchboard for inter-campus and Beaumont exchange calls. Free self-service laundry facilities are provided for each dormitory.

Brooks (Women), Gentry (Women), Plummer (Men) and Shivers (Men) are the newest additions to campus housing. These four dormitories are centrally heated and air conditioned. Rooms are shared by two students, and each room has its own dressing mirror and lavatory. Students take their meals in the dormitory dining hall.

Campbell (Men), Combs (Men), Morris (Men) and Gray (Women) house three students to each room. Suites of two rooms share a common bath and lavatory facilities. These dormitories are not centrally air conditioned, but a limited number of rooms in Morris and Gray Halls have window units that may be used by students who desire this type of accommodation. An extra charge is necessary for this service. Students living in these dormitories take their meals in the college Dining Hall located conveniently to them. All dining halls serve three meals per day except on Sundays when only breakfast and lunch are served.

The charge for board and room for the nine-month term is $720.00, plus state sales tax, for Campbell, Combs, Gray, and Morris Halls, and $810.00, plus state sales tax, for Brooks, Gentry, Plummer and Shivers Halls. Charges for a full semester may be paid at the beginning of each semester. For the convenience of those who desire, payments may be spread over the semester.

Apartments for Upper Classmen and Graduate Students

The college maintains a number of apartment units for senior and graduate students who desire this type of housing facility. These apartments are completely furnished, and each consists of kitchenette, private bath, built-in closets, and combination living room and bedroom area. A central laundry room is available at no extra cost. Charges for board and room are $774.00, plus tax, for the nine-month term. Charges for room only for the nine-month term are $324.00. Apartments with air conditioning cost $20 per month in addition to regular room charges. For the convenience of students wishing an installment plan, three payments may be made to the Finance office.

Apartments for Married Students

A limited number of accommodations for married students are located on the campus and are operated by the college. Although ample for a couple, these apartments are not large enough to permit occupancy by children.

These apartments rent for $594.00 for the nine months period. This rental includes all utilities except telephones. For the convenience of students who wish to pay rentals by the month, the charges may be arranged in nine equal payments of $66 each.

Some of these apartments are air-conditioned from April 15 to October 15. An additional $20 per semester is charged for this service. Rent refunds will not be made to students who move out during any month.

Reservations

To reserve an apartment or a room in the dormitories, direct a request to the Assistant to the Dean of Student Life, Lamar State College of Technology, Beaumont, Texas. A check for $20 must accompany the reservation request. Room reservations may be cancelled with full refund until three weeks prior to the first day of classes. No refund will be made on cancellations received after this date. Dormitory residents will be refunded deposits, less any breakage charges, at the end of the year. The $20 deposit will not be refunded if the student moves from the dormitory at any time other than at the end of the semester—or any other reason; this includes the student who is dropped from school for disciplinary reasons.

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 written instructions to hold the room for a longer period.

COLLEGE 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 the 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 six 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 Registrar by the student.

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

If a withdrawal is made before the end of the first six 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 affetced. A grade of "F" is issued for all courses not being passed at time of withdrawal after this penalty-free period.

A student may not withdraw within three days of the beginning of final exam week.

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 Dean of Student Life on the advice of competent medical personnel may require withdrawal, or deny admission, of a student for health reasons (mental or physical).

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.

Possession or use of alcoholic liquors on the campus is forbidden by law, and the guilty student is subject to immediate dismissal as well as criminal prosecution. Possession or use of such liquors at any college-sponsored function is classified as unacceptable behavior.

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.

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.

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.

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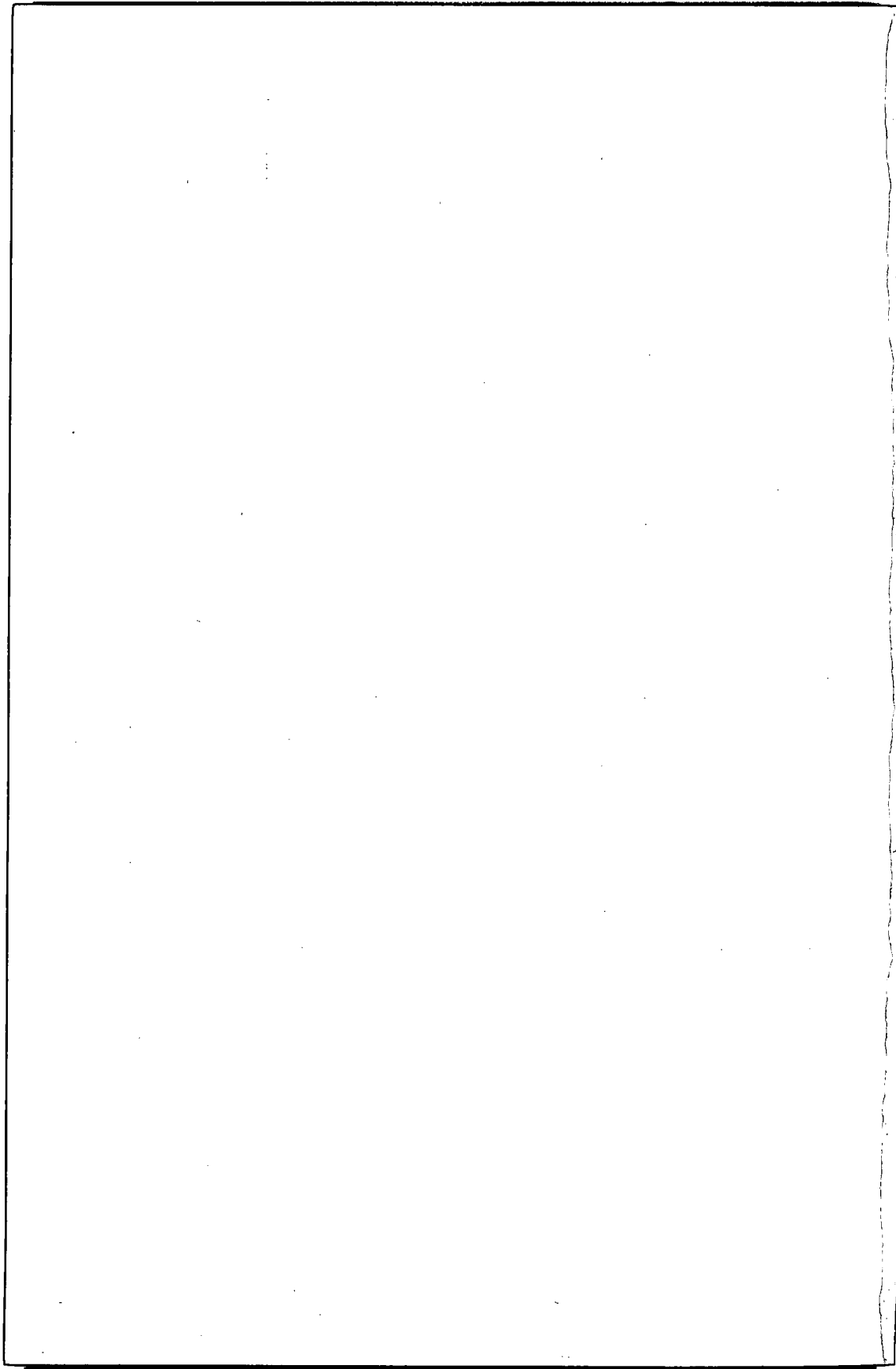
Students and student organizations are expected to honor contractual obligations promptly.

Penalty for failure to clear up these obligations may be: a) No re-admission; b) Withholding of grades and transcripts; c) Withholding of degree.
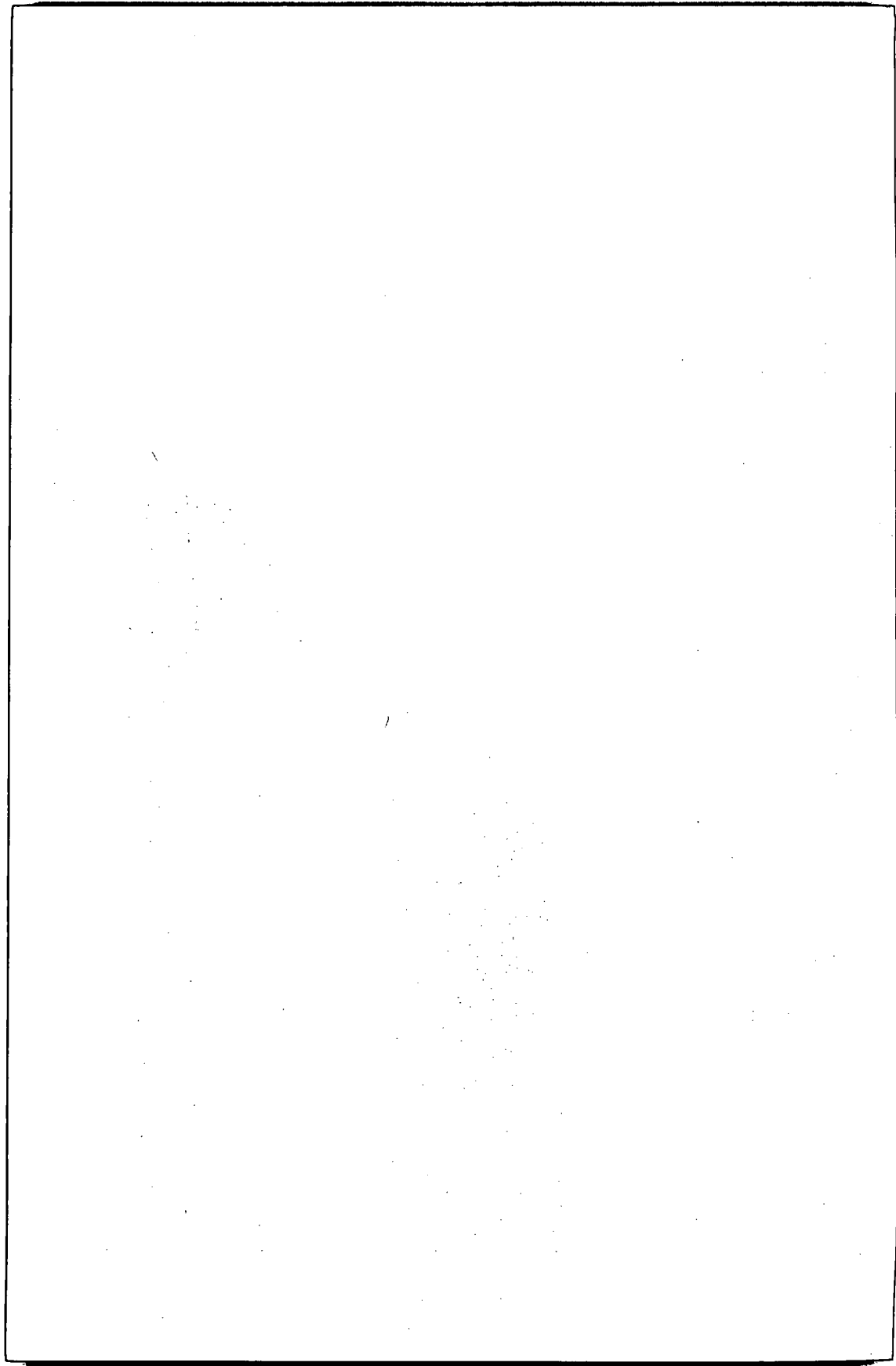
PART II

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. Teacher certification programs were also available in each of these fields.

In 1962, master's degrees were authorized in mathematics, engineering, and elementary education. Additional master's degrees in business administration, chemistry, special education, and secondary education were begun in the fall of 1965.

A Master of Education degree with a major in Guidance and Counseling was instituted in the summer of 1968. The program was approved too late for details to be included in this Catalog, but further information may be obtained from the Dean of the School of Education or from the Dean of the Graduate School.

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 History
Master of Business Administration
Master of Science
    Master of Science in Mathematics
    Master of Science in Chemistry
Master of Engineering Science
Master of Education
    Master of Education in Elementary Education
    Master of Education in Secondary Education
    Master of Education in Special Education
    Master of Education in Guidance and Counseling

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 or its equivalent 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 College Testing and Placement Center, located in Room 102 in the Liberal Arts Building, administers the Graduate Record Examination. Application forms and information about the Graduate Record Examination are available at this Center.

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 the applicant must have a grade point average of 2.0 (3 point scale) and a satisfactory score on the aptitude section of the Graduate Record Examination.

   B. Upon recommendation by the major department, an applicant with a grade point average between 1.5 and 2.0 and a satisfactory score on the Graduate Record Examination may be admitted on probation. This probation may be removed after the student completes nine semester hours of graduate work with grades of B or better.

   C. Upon recommendation by the major department, an applicant with a grade-point average below 1.5 may be admitted on probation if his scores on the Graduate Record Examination are exceptionally high.

   D. Information concerning minimum standards for the Graduate Record Examination may be obtained from the Dean of the Graduate School.

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 enroll in a graduate course without receiving credit toward any graduate degree may do so under the following conditions:

1. He must hold a bachelor's degree.
2. He must have the written consent of the Dean of the Graduate School.
3. An individual holding only a bachelor's degree may pursue no more than two graduate courses with this type of admission. A person with an advanced degree may be permitted to enroll for additional courses.

Registration

1. A student who has been admitted to the Graduate School may register in September or February for the long sessions, or in June or July for the summer terms.
2. An applicant for a graduate degree must be registered during the semester or summer session (one term is considered sufficient) in which the degree is to be awarded.
3. 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. He must also be registered during the term or semester when the oral examination is administered.

GRADUATE SCHOOL REQUIREMENTS

General

1. All the course work applied toward a given degree 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 completed at another institution.

5. No academic work done in extension courses may be transferred or applied to graduate degree programs.

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 must be enrolled in the semester or one term of a summer session in which he receives his degree.

8. 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.

9. 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.

10. When a graduate student with regular admission status fails 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 will be removed from probation. If he does not make progress toward eliminating the deficiency, his case will be referred to the Academic Standards Committee of the Graduate School for a recommendation.

11. The student admitted on probation whose grade-point average falls more than three grade points below a 2.0 (B) average will have his case referred to the Academic Standards Committee.

12. Resignation from the Graduate School should be made in writing to the Dean.

13. 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.

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 36 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.

Master of Engineering Science

1. Meet all general degree requirements.

2. Complete thirty semester hours of graduate work as follows: a minimum of eighteen semester hours in engineering courses (including six semester hours in thesis), and a minimum of nine semester hours in a combination of science and mathematics.

Master of Education

1. Meet all general degree requirements.

2. Earn a minimum of thirty-six semester hours, if a thesis is not planned, including twenty-one semester hours in education and fifteen semester hours in academic subject matter areas for the degree in Elementary Education or Special Education. Twelve hours in education, eighteen hours in one discipline, and six hours in other academic areas should be completed for the degree in Secondary Education.

3. Earn a minimum of thirty semester hours, if the thesis is planned, including twelve semester hours in education, six semester hours in thesis, and nine semester hours in academic subject matter areas for the degree in Elementary Education or Special Education. Twelve semester hours in education, including the thesis, twelve hours in one discipline, and six hours in other academic areas should be completed for the degree in Secondary Education.

ADMISSION TO CANDIDACY

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.

THESIS REQUIREMENTS

The Master of Arts, Master of Business Administration, Master of Science, and Master of Engineering Science degrees require a thesis. The Master of Education degree offers two plans, one of which does not require a thesis. 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, including the term or semester when the oral examination is administered.

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 and must be enrolled in the Graduate School at the time the examination is administered. 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. 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 are conferred at the annual commencement in June 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 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
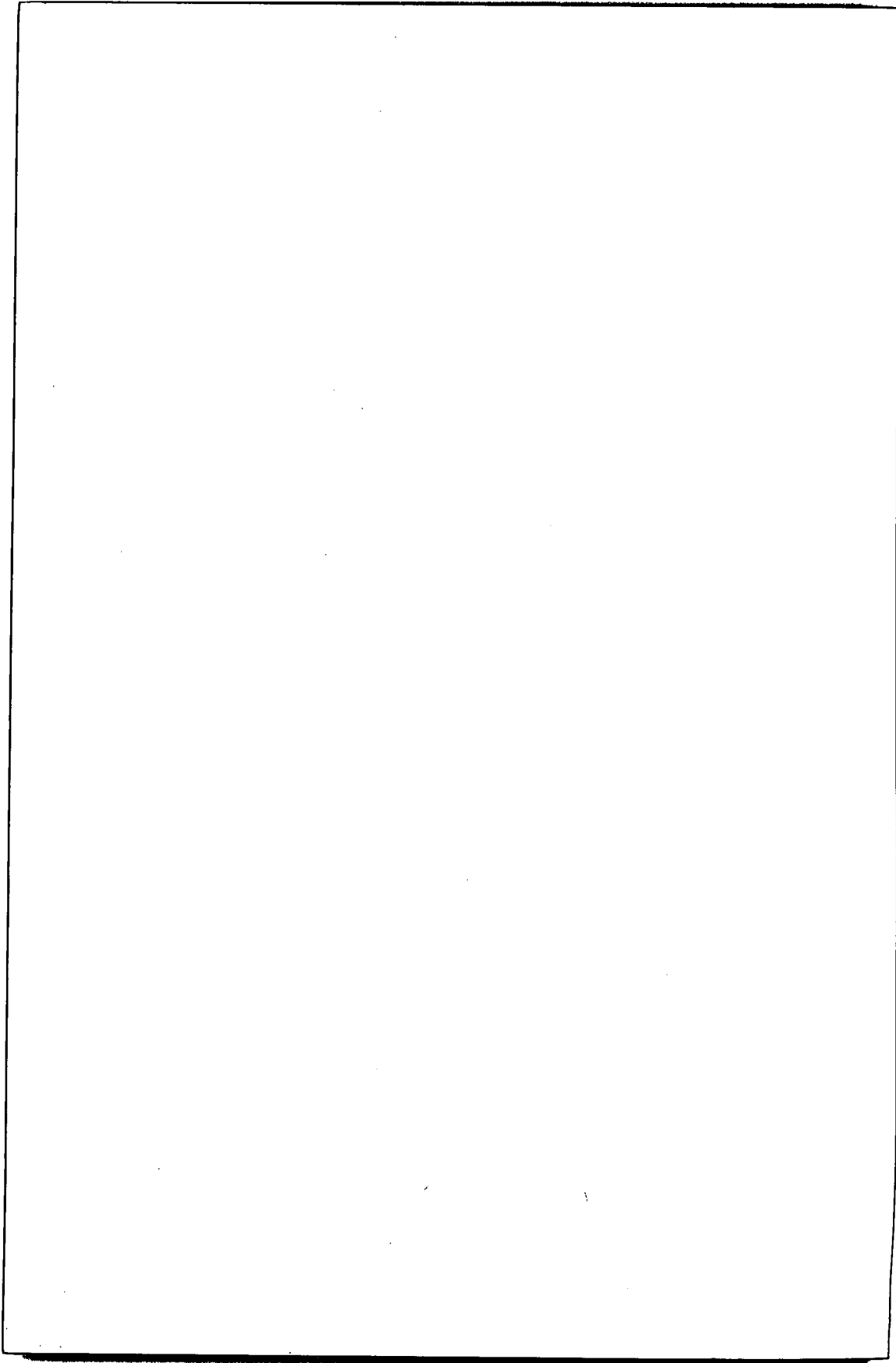
DEPARTMENT OF BIOLOGY

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

GRADUATE FACULTY

Members

Professor Edwin S. Hayes
General biology, cytology

Professor Russell J. Long
Histology, embryology, natural history

Professor W. Russell Smith
Microbiology

Professor Henry T. Waddell
Botany, mycology

531—**Seminar in Biological Sciences.** Designed to enhance the biological science background of non-science majors. Relevant biological concepts, library research and synoptic reports, lectures by staff on special topics. Class: 3 hours. Credit: 3 semester hours.

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

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

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

536—**Mammalogy.** Natural history, taxonomy and ecology of mammals. Lecture: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

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 courses 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 24 hours of course work and a thesis. Plan II requires 36 hours of course work. Specific degree requirements are as follows if a thesis is written:

1. Undifferentiated Business Courses—six semester hours selected from the following:

   BA 530—Seminar in Management
   BA 531—Seminar in Marketing
   BA 532—Problems in Business Finance
   Acc 534—Seminar in Accounting
   BA 5310—Advanced Statistical Analysis

2. Specialization—six semester hours selected from the following courses:

   Acc 536—Advanced Accounting Problems
   Acc 537—Managerial Accounting
   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 430—Government and Business
   Eco 436—Business Cycles
   Eco 437—Intermediate Theory
   Eco 438—Macro Economics
   Eco 4370—Seminar in Economic Problems
   Eco 4371—Managerial Economics
   Eco 530—Seminar in Monetary and Fiscal Policy
   Eco 531—Advanced Macroeconomics
   Eco 533—Contemporary Literature and Thought
   Eco 534—Seminar in Labor Economics

5. Approved electives—six semester hours in 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
BA 331—Business Law
BA 332—Principles of Finance
BA 334—Marketing
BA 335—Industrial Management
BA 432—Business Statistics
Eco 231 and 232—Principles of Economics
Business Communications—3 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

Professor C. D. Kirksey
    Business Administration

Professor J. D. Landes
    Accounting, Business Administration

Associate Professor Mietzl Miller
    Economics

Associate Professor Sam F. Parigi
    Economics

Professor Charles A. Partin
    Economics

Associate Member

Associate Professor H. A. Barlow
    Accounting

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.

Business administration courses must be selected from the following:

530—Seminar in Management. A course designed to broaden the student's concept of the field of management other than functional specialization; analysis of present and possible future problems in organization; labor-management relations; governmental and organizational relationships; responsibility of management, local and national. The student's ability to analyze, judge trends, and consider varying influences is developed through practice with actual cases. Research papers are presented by each student for critical analysis and discussion. 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 problems; a critical evaluation of research procedures and utilization of research findings; promotional programs. 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. 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 cover the interrelationships of production, distribution, and finance. The problems and situations confronting top and middle management are critically examined. Quantitative tools and techniques of accounting, statistics, and mathematics are employed to provide a framework for analysis and decision-making. Prerequisite: approval of professor. 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, queing theory, and statistical quality control. Prerequisite:.BA 432 and mathematical competence. Class: 3 hours. 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:

430—Government and Business. Regulation and restriction of business enterprises by government. Regulatory bodies; anti-trust laws; public utilities; transportation; government ownership. Class: 3 hours. Credit: 3 semester hours.

436—Business Cycles. The nature and causes of business cycles. Cyclical theories; business fluctuations; forecasting stabilization; current problems. Class: 3 hours. Credit: 3 semester hours.

437—Intermediate Theory. Economic analysis and methodology. Distribution theory; price theory; imperfect competition and monopoly; national income analysis. Class: 3 hours. Credit: 3 semester hours.

438—Macro Economics. A descriptive-analytical approach to the dynamic forces that influence the aggregate level of economic activity. Income and employment determinants; levels of income and employment; stabilization theory; investment and income relationship; monetary and fiscal policies. Class: 3 hours. Credit: 3 semester hours.

4370—Seminar in Economic Problems. An advanced level survey of current economic problems, methods, and empirical studies. Subject matter will be varied from semester to semester and will encompass the field of economic inquiry. Class: 3 hours. Credit: 3 semester hours.

4371—Managerial Economics. A study in depth of the principles and techniques of economic analysis applicable to the problems of business management; demand analysis and forecasting; costing; pricing; capital budgeting and related problems. Class: 3 hours. Credit: 3 semester hours.

530—Seminar in Monetary and Fiscal Policy. A study of the theory and practice of monetary management and the taxing-borrowing-spending programs of the government as they affect growth, output, employment, prices and resource allocation. Prerequisite: Principles of Economics— 6 semester hours and graduate standing. 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: Macroeconomics—3 semester hours 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. Man-power 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.

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 first three years of 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 and six hours of thesis. At least nine semester hours, exclusive of the thesis, must be in chemistry courses numbered 500 or above.
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, radiochemistry
Professor Margaret D. Cameron
    Organic Chemistry
Professor Ewin A. Eads
    Inorganic Chemistry
Professor Robert G. Mers
    Physical Chemistry
Professor Roger E. Yerick
    Analytical Chemistry, radiochemistry

Associate Members

Assistant Professor Kenneth L. Dorris
    Physical Chemistry
Assistant Professor Mary Jean George
    Biochemistry
Assistant Professor Keith C. Hansen
    Organic Chemistry

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.

435—Modern Organic. Selected topics in modern organic chemistry. The selected topic will appear in the printed schedule. When the topic is different and with the approval of department head, the course may be repeated for credit. Prerequisites: Chm 342, 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.

438—History of Chemistry. The development of chemistry as related to the men of science who contributed to its progress. Prerequisite: 24 semester hours of chemistry. Class: 3 hours. Credit: 3 semester hours.

439—Nuclear Chemistry. Theory of nuclear structure. Properties of nuclear radiations. Natural and artificial radioactivity and applications of radioactive tracers. Prerequisite: 24 semester hours of chemistry. 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.

4101, 4201, 4301, 4401—Chemistry for Teachers. Courses designed to advance the professional education of participants. The description of the area of study of each course will appear on the printed semester schedule. When courses are conducted in completely different areas and with the approval of the department head, a participant may repeat the course for credit. Class: 1 to 4 hours. Laboratory: 2 to 4 hours. Credit: 1 to 4 semester hours.

531—Advanced Analytical. Selected topics in contemporary analytical chemistry. 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.

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. Selected topics in modern inorganic chemistry. 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—Advanced Organic. Selected topics in modern organic chemistry. 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—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. Selected topics in physical chemistry. 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.

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.

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

SCHOOL OF EDUCATION

The Department of Education offers programs of study leading to the Master of Education degree and/or certification in Elementary Education, Secondary Education, and Special Education.

A Master of Education degree with a major in Guidance and Counseling was instituted in the summer of 1968. The program was approved too late for details to be included in this Catalog, but further information may be obtained from the Dean of the School of Education or from the Dean of the Graduate School.

The Department also offers courses to fulfill the Professional Development requirements for a Professional Certificate in Secondary Education in association with graduate degree programs in English and history.

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 and twelve semester hours in elementary education methods and materials courses.
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 student must have completed a course in supervised student teaching or have taught one year.
6. The student 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.
8. The student who does not write a thesis 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 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.

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 in Elementary Education
        (3) Edu 532 — Current Issues in Education
        (4) Edu 533 — Contemporary Philosophies of Education
        (5) Edu 535 — Advanced Educational Psychology
        (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

    C. Thesis. Six semester hours credit:
        (1) Edu 669A-669B — 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 430 — Earth Science Seminar
    E. Mth 530 — Seminar in Mathematics for Elementary Teachers
    F. Phy 430 — Seminar in Physical Sciences
    G. Soc 430 — Seminar in Principles of Sociology
    H. Spc 439 — Seminar in Fine Arts

Program Leading to Professional Certificate—Elementary

To be eligible to receive the Professional Certificate, the prerequistes 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 graduate level courses must be taken in one of the following disciplines: history, English, mathematics, biology, or chemistry.

*Required.

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

(1) Edu 530 — Structure and Organization of Public Education

(2) Edu 531 — Research

(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 — Advanced Educational Psychology

(7) Edu 536 — Problems in Teaching Language Arts and Social Studies

(8) Edu 537 — Elementary School Curriculum

(5) Edu 538 — Problems in Teaching Arithmetic and Science

(10) Edu 539 — Developmental Reading

(11) Edu 5301 — Current Literature for Children and Adolescents

(12) Edu 5321 — Technology

C. Resource Area. Six semester hours must be selected from the following courses:

(1) Bio 531 — Seminar in Biological Sciences

(2) Eco 535 — Seminar in Economics

(3) Geo 430 — Earth Science Seminar

(4) Mth 530 — Seminar in Mathematics for Elementary Teachers

(5) Phy 430 — Seminar in Physical Sciences

(6) Soc 430 — Seminar in Principles of Sociology

(7) Spc 439 — Seminar in Fine Arts

Degree Plan in Special Education—Mental Retardation

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 — Advanced Studies in Mental Retardation

B. Edu 5312 — Occupational Education for the Mentally Retarded

C. Edu 5313 — Psychology of the Mentally Retarded

D. Edu 5314 — Seminar on the Education of the Mentally Retarded

E. Edu 5315 — Problems and Issues in Special Education

F. Edu 5316 — Administration and Supervision of Special Education Programs

2. Professional Development. Nine semester hours must be selected from the following courses:

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

   (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 — Advanced Educational Psychology

**(7) Edu 430 — Education of the Mentally Retarded

**(8) Edu 431 — Psychology of Exceptional Children

   (9) Edu 5321 — Technology

B. Thesis. Six semester hours credit:
   (1) Edu 669A-669-B — 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 430 — Earth Science Seminar

   (4) Mth 530 — Seminar in Mathematics for Elementary Teachers

   (5) Phy 430 — Seminar in Physical Sciences

   (6) Soc 430 — Seminar in Principles of Sociology

   (7) Spc 439 — 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.

*Required.
**This course may be taken only by special permission.

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

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

        (1) Edu 5311 — Advanced Studies in Mental Retardation

        (2) Edu 5312 — Occupational Education for the Mentally Retarded

        (3) Edu 5313 — Psychology of the Mentally Retarded

        (4) Edu 5314 — Seminar on the Education of the Mentally Retarded

    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

        (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 — Advanced Educational Psychology

        (7) Edu 5321 — Technology

    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 441 — Parasitology

Bio 442 — Entomology

Bio 443 — Limnology

Bio 444 — Vertebrate Natural History

Bio 445 — Marine Biology

Bio 446 — Terrestrial Ecology

Bio 447 — Plant Taxonomy

Bio 4301 — Institute in Biological Sciences
Bio 532 — Mycology
Bio 533 — Ichthyology
Bio 534 — Herpetology
Bio 536 — Mammalogy

Chemistry

Chm 438 — History of Chemistry
Chm 439 — Nuclear Chemistry
Chm 443 — Biochemistry
Chm 444 — Qualitative Organic Analysis
Chm 4101, 4201, 4301, 4401 — Institute in Chemistry
Chm 5101, 5201, 5301, 5401, 5601 — Institute in Chemistry

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 435 — Modern Organic
Chm 436 — Inorganic II
Chm 446 — Instrumental
Chm 531 — Advanced Analytical
Chm 533 — Advanced Inorganic
Chm 535 — Advanced Organic

Health and Physical Education (Men)

HPE 430 — Problems in Physical and Health Education, Recrea-
tion, and Safety
HPE 431 — Recreation Leadership
HPE 435 — Adapted Physical Education
HPE 436 — Organization and Administration of Physical and Health
Education and Athletics
HPE 531 — Cultural Foundations of Physical Education
HPE 532 — Seminar in Physical Education
HPE 533 — Organization and Administration of the School Health
Program
HPE 534M — Scientific Basis of Exercise

Health and Physical Education (Women)

HPE 430 — Problems of Physical Education
HPE 431 — Practicum in Recreational Leadership

HPE 435 — Analysis of Physical Education and Dance Activities

HPE 438 — Measurement and Evaluation Procedures in Physical Education

HPE 439 — History and Theory of Dance

HPE 531 — Cultural Foundations of Physical Education

HPE 532 — Seminar in Physical Education

HPE 533 — Organization and Administration of School Health Programs

HPE 535 — Theories of Movement

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

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 440 — Basic Physics for Teachers

Phy 448 — Optics

Phy 531 — Theoretical Physics

Phy 532 — Relativity

Phy 533 — Seminar

Phy 5301-5601 — Institute in Physics

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

Required

Edu 5318 — Research in Secondary Education

Edu 5317 — Secondary School Curriculum
   or
Edu 5319 — Problems in Secondary School Instruction

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
  or

Edu 535 — Advanced Educational Psychology

Edu 5321 — Technology

Edu 669A-669-B — Thesis

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

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.

<center>

General Information Concerning
Professional Certificates

</center>

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 Constitutions 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
Professor W. Richard Hargrove
  Elementary Education, foundations of education
Professor Bradley B. Hogue
  Elementary Education, educational psychology
Associate Professor Joseph Ilika
  Elementary Education, elementary curriculum
Professor M. L. McLaughlin
  Elementary Education, contemporary education
Associate 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 Kenneth R. Briggs
     Educational Psychology

Assistant Professor Gloria Massey
     Secondary Education

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

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—Advanced Educational Psychology. Current theories and developments in the process of learning. Emphasis on motivation, transfer, and learning techniques. 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.

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—Advanced Studies in Mental Retardation. Sociological and educational problems related to mental retardation. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5312—Occupational Education for the Mentally Retarded. Employment opportunities, job analyses, guidance and placement procedures, agency services. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5313—Psychology of the Mentally Retarded. Examination of the psychological problems of mental retardation. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5314—Seminar on the Education of the Mentally Retarded. Study of the sociological and educational problems related to mental retardation. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

5315—Problems and Issues in Special Education. 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. Organization, financing, staffing and supervision in special education programs. 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.

5318—Research in Secondary Education. Familiarity with significant research in secondary education. Emphasis on terminology, methodology, and spirit of systematic research. 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.

669A-669B—Thesis. Prerequisite: admission to candidacy for the Master of Education 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.). The Department of Mathematics offers the Master of Science degree in Mathematics (M.S.). (See Department of Mathematics, this Catalog.)

The Master of Engineering Science degrees plan requires the completion of thirty semester hours of graduate work, including the 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 graduate engineering courses from those designated as 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. All course work presented for the M.E.S. degree must have the approval of the candidate's committee.

GRADUATE FACULTY

Members

Associate Professor Mohammed Ali
Operations research, quality control.

Professor Luther A. Beale
Welded tubular structures.

Professor Otto G. Brown
Fluid mechanics in turbulent flow.

Professor James L. Cooke
Control systems.

Professor Floyd M. Crum
Solid state devices in electronic circuits.

Professor Andre P. DelFlache
Soil mechanics, foundation, hydrology, geophysics.

Professor David G. Gates
Methods engineering, work measurement.

Professor Frederic C. Jelen
Corrosion, economic analysis.

Professor Robert A. McAllister
Transport properties, fluid mechanics.

Professor Harry T. Mei
Heat transfer, humidity control.

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

Professor Frank A. Thomas, Jr.
Thermodynamics, transport properties.

Professor Richard E. Walker
Rheology.

Associate Professor Joseph T. Watt
Control systems.

Associate Members

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

Associate Professor Eugene P. Martinez
Gas dynamics.

Assistant Professor Fred M. Young
Heat transfer, compressible flow.

Engineering (EGR)

*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 developed by the application of statistical methods to the kinetic theory of gases and quantum mechanics will be compared with experimental reaction rate determinations. May be taken for graduate credit in Chemistry or Engineering. Class: 3 hours. Credit: 3 semester hours.

533—Advanced Engineering Analysis I. Methods of solution of problems drawn from contemporary engineering practice. Methods of mathematical physics including lumped parameter and distributed-parameter problems will be covered. Analog and digital computer techniques will be introduced and employed. Statistical concepts will be employed. Prerequisite: Mth 4301 or equivalent. Class: 3 hours. Credit: 3 semester hours.

534—Nonlinear Analysis. Equations with known solutions. Numerical and graphical methods; use of the phase plane and analysis of singular points. Analytical techniques: perturbation method, variation of parameters, and principle of harmonic balance; describing functions. Forced oscillations and linear equations with varying coefficients. Stability. Prerequisite: Egr. 533 recommended. Class: 3 hours. Credit: 3 semester hours.

*535—Control Systems Engineering. Principles and analysis of systems and processes with applications drawn from the various engineering fields. Covers controls, response, stability and compensation. Special topics, which may be varied according to interest, from nonlinear systems, digital systems, statistically described signals and multivariable systems. Prerequisite: Mth 4301. 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—Energy Conversion. A study of energy forms and their relation to physical systems, including general laws of thermodynamics, quantum mechanics, electric and magnetic phenomena and methods of irreversible thermodynamics. 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: Math 4301. Class: 3 hours. Credit: 3 semester hours.

539—Seminar. Investigation of current engineering research and literature. Written and oral reports will be required. Class: 3 hours. Credit: 3 semester hours.

5311—Transport Phenomena. The fundamental relationships involved in momentum heat and mass transfer. Emphasis is on principles and fundamentals, but applications and analogies are developed extensively. Prerequisite: Mth 4301 or parallel, or Mth 433 or parallel. Class: 3 hours. Credit: 3 semester hours.

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

5312—Principles of Measurement. The fundamentals of physics, chemistry, and engineering are used to investigate methods for continuously monitoring process variables. The work includes an evaluation of reliability, accuracy, and usefulness for each fundamental application and the means of converting the measurement to signals for conventional or computer control. Class: 3 hours. Credit: 3 semester hours.

5313—Rate Processes. Rates of energy transfer with selected topics in the fields of mechanical, thermal, chemical, electrical, and other energy transformations. Prerequisite: Mth 4301. Class: 3 hours. Credit: 3 semester hours.

5314—Stagewise Processing. All stagewise processing operations such as distillation, extracting, absorption, etc., are treated as simple variations of the same process. Both equilibrium process and non-equilibrium stage process are considered. Multicomponent as well as binary systems are considered. Class: 3 hours. Credit: 3 semester hours.

5315—Advanced Engineering Mechanics. General analysis of stress and strain, equations of equilibrium and compatability, stress strain relations, two dimensional stress problems, elastic energy principles, thermoelastic problems. Class: 3 hours. Credit: 3 semester hours.

5316—Advanced Engineering Economics. 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, queing, 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 particular 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—Experimental Mechanics. 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. Prerequisite: Egr 5315. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

5319—Design of Experiments. The fundamental concepts in the design and analysis of experiments are presented. Emphasis is placed on the basic philosophy of design. A background in statistical inferences will be assumed with a requirement of at least one 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 the fundamentals of non-Newtonian liquid flow and how these principles can be applied to momentum, heat and mass transfer. Emphasis is on principles and fundamentals, but applications to practical problems, including methods of measuring rheological properties, are developed extensively for both non-elastic and elastic liquids. Class: 3 hours. Credit: 3 semester hours.

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

5324—Wave Mechanics of 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. Effects of vibrations of substructures. Effect on structure of waves from industrial, seismic and nuclear sources. Mechanical and electronic recording. Class: 3 hours. Credit: 3 semester hours.

5325—Information Theory. A study of the principles of signal processing. Specifically, a study is made of information theory of discreet systems; properties of continuous signals; ergodic ensembles and random noise; entropy of continuous distributions; signal space; linear correlation; filtering; and prediction; information aspects of modulation and noise reduction. 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.

5341—Advanced Conductive Heat Transfer. Conduction heat transfer in steady and transient state, including heat sources. Analytical, numerical, graphical, and analog methods of solution for steady and fluctuating boundary conditions. Prerequisite: Mth 4301. Class: 3 hours. Credit: 3 semester hours.

5351—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.

5391—Work Systems Engineering. Study of current research in methods of engineering and work measurement; work design; work systems, systems of standard data and predetermined motion time data, statistical treatment of work measurement. Prerequisite: IE 338, CHE 320. 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 semester hours.

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

Chemical Engineering (CHE)

4311—Heat Transmission. Process design calculation and process calculations involving the transfer of heat by conduction, convection, and radiation. Steady and unsteady state heat transmission. Prerequisite: Mth 232 and 233. Class: 3 hours. Credit: 3 semester hours.

4312—Filtration. Flow of liquids through homogeneous and non-homogeneous solids, porosity, permeability, constant rate and constant pressure, filtration, variable pressure-variable rate filtration, washing, cycles for maximum production and optimum cost, rotary filtration, and washing. Prerequisite: Egr 331. Class: 3 hours. Credit: 3 semester hours.

4321—Chemical Engineering Economics. Calculations involving process and control as determined by least cost or miximum profit. Based on unit operations and unit processes. Class: 3 hours. Credit: 3 semester hours.

4322—Advanced Unit Operations. The application of chemical engineering fundamentals to special problems selected for advanced study. Prerequisite: CHE 442. Class: 3 hours. Credit: 3 semester hours.

4323—Corrosion and Materials of Construction. Construction materials and corrosion in the chemical and petroleum industry. Class: 3 hours. Credit: 3 semester hours.

4325—Introduction to Nuclear Engineering. A study of the engineering aspects of nuclear fundamentals and processes. Class: 3 hours. Credit: 3 semester hours.

4329—Properties of Gases and Liquids. A critical review of various estimation and correlation procedures for a number of physical properties of pure gases and liquids. Though the subject matter is tied closely to basic theory, its intrinsic value results from its utility in almost every chemical or petroleum industry. Class: 3 hours. Credit: 3 semester hours.

Civil Engineering (CE)

430—Indeterminate Structures. Basic principles of statically indeterminate structural analysis, based upon requirements of equilibrium and continuity. Classical methods of strain energy, slope deflection and moment distribution used for analysis of frames, trusses and beams. Prerequisite: CE 334. Class: 3 hours. Credit: 3 semester hours.

433—Sanitation II. Introduction to the sanitation phase of public health work; communicable diseases, water and sewage treatment, food sanitation, industrial sanitation, swimming pool sanitation, refuse sanitation. Laboratory consists of laboratory tests and field trips. Prerequisite: CE 337. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

435—Advanced Sanitation. Advanced studies in sanitary microbiology and chemistry; enzymes, metabolic reactions, energy, synthesis, growth and death. Microbiology as applied to water, wastes, and biological treatment. Laboratory consists of physical, chemical and biological tests on streams, bench-scale plants, and actual water and waste water plants.. Prerequisite: CE 337. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

4311—Plastic Design. Plastic methods of analysis applied to continuous frames, bents and girders. Consideration of load and shape factors. Structural behavior in the plastic range. Prerequisite: CA 430. Class: 3 hours. Credit: 3 semester hours.

4313—Foundation Engineering. Principles of soil science applied to the design of rigid and elastic foundations. Spread footings, floating foundations, retaining walls, pile structures and caissons. Prerequisite: CE 434. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

4316—Soil Dynamics. Detailed study of mechanical properties of soil masses under the effect of dynamic loading, impact and shock wave propagation. Seismic phenomena, their reflection and refraction. Electronic recording and analysis of experimental transient data. Prerequisite: Geo 433. Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

Electrical Engineering (EE)

432—Electronics III. Tuned voltage and power amplifiers, oscillators, rectifiers with associated filters and regulators, modulation and demodulation (detection), relaxation oscillators, sweep generators, and electronic instruments. Prerequisite: EE 431. Class: 3 hours. Credit: 3 semester hours.

434—Network Synthesis. Impedance synthesis, network synthesis using image parameters, modern realization methods for two-terminal-pair networks, rational-fraction approximations. Prerequisite: EE 433. Class: 3 hours. Credit: 3 semester hours.

436—Control Engineering. Introduction; the Laplace transformation transform functions; time response; frequency response; stability; design and compensation; special topics as time permits. Prerequisite: EE 435. Class: 3 hours. Credit: 3 semester hours.

437—Micro-Wave. A study of micro-wave generation, transmission, and detection. Includes a treatment of motion of electrons in microwave devices and specific tubes such as klystrons, traveling-wave tubes, and magnetrons. Consideration is given measurements and measuring devices at these frequencies. Parallel: EE 431, and EE 433. Class: 3 hours. Credit: 3 semester hours.

4302—Communications Theory. Principles of modulation; random signal theory with network analysis; basic information theory; and analysis of noise. Prerequisite: EE 332. Class: 3 hours. Credit: 3 semester hours.

4303—Logical Design of Switching Systems. Switching algebra necessary for formulating and manipulating switching functions. Circuit realization using relay logic, diode logic, transistor gates and core gates. Derivation and simplification of state tables for sequential circuits. State assignments for the design of computing systems. Asynchronous circuits. Prerequisite: Egr. 333, EE 332. Class: 3 hours. Credit: 3 semester hours.

Industrial Engineering (IE)

435—Production and Inventory Control. Techniques employed in continuous process and job lot manufacture for planning and controlling production. Procurement, inventory control, scheduling, facilities loading, routing, dispatching. Prerequisite: Mth 234 and concurrent registration in CHE 320. Class: 3 hours. Credit 3 semester hours.

437—Operations Research. Introduction to the major techniques of operations research and their application to managerial decision-making. Transportation method, linear programming, allocation models, Monte Carlo technique. Prerequisite: Mth 234 and CHE 320. Class 3 hours. Credit: 3 semester hours.

4313—Human Engineering. The specialized adaptation of engineering designs to meet human physiological and psychological needs. Prerequisite: IE 338 or permission of instructor: Class: 2 hours. Laboratory: 3 hours. Credit: 3 semester hours.

4315—Organization and Management. Theory of the organization, the relationship of human efforts for effective and efficient coordinated activity. Investigation of the executive functions; planning, decision-making, policy formation, motivation, communicaton, control. Class: 3 hours. Credit: 3 semester hours.

Mechanical Engineering (ME)

432—Mechanical Vibrations. The theory of vibrating systems, including kinematics of vibrations, harmonic and non-harmonic, single and multiple degrees of freedom; free and forced vibrations, with and without damping. Application to crank and slider, rotating machinery; balancing vibration, isolation and absorption, and instrumentation. Prerequisite: ME 334 and ME 332. Class: 3 hours. Credit: 3 semester hours.

433—Aerodynamics. Topics include circulation and curl, irrotational flow, velocity, potential, vortex theorems, the equation of motion, flow about a body, and the thin airfold. Vector and complex notation is used. Prerequisite: ME 4313. Class: 3 hours. Credit: 3 semester hours.

439—Advanced Strength of Materials. Introduction to the fundamental theory of three dimensional elasticity. Specialization of the general theory to provide the theory of plane stress and plane strain. Determination of stress and deflections in a beam on elastic foundation, plates, shells, and cylinders. Study of torsion of bars and cylinders. Prerequisite: EGR 232. Class: 3 hours. Credit: 3 semester hours.

4311—Controls Engineering. The theory of integrated automatic control systems with application to combustion, temperature, pressure, flow and humidity control. Industrial control systems are considered. Prerequisite: ME 331 and ME 334. Class: 3 hours. Credit: 3 semester hours.

4313—Transport Theory II. Transport processes in incompressible boundary layers. Transport with change of phase. Compressible flow in nozzles, ducts, and turbomachines. High speed compressible boundary layer flow. Slip and free molecule flow. Prerequisite: ME 331. Class: 3 hours. Credit: 3 semester hours.

4314—Fundamentals of Physical Metallurgy. Fundamental and scientific principles of physical metallurgy to include nucleation theory of solidification, behavior of single and polycrystalline solids under stress and heat treatment—plastic deformation and recrystallization, and basic principles of X-ray diffraction used in physical metallurgy. Prerequisite: ME 4319 or parallel. Class: 3 hours. Credit: 3 semester hours.

DAPARTMENT 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 or six additional hours in English. At least twelve semester hours, exclusive of the thesis, must be in English courses numbered 500 or above. The minor must be approved by the Head of the Department of English; such approval will be given on the basis of the support the minor can give to the major.

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 English 530; 539; either 531, 532, or 534, and one course from 535, 536, 537, and 538. Six additional hours from the 500 level courses not already taken, or from 400 level courses specifically approved, are also required.

GRADUATE FACULTY

Members

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

Associate Professor Jay P. Blumenfeld
   Twentieth century literature, linguistics

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

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 A. 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 British and American forms. Prerequisite: Foreign language through 232. Class: 3 hours. Credit: 3 semester hours.

431—Chaucer. A study of the poetry and language of Chaucer with emphasis on the **Canterbury Tales.** Class: 3 hours. Credit: 3 semester hours.

432—The Age of Elizabeth. The non-dramatic literature of England from Skelton to Donne. Class: 3 hours. Credit: 3 semester hours.

433—The Age of Elizabeth. The dramatic literature of England, exclusive of Shakespeare, from Heywood to Ford. Class: 3 hours. Credit: 3 semester hours.

434—Shakespeare. Intensive study of selected major plays. Class: 3 hours. Credit: 3 semester hours.

435—The Seventeenth Century. The non-dramatic literature of England from the Metaphysical poets to Dryden. Class: 3 hours. Credit: 3 semester hours.

436—Milton. A study of Milton's poetry and prose against the social, political, and literary background of his time. Class: 3 hours. Credit: 3 semester hours.

437—Restoration and Eighteenth Century Drama. A study of the plays of the period 1660-1800. Class: 3 hours. Credit: 3 semester hours.

438—The Eighteenth Century. The poetry and prose in England from the Restoration to the rise of Romanticism. Class: 3 hours. Credit: 3 semester hours.

439—The Romantic Period. An intensive study of the major authors of the period from Burns to Keats. Class: 3 hours. Credit: 3 semester hours.

4311—The Victorian Period. An intensive study of the major authors of the period from Carlyle to Swinburne. 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.

4316—Literary Criticism. Chronological study of the great critics. An introduction to aesthetics. 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 development 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.

4321—Selected Problems in Comparative Literature. Intensive study of an author or authors, literary genre, or period selected from the range of world literature. Emphasis upon analysis and literary method. Class: 3 hours. Credit: 3 semester hours.

4123, 4223, 4323, 4423, 4523, 4623—Institute In English. An intensive study of one or more aspects of the discipline of English (language, literature, composition). Class: 1-4 hours. Laboratory: 1-4 hours. Credit: 1-6 semester hours.

530—Bibliography and Research Methods. An introduction to graduate research methods and sources. Basic course for all beginning graduate students. Prerequisite: graduate standing. Class: 3 hours. Credit 3 semester hours.

531—Old English. A study of the grammar and the reading of short selections from the poetry and prose written before 1200. Emphasis will be placed on vocabulary and the historical development of the language. Prerequisite: graduate standing and English 430 (History of the Language) or the equivalent. Class: 3 hours. Credit: 3 semester hours.

532—Middle English. A study of the grammar and the reading of short selections from literature of the period, 1200-1450. Emphasis will be placed on the development of the language into Modern English. Prerequisite: graduate standing and English 431 (Chaucer) or the equivalent. Class: 3 hours. Credit: 3 semester hours.

534—Studies in Medieval English Literature. An intensive study of an author or related authors selected from the Old English and Middle English periods. 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—Studies in Renaissance and Seventeenth Century English Litera-ture. 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—Studies in Restoration and Eighteenth Century English Litera-ture. 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—Studies 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 semes-ter hours.

538—Studies in Twentieth Century Literature. An intensive study of an author or related authors selected from the period. Course may be re-peated for a maximum of six semester hours credit when the topic varies. Prerequisite: graduate standing. Class: 3 hours. Credit: 3 semester hours.

539—Studies 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.

669A-669B—Thesis. Prerequisite: admission to candidacy for the mas-ter'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. At least twelve semester hours, exclusive of the thesis, must be in history courses numbered 500 or above. The minor must be approved by the Head of the Department of History; such approval will be given on the basis of the support the minor can give to the major. With the approval of the Head of the Department of History' 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

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

Associate Professor Andrew J. Johnson
United States History, Revolution, Constitution

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

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

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

Associate Member

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

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.

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 wil 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 course (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

Associate Professor Philip W. Latimer
Analysis, modern elementary mathematics

Professor Jeremiah M. Stark
Analysis, applied mathematics

Associate Members

Associate Professor Sterling W. McGuire
Mathematical Statistics

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

The graduate student will select his courses in mathematics from the following:

4302—Advanced Calculus for Engineers. Boundary-value problems, orthogonal functions, introduction 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 topcis 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.

4311—Numerical Solution of Differential Equations. Analytical foundations. Methods for ordinary and partial differential equations. 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, brachistrochrone problem, goedesics, surface of revolution 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.

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.

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 6 semester hours credit when the topic varies. Class: 3 hours. Credit: 3 semester hours.

696A-669B—Thesis. Prerequisite: admission to candidacy for the master's degree. Credit: 6 semester hours.

For Non-Mathematics Majors

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.

DEPARTMENT OF HEALTH AND PHYSICAL EDUCATION
FOR MEN

The Department of Health and Physical Education for Men offers the following graduate courses to be used primarily as the specialization area for the Master of Education—Secondary.

GRADUATE FACULTY

Member

Associate Professor Leonard A. Yates
    Physical Education

Associate Members

Assistant Professor Vernon R. Crowder
    Physical Education

Professor James B. Higgins
    Physical Education

Associate Professor Tyrus Terrell
    Physical Education

531—Cultural Foundations of Physical Education. A study of the historical 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. 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.

534M—Scientific Basis of Exercise. A study of the role of physical activities and their effects on the human organism. Class: 3 hours. Credit: 3 semester hours.

DEPARTMENT OF HEALTH AND PHYSICAL EDUCATION FOR WOMEN

The Department of Health and Physical Education for Women offers the following graduate courses to be used primarily as the specialization area for the Master of Education—Secondary.

GRADUATE FACULTY

Members

Associate Professor Mary Jane Haskins
    Physical Education, research

Professor Belle Mead Holm
    Health Education

Associate Professor Marcella D. Woods
    Motor Development, research

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. 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.

535—Theories of Movement. Theories of Delsartes, Laban, Graham and current phenomenological approaches to movement. 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 an area of specialization for the Master of Education degree in Secondary Education and as support to other advanced degree programs.

GRADUATE FACULTY

Members

Professor Carl J. Rigney
Thermal Physics, electromagnetism

Associate Professor Hugh O. Peebles
Astrophysics

Associate Member

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

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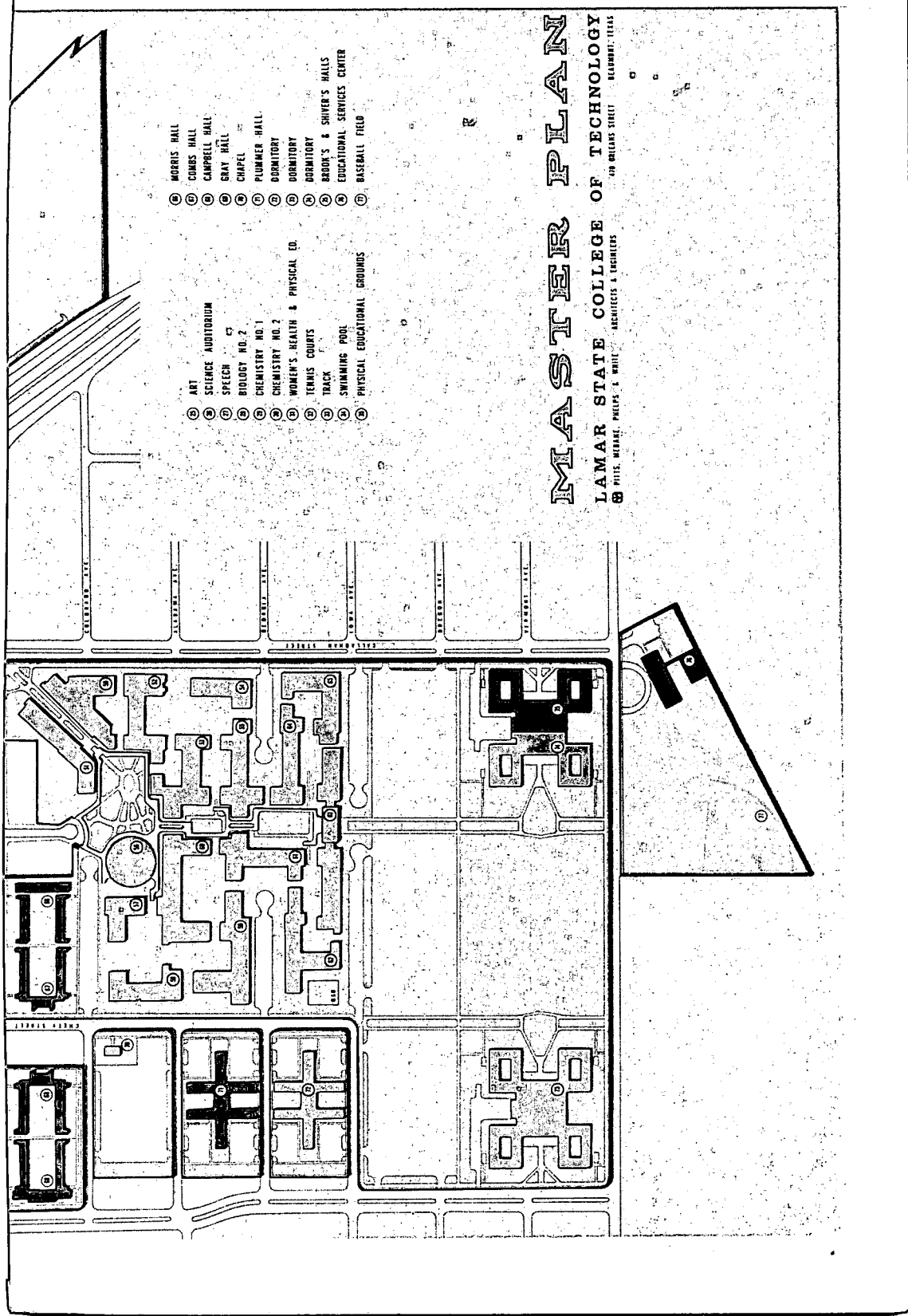
531—Theoretical Physics. The application of typical mathematical techniques, with emphasis on field and potential concepts. Class: 3 hours. Credit: 3 semester hours.

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.

INDEX

LEGEND

● EXISTING BUILDINGS

1. ADMINISTRATION BUILDING
2. CARILLON TOWER
3. ENGINEERING NO. 1
4. LIBERAL ARTS
5. HOME ECONOMICS
6. ENGINEERING NO. 2
7. STUDENT UNION
8. BOOKSTORE
9. PHYSICS
10. LIBRARY
11. HOME - DEAN OF MEN
12. PRESIDENT'S HOME
13. HEALTH CENTER
14. ENGINEERING
15. DINING HALL A
16. DINING HALL B
17. AUDITORIUM
18. MEN'S HEALTH & PHYSICAL ED.
19. MCDONALD GYMNASIUM
20. MECHANICAL PLANT
21. BIOLOGY NO. 1 - GEOLOGY
22. BUSINESS
23. MUSIC - SPEECH
24. THEATRE

● PROPOSED BUILDINGS

25. LAMAR APARTMENTS NO. 1
26. LAMAR APARTMENTS NO. 2
27. LAMAR APARTMENTS NO. 3
28. GENTRY HALL
29. GREEN HOUSE
30. VOCATIONAL BLDG. NO. 1
31. VOCATIONAL BLDG. NO. 2
32. VOCATIONAL BLDG. NO. 3
33. VOCATIONAL BLDG. NO. 4
34. NURSERY SCHOOL
35. HOME MANAGEMENT
36. BUILDING SUPERINTENDENT'S HOME
37. MAINTENANCE BLDG.
38. CARDINAL STADIUM
39. ENGINEERING
40. LIBERAL ARTS
41. CLASSROOM
42. MECHANICAL PLANT
43. GENERAL CLASSROOM
44. CLASSROOM
45. CLASSROOM
46. CLASSROOM
47. CLASSROOM
48. CLASSROOM
49. CLASSROOM
50. CLASSROOM

NORTH

UNIVERSITY DRIVE

MASTER PLAN

LAMAR STATE COLLEGE OF TECHNOLOGY
ORLEANS STREET   BEAUMONT, TEXAS

PITTS, MEBANE, PHELPS & WHITE   ARCHITECTS & ENGINEERS

- MORRIS HALL
- COMBS HALL
- CAMPBELL HALL
- GRAY HALL
- CHAPEL
- PLUMMER HALL
- DORMITORY
- DORMITORY
- BROOK'S & SHIVER'S HALLS
- EDUCATIONAL SERVICES CENTER
- BASEBALL FIELD

- ART
- SCIENCE AUDITORIUM
- SPEECH
- BIOLOGY NO.2
- CHEMISTRY NO.1
- CHEMISTRY NO.2
- WOMEN'S HEALTH & PHYSICAL ED.
- TENNIS COURTS
- TRACK
- SWIMMING POOL
- PHYSICAL EDUCATIONAL GROUNDS

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 Dean of Student Life.