

BULLETIN  
OF  
TEXAS TECHNOLOGICAL COLLEGE  
DIVISION OF GRADUATE STUDIES

LUBBOCK, TEXAS

DECEMBER, 1952

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## COLLEGE CALENDAR

## TWENTY-EIGHTH ANNUAL SESSION—1952-1953

## Spring Semester

1953

- Feb. 3-4. Tuesday-Wednesday. Registration for Spring Semester.
- Feb. 5. Thursday. Classes begin.
- Feb. 11. Wednesday. Late registration fee charged after this date.
- Feb. 16. Monday. Last day to complete registration or add a course, except in the Evening Program. For registration dates in that work, see the Evening Program Bulletin.
- March 11. Wednesday. Last day on which a student may drop, without grade penalty, a course in which he is not passing.
- March 16. Monday. Last day to file personnel forms and photographs at the Placement Office by those planning to complete their work in May.
- March 23. Monday. Last day to file with the Dean the "Statement of Intention to Graduate" on May 25, 1953.  
Last day to pay the \$5 Graduation Fee.
- April 2. Thursday, 10 P. M. Easter Vacation begins.
- April 7. Tuesday, 8 A. M. Classes resumed.  
Last day to order academic regalia at the College Bookstore.
- April 15. Wednesday. Last day to secure refund of the \$5 Graduation Fee if graduation plans have been changed.
- April 27. Monday. Last day to complete correspondence courses. Instructors are to file grades on correspondence work not later than May 11.  
Last day to submit to the Dean the first draft of theses and dissertations, bearing the written approval of the committee.  
Last day to submit to the Dean a request to graduate *in absentia*.  
Last day to remove grades of "Inc" and "Pr." Instructors are to send the "Change-of-Grade" card to the Dean's Office as soon as the work has been completed.
- May 22. Friday. Last day to submit to the Dean the final draft of theses and dissertations and to pay the binding fee.
- May 23-29. Saturday-Friday. Final examinations for the Spring Semester.
- May 24. Sunday, 8 P. M. Baccalaureate Sermon.
- May 25. Monday, 8 P. M. Commencement.



## SUMMER SESSION 1953

## First Term

- June 3. Wednesday. Registration for the First Term.  
 June 4. Thursday. Classes begin.  
 June 8. Monday. Last day to register or add a course.  
 June 12. Friday. Last day on which a student may drop, without grade penalty, a course in which he is not passing.  
 July 4. Saturday. American Independence Day. A holiday.  
 July 6. Monday. Last day to file personnel forms and photographs at the Placement Office by those planning to complete their work in August.  
 Last day to pay the \$5 Graduation Fee. Students who pay the fee after this date will not receive an actual diploma at Commencement.  
 Last day to secure refund of \$5 Graduation Fee if plans for graduation have been changed.  
 Last day to file with the Dean the "Statement of Intention to Graduate" on August 26, 1953.  
 July 13-14. Monday-Tuesday. Final examinations for the First Term.  
 July 14. Tuesday. First Term ends.

## Second Term

- July 16. Thursday. Registration for the Second Term.  
 July 17. Friday. Classes begin.  
 July 20. Monday. Last day to register or add a course.  
 July 23. Thursday. Last day to order academic regalia at the College Bookstore.  
 July 25. Saturday. Last day on which a student may drop, without grade penalty, a course in which he is not passing.  
 Aug. 6. Thursday. Last day to submit to the Dean the first draft of theses and dissertations, bearing the written approval of the committee.  
 Last day to complete correspondence courses.  
 Instructors are to file grades for correspondence work not later than August 12.  
 Last day for degree candidates to remove grades of "Inc" and "Pr." Instructors are to send the "Change-of-Grade" card to the Dean's Office as soon as the work has been completed.  
 Last day to submit to the Dean a request to graduate *in absentia*.  
 Students enrolled in the Second Term only have until this day to file personnel forms and photographs at the Placement Office.

- Aug. 15. Saturday. Each Dean will prepare the tentative list of degree candidates who are exempt from final examinations in courses. A degree candidate will be exempt from such examinations only in those courses applicable to his degree.
- Aug. 22. Saturday. Last day to submit to the Dean the final draft of theses and dissertations and to pay the binding fee.
- Aug. 24-25. Monday-Tuesday. Final examinations for the Second Term.
- Aug. 26. Wednesday. 8:30 A. M. Rehearsal for Commencement. All candidates for degrees in August are required to attend. 4-5:30 P. M. President's Reception for graduates. 7:15 P. M. Commencement.
- Second Term ends. Summer Session closes.

## TWENTY-NINTH ANNUAL SESSION—1953-54

### Fall Semester

1953

- Sept. 13. Sunday, 12 noon. Dormitory rooms open for occupancy. First meal, breakfast, Monday, September 14.
- Sept. 14. Monday. Fall Semester begins.
- Sept. 16. Wednesday. Preregistration consultations for all students.
- Sept. 17-18. Thursday-Friday. Registration for the Fall Semester.
- Sept. 19. Saturday. Classes begin.
- Sept. 22. Tuesday. Late registration fee charged after this date.
- Sept. 28. Monday. Last day to complete registration or add a course, except in the Evening Program. For registration dates in that work, see the Evening Program Bulletin.
- Oct. 19-22. Monday-Thursday. Religious Emphasis Week. (Tentative)
- Oct. 29. Thursday. Last day on which a student may drop, without grade penalty, a course in which he is not passing.
- Nov. 12. Thursday. Last day to file personnel forms and photographs at the Placement Office by those planning to complete their work in January.
- Nov. 24. Tuesday. Last day to drop a course without a grade of WF unless the drop is initiated by the Dean.
- Nov. 25. Wednesday, 10 P. M. Thanksgiving Vacation begins.
- Nov. 30. Monday, 8 A. M. Classes resumed.
- Dec. 19. Saturday, 12 noon. Christmas Vacation begins.

1954

- Jan. 4. Monday, 8 A. M. Classes resumed.
- Jan. 23-29. Saturday-Friday. Final examinations for the Fall Semester.
- Jan. 30. Saturday. Students without room reservations for the Spring Semester must vacate dormitory rooms not later than noon this date.
- Fall Semester ends.

## Spring Semester

- Jan. 31. Sunday, 12 noon. Dormitory rooms open to new occupants.
- Feb. 1. Monday, 8 A. M. Spring Semester begins.
- Feb. 2-3. Tuesday-Wednesday. Registration for the Spring Semester.
- Feb. 4. Thursday. Classes begin.
- Feb. 10. Wednesday. Late registration fee charged after this date.
- Feb. 15. Monday. Last day to complete registration or add a course, except in the Evening Program. For registration dates in that work, see the Evening Program Bulletin.
- March 8-11. Monday-Thursday. Willson Lectures.
- March 10. Wednesday. Last day on which a student may drop, without grade penalty, a course in which he is not passing.
- March 16. Tuesday. Last day to file personnel forms and photographs at the Placement Office by those planning to complete their work in May.  
Last day to file with the Dean the "Statement of Intention to Graduate" on May 31, 1954.  
Last day to pay the \$5 Graduation Fee.
- April 7. Wednesday. Last day to order the academic regalia at the College Bookstore.
- April 15. Thursday, 10 P. M. Easter Vacation begins.  
Last day to secure refund of the \$5 Graduation Fee if graduation plans have been changed.  
Last day to drop a course without a grade of WF unless the drop is initiated by the Dean.
- April 20. Tuesday, 8 A. M. Classes resumed.
- April 26. Monday. Last day to complete correspondence courses.  
Instructors are to file grades for correspondence work not later than May 10.  
Last day to submit to the Dean the first draft of theses and dissertations, bearing the written approval of the committee members.  
Last day to submit to the Dean a request to graduate *in absentia*.  
Last day for degree candidates to remove grades of "Inc" and "Pr." Instructors are to send the "Change-of-Grade" card to the Dean's Office as soon as the work has been completed.
- May 21. Friday. Last day to submit to the Dean the final draft of theses and dissertations and to pay the binding fee.
- May 21-27. Friday-Thursday. Final examinations for the Spring Semester.
- May 27. Thursday. Dormitory dining rooms close with the serving of the evening meal.
- May 28. Friday, 10 A. M. Dormitories close. Candidates for degrees on May 31, 1954, may occupy dormitory rooms until 10 A. M., Tuesday, June 1.

- May 30. Sunday, 8:30 A. M. Commencement Rehearsal at the Stadium.  
4-5:30 P. M. President's Reception for graduates.  
8 P. M. Baccalaureate Sermon in the Stadium.
- May 31. Monday, 8 P. M. Commencement.  
Spring Semester ends.

## SUMMER SESSION 1954

- June 7. Monday. Summer Session begins. Registration for the First Term.



## BOARD OF DIRECTORS

## OFFICERS

CHARLES C. THOMPSON, *Chairman*CHANSLOR E. WEYMOUTH, *Vice Chairman*W. T. GASTON, *Secretary*

## MEMBERS

## TERM EXPIRES 1953

LEON INCE.....	Houston
CHANSLOR E. WEYMOUTH.....	Amarillo
CHARLES W. WOOLDRIDGE.....	Dallas

## TERM EXPIRES 1955

C. T. McLAUGHLIN.....	Snyder
RAYMOND PFLUGER.....	Eden
ROBERT B. PRICE.....	El Paso

## TERM EXPIRES 1957

THOMAS F. ABBOTT, JR. ....	Fort Worth
GEORGE E. BENSON.....	Lubbock
CHARLES C. THOMPSON.....	Colorado City

## STANDING COMMITTEES

Building:	Weymouth, Ince, Price.
Executive:	Price, Thompson, Benson.
Finance:	Benson, Price, McLaughlin.
Legislative:	Abbott, Benson, Ince, McLaughlin.
Public Relations:	Ince, McLaughlin, Pfluger.

## OFFICERS OF ADMINISTRATION

EDWARD NEWLON JONES, B.S., Ph.D., LL.D., President

CLIFFORD BARTLETT JONES, LL.D., President Emeritus.

MARSHALL LEE PENNINGTON, B.B.A., Vice President and  
Comptroller.

JAMES ROY WELLS, B.B.A., B.A., M.B.A., Assistant to the President.

JAMES GEORGE ALLEN, B.A., M.A., Dean of Student Life.

WARREN PERRY CLEMENT, B.A., M.A., Registrar and Director of  
Admissions.

SETH THOMAS CUMMINGS, Purchasing Agent and Assistant Busi-  
ness Manager.

WILLIAM THOMAS GASTON, Business Manager and Secretary of the  
Board of Directors.

WILLIAM BRYAN GATES, B.S., M.A., Ph.D., Dean of Graduate Studies.

ROBERT CABANISS GOODWIN, B.A., M.A., Ph.D., Dean of Arts and  
Sciences.

GEORGE GAIL HEATHER, B.S., M.A., Ph.D., Dean of Business Ad-  
ministration.

DYSART EDGAR HOLCOMB, B.S., M.S., Ph.D., Dean of Engineering.

RAY CURTIS JANEWAY, B.A., B.S. in L.S., M.S., Librarian.

JACOB HOMER MILLIKIN, B.A., M.A., Director of Extension.

MARJORIE M. NEELY, B.A., M.S., Dean of Women.

SHIRLEY SCHULZ, B.S., Director of Food Service.

WENZEL LOUIS STANGEL, B.S., M.S., Dean of Agriculture.

EVERITT DONALD WALKER, B.S., M.B.A., C.P.A., Auditor.

MARGARET WATSON WEEKS, B.S., M.S., Dean of Home Economics.

HAMPTON L. GREEN, B.S., Lt. Colonel, U. S. Army, Professor of  
Military Science and Tactics.

OLLEN TURNER, Colonel, U.S. Air Force, Professor of Air Science and  
Tactics.

\* \* \* \*

FLORENCE EVELYN CLEWELL, B.A., Assistant Registrar.

JEAN EWING, B.S., M.A., Assistant Dean of Women.

NEIL CASEY FINE, B.S., M.S., Ph.D., Assistant Dean of Agriculture.

WARREN GAMALIEL HARDING, B.A., M.Ed., Assistant Registrar.

\*SABE McCLAIN KENNEDY, Jr., B.A., M.A., Ph.D., Acting As-  
sistant Dean of Arts and Sciences.

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\*Acting Assistant Dean, September 15, 1952, to June 15, 1953.

LEWIS NORTEN JONES, B.A., M.A., Assistant Dean of Student Life.

NANCY NALL INNIS, B.A., M.Ed., Assistant Dean of Women.

JAMES EDWARD PLATZ, B.A., B.S., in L.S., Assistant Librarian.

VIRGINIA LEE SNELLING, B.A., Assistant Auditor.

JOE WALKER SEAY, B.B.A., Assistant Purchasing Agent.

JOHN GATES TAYLOR, Assistant Auditor.

\*\*ERNEST WALLACE, B.S., M.A., Ph.D., Assistant Dean of Arts and Sciences.

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\*\*On leave of absence, long session of 1952-1953.

#### OFFICE OF THE DEAN OF GRADUATE STUDIES

Room 251 Administration Building

Telephone 5-8541, Extension 412

William Bryan Gates, Ph.D., Dean

Mrs. Monda Hamilton Law, B.A., Secretary

Nancy Davis and Mona Powell, Assistants

## GRADUATE COUNCIL

1952-1953

- WILLIAM BRYAN GATES, Ph.D., Professor of English and Dean of Graduate Studies, Chairman.
- ALBERT BARNETT, Ph.D., Professor of Education and Psychology and Director of the Guidance Center.
- TRUMAN WILDES CAMP, Ph.D., Professor and Head of the Department of English.
- JOHN STEPHEN CARROLL, Ph.D., Professor and Head of the Department of Education.
- WARREN PERRY CLEMENT, M.A., Registrar and Director of Admissions.
- LEWIS MANNING CLINE, Ph.D., Distinguished Professor of Geology.
- JAMES WILLIAM DAVIS, Ph.D., Professor and Head of the Department of Government.
- JOE DENNIS, Ph.D., Professor and Head of the Department of Chemistry and Chemical Engineering.
- MABEL DEANE ERWIN, M.A., Professor and Head of the Department of Clothing and Textiles.
- NEIL CASEY FINE, Ph.D., Professor of Animal Husbandry and Assistant Dean of Agriculture.
- ROBERT CABANISS GOODWIN, Ph.D., Professor of Chemistry and Dean of Arts and Sciences.
- FREEDIS LLOYD MIZE, Ph.D., Professor and Head of the Department of Management.
- CARL COKE RISTER, Ph.D., Distinguished Professor of History.
- GEORGE ARTHUR WHETSTONE, Ph.D., Associate Professor of Civil Engineering.



## GRADUATE FACULTY

This list includes only the regular members of the Graduate Faculty; other staff members are sometimes authorized to give courses in which graduate credit may be earned.

- BYRON ROBERT ABERNETHY, Ph.D., Professor of Government.  
OTTO VINCENT ADAMS, D.Sc., Professor of Civil Engineering.  
VIVIAN JOHNSON ADAMS, M.A., Professor and Head of the Department of Home Economics Education.  
JAMES GEORGE ALLEN, M.A., Professor of English and Dean of Student Life.  
CECIL IRVY AYERS, M.S., Associate Professor of Agronomy.  
ALBERT BARNETT, Ph.D., Professor of Education and Psychology and Director of the Guidance Center.  
RALPH HURD BOND, M.S., Associate Professor of Geology.  
WELDON LEROY BRADSHAW, B.S. in Arch., Professor of Architecture.  
JOHN PAUL BRAND, Ph.D., Associate Professor of Geology.  
CHARLES VICTOR BULLEN, M.S. in E.E., Professor and Head of the Department of Electrical Engineering.  
MARTHA WASHINGTON BUTTRILL, M.A., Assistant Professor of Foods and Nutrition.  
SANNIE CALLAN, M.A., Professor and Head of the Department of Child Development and Family Relations.  
EARL D. CAMP, Ph.D., Assistant Professor of Biology.  
TRUMAN WILDES CAMP, Ph.D., Professor and Head of the Department of English.  
JOHN STEPHEN CARROLL, Ph.D., Professor and Head of the Department of Education.  
RAY LEON CHAPPELLE, M.S., Professor and Head of the Department of Agricultural Education.  
GERALDINE CLEWELL, M.S., Associate Professor of Home Economics Education.  
LEWIS MANNING CLINE, Ph.D., Distinguished Professor of Geology.  
VERNON THOMAS CLOVER, Ph.D., Associate Professor of Economics.  
LEWIS BRISCOE COOPER, Ph.D., Professor of Education.  
WILLIAM MOORE CRAIG, Ph.D., Professor of Chemistry.  
JAMES CECIL CROSS, Ph.D., Professor and Head of the Department of Biology.  
RAYMOND LEON DAVIDSON, Ed.D., Assistant Professor of Education.  
JAMES WILLIAM DAVIS, Ph.D., Professor and Head of the Department of Government.

JOE DENNIS, Ph.D., Professor and Head of the Department of Chemistry and Chemical Engineering.

WILLIAM LYON DUCKER, B.S., Professor and Head of the Department of Petroleum Engineering.

\*ANDERSON HUNTER DUPREE, Ph.D., Assistant Professor of History.

JOSEPH S. DWYER, M.S. in I.E., Professor and Head of the Department of Industrial Engineering.

CHARLES DUDLEY EAVES, Ph.D., Professor of History.

GEORGE OLIVER ELLE, Ph.D., Professor of Horticulture.

MABEL DEANE ERWIN, M.A., Professor and Head of the Department of Clothing and Textiles.

GEORGE K. ESTOK, Ph.D., Assistant Professor of Chemistry and Chemical Engineering.

L. KATHERINE EVANS, M.A., Associate Professor of Education.

NEIL CASEY FINE, Ph.D., Professor of Animal Husbandry and Assistant Dean of Agriculture.

GORDON FULLER, Ph.D., Professor of Mathematics.

STERLING HALE FULLER, Ph.D., Assistant Professor of Government.

RAYMOND ERNEST GARLIN, Ph.D., Professor of Education.

EUNICE JOINER GATES, Ph.D., Professor of Foreign Languages.

WILLIAM BRYAN GATES, Ph.D., Professor of English and Dean of Graduate Studies.

EVERETT ALDEN GILLIS, Ph.D., Associate Professor of English.

HERMAN GLASER, Ph.D., Associate Professor of Physics.

HARRY FREDERICK GODEKE, M.S., Professor of Mechanical Engineering.

HOWARD ELDON GOLDEN, Ph.D., Associate Professor of Marketing.

ROBERT CABANISS GOODWIN, Ph.D., Professor of Chemistry and Chemical Engineering and Dean of Arts and Sciences.

ALAN MURRAY FINLAY GUNN, Ph.D., Professor of English.

J. EVETTS HALEY, M.A., Director of the Institute of Americanism.

THOMAS EARLE HAMILTON, Ph.D., Associate Professor of Foreign Languages.

FRED GEORGE HARBAUGH, D.V.M., Professor of Animal Husbandry.

JAMES FENTON HARDING, M.S. in C.E., Associate Professor of Civil Engineering.

LAURENCE GEORGE HARMON, M.S., Professor of Dairy Manufactures.

HORACE C. HARTSELL, Ed.D., Assistant Professor of Education.

EMMETT ALLEN HAZLEWOOD, Ph.D., Professor and Head of the Department of Mathematics.

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\*On leave of absence.

- GEORGE GAIL HEATHER, Ph.D., Professor of Economics and Dean of Business Administration.
- ELLIS RICHARD HEINEMAN, M.A., Professor of Mathematics.
- JOHN RUSSELL HEITMAN, M.S.J., Professor and Head of the Department of Journalism.
- GENE LeCLAIR HEMMLE, Ed.D., Professor and Head of the Department of Music.
- DYSART EDGAR HOLCOMB, Ph.D., Professor of Chemical Engineering and Dean of Engineering.
- WILLIAM CURRY HOLDEN, Ph.D., Professor and Head of the Department of History, Anthropology, and Sociology, and Director of the Museum.
- CHARLES ERNEST HOUSTON, M.A., Associate Professor of Electrical Engineering.
- LEHMAN CATES HUTCHINS, Ph.D., Professor and Head of the Department of Psychology.
- DOYLE DAVID JACKSON, Ph.D., Professor of Education.
- J. W. JACKSON, M.A., Professor of Government.
- WILLIAM MORLEY JENNINGS, B.S., Professor of Physical Education.
- EDWARD NEWLON JONES, Ph.D., President and Professor of Biology.
- SABE McCLAIN KENNEDY, JR., Ph.D., Assistant Professor of Government and Acting Assistant Dean of Arts and Sciences, 1952-1953.
- OSCAR ARVLE KINCHEN, Ph.D., Professor of History.
- RAMON WALTER KIREILIS, P.Ed.D., Professor and Head of the Department of Physical Education.
- FLORIAN ARTHUR KLEINSCHMIDT, M.Arch., Professor and Head of the Department of Architecture and Allied Arts.
- JAMES E. KUNTZ, Ph.D., Assistant Professor of Psychology.
- MINA WOLF LAMB, Ph.D., Associate Professor of Foods and Nutrition.
- MILTON FREDERIC LANDWER, Ph.D., Professor of Zoology.
- PAUL MERVILLE LARSON, Ph.D., Professor and Head of the Department of Speech.
- THOMAS LUTHER LEACH, M.S., Professor of Agricultural Education.
- SAMUEL H. LEE, Ph.D., Assistant Professor of Chemistry and Chemical Engineering.
- ARCHIE LEROY LEONARD, M.S., Associate Professor of Agricultural Economics.
- IVAN LEE LITTLE, M.A., Assistant Professor of Philosophy.
- THOMAS BROOKS LIVINGSTON, Ed.D., Associate Professor of Education.

ROBERT IVAN LOCKARD, M.S., Associate Professor of Architecture.  
ROY RAYMOND MALE, JR., Ph.D., Assistant Professor of English.  
ELMER LEON McBRIDE, M.S., Professor and Head of the Department of Agricultural Economics.

\*JOSEPH THOMAS McCULLEN, JR., Ph.D., Associate Professor of English.

DONALD McDONALD, M.S., Assistant Professor of Education.  
SETH SHEPARD McKAY, Ph.D., Professor of History.

CHESTER M. McKINNEY, JR., Ph.D., Assistant Professor of Physics.  
FITZHUGH LEE McREE, M.S. in C.E., Professor of Civil Engineering.  
GEORGE PEYTON MECHAM, Ph.D., Associate Professor of Education.

WILLIAM WALTER MERRYMON, Ph.D., Associate Professor of Physics.

JONNIE McCRERY MICHIE, M.A., Professor and Head of the Department of Foods and Nutrition.

FREEDIS LLOYD MIZE, Ph.D., Professor and Head of the Department of Management.

RAY CLIFFORD MOWERY, M.S., Professor and Head of the Department of Animal Husbandry.

JAMES HAROLD MURDOUGH, M.S.E., Professor and Head of the Department of Civil Engineering.

DORIS NESBITT, M.S., Assistant Professor of Home Economics Education.

FRED WAYLAND NORWOOD, Ph.D., Associate Professor of Accounting and Finance.

AARON GUSTAF OBERG, Ph.D., Professor of Chemical Engineering.

WILLIAM MARTIN PEARCE, JR., Ph.D., Associate Professor of History.

ANNAH JOE PENDLETON, M.A., Professor of Speech.

JOHN MOORE PENICK, JR., Ph.D., Associate Professor of Industrial Engineering.

MARTYE POINDEXTER, M.A., Professor and Head of the Department of Applied Arts.

LOUIS JOHN POWERS, M.S. in M.E., Professor and Head of the Department of Mechanical Engineering.

CHARLES BLAISE QUALIA, Ph.D., Professor and Head of the Department of Foreign Languages.

JULES RENARD, Licenciante in Chemical Science, C.E., Assistant Professor of Chemistry and Chemical Engineering.

CARL COKE RISTER, Ph.D., Distinguished Professor of History.

ROBERT LYLE ROUSE, Ph.D., Assistant Professor of Economics.

REGINALD RUSHING, Ph.D., C.P.A., Professor and Head of the Department of Accounting and Finance.

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\*On leave of absence.



- ELIZABETH SKIDMORE SASSER, Ph.D., Assistant Professor of Architecture.
- CLARENCE CARL SCHMIDT, Ph.D., Professor and Head of the Department of Physics.
- JESSE Q. SEALEY, Ph.D., Associate Professor of Biology.
- RAYMOND GILBERT SIDWELL, Ph.D., Professor and Head of the Department of Geology.
- WILLIAM MACKEY SLAGLE, M.A., Professor of Chemistry.
- FRED WINCHELL SPARKS, Ph.D., Professor of Mathematics.
- WENZEL LOUIS STANGEL, M.S., Professor of Animal Husbandry and Dean of Agriculture.
- OSCAR ALLEN ST. CLAIR, B.S. in E.E., Professor of Industrial Engineering.
- PER GUSTAF STENSLAND, Ph.D., Professor of Education and Head of the Adult Education Program.
- RUSSELL WILLIAM STRANDTMANN, Ph.D., Professor of Biology.
- ALFRED BELL STREHLI, M.A., Assistant Professor of Foreign Languages.
- ALAN LANG STROUT, Ph.D., Professor of English.
- RICHARD ARTHUR STUDHALTER, Ph.D., Professor of Botany.
- DONALD J. TATE, Ed.D., Professor and Head of the Department of Business Education.
- HASKELL GRANT TAYLOR, M.A., Professor of Accounting and Finance.
- AGNES ANN TRUE, Ph.D., Associate Professor of Psychology.
- KIRK B. TURNER, M.S., Assistant Professor of Animal Husbandry.
- RALPH SYLVESTER UNDERWOOD, Ph.D., Professor of Mathematics.
- ELO JOE URBANOVSKY, B.S., Professor and Head of the Department of Horticulture and Park Management.
- \*ERNEST WALLACE, Ph.D., Professor of History and Assistant Dean of Arts and Sciences.
- GEORGE FREDERICK WARN, M.S., Assistant Professor of Geology.
- MARGARET WATSON WEEKS, M.S., Professor of Foods and Nutrition and Dean of Home Economics.
- GEORGE ARTHUR WHETSTONE, Ph.D., Associate Professor of Civil Engineering.
- THOMAS FERDINAND WIESEN, M.B.A., Professor and Head of the Department of Economics.
- DEWEY O. WILEY, D.Mus., Professor of Music and Director of Bands.
- JUDDIE JOHNSON WILLINGHAM, Ph.D., Professor and Head of the Department of Dairy Manufactures.
- WARREN WATSON YOCUM, Ph.D., Professor of Horticulture.
- ARTHUR WESLEY YOUNG, Ph.D., Professor and Head of the Departments of Agronomy and Agricultural Engineering.

\*On leave of absence.

## GEOGRAPHICAL AND HISTORICAL STATEMENT

Texas Technological College is a state-supported coeducational institution comprising six major schools or divisions: Agriculture, Arts and Sciences, Business Administration, Engineering, Home Economics, and Graduate. Lubbock, its seat, is a city of about ninety-six thousand inhabitants. It is situated in the Plains area of West Texas at an altitude of more than three thousand feet. Dry, crisp air and sunny days throughout practically the entire year provide a healthful, invigorating climate. Three air lines, two railways, and a network of bus routes make the city easily accessible from all directions.

Graduate work has been offered at Texas Technological College since 1927. In 1935 this work was set apart as the Division of Graduate Studies, and since 1937 the Division has operated as a unit under its own Dean and Council.

### PURPOSE OF THE DIVISION AND THE DEGREES OFFERED

The Division of Graduate Studies was established to provide facilities for advanced study and research in the humanities, the social sciences, and the physical sciences, as well as in more specialized areas of learning. A high grade of scholarly work rather than the fulfillment of mere routine requirements should be the goal of every member of the Division.

Because of the regulations governing them, the graduate degrees offered by Texas Technological College fall into two groups:

#### I

Master of Arts	Master of Science	Doctor of Philosophy
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#### II

Master of Business Administration	Master of Education
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Master of Science in Agriculture

Master of Science in Chemical Engineering  
and Electrical Engineering

Master of Science in Home Economics

Doctor of Education

## GENERAL REGULATIONS

**RESPONSIBILITY OF THE STUDENT.** For graduate students, the publication of information in the Bulletin is considered sufficient notification regarding all of the regulations. Every graduate student should therefore thoroughly familiarize himself with the material in this Bulletin. Failure to do so may lead to complications for which the Division of Graduate Studies cannot assume the responsibility. The General Regulations apply to all degree plans unless exceptions are specifically noted.

**ADMISSION AND ELIGIBILITY FOR ENROLLMENT.** Applicants with a Bachelor's degree from a recognized college or university will be admitted on the basis of a complete transcript of their previous work. Well in advance of registration, the prospective student (including students who hold a Bachelor's degree from Texas Technological College) should make formal application for admission to the Division of Graduate Studies. This application is made at the Office of the Registrar, not at the Office of the Dean of Graduate Studies.

Full-time members of the faculty may not enroll for courses without special permission from the President of the College. No member of the faculty with a rank above instructor is eligible to receive an advanced degree from Texas Technological College.

An undergraduate student who lacks nine semester hours, or less, of graduation and who has at least a "B" average (Grade point average of 2.00 or above) in his major and minor subjects may enroll for courses carrying graduate credit, subject to the approval of the dean of the undergraduate division and the Dean of Graduate Studies. This approval must be obtained at the time of registration; otherwise, no course taken by an undergraduate may ever be counted for graduate credit. Such a student may not register for more than fifteen semester hours, including graduate and undergraduate courses, and he is expected to complete his undergraduate requirements within the academic year in which he first enrolls for graduate courses.

In exceptional instances, a senior may, upon the recommendation of the department concerned, enroll for some of the courses listed as "Primarily for Graduates," but each case will be considered individually.

**PRELIMINARY OUTLINE OF WORK FOR THE MASTER'S DEGREE.** Before registering for any graduate work, the student should secure at the Graduate Office the forms for the preliminary outline of his program and have them filled out by the head of the major and minor departments and leave them at the Graduate Office for checking.

**REGISTRATION.** A few days before registration (See the Calendar at the front of this Bulletin), the student should apply at the office of the Registrar for instructions for registration. At the time of enroll-

ment, the student should have his complete schedule made out and approved by the head of his major department, or by some one designated to act for him, and have each of the individual courses approved by the department which offers it. When all of these approvals have been secured, the student should take his card to the Graduate Office for the Dean's approval. The registration cards of all graduate students and of all students enrolling for any graduate credit must be approved by the Dean of Graduate Studies.

**GRADUATE ADVISERS.** Throughout the first year of graduate work, the head of the student's major department, or some professor designated by the department head, serves as the student's adviser. If he is an applicant for a Master's degree requiring a thesis, a thesis committee will be appointed by the Dean upon the recommendation of the adviser.

The function of the Advisory Committee for applicants for one of the Doctors' degrees is discussed under the special requirements for those degrees.

**PREREQUISITES IN THE MAJOR AND MINOR SUBJECTS.** For full acceptance by the major department, the student must have completed an undergraduate major in that department or at least twelve semester hours of advanced work in it (with the necessary prerequisites for such courses), together with sufficient advanced work in closely allied subjects to bring the total up to the equivalent of a major in that particular department at this institution.

Full acceptance by the minor department requires an undergraduate minor in that field or, normally, twelve hours of undergraduate courses, including six semester hours of advanced work, in it.

Students who cannot satisfy these requirements upon entrance must take sufficient undergraduate leveling work (without graduate credit) to remove their deficiencies.

In certain of the professional curricula, these requirements are somewhat modified. Such modifications are shown in the statement of requirements for the particular degree.

**REQUIREMENTS IN MAJOR AND MINOR SUBJECTS.** Candidates for the Master's degree will ordinarily complete from eighteen to twenty-four semester hours, including the thesis (if any) in the major subject and the remainder in one or two minor subjects. At least six hours must be in a department other than the major. Fewer than six hours will not be considered a minor.

Requirements in majors and minors for the Doctors' degrees will be found in the general material pertaining to those degrees.



**RANK OF COURSES.** Any course listed in this Bulletin may be taken for graduate credit, but in those numbered below 500 the graduate student must do additional work beyond that required of undergraduates. Courses numbered in the 500 series and above are primarily for graduate students. At least nine semester hours of the work credited toward the Master's degree (exclusive of the thesis) must be in 500 courses. It is expected that most of the courses credited toward the Doctor's degree will be in the group numbered 500 and above.

#### **TYPES OF COURSES.**

"Regular Residence Courses" are those which meet on the campus during the normal college hours, either in the long session or the summer session.

"Evening Program Courses" are those which meet on the campus but which are organized to serve the needs of part-time students. They are usually scheduled in the evening or late afternoon or on Saturday. They may be taken by regular students.

"Field Courses" are those in which part of the work is done on the campus and part in the field or at a location offering special facilities.

"Individual Study Courses" are those in which a student works individually, on or off the campus, but with the direction of a professor. Those who enroll in this type of course must present evidence that they are superior students and that they are capable of benefiting from the opportunity for independent study.

"Extension Courses" are those offered through the Division of Extension.

"Correspondence Courses" are also offered through the Division of Extension. Graduate credit cannot be earned through correspondence work.

"Evening Program Courses," "Field Courses," "Individual Study Courses" and "Extension Courses" are considered standard work, but the amount of graduate credit that may be earned in them is limited because of the well-established belief that, no matter how good an individual course may be, graduate students should do a considerable amount of their work in association with other students and other classes, on the campus and near libraries and laboratories.

The regulations concerning the limitation of graduate credit in these types of courses will be found under the heading of "Residence Requirements."

No course of any type may count towards a graduate degree unless it forms part of a logical plan acceptable to the major and minor departments and unless registration for it was approved by the Dean of Graduate Studies.

**GRADES.** The grade average of all work credited toward a graduate degree must be at least "B" (Grade point average of 2.00 or above). No grade less than "C" will be counted.

The grade of "Pr" may be given by a professor when a student's work in a thesis or other research course is satisfactorily in progress at the end of a term or semester. This grade must be replaced by a regular letter grade before final credit is awarded for the work.

The grade of "I" or "Inc" may be given whenever a student's work in a course shows a major deficiency in quantity though not in quality, provided that the deficiency was occasioned by causes beyond the student's control. Within four weeks after the beginning of the next period in residence, the student must initiate a petition for the completing of the work. Failure to do so may result in the grade of "F" on the course. When the grade of "I" or "Inc" stands for one year without action, it may become "F."

**ADDING OR DROPPING COURSES AND WITHDRAWING FROM COLLEGE.** No course may be added or dropped without the approval of the Dean of Graduate Studies. Students who find it necessary to withdraw from college must apply at the office of the Dean of Graduate Studies for official withdrawal blanks.

**CREDIT BY TRANSFER AND EXTENSION.** A maximum of six semester hours of credit toward the Master's degree may be accepted from another graduate school of recognized standing; a maximum of six semester hours of graduate work completed by extension may be credited toward the Master's degree provided the work was done under the direction of a recognized institution, but the combination of transferred credit and that earned by extension cannot exceed six semester hours. Correspondence work may not be credited toward any graduate degree.

Regulations concerning credit toward the Doctors' degrees for work completed elsewhere are given under the special requirements for those degrees.

**RESIDENCE REQUIREMENTS.** In general, each semester hour of successfully completed graduate work represents one week of residence credit; thus, completion of fifteen hours of work in a semester of a long session is credited as fifteen weeks of residence. There are, however, some limitations on the way residence credit may be earned.

The minimum residence requirement for those Masters' degrees listed in Group I (Master of Arts and Master of Science in the sciences and mathematics) is thirty weeks, of which at least fifteen must be earned in "Regular Residence Courses" (See p. 21 of this Bulletin). Credit for the remainder may be earned in "Regular Residence Courses" or by the following methods:

(a) "Evening Program Courses"—a maximum of nine hours of course work

(b) "Field Courses"—a maximum of six hours

(c) "Individual Study Courses"—a maximum of six hours

(d) "Extension Courses" and/or credit transferred from another

graduate school—a maximum of six hours of either or a combination of the two.

Not more than fifteen semester hours of course credit or fifteen weeks of residence credit may be earned by any combination of (a), (b), (c), and (d).

The residence requirements for the professional Master's degrees listed in Group II (See p. 18) are fundamentally the same as those for Group I except that mature students, actively engaged in the profession for which they are seeking additional preparation, may satisfy all of the residence requirements (thirty weeks) by the following methods, subject to the limitations indicated for some types of courses:

- (a) "Regular Residence Courses"—no limit
- (b) "Evening Program Courses"—no limit
- (c) "Field Courses"—a maximum of six hours
- (d) "Individual Study Courses"—a maximum of six hours
- (e) "Extension Courses" and/or credit transferred from another graduate school—a maximum of six hours of either or a combination of the two.

Residence requirements for the Doctors' degrees are discussed under the special requirements for those degrees.

**TIME LIMIT ON WORK FOR THE MASTER'S DEGREE.** All work credited toward the Master's degree must be completed within a period of six calendar years, but for veterans, the period is extended by the length of time they were in military service after beginning graduate work.

**STUDENT LOAD.** Graduate students devoting their full time to their studies may enroll for a maximum of fifteen semester hours of work in a semester or six hours in a six-weeks summer term if any portion of the work is to count for graduate credit. For teaching fellows, assistants, or others employed in part-time positions on or off the campus, the permissible load will be determined by the Dean and the head of the student's major department. For teachers and others employed in full-time duties on or off the campus, the maximum enrollment is for three hours in any semester or summer term if they wish graduate credit for any portion of the work completed in that term or semester.

Any correspondence courses which may be carried to satisfy undergraduate prerequisites and any extension work for which the student is enrolled, whether for graduate credit or not, will be counted as a part of the student's total load. Exceptions may sometimes be made in the case of a course to satisfy the State law in Government or in the case of non-credit work in a language to satisfy the requirements in foreign languages.

**FOREIGN LANGUAGE REQUIREMENTS.** Candidates for the Master of Arts degree and candidates for the Master of Science degree in mathematics and the pure sciences must have a reading knowledge of a foreign language. Satisfactory completion of at least twelve semester hours of

undergraduate work in a single foreign language acceptable to the major department may be considered as satisfying this requirement, but any department may require a language examination.

A foreign language is not required in the programs leading to the Master of Education, Master of Business Administration, or Master of Science in some of the specialized fields.

Applicants for the degree of Doctor of Philosophy must pass a reading examination in at least two modern foreign languages, usually French and German. Further details will be found under the special requirements for the Doctor of Philosophy degree.

**STATE OF TEXAS REQUIREMENT IN GOVERNMENT.** By an act of the Texas Legislature, a student who enters a state-supported college after September 1, 1937, must satisfactorily complete a course in State and Federal Government before he may receive a degree. Graduate students should consult the Dean about this requirement.

**GRADUATE RECORD EXAMINATION.** After September 1, 1953, the Graduate Record Examination (Aptitude Test) will be required as a part of the preliminary or qualifying examination for the Doctor's degree. It is contemplated that after September 1, 1954, this examination may be required as a part of the final or comprehensive examination for the Master's degree. Students who have once taken this examination, either here or elsewhere, will not be required to repeat it.

Until September 1, 1954, there will be no charge for this examination; after that date, however, each applicant will defray the cost of the examination as set by the Educational Testing Service, which prepares and scores the tests.

**CANDIDACY FOR THE MASTER'S DEGREE.** Admission to the Division of Graduate Studies does not automatically make a student a candidate for an advanced degree. A formal application for admission to candidacy must be made at the Dean's office when the applicant has completed twelve semester hours, or a little more, in residence in his major and minor; the application must be made at least twelve weeks before graduation in the long session or at least nine weeks before an August commencement. Before this application can be approved and the student admitted to candidacy, he must have completed the following stages in his work: (a) He must have at least a "B" average (Grade point average of 2.0 or above) in all graduate work taken up to the time of application; (b) He must have satisfied the foreign language requirement—if any; (c) His graduate work up to this point must be acceptable in quality and quantity to the major and minor departments; and (d) The thesis subject (if a thesis is required) must have been approved by the adviser.

Admission to candidacy for the Doctors' degrees is discussed under the requirements for those degrees.



**STATEMENT OF INTENTION TO GRADUATE.** Not earlier than twelve weeks and not later than nine weeks prior to the proposed date of graduation, every candidate for the Master's degree must file at the Graduate Office a "Statement of Intention to Graduate." No candidate's name will be placed on the "Tentative List of Graduates" for any commencement unless this statement has been received at the Graduate Office within the time limits specified. This list is made up solely on the basis of the receipt of the "Statement of Intention to Graduate." Names are not automatically carried forward from one graduation to the next. Candidates who fail to graduate at the time designated in the "Statement" are required to file a supplementary notice for any subsequent graduation.

**FINAL EXAMINATIONS FOR THE MASTER'S DEGREE.** Before being recommended for graduation, every candidate for a Master's degree is required to pass a final examination in his major subject and in his minor subject(s)—unless he has a composite minor, in which case, the examinations in the courses comprising the composite minor will suffice. See page 24 for the statement regarding the Graduate Record Examination.

The final examinations for the Master's degree are given once each term or semester; they may be oral or written or both at the discretion of the department concerned. A student who fails to pass these examinations may repeat them but not until the next regularly scheduled examination period.

Every one receiving a Master's degree after June 1, 1953, is required to pass such examinations before graduation.

**THESIS REQUIREMENTS FOR THE MASTER'S DEGREE.** A thesis is required of candidates for all Masters' degrees except Master of Education, in the program for which the thesis is optional.

Research leading to the thesis is supervised by a committee appointed by the Dean upon the recommendation of the head of the student's major department or the professor designated to act as the adviser. Primary responsibility for the direction of the thesis rests upon this adviser, who is chairman of the thesis committee, but he and the student should consult frequently with the other members of the committee.

The student should secure at the Graduate Office the mimeographed instructions for the preparation of the manuscript of the thesis.

A complete typewritten draft of the thesis, in a form acceptable to all members of the committee and bearing their written approval, must be submitted to the Dean at least thirty days before a long-session commencement or at least twenty days before a summer-session commencement. Failure to comply with these regulations will be considered grounds for rejection of the thesis.

Not later than five days before graduation, at least three copies of the final typewritten version of the thesis, signed by each member of

the committee, must be presented to the Dean. One of these copies is for the major department; the original or ribbon copy and one carbon copy are for the Library. Any other copies needed by the candidate should be arranged for at the time the three official copies are being typewritten.

At the time the copies of the thesis are submitted to the Dean, the student will pay the fee for binding the thesis. No candidate will be certified for graduation until all of these requirements have been satisfied.

DEPARTMENTAL REQUIREMENTS. Subject to the approval of the Dean, a department may impose any additional requirements deemed necessary, such as a qualifying examination for admission to candidacy for the Master's degree, special reading assignments, and examinations, oral or written or both.

## SPECIAL REQUIREMENTS FOR THE VARIOUS DEGREES

Students whose undergraduate preparation is not adequate for their particular graduate program will be required to complete the necessary undergraduate leveling work.

### MASTER OF ARTS AND MASTER OF SCIENCE

**Prerequisite:** A Bachelor's degree with sufficient undergraduate preparation in the major and minor subjects. See page 20 of this Bulletin for the general statement concerning prerequisites in the major and minor.

**Required:** A minimum of thirty semester hours of work, from eighteen to twenty-four of which, including the thesis (631 and 632), will be in the major subject. The student may have one minor or two, but at least six semester hours must be completed in some subject which lies outside the major department and in which the student has the prerequisites. A reading knowledge of a foreign language is required. See page 23 of this Bulletin.

As a general policy, the Master of Arts degree will be conferred on candidates who successfully complete major programs in Economics, Education, English, Government, History (Anthropology, Sociology), Psychology, Spanish, or Speech; and the Master of Science degree will usually be conferred on those who complete majors in Biology, Chemistry, Geology, Mathematics, or Physics.

### MASTER OF BUSINESS ADMINISTRATION

**Prerequisite:** A Bachelor of Business Administration degree or its equivalent.

**Required:** A minimum of thirty semester hours of work, including the thesis, 631 and 632.

### MASTER OF EDUCATION

For the professional degree of Master of Education, the student may choose any one of the three plans outlined below, with a major in Education, Agricultural Education, Business Education, Home Economics Education, Music Education, or (at a date to be determined later) Physical Education.

The programs in Agricultural Education, Business Education, Home Economics Education, Music Education, and Physical Education are designed for teachers in these various fields.

The Major in Education is based upon the Core Curriculum in Professional Education which leads to the degree of Bachelor of Science in Education or its equivalent, this same core extending through the successive stages of graduate work. The program is intended for further

development of teacher competence, with part of the work toward and additional work beyond the Master's degree being offered for particular certification endorsements. The competency and certification areas are: (1) Elementary Education, (2) Secondary Education, (3) Adult Education, (4) Higher Education, (5) Visiting Teacher, (6) Counseling and Guidance, (7) Supervision and Curriculum Development, and (8) Administration. The Education courses are selected from one or more areas according to the degree plan approved for the individual student by the Department of Education and the Graduate Dean.

**PLAN I—WITH THESIS—Required:** A minimum of thirty semester hours of graduate work, eighteen of which, including the thesis (631 and 632), are to be in the major subject, and twelve of which are to be outside any field of education. These twelve hours of work may be completed in one or two conventional graduate minors, or they may be taken as a composite minor from the list of courses shown below. The courses in Group A of the Composite Minor are open to all majors; those in Group B are limited to students seeking certification in the Elementary Area.

**PLAN II—WITH RESEARCH COURSES—Required:** A minimum of thirty semester hours of graduate work, eighteen of which, including the two research courses taken in lieu of the thesis, are to be in the major subject, and twelve of which are to be outside any field of education. These twelve hours of work may be completed in one or two conventional graduate minors, or they may be taken as a composite minor from the list of courses shown below. The courses in Group A of the Composite Minor are open to all majors; those in Group B are limited to students seeking certification in the Elementary Area.

The research courses taken in lieu of the thesis are as follows: For Education: Ed. 531 and 5311; for Agricultural Education: Ag. Ed. 531 and Agronomy 535; for Business Education: Bus. Ed. 531 and 534; for Home Economics Education: Home Ec. Ed. 534 and 536; and for Music Education: Mus. Ed. 530 and 531.

**PLAN III—WITHOUT THESIS OR RESEARCH COURSES—Required:** A minimum of thirty-six semester hours of graduate work, eighteen of which are normally to be in the major subject. Nine of the remaining hours of work will be completed in a conventional graduate minor outside any field of education, or they may be taken as a composite minor from the list of courses shown below. The rest of the work may be selected from this same list or from any graduate courses, outside the major subject, for which the student has the prerequisites. In exceptional circumstances, a student may be permitted to complete a maximum of twenty-four semester hours in the major subject, in which case, six to nine hours will be completed in a conventional graduate minor outside any field of education or taken as a composite minor from the list of courses shown below. The rest of the work may be selected from this same list or from any graduate courses, outside the major subject, for which the student has the prerequisites. The courses in



Group A of the Composite Minor are open to all majors; those in Group B are limited to students seeking certification in the Elementary Area.

## LIST OF COURSES COMPRISING THE COMPOSITE MINOR FOR THE DEGREE OF MASTER OF EDUCATION

### GROUP A

Open to All Applicants for the Degree of Master of Education

- Allied Arts 4350. Modern World Art.
- Anthropology 4350. The Origin of Social Customs and Institutions.
- English 4350. Appreciation of the Literature of Western Civilization.
- Government 4350. Political Ideologies and Issues in the Modern World.
- History 4350. Patterns of World History.
- Language 4350. Language Culture in the Humanities.
- Music Literature 4350. Music in General Culture.
- Philosophy 4350. Structure and Dynamics of Philosophical Thought.
- Speech 4350. History of Speech and the Theater.

### GROUP B

Open Only to Students Seeking Certification in the Elementary Area

- Allied Arts 4335. Art in Elementary Education.
- Applied Arts 4335. Theory and Practice of Art for Elementary Teachers.
- Clothing and Textiles 4335. Textile Trends and Resources for Elementary Teachers.
- Economics 4335. Human Geography.
- English 4335. English Grammar, Composition, and Literature for Elementary Teachers.
- Foods and Nutrition 4335. Nutrition Trends and Resources for Elementary Teachers.
- History 4335. History Appreciation for Elementary Teachers.
- Music Education 4335. Music for Children.
- Spanish 4335. A Study of Spanish Civilization for Elementary Teachers.
- Speech 4335. Basic Speech for Elementary Teachers.

## MASTER OF SCIENCE IN AGRICULTURE

Prerequisite: A Bachelor of Science in Agriculture or its equivalent.

Required: A minimum of thirty semester hours of work, including the thesis, 631 and 632.

## MASTER OF SCIENCE IN CHEMICAL ENGINEERING OR ELECTRICAL ENGINEERING

Prerequisite: A Bachelor of Science in the appropriate field of engineering or its equivalent.

Required: A minimum of thirty semester hours of work, including the thesis, 631 and 632.

## MASTER OF SCIENCE IN HOME ECONOMICS

Prerequisite: A Bachelor of Science in Home Economics or its equivalent.

Required: A minimum of thirty semester hours of work, including the thesis, 631 and 632.

## DOCTOR OF PHILOSOPHY AND DOCTOR OF EDUCATION

The degrees of Doctor of Philosophy and Doctor of Education are awarded in recognition of superior attainments in scholarship and capacity for independent thinking. Hence, only students with exceptional records should undertake work for the doctorate. Major work leading to the degree of Doctor of Philosophy is offered in American Civilization, Chemistry, Education, English, Geology, and History. The degree of Doctor of Education provides a major in professional education with study in closely related fields.

**ADMISSION.** The general requirement for admission to advanced graduate study is the possession of the Bachelor's degree from a recognized college or university and an undergraduate record showing promise of success in independent study. The possession of the Master's degree is desirable but not a requirement.

Admission as indicated above places the student in the category of "Unclassified Graduate Students." Those who wish to be considered applicants for admission to doctoral work must file at the beginning of their advanced graduate work an application for admission to this type of study. The blanks for this purpose are to be obtained at the Graduate Office. No one is considered to be working on the doctorate at Texas Technological College until this application has been approved by the major and minor departments and the Dean of Graduate Studies.

Applicants for admission to doctoral work may be required to pass a general examination designed to test their fitness for this type of study and such departmental examinations as may be deemed necessary. This general examination may be repeated only by special permission of the Dean. It is not to be confused with the regular preliminary or qualifying examination for admission to candidacy, required of all applicants before they may become *candidates* for a Doctor's degree.

Students whose applications for admission to doctoral work are not approved may be advised not to attempt to work toward the Doctor's

degree, but they may remain in the Division of Graduate Studies as "Unclassified Graduate Students" as long as they wish.

**FIELDS OF STUDY.** The applicant for the degree of Doctor of Philosophy or Doctor of Education will devote most of his time to his major subject, but he must have a minor subject of at least twelve hours of course work in a department other than the major.

**PROGRAM OF WORK.** Although an applicant for the Doctor of Philosophy or the Doctor of Education degree is not required to complete his work in a series of successive years, and although no definite number of semester hours can be specified for either degree, the general program of work for the Ph.D. or the Ed.D. should be distributed somewhat according to the following plan:

**First Year Beyond the Bachelor's Degree:** Complete from twenty-four to thirty semester hours of work in the major and minor subjects; and (if an applicant for the Ph.D.) satisfy the requirements in foreign languages.

**Second Year:** Complete from twenty-four to thirty additional hours in the major and minor subjects; take the preliminary or qualifying examinations; and begin preliminary work on the dissertation.

**Third Year and Beyond:** Finish whatever course work may be recommended by the Advisory Committee; complete the dissertation; and take the final examinations.

It must be emphasized that doctoral work is highly individualized and that the requirements cannot be stated merely in terms of semester hours or years of study.

**RESIDENCE REQUIREMENTS.** A minimum of three years of graduate study beyond the Bachelor's degree is required for the degree of Doctor of Philosophy or Doctor of Education. Work completed for the Master's degree is considered one of these years provided it forms part of a logical sequence in the entire program.

Work completed at another graduate school will be considered for residence and course credit on the recommendation of the departments concerned and credit allowed accordingly. If the work was completed after the attainment of the Master's degree, credit toward the Doctor's degree will be allowed only if the work was done at an institution having a doctoral program in that particular field.

In all cases, regardless of the amount of work completed elsewhere, the applicant for the Ph.D. or the Ed.D. must complete at least one year of residence work beyond the Master's degree at Texas Technological College.

**ADVISORY COMMITTEE.** Shortly after the beginning of the student's second year of graduate work beyond the Bachelor's degree or at a time suggested by the major and minor departments, an Advisory Committee will be appointed to guide the applicant through the remainder of his program. This committee, appointed by the Dean on the recommendation of the departments concerned, will include representatives from the major

and minor departments. It will hold meetings with the applicant as often as may be desirable and will, from time to time, report to the Dean on the applicant's progress.

**PRELIMINARY OR QUALIFYING EXAMINATIONS FOR ADMISSION TO CANDIDACY.** Early in the second year of graduate work beyond the Bachelor's degree or at a time suggested by the major and minor departments, the applicant will undergo the preliminary or qualifying examinations, which help to determine whether he is to be admitted to candidacy for the Doctor's degree. The major portion of the examination will be a written test of at least six hours' duration on the major and minor subjects, the distribution of this time being determined by the extent of the two fields. Approximately one half of the examination in both the major and the minor will be of the essay or discussion type. If the student's advisory committee recommends the acceptance of the work, it will be reviewed by a special committee of the Graduate Council or other professors. Only those students satisfying both the advisory committee and the reviewing committee will be considered for admission to candidacy. Departments may require supplementary oral examinations at their discretion. See page 24 for statement regarding the Graduate Record Examination.

Applicants whose preliminary or qualifying examinations are not satisfactory may not undertake them again until the lapse of one full semester or at least fifteen weeks.

**ADMISSION TO CANDIDACY FOR THE DOCTOR'S DEGREE.** When the applicant for the degree of Doctor of Philosophy or Doctor of Education has demonstrated his intellectual maturity and scholarship by satisfying all of the requirements shown above, and the special requirements for his particular program of study, the chairman of the advisory committee will make a formal written request to the Dean that the applicant be admitted to candidacy for the particular Doctor's degree which is being sought.

This request will include a statement about the applicant's course work, the quality of the preliminary or qualifying examinations, the status of the research on the dissertation, and a general estimate of the applicant's fitness for further graduate study. This request must be approved by the Dean and the Graduate Council before the applicant can be admitted to candidacy for a Doctor's degree.

**THE DISSERTATION.** The subject of the dissertation must be approved by the advisory committee and the Dean at least eight months before the candidate expects to receive his degree.

The dissertation should demonstrate a mastery of the techniques of research, a thorough understanding of the subject matter, skill in organizing and presenting the material, and an adequate command of the English language. It must also reveal the candidate's ability to attack a problem with independence and sound judgment, and it must be a contribution to learning in the field within which it falls, including a significant re-evaluation of existing data. The work on the dissertation



will be constantly under the supervision of the advisory committee and any other professors considered necessary.

Not later than one month before graduation, three typewritten copies of the dissertation, in an acceptable form and ready for binding, must be approved by the advisory committee and the Dean. Three typewritten copies of an abstract, about two thousand words in length, must accompany the manuscript and must also have the approval of the advisory committee and the Dean.

The cost of binding the three typewritten copies of the dissertation, of preparing other reproductions that may be considered necessary, and other fees incident to graduation must be paid before the candidate will be certified to receive his degree.

**THE FINAL EXAMINATIONS.** Final examinations are required of all candidates for the degree of Doctor of Philosophy or Doctor of Education. The written examination will be similar to the preliminary or qualifying examination for admission to candidacy, and, as in that examination, the papers will require the approval of both the advisory committee and the special reviewing committee. The oral examination will ordinarily cover the field of the dissertation.

Under exceptional circumstances, and with the approval of the Dean, a candidate may be permitted to take the written part of the final examination before the dissertation is quite finished.

**OTHER REQUIREMENTS.** In addition to the requirements set forth above, which apply to both the Doctor of Philosophy and the Doctor of Education, certain other details should be noted in regard to each of these degrees.

## SPECIAL REGULATIONS CONCERNING THE DOCTOR OF PHILOSOPHY

**RESIDENCE REQUIREMENTS.** The "year of residence" referred to above is interpreted to be based on the successful completion of from twelve to fifteen hours of graduate work in each of two semesters of a long session. The terms of residence of teaching fellows and assistants will be adjusted in accordance with their duties, but their period of residence will, in general, be two years as a minimum.

In meeting the additional residence requirements for the degree of Doctor of Philosophy, the applicant may secure residence credit for work completed in special types of courses ("Evening Program Courses," "Field Courses," and "Individual Study Courses") only to the extent of fifteen semester hours or fifteen weeks. Not more than six of these hours may be in "Field Courses" or in "Individual Study Courses."

**REQUIREMENTS IN FOREIGN LANGUAGES.** A satisfactory reading knowledge of at least two foreign languages is required of every applicant for the Ph.D. degree. The examination in these languages, covering

critical or historical material in the student's major subject, are given by the Department of Foreign Languages of Texas Technological College. French and German are the usual languages, but if a student's research would benefit by the substitution of another language for one of these, the Graduate Council may, on the recommendation of the student's major department, authorize such a substitution.

In all instances, the regulations of the Division of Graduate Studies and the general requirements for Doctors' degrees will prevail.

## SPECIAL REGULATIONS CONCERNING THE DOCTOR OF EDUCATION

**RESIDENCE REQUIREMENTS.** The "year of residence" referred to above, representing the completion of at least twenty-four semester hours of graduate work under the direction of Texas Technological College, may be fulfilled in the long session or summer sessions. On the specific recommendation of the Head of the Department of Education, a maximum of fifteen semester hours may be completed in "Evening Program Courses," "Field Courses," and "Individual Study Courses."

It is expected that most of the work for the degree of Doctor of Education will be completed in long sessions or summer sessions. However, because of the professional nature of the program and the fact that applicants for this degree are mature people, actively engaged in school work, each case is considered individually so far as the total residence requirement is concerned.

**THE NATURE OF THE PROGRAM.** Students interested in the Doctor of Education degree, and identified with special reference to their intellectual maturity and capacity for independent thinking, are accepted for advanced graduate work. The scope and sequence of the work for these selected students are designed so as to be most advantageous for the development of their general and special abilities in terms of responsibility and leadership.

**DIFFERENTIATION BETWEEN THE ED. D. AND THE PH.D. IN EDUCATION.** While for the most part there is a common core of the professional education curriculum which extends from the undergraduate work through the successive stages of the graduate program and which is required of both the Ed. D. and the Ph.D. candidates, there is a differentiation between the two programs.

This differentiation is based on several factors. The Ph.D. is considered chiefly a research degree; the Ed. D. is primarily a professional degree, though both are partly research and partly professional. Another differentiation is an analysis, based on a conference between the Head of the Department of Education and the Dean of Graduate Studies, of the needs of the individual student.

Among other factors distinguishing the two programs is the interest of the student in the two foreign languages which are required of appli-

cants for the Ph.D. degree and his need for them, or his interest in advanced statistical and analytical procedures, which are required of applicants for the Ed.D., and his need for these disciplines.

Applicants are urged to confer with the Head of the Department of Education and the Dean of Graduate Studies regarding their choice between the two programs.

#### BASIC REQUIREMENTS FOR THE DEGREE OF DOCTOR OF EDUCATION.

The basic requirements for the degree of Doctor of Education are the same as those for the Doctor of Philosophy with a major in Education. In general, the program consists of three stages, at all points of which the student's program is under the supervision of the Head of the Department of Education and the Dean of Graduate Studies.

1. The first stage is the achievement of the Master's degree in Education or its equivalent.

2. During the second stage of the graduate work, emphasis is placed upon the importance of the student's securing a thorough and unified understanding of the whole field of professional education and whatever minor subjects he may have selected. The basic Education course for the second stage is the "General Education Seminar" (5351), which is required of all graduate students in Education.

In addition to the work in the "General Education Seminar," the second stage of graduate study provides an opportunity for extending the broad base of general education through work in other divisions and departments of the college and through study in special seminars, the selection of which will be determined in part by the student's interest in a particular certificate endorsement or a special field of education.

Among such special seminars are these: history and philosophy, comparative education, educational psychology, educational sociology, elementary education, secondary education, the junior college, educational administration, supervision and curriculum development, audio-visual education, health education, counseling and guidance, and others which may be developed as the need arises. Admission to any of the special seminars is through approval of the admissions committee of the education faculty and the faculty committee assigned to the particular seminar.

3. The third stage of the graduate program is normally devoted to the intensive action research and documentary research culminating in the Doctor's dissertation. A student is not admitted to this stage of the work until he has secured from the admissions committee of the education faculty and the Dean of Graduate Studies approval of the dissertation subject and of the graduate work which has been completed.

In all instances, the regulations of the Division of Graduate Studies and the general requirements for Doctors' degrees will prevail.

## GENERAL INFORMATION

## FEES AND DEPOSITS

All fees and deposits are payable in full at the time of registration, and a student is not considered enrolled in the college until he has paid them. All checks, drafts, and money orders are accepted subject to final payment. The student is referred to the General Catalog for further details about fees.

REGISTRATION FEE FOR RESIDENTS OF TEXAS.\* For students enrolled for twelve or more semester hours, the registration fee is \$25.00 each semester. For those enrolled for fewer than twelve hours, the fee is charged as follows:

For 11 semester hours \$23.50	For 7 semester hours \$15.50
10 semester hours \$21.50	6 semester hours \$13.50
9 semester hours \$19.50	5 semester hours \$11.50
8 semester hours \$17.50	4 semester hours \$ 9.50
3 semester hours \$7.50	

REGISTRATION FEE FOR NON-RESIDENTS OF TEXAS.\* Non-resident students are required to pay a registration fee of \$150.00 per semester of the long session. Non-resident students enrolled for fewer than twelve semester hours will be charged at the rate of \$12.50 per semester hour for which they enroll.

REGISTRATION FEE FOR EVENING PROGRAM COURSES. Students enrolling only in the Evening Program are charged at the rate of \$10 per semester for each course carrying three semester hours' credit or less; for each course carrying four hours' credit, the fee is \$12. All Evening Program students are required to make the general property deposit of \$7. If they register for a laboratory course, they are required to pay the customary laboratory fee.

REGISTRATION FEE FOR FIELD COURSES AND INDIVIDUAL STUDY COURSES. Students enrolling only for Field Courses and/or Individual Study Courses are charged at the rate indicated in the table shown above in the second paragraph if they are residents of Texas. The fee for non-residents is shown in paragraph three above. All students enrolled for

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\* A "resident of the State" may be defined as a person who has maintained his legal residence in Texas for at least twelve months prior to his enrollment in Texas Technological College, or, if a minor, one whose family has maintained legal residence in the State for at least this length of time. Prospective graduate students whose status is not clearly defined by this statement should consult the General Catalog or write to the Director of Admissions for a clarification of their legal residence.



Field Courses or Individual Study Courses are required to make the general property deposit of \$7. If they register for a laboratory course, they are required to pay the customary laboratory fee.

The Master's thesis and the Doctor's dissertation are considered Individual Study Courses when the student enrolls for no work other than the thesis or dissertation.

**VISITOR'S FEE.** A fee of \$5.00 for each course is required for the privilege of attending courses as a visitor. No credit may be obtained from courses audited in this manner. Permission to audit courses is not granted in the Evening Program, but students may register for non-credit by paying the regular Evening Program registration fees.

**LATE REGISTRATION FEE.** Any student who fails to register and pay fees within three days of the regular registration period shall be required to pay an additional service charge of \$2.00.

**GENERAL PROPERTY DEPOSIT.** Each student enrolled in the college must make a general property deposit of \$7.00. This deposit is subject to charges for property loss or damages or breakage or violations of rules in the library or laboratories. If the charges incurred for any semester reduce the deposit by fifty per cent, the student, upon notice from the Auditor, will be required to restore the deposit to its original amount by paying the charges at once; pending payment, no credit will be allowed on the work of that semester or term, and the student will be ineligible to re-enter college. This deposit, less any charges against it, will be returned to the student at the end of his career as a student in Texas Technological College.

**LABORATORY FEES.** For all courses in which the combined credit of lecture and laboratory is from one to three semester hours, a laboratory fee of \$2.00 is charged for each semester. For courses in which the semester credit is four hours or more, the laboratory fee is \$4.00 per semester.

**GRADUATION FEE.** The graduation fee is \$5.00. After a student's diploma has been ordered, there can be no refund of this fee even if the candidate does not graduate. The fee will have to be paid again for a subsequent graduation.

**STUDENT HEALTH AND ACTIVITY FEE.** Pursuant to an act of the Texas Legislature,\* each student is required to pay a health and activity fee of \$30.00 per year, payable \$15.00 per semester. This fee covers recreational activities, health and infirmary service (see Health Service), student publications, admissions to intercollegiate athletic contests and to the programs on the Artists' Course.

\* Fortieth Legislature, General Session. Amended Fiftieth Legislature, General Session. Subject to change by subsequent sessions of the legislature.

STUDENT HEALTH SERVICE. For details about the Health Service, see the General Catalog.

## FELLOWSHIPS AND SCHOLARSHIPS

A number of graduate assistantships and teaching fellowships are available. Prospective graduate students are invited to correspond with the head of the department in which they plan to do their major work.

In connection with graduate study in Counseling and Guidance (a program offered jointly by the Departments of Education and Psychology), several assistantships in personnel work are available to both men and women students. Information regarding these positions may be secured by addressing the Offices of the Deans of Student Life.

## HOUSING ACCOMMODATIONS

The college owns and operates eight dormitories with a normal capacity of almost three thousand students. Charges for room and board vary with the cost of living and are subject to change without notice. Inquiries regarding dormitory accommodations should be addressed to Mr. H. L. Burgess, Office of Dormitory Reservations.

Information regarding living accommodations off the campus may be obtained from the Office of the Dean of Women and the Office of the Assistant Dean of Student Life.

## THE LIBRARY

The Library of Texas Technological College, erected in 1937, provides two large reading rooms and three special reading rooms for students. Graduate students may secure individual study carrells in the stacks, and a few small private study rooms are available for the use of those graduate students who are writing doctoral dissertations.

At the beginning of the session of 1952-53, the Library holdings consisted of 101,680 catalogued volumes, 24,915 periodicals, and 280,887 documents. Approximately ten thousand items are being added each year.

The Southwest Collection, which is housed in a separate room on the second floor, was established for the acquisition and preservation of materials of particular interest in this region. It includes documents and manuscripts, catalogued volumes, many not obtainable in other Texas libraries, and a large collection of early Texas newspapers on microfilm, a gift of Lewis W. McNaughton of Dallas. The archive material includes a group of papers connected with the estate of James Bowie, given to

the Library by the late Senator Arthur P. Duggan of Littlefield, Texas; a collection of records of the Matador Land and Cattle Company, a gift of Maurice Reilly; and a collection of records of the Spur Ranch, given by President Emeritus Clifford B. Jones. With the aid of several residents of Spur, Texas, a file of the *Texas Spur* from 1909 to 1940 has been secured for this collection.

The Library is open from 8 A.M. to 10 P.M., Monday through Friday, and from 8 A.M. to 5 P.M. on Saturday. During the summer session it is open from 7:30 A.M. to 9:30 P.M., Monday through Friday, and from 7:30 A.M. to 4:30 P.M. on Saturday. The Library is closed on Sundays and holidays.

## DEPARTMENTS AND DIVISIONS OF INSTRUCTION

Not all of the courses shown in this Bulletin are offered every year; some are given every other year, and some only every three or four years. The class schedule, published just before the opening of each term or semester, indicates the particular courses to be offered and the hours at which they meet.

The college reserves the right, however, to cancel any scheduled course or to withdraw any course or program from the list of graduate offerings if the best interests of the institution require such action.

Students who wish detailed descriptions of the courses and further statements about prerequisites for them should request from the Registrar a copy of the General Catalog. However, since each course listed on a student's schedule must be approved by an official representative of that department, and the whole program of courses must be approved by the head of the major department and the Dean of Graduate Studies, the brief course description employed in this Bulletin will usually be adequate for registration purposes.

In all departments offering major work for the Master's degree, the Master's Thesis is listed as course No. 631-2; it carries six semester hours' credit.

While working on the doctoral dissertation, candidates for the Doctor's degree will enroll for course No. 731, 732 (Research), which may be repeated for credit as many times as the student's advisory committee may require.

For bookkeeping purposes, final registration for the doctoral dissertation will be under course No. 831-2.

## AGRICULTURE

Dean W. L. Stangel, Graduate Chairman  
Assistant Dean N. C. Fine, Vice-Chairman

Professors Chappelle, Elle, Fine, Harbaugh, Harmon, Leach, McBride,  
Mowery, Stangel, Urbanovsky, Willingham, Yocum, and Young  
Associate Professors Ayers and Leonard  
Assistant Professor Turner

Courses Applicable to the Degree of Master of Science in Agriculture

## AGRICULTURAL ECONOMICS

- 411, 412. AGRICULTURAL ECONOMICS SEMINAR. Cr. 1, each.  
Mr. McBride.
- 421. LAND ECONOMICS. Cr. 2. Mr. Leonard.
- 422. AGRICULTURAL PRICES AND FORECASTING. Cr. 2.
- 425. FARM LAWS. Cr. 2. Mr. Leonard.



- 431. LIVESTOCK MARKETING. Cr. 3.
- 433. FARM MANAGEMENT AND RECORDS. Cr. 3. Mr. Leonard.
- 434. ADVANCED FARM MANAGEMENT. Cr. 3. Mr. Leonard.
- 435. INTERNATIONAL AGRICULTURAL ECONOMICS. Cr. 3.  
Mr. McBride.
- 436. MARKETING DAIRY PRODUCTS. Cr. 3.
- 437. FARM APPRAISAL AND FINANCE. Cr. 3.
- 511. PROBLEMS. Cr. 1.
- 531. PROBLEMS IN LAND USE. Cr. 3. Mr. Leonard.
- 533. MARKETING PROBLEMS. Cr. 3.
- 534, 535. RESEARCH IN AGRICULTURAL ECONOMICS. Cr. 3, each.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### AGRICULTURAL ENGINEERING

- 421. TERRACING. Cr. 2.
- 422. IRRIGATION PRACTICES. Cr. 2.
- 425. AGRICULTURAL ENGINEERING PROBLEMS. Cr. 2.
- 431. FARM BUILDINGS. Cr. 3.
- 432. LAND MAPPING AND MEASUREMENT. Cr. 3.
- 433. ADVANCED FARM SHOP. Cr. 3.
- 434. ADVANCED FARM MACHINERY. Cr. 3.
- 435. METHODS IN FARM SHOP. Cr. 3.
- 436. FARM MACHINERY EVALUATION. Cr. 3.

### AGRONOMY

- 421. COTTON AND OTHER FIBER CROPS. Cr. 2. Mr. Ayers.
- 422, 423. SOIL MANAGEMENT. Cr. 2, each. Mr. Young.
- 424. ADVANCED CROP JUDGING AND GRAIN GRADING. Cr. 2.  
Mr. Ayers.
- 430. AGRONOMY PROBLEMS. Cr. 3. Staff.
- 431. PLANT BREEDING AND IMPROVEMENT. Cr. 3. Mr. Ayers.
- 434. SOIL CONSERVATION AND LAND USE PLANNING. Cr. 3.
- 435. SOIL MORPHOLOGY AND GENESIS. Cr. 3.
- 436. SOIL CHEMISTRY. Cr. 3. Mr. Young.
- 437. RANGE MANAGEMENT. Cr. 3.
- 439. SOIL MICROBIOLOGY. Cr. 3. Mr. Young.
- 4310. ADVANCED RANGE MANAGEMENT. Cr. 3.
- 441. PLANT PRODUCTION. Cr. 4.
- 512, 513, 514. AGRONOMY SEMINAR. Cr. 1, 2, or 3. Staff.
- 531, 532, 533. AGRONOMY PROBLEMS. Cr. 3, 6, or 9. Staff.
- 535. RESEARCH METHODS. Cr. 3. Mr. Young.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### ANIMAL HUSBANDRY

- 411. ANIMAL HUSBANDRY SEMINAR. Cr. 1. Staff.
- 4111. DAIRY HUSBANDRY SEMINAR. Cr. 1.

- 412. DAIRY CATTLE BREEDING. Cr. 1. Mr. Harbaugh.
- 420. CLASSIFICATION AND GRADING MEATS. Cr. 2.
- 425. HORSE PRODUCTION. Cr. 2. Mr. Harbaugh.
- 427. SWINE PRODUCTION. Cr. 2.
- 429. ADVANCED DAIRY CATTLE PRODUCTION. Cr. 2.
- 431. BEEF CATTLE PRODUCTION. Cr. 3. Mr. Stangel.
- 432. ANIMAL BREEDING. Cr. 3. Mr. Fine.
- 433. SHEEP AND WOOL PRODUCTION. Cr. 3. Mr. Mowery.
- 435. DAIRY CATTLE PRODUCTION. Cr. 3.
- 436. ADVANCED ANIMAL NUTRITION. Cr. 3. Mr. Turner.
- 438. RANGE MANAGEMENT. Cr. 3.
- 531, 532. ADVANCED ANIMAL HUSBANDRY. Cr. 3, each. Staff.
- 533. ANIMAL HUSBANDRY RESEARCH. Cr. 3. Staff.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### DAIRY MANUFACTURES

- 430. ADVANCED PROBLEMS IN THE FUNDAMENTALS OF DAIRY SCIENCE. Cr. 3. Mr. Harmon.
- 431. CHEESE MAKING. Cr. 3. Mr. Harmon.
- 432. DAIRY INDUSTRY PROBLEMS. Cr. 3. Staff.
- 433. ICE CREAM MAKING. Cr. 3. Mr. Willingham.
- 434. BUTTERMAKING. Cr. 3. Mr. Harmon.
- 435. DAIRY AND FOOD INSPECTION. Cr. 3. Mr. Harmon.
- 437. CREAMERY MANAGEMENT AND MERCHANDISING. Cr. 3. Mr. Willingham.
- 438. ADVANCED DAIRY BACTERIOLOGY. Cr. 3. Mr. Harmon.
- 512. ADVANCED DAIRY PRODUCTS QUALITY CONTROL. Cr. 1. Mr. Willingham.
- 531, 532. DAIRY MANUFACTURING PROBLEMS. Cr. 3, each. Staff.
- 533, 534. DAIRY MANUFACTURING PROBLEMS. Cr. 3, each. Staff.
- 535, 536. DAIRY BACTERIOLOGY RESEARCH. Cr. 3, each. Staff.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### HORTICULTURE AND PARK MANAGEMENT

- 421. CITRICULTURE. Cr. 2. Mr. Yocum.
- 422, 423. DESIGN AND OPERATION OF PARKS AND RECREATION SYSTEMS. Cr. 2, each. Mr. Urbanovsky.
- 425. HORTICULTURAL PROBLEMS. Cr. 2. Staff.
- 430. HORTICULTURAL PROBLEMS. Cr. 3. Staff.
- 431, 432. POMOLOGY. Cr. 3, each. Mr. Yocum.
- 433. SYSTEMATIC POMOLOGY. Cr. 3. Mr. Yocum.
- 434. LANDSCAPE PLANNING. Cr. 3. Mr. Urbanovsky.
- 512, 513, 514. HORTICULTURE SEMINAR. Cr. 1, 2, or 3. Staff.
- 531, 532, 533. HORTICULTURAL PROBLEMS. Cr. 3, 6, or 9. Staff.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## POULTRY HUSBANDRY

- 411. POULTRY HUSBANDRY SEMINAR. Cr. 1. Mr. Turner.
- 421. POULTRY PRODUCTION. Cr. 2. Mr. Turner.
- 422. TURKEY PRODUCTION. Cr. 2. Mr. Turner.
- 423. MARKET EGGS. Cr. 2. Mr. Turner.
- 531. POULTRY HUSBANDRY RESEARCH. Cr. 3. Mr. Turner.

## RURAL SOCIOLOGY

- 431. SOCIO-ECONOMIC SURVEYS OF RURAL AREAS. Cr. 3.  
Mr. McBride.
- 432. RURAL SOCIOLOGY. Cr. 3. Mr. McBride.
- 532. CURRENT PROBLEMS IN RURAL SOCIOLOGY. Cr. 3. Mr. McBride.

## AGRICULTURAL EDUCATION

Courses Applicable to a Major for the Degree of Master of Education  
or Master of Science in Agriculture

- 423. PROBLEMS IN TEACHING VOCATIONAL AGRICULTURE. Cr. 2.  
Staff.
- 424. ORGANIZATION AND ADMINISTRATION OF VOCATIONAL  
AGRICULTURE. Cr. 2. Mr. Leach.
- 425. FUTURE FARMER ACTIVITIES. Cr. 2.
- 431. METHODS OF TEACHING VOCATIONAL AGRICULTURE IN THE  
HIGH SCHOOL. Cr. 3. Mr. Chappelle.
- 432. METHODS OF TEACHING VOCATIONAL AGRICULTURE IN ADULT  
WORK. Cr. 3. Mr. Chappelle.
- 461. PRACTICE TEACHING IN VOCATIONAL AGRICULTURE. Cr. 6.  
Mr. Leach.
- 511. PROBLEMS IN TEACHING VOCATIONAL AGRICULTURE. Cr. 1.
- 522. ADVANCED METHODS IN TEACHING VOCATIONAL AGRICULTURE  
IN ALL-DAY CLASSES. Cr. 2. Mr. Chappelle.
- 523. ADVANCED METHODS IN TEACHING VOCATIONAL AGRICULTURE  
TO ADULTS. Cr. 2. Mr. Leach.
- 524. ADVANCED METHODS IN TEACHING FUTURE FARMER WORK.  
Cr. 2.
- 531, 532. INVESTIGATIONS IN THE FIELD OF AGRICULTURAL EDUCATION.  
Cr. 3, each. Mr. Leach.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.  
Required for the Master of Science in Agriculture; optional  
for the Master of Education.

## BIOLOGY

Professor James C. Cross  
Head of the Department

Professors Cross, Landwer, Strandtmann, and Studhalter  
Associate Professor Sealey  
Assistant Professor Camp

## Majors and Minors for the Master's Degree

Before being recommended for admission to candidacy for the Master's degree with a major in this department, the student must take a preliminary examination to determine whether he is prepared to do graduate work in the subject chosen. The scope of this examination will be determined by the major professor, but it will ordinarily include all work usually required of undergraduates who major in this department. If the graduate major is botany, the emphasis will be upon botany; if the graduate major is zoology, the emphasis will be upon zoology. If the examination reveals serious weaknesses in any necessary subject matter, the student may be required to register for or repeat such courses as may be designated by the major professor.

Likewise before being recommended for admission to candidacy for the Master's degree, the student must pass a reading examination in French or German or some other language acceptable to this department. The examination will be given under the direction of the Department of Foreign Languages and will deal with critical material in the area of the student's major subject.

If the student's major is botany, his minor may be bacteriology, chemistry, geology, mathematics, physics, or zoology; if his major is zoology, his minor may be bacteriology, botany, chemistry, mathematics, or physics.

## BACTERIOLOGY

- 331, 332. PRINCIPLES OF BACTERIOLOGY. Cr. 3, each. Mr. Sealey.  
333. COMMUNICABLE DISEASES. Cr. 3. Mr. Sealey.  
334. BACTERIOLOGY OF FOODS AND FOOD SANITATION. Cr. 3.  
Mr. Sealey.

## BIOLOGY

- 333, 334. BIO-ECOLOGY. Cr. 3, each. Mr. Studhalter.  
431. ADVANCED HEREDITY. Cr. 3.

## BOTANY

331. PLANT PHYSIOLOGY. Cr. 3. Mr. Camp.  
339. PLANT ANATOMY. Cr. 3. Mr. Studhalter.  
411. BOTANY SEMINAR. Cr. 1. Mr. Studhalter.  
431. BOTANICAL MICROTECHNIQUE. Cr. 3.



- 433. ADVANCED MORPHOLOGY. Cr. 3. Mr. Studhalter.
- 435. ADVANCED TAXONOMY. Cr. 3. Mr. Studhalter.
- 436, 437. PLANT GEOGRAPHY. Cr. 3, each. Mr. Studhalter.
- 438. MORPHOLOGY OF FUNGI. Cr. 3. Mr. Studhalter.
- 531. PROBLEMS IN BOTANY. Cr. 3.
- 534. ADVANCED PLANT ANATOMY. Cr. 3. Mr. Studhalter.
- 535. FIELD BOTANY. Cr. 3.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### ZOOLOGY

- 331. ANIMAL HISTOLOGY. Cr. 3. Mr. Landwer.
- 332. COMPARATIVE VERTEBRATE EMBRYOLOGY. Cr. 3. Mr. Landwer.
- 333. PARASITOLOGY. Cr. 3. Mr. Strandtmann.
- 334, 335. ENTOMOLOGY. Cr. 3, each. Mr. Strandtmann.
- 411. ZOOLOGY SEMINAR. Cr. 1.
- 435. CYTOLOGY. Cr. 3. Mr. Cross.
- 436. ZOOLOGY MICROTECHNIQUE. Cr. 3. Mr. Cross.
- 437. MAMMALOGY. Cr. 3. Mr. Landwer.
- 438. FIELD ENTOMOLOGY. Cr. 3. Mr. Strandtmann.
- 4312. ADVANCED PARASITOLOGY. Cr. 3. Mr. Strandtmann.
- 531. PROBLEMS IN ZOOLOGY. Cr. 3.
- 535. FIELD ZOOLOGY. Cr. 3. Mr. Landwer.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

### BUSINESS ADMINISTRATION

Dean George G. Heather, Graduate Chairman

Professors Heather, Mize, Rushing, Tate, Taylor, and Wiesen

Associate Professors Clover, Golden, and Norwood

Assistant Professor Rouse

Courses Applicable to the Degree of Master of Business Administration

### ACCOUNTING

- 321. ANALYSIS OF FINANCIAL STATEMENTS. Cr. 2. Mr. Norwood.
- 322. PAYROLL ACCOUNTING. Cr. 2.
- 331. MANAGERIAL ACCOUNTING. Cr. 3. Mr. Norwood.
- 334, 335. INTERMEDIATE ACCOUNTING. Cr. 3, each. Mr. Rushing,  
Mr. Norwood.
- 336. PRINCIPLES OF COST ACCOUNTING. Cr. 3. Mr. Norwood.
- 337. ADVANCED COST ACCOUNTING. Cr. 3. Mr. Norwood.
- 338. BUDGETING. Cr. 3.
- 430. INCOME TAX ACCOUNTING. Cr. 3. Mr. Taylor.
- 431. ADVANCED INCOME TAX ACCOUNTING. Cr. 3. Mr. Taylor.
- 432. GOVERNMENTAL ACCOUNTING. Cr. 3. Mr. Taylor.
- 433. PETROLEUM ACCOUNTING. Cr. 3. Mr. Rushing.
- 434, 435. ADVANCED ACCOUNTING. Cr. 3, each. Mr. Rushing.

- 436. ACCOUNTING SYSTEMS. Cr. 3. Mr. Norwood.
- 437. PRINCIPLES OF AUDITING. Cr. 3. Mr. Rushing.
- 438. ADVANCED AUDITING. Cr. 3. Mr. Rushing.
- 441, 442. MACHINE ACCOUNTING. Cr. 4, each.  
Machine Service Fee, \$4.00 each.
- 531, 532. C. P. A. PROBLEMS. Cr. 3, each. Mr. Rushing, Mr. Norwood.
- 533. CURRENT ACCOUNTING THEORY. Cr. 3. Mr. Rushing.
- 534. SPECIALIZED COST ACCOUNTING. Cr. 3. Mr. Norwood.
- 631-2. MASTER'S THESIS. Cr. 6. Mr. Rushing, Mr. Taylor, Mr. Norwood.

### ECONOMICS

- 331. INTERMEDIATE ECONOMIC PRINCIPLES. Cr. 3. Mr. Clover, Mr. Rouse.
- 332. PUBLIC UTILITY ECONOMICS. Cr. 3.
- 333. PUBLIC EXPENDITURES. Cr. 3. Mr. Clover.
- 334. TAXATION. Cr. 3. Mr. Clover.
- 335. TRANSPORTATION PRINCIPLES AND PRACTICES. Cr. 3.
- 337. ECONOMIC SYSTEMS. Cr. 3. Mr. Rouse.
- 338. FOREIGN TRADE. Cr. 3. Mr. Wiesen.
- 339. LATIN AMERICA AND THE UNITED STATES. Cr. 3. Mr. Wiesen.
- 3311. NATIONAL INCOME ANALYSIS. Cr. 3. Mr. Rouse.
- 3312. ECONOMICS OF LABOR. Cr. 3. Mr. Clover.
- 3313. CONSUMER ECONOMICS. Cr. 3. Mr. Clover.
- 432. FOREIGN MARKET SURVEYS. Cr. 3. Mr. Wiesen.
- 433. INTERNATIONAL ECONOMIC RELATIONS. Cr. 3. Mr. Wiesen.
- 434. PUBLIC REGULATION AND BUSINESS POLICY. Cr. 3. Mr. Wiesen, Mr. Clover.
- 435. TRANSPORTATION ECONOMICS. Cr. 3.
- 436. DEVELOPMENT OF ECONOMIC DOCTRINES. Cr. 3. Mr. Wiesen, Mr. Rouse.
- 437. CURRENT ECONOMIC PROBLEMS. Cr. 3. Mr. Clover.
- 438. RESEARCH IN ECONOMICS AND BUSINESS. Cr. 3. Mr. Clover.
- 4310. ADVANCED ECONOMIC PRINCIPLES. Cr. 3.
- 4311. THEORIES OF DEPRESSIONS. Cr. 3. Mr. Rouse.
- 4312. DISTRIBUTION THEORY. Cr. 3. Mr. Rouse.
- 4335. HUMAN GEOGRAPHY. Cr. 3. Mr. Clover.  
Enrollment limited to graduate students majoring in Elementary Education.
- 531. ECONOMIC RESEARCH. Cr. 3. Mr. Wiesen, Mr. Clover, Mr. Rouse.
- 532. SEMINAR IN CURRENT ECONOMIC TRENDS. Cr. 3. Mr. Wiesen, Mr. Rouse.
- 533. SEMINAR IN RECENT ECONOMIC THEORY. Cr. 3. Mr. Wiesen, Mr. Clover, Mr. Rouse.
- 534. SEMINAR IN PUBLIC FINANCE. Cr. 3. Mr. Clover.

535. READINGS IN ECONOMICS. Cr. 3. Mr. Wiesen, Mr. Clover,  
Mr. Rouse.  
631-2. MASTER'S THESIS. Cr. 6. Mr. Wiesen, Mr. Clover, Mr. Rouse.

## FINANCE

331. CORPORATION FINANCE. Cr. 3. Mr. Heather.  
333. PRINCIPLES OF MONEY, BANKING, AND CREDIT. Cr. 3. Mr.  
Rouse.  
334. CREDITS AND COLLECTIONS. Cr. 3. Mr. Heather.  
336. LIFE INSURANCE. Cr. 3.  
337. PROPERTY AND CASUALTY INSURANCE I. Cr. 3.  
338, 339. BUSINESS LAW. Cr. 3, each.  
3310. OIL AND GAS LAW. Cr. 3.  
3311. REAL ESTATE LAW. Cr. 3.  
3312. INSURANCE LAW. Cr. 3.  
3313. LANDLORD AND TENANT LAW. Cr. 3.  
431. THE FEDERAL RESERVE SYSTEM. Cr. 3. Mr. Rouse.  
432. REAL ESTATE. Cr. 3.  
433. CORPORATE FINANCIAL PROBLEMS AND CASES. Cr. 3.  
434. INVESTMENTS. Cr. 3. Mr. Rouse.  
437. PROPERTY AND CASUALTY INSURANCE II. Cr. 3.  
438. PROPERTY AND CASUALTY INSURANCE III. Cr. 3.  
439. PROPERTY AND CASUALTY INSURANCE IV. Cr. 3.  
4310. C. P. A. LAW REVIEW. Cr. 3.  
4311. PROPERTY AND CASUALTY INSURANCE V. Cr. 3.  
4312. PROPERTY AND CASUALTY INSURANCE VI. Cr. 3.  
531. CURRENT FINANCIAL PROBLEMS. Cr. 3.  
631-2. MASTER'S THESIS. Cr. 6. Mr. Heather, Mr. Rouse.

## MANAGEMENT

332. MANAGEMENT OF SMALL BUSINESS ENTERPRISES. Cr. 3.  
334. PERSONNEL ADMINISTRATION. Cr. 3. Mr. Mize.  
335. PURCHASING, STORES, AND INVENTORY CONTROL. Cr. 3.  
336. INDUSTRIAL TRAFFIC MANAGEMENT. Cr. 3.  
410. EMPLOYMENT GUIDANCE. Cr. 1.  
431. OFFICE MANAGEMENT. Cr. 3.  
432. ADVANCED PERSONNEL MANAGEMENT. Cr. 3. Mr. Mize.  
433. LABOR LEGISLATION. Cr. 3.  
434. JOB EVALUATION AND WAGE ADMINISTRATION. Cr. 3. Mr.  
Mize.  
435. EMPLOYEE SUPERVISION. Cr. 3. Mr. Mize.  
436. PROBLEMS IN OFFICE MANAGEMENT. Cr. 3.  
437. HUMAN RELATIONS IN INDUSTRY. Cr. 3. Mr. Mize.  
438. INTERVIEWING, SELECTING, AND COUNSELING EMPLOYEES.  
Cr. 3. Mr. Mize.  
439. PERSONNEL TESTS AND RATING SCALES. Cr. 3. Mr. Mize.

- 4310. INDUSTRIAL MANAGEMENT PROBLEMS. Cr. 3. Mr. Mize.
- 4311. FOREMANSHIP PRACTICE. Cr. 3. Mr. Mize.
- 531, 532. RESEARCH IN MANAGEMENT. Cr. 3, each. Mr. Mize.
- 533, 534. RESEARCH IN MANAGEMENT. Cr. 3, each. Mr. Mize.
- 631-2. MASTER'S THESIS. Cr. 6. Mr. Mize.

## MARKETING

- 321. PUBLIC RELATIONS. Cr. 2.
- 332. PRINCIPLES OF MARKETING. Cr. 3. Mr. Golden.
- 333. MARKETING PROBLEMS. Cr. 3. Mr. Golden.
- 334. PRINCIPLES OF ADVERTISING. Cr. 3.
- 335. PRINCIPLES OF RETAILING. Cr. 3.
- 336. INTRODUCTION TO BUSINESS STATISTICS. Cr. 3. Mr. Golden.
- 337. INTERMEDIATE BUSINESS STATISTICS. Cr. 3. Mr. Golden.
- 431. COMMODITY MARKETING. Cr. 3. Mr. Golden.
- 432. ESSENTIALS OF TELEVISION ADVERTISING. Cr. 3.
- 434. WHOLESALING. Cr. 3.
- 435. BUSINESS CYCLES AND FORECASTS. Cr. 3. Mr. Golden.
- 437. ADVANCED BUSINESS STATISTICS. Cr. 3. Mr. Golden.
- 438. DISPLAY. Cr. 3.
- 439. SALES MANAGEMENT. Cr. 3. Mr. Golden.
- 4314. ADVERTISING COPY. Cr. 3.
- 4315. RETAIL BUYING. Cr. 3.
- 4316. GRAPHIC ANALYSIS. Cr. 3. Mr. Golden.
- 4317. ADVERTISING LAYOUT. Cr. 3.
- 4318. MECHANICAL PRODUCTION OF ADVERTISING. Cr. 3.
- 4319. ADVERTISING INTERNSHIP. Cr. 3.
- 531. RESEARCH IN MARKETING. Cr. 3. Mr. Golden.
- 532. ADVANCED MARKETING PROBLEMS. Cr. 3. Mr. Golden.
- 534. PROBLEMS IN ADVERTISING. Cr. 3.
- 539. PROBLEMS IN SALES MANAGEMENT. Cr. 3. Mr. Golden.
- 631-2. MASTER'S THESIS. Cr. 6. Mr. Golden.

## SECRETARIAL ADMINISTRATION

- 321. CALCULATING MACHINES. Cr. 2.  
Machine Service Fee \$4.
- 330. OFFICE OR STORE EXPERIENCE. Cr. 3. Mr. Tate.
- 331. SECRETARIAL PRACTICE. Cr. 3. Mr. Tate.
- 333. BUSINESS CORRESPONDENCE. Cr. 3.
- 337. REPORT WRITING. Cr. 3.
- 421. VOICE WRITING AND DUPLICATING MACHINES. Cr. 2.  
Machine Service Fee \$4.



## BUSINESS EDUCATION

Courses Applicable to a Major for the Degree of Master of Education  
or Master of Business Administration

- 422. IMPROVEMENT OF INSTRUCTION IN BOOKKEEPING AND THE  
SOCIAL-BUSINESS SUBJECTS. Cr. 2. Mr. Tate.
- 423. IMPROVEMENT OF INSTRUCTION IN TYPEWRITING AND  
SHORTHAND. Cr. 2. Mr. Tate.
- 424. IMPROVEMENT OF INSTRUCTION IN BASIC BUSINESS. Cr. 2.  
Mr. Tate.
- 425. IMPROVEMENT OF INSTRUCTION IN OFFICE MACHINES. Cr. 2.
- 426. IMPROVEMENT OF INSTRUCTION IN DISTRIBUTIVE EDUCATION.  
Cr. 2.
- 511. DIRECTED INDIVIDUAL STUDY IN BUSINESS EDUCATION. Cr. 1.  
Mr. Tate.
- 530. OBJECTIVES AND PRINCIPLES OF BUSINESS EDUCATION. Cr. 3.  
Mr. Tate.
- 531. CURRICULUM PROBLEMS OF BUSINESS EDUCATION. Cr. 3.
- 532. GUIDANCE IN BUSINESS EDUCATION. Cr. 3. Mr. Tate.
- 533. SUPERVISION AND ADMINISTRATION OF BUSINESS EDUCATION.  
Cr. 3. Mr. Tate.
- 534. RESEARCH SEMINAR IN BUSINESS EDUCATION. Cr. 3.
- 535. TESTS AND MEASUREMENTS IN BUSINESS EDUCATION. Cr. 3.  
Mr. Tate.
- 536. EVALUATION OF CURRENT LITERATURE IN BUSINESS  
EDUCATION. Cr. 3. Mr. Tate.
- 537. IMPROVEMENT OF INSTRUCTION IN BUSINESS SUBJECTS. Cr. 3.  
Mr. Tate.
- 538. WORKSHOP IN SECRETARIAL SUBJECTS. Cr. 3. Mr. Tate.
- 539. WORKSHOP IN BOOKKEEPING AND GENERAL BUSINESS SUBJECTS.  
Cr. 3. Mr. Tate.
- 631-2. MASTER'S THESIS. Cr. 6. Mr. Tate.  
Required for the Master of Business Administration; optional  
for the Master of Education.

## CHEMISTRY AND CHEMICAL ENGINEERING

Professor Joe Dennis  
Head of the Department

Professors Craig, Dennis, Goodwin, Holcomb, Oberg, and Slagle  
Assistant Professors Estok, Lee, and Renard

Chemistry: Majors and Minors for the Master's Degree  
and the Doctor of Philosophy

Chemical Engineering: Majors and Minors for the Master's Degree  
Special Regulations Concerning the Master's Degree

Before being recommended for admission to candidacy for the  
Master's degree with a major in this department, the student must take

written preliminary examinations on his undergraduate work. The scope of these examinations is as follows: For applicants for the Master's degree in Chemistry: Inorganic, organic, and analytical chemistry and either physical or biological chemistry. For applicants for the Master's degree in Chemical Engineering: Inorganic, organic, analytical, and physical chemistry and chemical engineering.

The examinations are given during the first week of each semester, according to schedules posted on the departmental bulletin board. The student will have an opportunity to register for such remedial courses as the examinations may show to be necessary.

At least one semester before graduation, every applicant for the Master's degree in this department must pass a reading examination in a foreign language acceptable to this department. The examination will be given under the direction of the Department of Foreign Languages and will deal with critical material in the field of chemistry or chemical engineering.

No student may receive a Master's degree in Chemistry or Chemical Engineering without having done satisfactory work in physical chemistry (Chemistry 441-2 or its equivalent).

The Master's thesis must be based on experimental work except in extraordinary cases; it shall be the duty of each thesis committee in this department to see that the spirit of this regulation is carried out.

#### Special Regulations Concerning the Doctor's Degree

Credit for the research presented in the doctoral dissertation in this department shall constitute not less than one-sixth nor more than one-third of the total work presented for the degree.

At least eighteen semester hours of work must be done outside this department.

### CHEMISTRY

- 331, 332. QUANTITATIVE ANALYSIS. Cr. 3, each. Mr. Craig.  
For minors only.
- 342. PHYSIOLOGICAL CHEMISTRY. Cr. 4. Mr. Dennis.  
For Agriculture and Home Economics students only.
- 353, 354. ORGANIC CHEMISTRY. Cr. 5, each. Mr. Goodwin.  
For minors only.
- 411, 412. CHEMICAL LITERATURE AND SEMINAR. Cr. 1, each.  
Staff.
- 421. HISTORY OF CHEMISTRY. Cr. 2. Mr. Craig, Mr. Slagle.
- 431. QUALITATIVE ORGANIC ANALYSIS. Cr. 3. Mr. Dennis.
- 433. INORGANIC PREPARATIONS. Cr. 3. Mr. Slagle.
- 434. ORGANIC PREPARATIONS. Cr. 3.
- 436, 437. BIOLOGICAL CHEMISTRY. Cr. 3, each. Mr. Dennis.
- 438. ADVANCED PHYSICAL CHEMISTRY. Cr. 3. Mr. Oberg.
- 439. INSTRUMENTAL METHODS OF ANALYSIS. Cr. 3. Mr. Oberg.

- 441, 442. PHYSICAL CHEMISTRY. Cr. 4, each. Mr. Craig.  
 511, 512. GRADUATE SEMINAR. Cr. 1, each. Staff.  
 5301. ADVANCED INORGANIC CHEMISTRY I. Cr. 3. Mr. Slagle.  
 5302. ADVANCED INORGANIC CHEMISTRY II. Cr. 3.  
 5303. NUCLEAR CHEMISTRY. Cr. 3.  
 5304. SELECTED TOPICS IN INORGANIC CHEMISTRY. Cr. 3.  
 5314. ADVANCED ANALYTICAL CHEMISTRY. Cr. 3. Mr. Craig.  
 5315. SPECTROGRAPHIC ANALYSIS I, EMISSION SPECTRA. Cr. 3.  
 5316. SPECTROGRAPHIC ANALYSIS II, ABSORPTION SPECTRA. Cr. 3.  
     Mr. Craig.  
 5318. CHEMICAL MICROSCOPY. Cr. 3.  
 5321. ADVANCED ORGANIC CHEMISTRY I. Cr. 3. Mr. Estok,  
     Mr. Goodwin, Mr. Lee.  
 5322. ADVANCED ORGANIC CHEMISTRY II. Cr. 3. Mr. Lee.  
 5324. QUANTITATIVE ORGANIC ANALYSIS. Cr. 3. Mr. Dennis.  
 5325. SELECTED TOPICS IN ORGANIC CHEMISTRY. Cr. 3. Staff.  
 5327. PHYSICAL ORGANIC CHEMISTRY. Cr. 3. Mr. Estok, Mr. Lee.  
 5328. MECHANISMS OF ORGANIC REACTIONS. Cr. 3. Mr. Estok,  
     Mr. Lee.  
 5331. BIOCHEMICAL TECHNIQUES. Cr. 3. Mr. Dennis.  
 5334. SELECTED TOPICS IN BIOCHEMISTRY. Cr. 3. Mr. Dennis.  
 5335. PHYSICAL BIOCHEMISTRY. Cr. 3.  
 5336. THE CHEMISTRY OF ENZYMES. Cr. 3.  
 5342. ADVANCED PHYSICAL CHEMISTRY. Cr. 3.  
 5343. COLLOIDAL CHEMISTRY. Cr. 3. Mr. Oberg.  
 5344. KINETICS OF CHEMICAL REACTIONS. Cr. 3. Mr. Oberg, Mr.  
     Lee.  
 5346. ELECTROCHEMISTRY. Cr. 3.  
 5347. ADVANCED CHEMICAL THERMODYNAMICS. Cr. 3. Mr. Oberg.  
 537, 538. ADVANCED WORK IN SPECIFIC FIELDS. Cr. 3, each.  
 631-2. MASTER'S THESIS. Cr. 6. Staff.  
 731, 732. RESEARCH. Cr. 3, each. Staff.  
     Required of students working on the Doctor's dissertation.  
     May be repeated for credit as many times as the advisory com-  
     mittee recommends.  
 831-2. DOCTOR'S DISSERTATION. Cr. 6 (for bookkeeping purposes).  
     Staff.  
     Required as the final registration for the dissertation.

## CHEMICAL ENGINEERING

- 331, 332. PRINCIPLES OF CHEMICAL ENGINEERING. Cr. 3, each.  
     Mr. Oberg.  
     For minors only.  
 425, 426. UNIT OPERATIONS LABORATORY. Cr. 2, each. Mr. Renard.  
     For minors only.  
 430. CHEMICAL ENGINEERING PLANT DESIGN. Cr. 3. Mr. Renard.  
     For minors only.

- 431, 432. CHEMICAL TECHNOLOGY. Cr. 3, each. Mr. Renard.  
For minors only.
- 433, 434. CHEMICAL ENGINEERING THERMODYNAMICS. Cr. 3, each.  
Mr. Oberg.  
For minors only.
435. INSTRUMENTATION. Cr. 3. Mr. Renard.
437. ADVANCED CHEMICAL ENGINEERING. Cr. 3. Mr. Holcomb.  
For minors only.
438. PETROLEUM REFINING ENGINEERING. Cr. 3.
531. ADVANCED CHEMICAL ENGINEERING THERMODYNAMICS. Cr. 3.  
Mr. Holcomb.
532. CHEMICAL ENGINEERING DESIGN. Cr. 3. Mr. Renard.
533. ORGANIC UNIT PROCESSES. Cr. 3. Mr. Renard.
534. ABSORPTION AND EXTRACTION. Cr. 3.
535. HEAT TRANSFER. Cr. 3.
536. DISTILLATION. Cr. 3. Mr. Holcomb.
- 537, 538. ADVANCED WORK IN SPECIAL FIELDS. Cr. 3, each.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## EDUCATION AND PHILOSOPHY

Professor John S. Carroll  
Head of the Department

Professors Barnett, Carroll, Cooper, Garlin, and Jackson  
Associate Professors Evans, Livingston, and Meham  
Assistant Professors Davidson, Hartsell, Little, and McDonald

Majors and Minors for the Master's Degree,  
the Doctor of Education, and the Doctor of Philosophy

## EDUCATION

330. PRINCIPLES OF MODERN EDUCATION. Cr. 3. Mr. Garlin.
333. CURRICULUM DEVELOPMENT IN ELEMENTARY EDUCATION.  
Cr. 3. Miss Evans.
334. CURRICULUM DEVELOPMENT IN SECONDARY EDUCATION.  
Cr. 3. Mr. Garlin, Mr. Jackson.
335. ELEMENTARY EDUCATION METHODS. Cr. 3. Mr. Meham.
336. SECONDARY EDUCATION METHODS. Cr. 3. Mr. Garlin.
3310. CHILDREN'S LITERATURE. Cr. 3. Mr. McDonald.
3311. READING DEVELOPMENT IN THE ELEMENTARY SCHOOL. Cr. 3.  
Mr. Livingston.
3314. SECONDARY SCHOOL ORGANIZATION AND ADMINISTRATION.  
Cr. 3. Mr. Garlin, Mr. Hartsell.
3315. AUDIO-VISUAL EDUCATION. Cr. 3. Mr. Davidson,  
Mr. Hartsell.
430. HISTORY AND PHILOSOPHY OF EDUCATION. Cr. 3. Mr. Jackson.
435. EDUCATIONAL EVALUATION. Cr. 3. Mr. Livingston.



436. PUBLIC SCHOOL ADMINISTRATION. Cr. 3. Mr. Garlin.
437. PUBLIC SCHOOL RELATIONS. Cr. 3. Mr. Garlin.
438. SUPERVISION AND CURRICULUM DEVELOPMENT. Cr. 3.  
Miss Evans.
439. METHODS OF TEACHING SPEECH. Cr. 3.  
May also be taken as Speech 439.
- 4310, 4311. ADVANCED STAGE DIRECTING METHODS. Cr. 3.  
May also be taken as Speech 4310 or 4311.
4312. ELEMENTARY SCHOOL ORGANIZATION AND ADMINISTRATION.  
Cr. 3. Mr. McDonald, Mr. Hartsell.
4314. SPEECH PATHOLOGY. Cr. 3.  
May also be taken as Speech 4314.
4316. WORKSHOP IN CURRICULUM DEVELOPMENT. Cr. 3. Mr.  
Davidson, Mr. McDonald.
4317. CURRICULUM DEVELOPMENT PRACTICUM. Cr. 3. Mr.  
Davidson, Mr. McDonald.
- 4318, 4319. SPEECH CORRECTION METHODS. Cr. 3, each.  
May also be taken as Speech 4318 or 4319.
- 4320, 4321. SUPERVISED CLINICAL PRACTICE IN SPEECH CORRECTION.  
Cr. 3, each.  
May also be taken as Speech 4320 or 4321.
4323. APPLIED CURRICULUM DEVELOPMENT. Cr. 3. Miss Evans,  
Mr. Mecham.
4324. APPLIED CURRICULUM PRACTICUM. Cr. 3. Miss Evans,  
Mr. Mecham.
531. EDUCATIONAL RESEARCH. Cr. 3. Mr. Cooper.
532. PHILOSOPHY OF EDUCATION. Cr. 3. Mr. Jackson.
534. ADVANCED EDUCATIONAL SOCIOLOGY. Cr. 3. Mr. Jackson.
535. FEDERAL, STATE, COUNTY AND LOCAL SCHOOL ADMINISTRATION.  
Cr. 3. Mr. Carroll.
536. ELEMENTARY SCHOOL ADMINISTRATION. Cr. 3. Mr. McDonald.
537. SECONDARY SCHOOL ADMINISTRATION. Cr. 3. Mr. Garlin.
538. ADVANCED AUDIO-VISUAL EDUCATION. Cr. 3. Mr. Davidson,  
Mr. Hartsell.
539. ADMINISTRATION OF BUSINESS SERVICES. Cr. 3. Mr. Carroll.
5310. AUDIO-VISUAL WORKSHOP. Cr. 3. Mr. Davidson,  
Mr. Hartsell.
5311. APPLIED EDUCATIONAL RESEARCH. Cr. 3. Mr. Cooper.
5312. ELEMENTARY SUPERVISION AND CURRICULUM DEVELOPMENT.  
Cr. 3. Miss Evans.
5313. SECONDARY SUPERVISION AND CURRICULUM DEVELOPMENT.  
Cr. 3. Miss Evans.
5314. ADVANCED CURRICULUM WORKSHOP. Cr. 3. Mr. Mecham,  
Mr. Davidson.
5315. ADULT EDUCATION. Cr. 3. Mr. Stensland.
5316. JUNIOR COLLEGE EDUCATION. Cr. 3. Mr. Garlin.
5317. ADVANCED CURRICULUM PRACTICUM. Cr. 3. Mr. Mecham,  
Miss Evans.

5318. AUDIO-VISUAL EDUCATION PRACTICUM. Cr. 3. Mr. Hartsell.  
5320. INDIVIDUAL STUDY IN ELEMENTARY EDUCATION. Cr. 3.  
Mr. Mecham, Mr. Livingston.  
5321. INDIVIDUAL STUDY IN SECONDARY EDUCATION. Cr. 3.  
Mr. Garlin.  
5322. INDIVIDUAL STUDY IN THE HISTORY AND PHILOSOPHY OF  
EDUCATION. Cr. 3.  
5323. INDIVIDUAL STUDY IN COMPARATIVE EDUCATION. Cr. 3.  
Mr. Carroll.  
5324. INDIVIDUAL STUDY IN EDUCATIONAL SOCIOLOGY. Cr. 3.  
Mr. Jackson.  
5325. INDIVIDUAL STUDY IN EDUCATIONAL PSYCHOLOGY. Cr. 3.  
Mr. Livingston.  
5326. INDIVIDUAL STUDY IN PUBLIC SCHOOL ADMINISTRATION. Cr. 3.  
Mr. Carroll.  
5327. INDIVIDUAL STUDY IN ADULT EDUCATION. Cr. 3. Mr.  
Stensland.  
5331. HUMAN DEVELOPMENT IN EDUCATION. Cr. 3. Miss Evans.  
5337. ADVANCED SUPERVISION WORKSHOP. Cr. 3.  
5338. FOUNDATIONS OF SPECIAL EDUCATION. Cr. 3.  
5340. DEVELOPING SOCIAL STUDIES PROGRAMS IN ELEMENTARY  
EDUCATION. Cr. 3. Miss Evans.  
5341. DEVELOPING ARITHMETIC PROGRAMS IN ELEMENTARY  
EDUCATION. Cr. 3. Mr. Livingston.  
5342. DEVELOPING READING PROGRAMS IN ELEMENTARY EDUCATION.  
Cr. 3. Mr. Livingston.  
5343. DEVELOPING NATURAL AND PHYSICAL ENVIRONMENT CON-  
CEPTS IN ELEMENTARY EDUCATION. Cr. 3. Miss Evans.  
5344. DEVELOPING LANGUAGE ARTS PROGRAMS IN ELEMENTARY  
EDUCATION. Cr. 3. Mr. McDonald.  
5351. GENERAL EDUCATION SEMINAR. Cr. 3. Mr. Carroll.  
5352. SEMINAR IN THE HISTORY AND PHILOSOPHY OF EDUCATION.  
Cr. 3. Mr. Jackson.  
5353. SEMINAR IN COMPARATIVE EDUCATION. Cr. 3. Mr. Carroll.  
5354. SEMINAR IN EDUCATIONAL SOCIOLOGY. Cr. 3. Mr. Jackson.  
5355. SEMINAR IN ELEMENTARY EDUCATION. Cr. 3. Mr. Mecham.  
5356. SEMINAR IN SECONDARY EDUCATION. Cr. 3. Mr. Garlin.  
5357. SEMINAR IN THE JUNIOR COLLEGE. Cr. 3. Mr. Garlin.  
5358. SEMINAR IN EDUCATIONAL ADMINISTRATION. Cr. 3.  
Mr. Carroll.  
5359. SEMINAR IN SUPERVISION AND CURRICULUM DEVELOPMENT.  
Cr. 3. Miss Evans.  
5360. SEMINAR IN AUDIO-VISUAL EDUCATION. Cr. 3. Mr. Hartsell.  
5361. SEMINAR IN HEALTH EDUCATION. Cr. 3. Miss Evans.  
5370. IN-SERVICE DEVELOPMENT OF ELEMENTARY EDUCATION  
PROGRAMS. Cr. 3. Mr. Livingston.  
5371. IN-SERVICE DEVELOPMENT OF SECONDARY EDUCATION  
PROGRAMS. Cr. 3. Miss Evans.

- 631-2. MASTER'S THESIS. Cr. 6. Mr. Carroll.  
 731, 732. RESEARCH. Cr. 3, each. Mr. Carroll.  
 Required of students working on the Doctor's dissertation. May be repeated for credit as many times as the advisory committee recommends.  
 831-2. DOCTOR'S DISSERTATION. Cr. 6 (for bookkeeping purposes).  
 Mr. Carroll.  
 Required as the final registration for the dissertation.

## EDUCATIONAL PSYCHOLOGY

331. CHILD PSYCHOLOGY. Cr. 3. Miss True.  
 333. STATISTICAL METHODS. Cr. 3. Mr. Barnett.  
 335. ADOLESCENT PSYCHOLOGY. Cr. 3. Miss True.  
 337. COUNSELING AND GUIDANCE. Cr. 3. Mr. Barnett.  
 431. TESTS AND MEASUREMENTS. Cr. 3. Mr. Barnett.  
 433. MENTAL HYGIENE: THE PSYCHOLOGY OF PERSONAL ADJUSTMENT. Cr. 3. Miss True.  
 530. ADVANCED EDUCATIONAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.  
 531. INTRODUCTION TO PROJECTIVE TECHNIQUES. Cr. 3.  
 Mr. Hutchins.  
 533. EXPERIMENTAL CHILD PSYCHOLOGY. Cr. 3. Miss True.  
 534. PRACTICUM IN INTELLIGENCE TESTING. Cr. 3. Mr. Barnett.  
 535. INTRODUCTION TO THE RORSCHACH TEST. Cr. 3.  
 Mr. Hutchins.  
 537. ADVANCED STATISTICAL METHODS. Cr. 3. Mr. Kuntz.  
 539. VOCATIONAL INFORMATION. Cr. 3. Mr. Kuntz.  
 5310. TECHNIQUES OF COUNSELING AND GUIDANCE. Cr. 3.  
 Mr. Barnett.  
 5311. PRACTICUM IN COUNSELING AND GUIDANCE. Cr. 3.  
 Mr. Barnett.  
 5312, 5313. PRACTICUM IN ADVANCED PSYCHOLOGICAL TESTING. Cr. 3, each. Staff.  
 5314. SEMINAR IN EDUCATIONAL PSYCHOLOGY. Cr. 3.  
 5315. SEMINAR IN COUNSELING AND GUIDANCE. Cr. 3.  
 Mr. Barnett.  
 560, 561. INTERNSHIP IN COUNSELING AND GUIDANCE. Cr. 6, each.

## PHILOSOPHY

332. HISTORY OF PHILOSOPHY. Cr. 3. Mr. Little.  
 333. THE DEVELOPMENT OF AMERICAN PHILOSOPHY. Cr. 3.  
 Mr. Little.  
 335. ORIENTAL PHILOSOPHIES. Cr. 3. Mr. Little.  
 337. LOGIC. Cr. 3. Mr. Little.  
 431. AESTHETICS. Cr. 3. Mr. Little.  
 432. PHILOSOPHY OF VALUE. Cr. 3. Mr. Little.  
 436. PHILOSOPHY OF RELIGION. Cr. 3. Mr. Little.

438. SEMINAR IN PHILOSOPHICAL PROBLEMS. Cr. 3. Mr. Little.  
 4350. STRUCTURE AND DYNAMICS OF PHILOSOPHICAL THOUGHT.  
 Cr. 3. Mr. Little.

## ENGINEERING

Dean Dysart E. Holcomb, Graduate Chairman

Advisory Committee: Professors Bullen, Ducker, Murdough, Oberg, and Powers

Professors Adams, Bradshaw, Bullen, Ducker, Dwyer, Godeke, Holcomb,  
 Kleinschmidt, McRee, Murdough, Oberg, Powers, St. Clair  
 Associate Professors Houston, Lockard, Penick, Whetstone  
 Assistant Professor Sasser

### Degrees Offered:

Master of Science in Chemical Engineering  
 Master of Science in Electrical Engineering

## ARCHITECTURE AND ALLIED ARTS

### ARCHITECTURE

320. HISTORY OF ORNAMENT AND FURNITURE. Cr. 2. Mr. Lockard.  
 321. HISTORY OF EARLY AMERICAN ARCHITECTURE. Cr. 2.  
 Mr. Kleinschmidt.  
 322. HISTORY OF RENAISSANCE ARCHITECTURE. Cr. 2. Mrs. Sasser.  
 323. HISTORY OF MODERN ARCHITECTURE. Cr. 2. Mrs. Sasser.  
 324. HISTORY OF SCULPTURE. Cr. 2. Mr. Kleinschmidt.  
 326. CONSTRUCTIVE ANATOMY. Cr. 2.  
 327. LIFE DRAWING I. Cr. 2. Mr. Lockard.  
 Model Fee \$5.  
 3216, 3217. ARCHITECTURAL SCULPTURE. Cr. 2, each.  
 Materials Fee \$5 each semester.  
 333, 334. BUILDING CONSTRUCTION. Cr. 3, each. Mr. Bradshaw.  
 351, 352. ARCHITECTURAL DESIGN, GRADE II. Cr. 5, each.  
 Mr. Lockard.  
 420. PROFESSIONAL PRACTICE. Cr. 2. Mr. Bradshaw.  
 422. BUILDING MATERIALS AND CONSTRUCTION. Cr. 2. Mr. Bradshaw.  
 423, 424. LIFE DRAWING II AND III. Cr. 2, each. Mr. Kleinschmidt.  
 Model Fee \$5 each semester.  
 435. ADVANCED ARCHITECTURAL CONSTRUCTION. Cr. 3.  
 Mr. Bradshaw.  
 436. CITY PLANNING. Cr. 3. Mr. Bradshaw.  
 461, 462. ARCHITECTURAL DESIGN, GRADE III. Cr. 6, each.  
 Mr. Lockard.  
 483, 484. ARCHITECTURAL DESIGN, GRADE IV. Cr. 8, each.  
 Mr. Kleinschmidt.  
 411, 412. ENGINEERING SEMINAR. Cr. 1, each. Mr. Kleinschmidt.



## ALLIED ARTS

- 328, 329. ADVANCED LETTERING AND ART LAYOUT. Cr. 2, each.  
3210, 3211. COMMERCIAL ILLUSTRATION I. Cr. 2, each.  
331, 332. COMMERCIAL DESIGN I. Cr. 3, each.  
426, 427. OIL PAINTING OR ADVANCED WATER COLOR. Cr. 2, each.  
428, 429. HISTORY OF PAINTING. Cr. 2, each. Mrs. Sasser.  
4210, 4211. FASHION ILLUSTRATION. Cr. 2, each.  
4212, 4213. COMMERCIAL ILLUSTRATION II. Cr. 2, each.  
433, 434. COMMERCIAL DESIGN II. Cr. 3, each.  
437, 438. PRINCIPLES OF DRAWING AND PAINTING AND THEORY OF DESIGN. Cr. 3, each. Mr. Kleinschmidt.  
4311, 4312. CERAMICS. Cr. 3, each.  
Materials Fee \$5 each semester.  
Service Courses Primarily for Education Majors  
335, 336. HISTORY OF ART. Cr. 3, each. Mr. Lockard, Mrs. Sasser.  
337, 338. ART IN ELEMENTARY EDUCATION. Cr. 3, each. Mrs. Sasser.  
439, 4310. METHODS OF TEACHING ART INTEGRATED FOR THE ELEMENTARY SCHOOL. Cr. 3, each. Mrs. Sasser.  
4313, 4314. METHODS OF TEACHING ART INTEGRATED FOR THE HIGH SCHOOL. Cr. 3, each. Mrs. Sasser.  
4335. ART IN ELEMENTARY EDUCATION. Cr. 3. Mrs. Sasser.  
Enrollment limited to graduate students majoring in Elementary Education.  
4350. MODERN WORLD ART. Cr. 3. Mr. Kleinschmidt.

## CHEMICAL ENGINEERING

See Department of Chemistry and Chemical Engineering

## CIVIL ENGINEERING

3311. HYDRAULIC MACHINERY. Cr. 3. Mr. Whetstone.  
411. SOIL MECHANICS AND FOUNDATIONS LABORATORY. Cr. 1.  
424, 425. MATERIALS. Cr. 2, each. Mr. Adams, Mr. McRee.  
426. MUNICIPAL SANITATION. Cr. 2.  
431, 432. REINFORCED CONCRETE. Cr. 3, each. Mr. Murdough.  
433, 434. STRUCTURES. Cr. 3, each. Mr. Murdough.  
437. WATER SUPPLY AND TREATMENT. Cr. 3.  
438. SEWERAGE AND SEWAGE TREATMENT. Cr. 3.  
439. LAW AND ETHICS IN ENGINEERING. Cr. 3. Mr. Adams,  
Mr. McRee.  
4312. SOIL MECHANICS AND FOUNDATIONS. Cr. 3.  
4313. WATER PURIFICATION. Cr. 3.  
4314. SEWAGE TREATMENT. Cr. 3.

## ELECTRICAL ENGINEERING

- 322. ALTERNATING CURRENT CIRCUITS LABORATORY. Cr. 2.
- 323. ELECTRONICS LABORATORY. Cr. 2.
- 324. COMMUNICATIONS CIRCUITS LABORATORY. Cr. 2.
- 325. ELECTRONICS. Cr. 2.
- 332. ALTERNATING CURRENT CIRCUITS. Cr. 3. Mr. Houston.
- 334. COMMUNICATIONS CIRCUITS. Cr. 3.
- 336. ILLUMINATION. Cr. 3.
- 410. CURRENT ELECTRICAL ENGINEERING. Cr. 1.
- 411, 412. ENGINEERING SEMINAR. Cr. 1, each.
- 4112, 4113. ELECTRICAL MACHINERY LABORATORY. Cr. 1, each.
- 4114. COMMUNICATIONS CIRCUITS LABORATORY. Cr. 1.  
Mr. Houston.
- 429. ENGINEERING ELECTRONICS. Cr. 2.
- 4210. VACUUM TUBE CIRCUITS LABORATORY. Cr. 2.
- 4211. RADIO ENGINEERING LABORATORY. Cr. 2.
- 4212, 4213. ELECTRICAL MACHINERY LABORATORY. Cr. 2, each.
- 4216. ENGINEERING ELECTRONICS LABORATORY. Cr. 2.
- 4217. INSTRUMENTATION LABORATORY. Cr. 2.
- 432, 433. ELECTRIC POWER TRANSMISSION. Cr. 3, each.
- 435. ADVANCED ILLUMINATION. Cr. 3.
- 436, 437. ELECTROMAGNETIC FIELD THEORY. Cr. 3, each.  
Mr. Houston.
- 4310. VACUUM TUBE CIRCUITS. Cr. 3.
- 4311. RADIO ENGINEERING. Cr. 3.
- 4312, 4313. ELECTRICAL MACHINERY. Cr. 3, each.
- 4314. COMMUNICATIONS CIRCUITS. Cr. 3. Mr. Houston.
- 4317. INSTRUMENTATION—THEORY AND PRACTICE. Cr. 3.
- 521, 522. ADVANCED ELECTRONICS LABORATORY. Cr. 2, each.  
Mr. Houston.
- 523. SYMMETRICAL COMPONENTS LABORATORY. Cr. 2.
- 526. CONTROLS AND SERVO-MECHANISMS LABORATORY. Cr. 2.
- 528, 529. ADVANCED ELECTRICAL MACHINES LABORATORY. Cr. 2, each.
- 531, 532. VACUUM TUBES AND ASSOCIATED CIRCUITS. Cr. 3, each.  
Mr. Houston.
- 533. SYMMETRICAL COMPONENTS. Cr. 3.
- 535. PROTECTION OF ELECTRIC POWER SYSTEMS. Cr. 3.
- 536, 537. ADVANCED NETWORK THEORY. Cr. 3, each.
- 538, 539. ADVANCED ELECTRICAL MACHINE THEORY. Cr. 3, each.
- 631-2. MASTER'S THESIS. Cr. 6.

## INDUSTRIAL ENGINEERING

- 331. TIME AND MOTION STUDY. Cr. 3. Mr. Dwyer.
- 332. MANAGEMENT. Cr. 3. Mr. Dwyer, Mr. St. Clair, Mr. Penick.
- 333. MANUFACTURING METHODS. Cr. 3.
- 336. TOOL DESIGN. Cr. 3. Mr. Penick.

- 337. INDUSTRIAL CONTROL. Cr. 3. Mr. Dwyer.
- 411. INDUSTRIAL ENGINEERING PROBLEMS. Cr. 1. Mr. St. Clair.
- 423. PURCHASING. Cr. 2. Mr. Penick.
- 432, 433. INDUSTRIAL PLANT DESIGN. Cr. 3, each. Mr. St. Clair.
- 435. INDUSTRIAL SAFETY ENGINEERING. Cr. 3.
- 436. PRINCIPLES OF ENGINEERING ECONOMICS. Cr. 3. Mr. Dwyer,  
Mr. Penick.

### MECHANICAL ENGINEERING

- 330, 331. THERMODYNAMICS. Cr. 3, each. Mr. Godeke.
- 333. FLUID DYNAMICS. Cr. 3. Mr. Powers.
- 432. POWER PLANT DESIGN. Cr. 3.
- 433. INTERNAL COMBUSTION ENGINES. Cr. 3.
- 436, 437. MACHINE DESIGN. Cr. 3, each. Mr. Powers.
- 4310, 4311. AERODYNAMICS. Cr. 3, each. Mr. Powers.

### PETROLEUM ENGINEERING

- 310. DRILLING FLUID LABORATORY. Cr. 1.
- 331. PETROLEUM DEVELOPMENT METHODS. Cr. 3.
- 333. PETROLEUM PRODUCTION METHODS. Cr. 3.
- 410, 411. SEMINAR. Cr. 1, each. Mr. Ducker.
- 412. PRODUCTION LABORATORY. Cr. 1.
- 413. NATURAL GAS LABORATORY. Cr. 1. Mr. Ducker.
- 416. RESERVOIR ENGINEERING LABORATORY. Cr. 1.
- 433. ADVANCED PRODUCTION ENGINEERING. Cr. 3.
- 434. NATURAL GAS ENGINEERING. Cr. 3. Mr. Ducker.
- 435. ADVANCED NATURAL GAS ENGINEERING. Cr. 3. Mr. Ducker.
- 436. RESERVOIR ENGINEERING. Cr. 3.

### ENGLISH AND JOURNALISM

Professor Truman W. Camp  
Head of the Department

Professors Allen, Camp, Gates, Gunn, Heitman (Journalism), and Strout  
Associate Professors Gillis and McCullen  
Assistant Professor Male

Majors and Minors for the Master's Degree  
and (in English only) the Doctor of Philosophy

Students seeking the Master's degree in the Graduate Department of English and Journalism should confer with Professors Camp and Heitman concerning their program and the choice of the minor subject, which will ordinarily be in such closely related fields as history, foreign languages, philosophy, psychology, government, or speech.

Upon completing his work for the Master's degree or at the beginning of his second full year of graduate work, the student who plans to

take the Doctor's degree in English will be given a preliminary comprehensive examination in English literature and American literature, to determine his degree of proficiency in these subjects.

A student seeking the doctorate in English literature should have at least one graduate course in each of the following fields: Old English, Middle English, the Renaissance, Shakespeare, the Seventeenth Century, the Eighteenth Century, Romanticism, the Nineteenth Century, and American literature. He will select one field (or two or more closely related fields) as the area of concentration, in which he will take additional courses and write his dissertation. All English doctoral candidates should take English 531, preferably at the beginning of their work here.

## ENGLISH

- 430. CHAUCER. Cr. 3. Mr. Gunn.
- 431. RESTORATION AND EIGHTEENTH CENTURY DRAMA. Cr. 3.  
Mr. Camp.
- 432. SHAKESPEARE. Cr. 3. Mr. Camp, Mr. Gates, Mr. McCullen.
- 434. MILTON AND HIS AGE. Cr. 3. Mr. Allen.
- 435. ENGLISH ROMANTICISM. Cr. 3. Mr. Strout.
- 436. THE LATER ROMANTIC POETS. Cr. 3. Mr. Strout.
- 438. HISTORY OF THE ENGLISH LANGUAGE. Cr. 3. Mr. Gunn.
- 439. CURRENT ENGLISH. Cr. 3. Mr. Gunn.
- 4311. EARLY EIGHTEENTH CENTURY ENGLISH POETRY AND PROSE.  
Cr. 3. Mr. Camp.
- 4312. THE AGE OF JOHNSON. Cr. 3. Mr. Camp.
- 4314. NON-DRAMATIC POETRY AND PROSE OF THE SEVENTEENTH  
CENTURY. Cr. 3. Mr. McCullen.
- 4315. TUDOR POETRY AND PROSE. Cr. 3. Mr. Strout.
- 4316. THE STRUCTURE OF THE NOVEL. Cr. 3. Mr. Allen.
- 4319. LATER VICTORIAN PROSE AND POETRY. Cr. 3.
- 4320. AMERICAN LITERATURE AND ITS BACKGROUNDS. Cr. 3.  
Mr. Gates, Mr. Male.
- 4321. AMERICAN LITERATURE AND ITS BACKGROUNDS. Cr. 3.  
Mr. Gates, Mr. Male.
- 4322. LIFE AND LITERATURE OF THE SOUTHWEST. Cr. 3. Mr. Gillis.
- 4325. THE AMERICAN NOVEL OF THE LATE NINETEENTH AND  
TWENTIETH CENTURIES. Cr. 3. Mr. Gillis, Mr. Male.
- 4326. TYPES OF AMERICAN FICTION. Cr. 3. Mr. Gates, Mr. Male.
- 4327. THE ENGLISH NOVEL FROM LYLY TO SCOTT. Cr. 3. Mr. Allen.
- 4328. ENGLISH AND FOREIGN FICTION FROM 1825 TO 1910. Cr. 3.
- 4330. MODERN BRITISH AND AMERICAN POETRY. Cr. 3. Mr. Gillis.
- 4331. PRE-SHAKESPEAREAN DRAMA. Cr. 3. Mr. McCullen.
- 4332. ELIZABETHAN DRAMA TO 1642. Cr. 3. Mr. McCullen.
- 4333. PHILOSOPHICAL IDEAS IN LITERATURE. Cr. 3. Mr. McCullen,  
Mr. Male.

May be repeated for credit.



4335. ENGLISH GRAMMAR, COMPOSITION, AND LITERATURE FOR  
ELEMENTARY TEACHERS. Cr. 3. Mr. Gillis.  
Enrollment limited to graduate students majoring in Elementary  
Education.
4350. APPRECIATION OF THE LITERATURE OF WESTERN CIVILIZATION.  
Cr. 3.
530. STUDIES IN MIDDLE ENGLISH LITERATURE. Cr. 3. Mr. Gunn.  
May be repeated for credit.
531. BIBLIOGRAPHY AND METHODS OF LITERARY RESEARCH. Cr. 3.  
Mr. Gunn, Mr. McCullen.
533. ELIZABETHAN DRAMA. Cr. 3. Mr. Gates, Mr. McCullen.
534. OLD ENGLISH. Cr. 3. Mr. Gunn.
535. STUDIES IN NINETEENTH CENTURY ENGLISH LITERATURE.  
Cr. 3. Mr. Strout.
536. STUDIES IN AMERICAN LITERATURE. Cr. 3. Mr. Gates.  
May be repeated for credit.
537. SPENSER. Cr. 3. Mr. Strout.
538. STUDIES IN THE ENGLISH ROMANTIC POETS. Cr. 3. Mr. Strout.
5310. STUDIES IN EIGHTEENTH CENTURY ENGLISH LITERATURE.  
Cr. 3. Mr. Camp.
5312. LITERARY CRITICISM: ANCIENT AND MEDIEVAL. Cr. 3.  
Mr. Strout, Mr. Gillis.
5313. LITERARY CRITICISM: RENAISSANCE AND MODERN. Cr. 3.  
Mr. Strout, Mr. Gillis.
5319. STUDIES IN SHAKESPEARE. Cr. 3. Mr. Gates.  
May be repeated for credit.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.
- 731, 732. RESEARCH. Cr. 3, each. Staff.  
Required of students working on the Doctor's dissertation. May  
be repeated for credit as many times as the advisory committee  
recommends.
- 831-2. DOCTOR'S DISSERTATION. Cr. 6 (for bookkeeping purposes).  
Staff.  
Required as the final registration for the dissertation.

## JOURNALISM

332. MAGAZINE ARTICLE WRITING. Cr. 3.
333. PROBLEMS OF THE COMMUNITY NEWSPAPER. Cr. 3.  
Mr. Heitman.
430. PRINCIPLES OF JOURNALISM. Cr. 3. Mr. Heitman.
432. HIGH SCHOOL PUBLICATIONS. Cr. 3.
434. EDITORIAL WRITING. Cr. 3.
- 435, 436. NEWSPAPER ADVERTISING PROBLEMS AND METHODS.  
Cr. 3, each. Mr. Heitman.

## FOREIGN LANGUAGES

Professor Charles B. Qualia  
Head of the Department

Professors Qualia and Gates  
Associate Professor Hamilton  
Assistant Professor Strehli

Minors Only for the Doctor of Philosophy

## SPANISH

Majors and Minors for the Master's Degree

- 431, 432. THE MODERN NOVEL. Cr. 3, each. Mr. Qualia.  
433, 434. THE MODERN DRAMA. Cr. 3, each. Mr. Qualia.  
435. TEACHER'S COURSE IN METHODS OF TEACHING SPANISH. Cr. 3.  
436, 437. ADVANCED GRAMMAR, COMPOSITION AND STYLE. Cr. 3, each.  
Mr. Qualia, Mrs. Gates, Mr. Hamilton.  
438. THE DRAMA BEFORE LOPE DE VEGA. Cr. 3. Mrs. Gates.  
4310, 4311. SPANISH CIVILIZATION IN MEXICO. Cr. 3, each.  
Mr. Hamilton.  
4312, 4313. THE PROSE OF THE GOLDEN AGE. Cr. 3, each.  
Mr. Hamilton.  
4314, 4315. THE DRAMA OF THE GOLDEN AGE. Cr. 3, each.  
Mr. Hamilton.  
4316, 4317. A SURVEY OF SPANISH LITERATURE. Cr. 3, each.  
Mr. Strehli.  
4318. CONTEMPORARY DRAMA. Cr. 3. Mr. Qualia.  
4320. CONTEMPORARY NOVEL. Cr. 3. Mr. Qualia.  
4324, 4325. READINGS IN LATIN-AMERICAN LITERATURE. Cr. 3, each.  
Mrs. Gates.  
4326, 4327. A SURVEY OF SPANISH-AMERICAN LITERATURE. Cr. 3, each.  
Mrs. Gates.  
4335. A STUDY OF SPANISH CIVILIZATION FOR ELEMENTARY  
TEACHERS. Cr. 3. Mr. Qualia, Mrs. Gates, Mr. Hamilton,  
Mr. Strehli.  
Prerequisite: 12 semester hours in Spanish.  
Enrollment limited to graduate students majoring in Elementary  
Education.  
5312, 5313. STUDIES IN SPANISH AND SPANISH-AMERICAN LITERATURE.  
Cr. 3, each. Mrs. Gates, Mr. Qualia, Mr. Hamilton,  
Mr. Strehli.  
631-2. MASTER'S THESIS. Cr. 6. Staff.

## FRENCH

Minors Only for the Master's Degree

- 431, 432. THE MODERN DRAMA. Cr. 3, each. Mr. Qualia.

433, 434. THE LITERATURE OF THE NINETEENTH CENTURY.

Cr. 3, each. Mr. Qualia.

435, 436. READINGS IN FRENCH LITERATURE. Cr. 3, each. Mr. Qualia.

## LATIN

Minors Only for the Master's Degree

331, 332. JUNIOR READINGS. Cr. 3, each.

431, 432. SENIOR READINGS. Cr. 3, each.

Language 4350. LANGUAGE CULTURE IN THE HUMANITIES. Cr. 3.

## GEOLOGY

Professor Raymond G. Sidwell  
Head of the Department

Distinguished Professor Cline

Professor Sidwell

Associate Professors Bond and Brand

Assistant Professor Warn

Majors and Minors for the Master's degree  
and the Doctor of Philosophy

Before being recommended for admission to candidacy for the Master's degree with a major in this department, the student must take a qualifying examination covering the usual undergraduate program for a Bachelor's degree in Geology. If this examination reveals serious weaknesses in necessary areas, the student may be required to register for or repeat such courses as may be designated by the major professor. Likewise before being approved for candidacy for the Master's degree, the student must satisfy the requirements in foreign languages as indicated in the General Regulations.

Requirements for the Doctor's degree in Geology are covered by the general statements concerning this degree, but prospective students who have special problems are invited to write to the head of the department for further details.

333. OPTICAL MINERALOGY (PETROGRAPHY). Cr. 3. Mr. Sidwell.

334. PETROGRAPHY AND PETROLOGY. Cr. 3. Mr. Sidwell.

335, 336. GENERAL PALEONTOLOGY. Cr. 3, each. Mr. Brand.

337. GROUND WATER. Cr. 3.

338. METALLIC ORES OR NON-METALLIC DEPOSITS. Cr. 3.

339. NON-METALLIC DEPOSITS. Cr. 3.

363. FIELD GEOLOGY. Cr. 6.

433. STRUCTURAL GEOLOGY. Cr. 3. Mr. Warn.

434. GEOLOGY OF OIL AND GAS. Cr. 3. Mr. Warn.

435. INDEX FOSSILS. Cr. 3. Mr. Brand.

436. MICROPALAEONTOLOGY. Cr. 3. Mr. Brand.

437. SEDIMENTATION, ENVIRONMENTS. Cr. 3. Mr. Sidwell.  
 438. SEDIMENTATION, PRODUCTS. Cr. 3. Mr. Sidwell.  
 4310. ELEMENTARY VERTEBRATE PALEONTOLOGY. Cr. 3.  
 4311. ADVANCED VERTEBRATE PALEONTOLOGY. Cr. 3.  
 4314. STRATIGRAPHY (PALEOZOIC) OF THE MID-CONTINENT AREA.  
 Cr. 3. Mr. Cline.  
 4315. STRATIGRAPHY (MESOZOIC-CENOZOIC) OF THE MID-CONTINENT  
 AREA. Cr. 3. Mr. Cline.  
 4316. AERIAL PHOTOGRAPHY. Cr. 3. Mr. Warn.  
 511, 512. RESEARCH METHODS. Cr. 1, each. Staff.  
 531. ADVANCED SEDIMENTATION. Cr. 3. Mr. Sidwell.  
 532. ADVANCED SEDIMENTATION (MARINE). Cr. 3. Mr. Sidwell.  
 533, 534. STRUCTURES OF OIL AND GAS RESERVOIRS. Cr. 3, each.  
 Mr. Cline.  
 535, 536. ADVANCED WORK IN SPECIFIC FIELDS. Cr. 3, each.  
 537. FIELD GEOLOGY. Cr. 3.  
 538. GEOLOGY OF THE SOUTHWEST. Cr. 3.  
 539. ADVANCED INVERTEBRATE PALEONTOLOGY OF THE PALEOZOIC.  
 Cr. 3. Mr. Brand.  
 5310. ADVANCED INVERTEBRATE PALEONTOLOGY OF THE MESOZOIC.  
 Cr. 3. Mr. Brand.  
 5311. STRATIGRAPHIC MICROPALAEONTOLOGY. Cr. 3. Mr. Brand.  
 5312. MESOZOIC-CENOZOIC MICROPALAEONTOLOGY. Cr. 3.  
 Mr. Brand.  
 5313, 5314. STRATIGRAPHY OF THE UNITED STATES. Cr. 3, each.  
 Mr. Cline.  
 5319. EOLIAN SEDIMENTATION MATERIALS. Cr. 3. Mr. Warn.  
 5320. EOLIAN SEDIMENTATION PROCESSES. Cr. 3. Mr. Warn.  
 5321. GEOCHEMISTRY OF SEDIMENTARY PROCESSES. Cr. 3. Mr. Sidwell.  
 5322. ADVANCED FIELD GEOLOGY. Cr. 3. Mr. Cline.  
 5324. PROBLEMS IN SEDIMENTATION. Cr. 3. Mr. Sidwell.  
 5326. PROBLEMS IN STRATIGRAPHY. Cr. 3. Mr. Cline.  
 5327. PROBLEMS IN MICROPALAEONTOLOGY. Cr. 3. Mr. Brand.  
 5328. PROBLEMS IN STRUCTURAL GEOLOGY. Cr. 3. Mr. Warn.  
 631-2. MASTER'S THESIS. Cr. 6. Staff.  
 731, 732. RESEARCH. Cr. 3, each. Staff.  
 Required of students working on the Doctor's dissertation. May  
 be repeated for credit as many times as the advisory committee  
 recommends.  
 831-2. DOCTOR'S DISSERTATION. Cr. 6 (for bookkeeping purposes).  
 Staff.  
 Required as the final registration for the dissertation.

## GEOGRAPHY

331. GENERAL METEOROLOGY. Cr. 3. Mr. Warn.  
 332. PRACTICAL METEOROLOGY. Cr. 3. Mr. Warn.



## GOVERNMENT

Professor J. William Davis  
Head of the Department

Professors Davis, Abernethy, and Jackson  
Assistant Professors Fuller and Kennedy

Majors and Minors for the Master's Degree  
and Minors Only for the Doctor of Philosophy

- 331. LOCAL GOVERNMENT. Cr. 3.
- 332. LOCAL ADMINISTRATION. Cr. 3.
- 334. AMERICAN POLITICAL PARTIES. Cr. 3.
- 335. AMERICAN FOREIGN RELATIONS. Cr. 3.
- 336. AMERICAN DIPLOMACY. Cr. 3. Mr. Fuller.
- 337. PUBLIC ADMINISTRATION, ORGANIZATION. Cr. 3. Mr. Jackson.
- 338. PUBLIC ADMINISTRATION, PROCEDURE. Cr. 3. Mr. Jackson.
- 339. GOVERNMENT AND BUSINESS. Cr. 3. Mr. Abernethy.
- 3311. POLITICAL INSTITUTIONS. Cr. 3. Mr. Abernethy.
- 3312. GOVERNMENT AND LABOR. Cr. 3. Mr. Abernethy.
- 431, 432. AMERICAN CONSTITUTIONAL LAW. Cr. 3, each. Mr. Davis.
- 433. EUROPEAN POLITICAL IDEAS. Cr. 3. Mr. Davis.
- 434. AMERICAN POLITICAL IDEAS. Cr. 3. Mr. Davis.
- 435. INTERNATIONAL ORGANIZATION. Cr. 3.
- 436. INTERNATIONAL LAW. Cr. 3.
- 437. POLITICAL GEOGRAPHY. Cr. 3. Mr. Kennedy.
- 438. WORLD POLITICS. Cr. 3. Mr. Fuller.
- 439. MODERN POLITICAL IDEAS. Cr. 3. Mr. Abernethy.
- 4350. POLITICAL IDEOLOGIES AND ISSUES IN THE MODERN WORLD.  
Cr. 3.
- 531. SEMINAR IN AMERICAN GOVERNMENT AND POLITICS. Cr. 3.  
Mr. Davis, Mr. Abernethy, Mr. Jackson.
- 532. SEMINAR IN POLITICAL THEORY. Cr. 3. Mr. Davis,  
Mr. Abernethy.
- 533. SEMINAR IN PUBLIC ADMINISTRATION. Cr. 3. Mr. Jackson.
- 534. SEMINAR IN PUBLIC LAW. Cr. 3. Mr. Davis.
- 535. SEMINAR IN INTERNATIONAL RELATIONS. Cr. 3.  
Mr. Kennedy, Mr. Fuller.
- 536. SEMINAR IN COMPARATIVE GOVERNMENTS AND INSTITUTIONS.  
Cr. 3. Mr. Kennedy.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## HEALTH AND PHYSICAL EDUCATION AND RECREATION

Professor Ramon W. Kireilis

Head of the Department

Professors Kireilis and Jennings

- 410. DRIVER EDUCATION WORKSHOP. Cr. 1. Mr. Jennings.
- 434. PRINCIPLES OF PHYSICAL EDUCATION. Cr. 3.
- 435. MODERN TRENDS IN PHYSICAL EDUCATION. Cr. 3.  
Mr. Kireilis.
- 436. PHYSICAL EXAMINATIONS AND CORRECTIVE PHYSICAL  
EDUCATION. Cr. 3. Mr. Kireilis.
- 437. MEASUREMENTS IN PHYSICAL EDUCATION. Cr. 3. Mr. Kireilis.
- 438. CURRICULUM DEVELOPMENT IN PHYSICAL EDUCATION. Cr. 3.  
Mr. Kireilis.
- 439. COMMUNITY RECREATION. Cr. 3.
- 4320. SAFETY EDUCATION. Cr. 3.
- 4321. METHODS AND TECHNIQUES OF DRIVER INSTRUCTION. Cr. 3.  
Mr. Jennings.
- 4322. ORGANIZATION AND ADMINISTRATION OF INTERSCHOLASTIC  
AND INTERCOLLEGIATE ATHLETIC PROGRAMS. Cr. 3.  
Mr. Jennings.
- 4323. ORGANIZATION AND ADMINISTRATION OF CAMPS. Cr. 3.
- 4324. ORGANIZATION AND ADMINISTRATION OF INTRAMURAL SPORTS.  
Cr. 3.
- 4325. CAMP COUNSELING. Cr. 3.
- 531. ADMINISTRATION OF PHYSICAL EDUCATION. Cr. 3.  
Mr. Kireilis.
- 532. SUPERVISION OF PHYSICAL EDUCATION. Cr. 3. Mr. Kireilis.
- 533. FACILITIES FOR PHYSICAL EDUCATION. Cr. 3. Mr. Kireilis.
- 534. ADMINISTRATION OF THE SCHOOL HEALTH PROGRAM. Cr. 3.  
Mr. Kireilis.

## HISTORY, ANTHROPOLOGY, AND SOCIOLOGY

Professor W. C. Holden

Head of the Department

Distinguished Professor Rister

Professors Eaves, Holden, Kinchen, McKay, and Wallace

Associate Professor Pearce

Assistant Professor Dupree

### HISTORY

Majors and Minors for the Master's Degree  
and the Doctor of Philosophy

- 333. RENAISSANCE AND REFORMATION. Cr. 3. Mr. Pearce.
- 334. THE FRENCH REVOLUTION AND NAPOLEON. Cr. 3.  
Mr. Pearce.

335. THE GEOPOLITICS OF WORLD WAR II. Cr. 3. Mr. Eaves.
338. EIGHTEENTH CENTURY ENGLAND. Cr. 3.
339. NINETEENTH CENTURY ENGLAND. Cr. 3. Mr. Kinchen.
3309. THE NEAR EAST. Cr. 3. Mr. Eaves.
3311. THE CANADIAN DOMINION. Cr. 3. Mr. Kinchen.
3312. THE RECENT HISTORY OF RUSSIA. Cr. 3.
3313. EUROPE FROM 1815 TO 1918. Cr. 3. Mr. Eaves.
3314. EUROPE SINCE 1919. Cr. 3. Mr. Eaves.
3315. JAPAN AND CHINA. Cr. 3. Mr. Eaves.
3316. THE BRITISH EMPIRE. Cr. 3. Mr. Kinchen.
3319. TWENTIETH CENTURY BRITAIN. Cr. 3. Mr. Kinchen.
433. THE AMERICAN REVOLUTION. Cr. 3. Mr. McKay, Mr. Dupree.
434. EARLY AMERICAN CONSTITUTIONAL DEVELOPMENT. Cr. 3.  
Mr. McKay.
435. ANGLO-AMERICAN DIPLOMACY. Cr. 3. Mr. McKay.
436. THE FEDERALIST AND REPUBLICAN PERIODS. Cr. 3.  
Mr. Wallace, Mr. Dupree.
437. THE JACKSONIAN PERIOD. Cr. 3. Mr. Wallace, Mr. Dupree.
4310. EXPANSION OF THE UNITED STATES. Cr. 3. Mr. McKay.
4311. THE CIVIL WAR. Cr. 3. Mr. McKay.
4312. RECONSTRUCTION. Cr. 3. Mr. McKay.
4313. HISTORY OF THE UNITED STATES, 1877-1898. Cr. 3.  
Mr. Dupree.
4314. HISTORY OF THE UNITED STATES, 1898-1918. Cr. 3.  
Mr. Dupree.
4315. CONSTITUTIONAL DEVELOPMENT IN TEXAS. Cr. 3. Mr. McKay.
4316. HISTORY OF THE UNITED STATES, 1919-1932. Cr. 3.  
Mr. McKay.
4317. HISTORY OF THE UNITED STATES SINCE 1933. Cr. 3.  
Mr. McKay.
4319. LATIN AMERICAN DIPLOMACY. Cr. 3.
4320. SOCIAL HISTORY OF TEXAS, 1821-1860. Cr. 3. Mr. Holden.
4321. RECENT HISTORY OF TEXAS, 1900-1940. Cr. 3. Mr. McKay.
4322. LIFE AND LITERATURE OF THE SOUTHWEST. Cr. 3. Mr. Gillis.
- 4323, 4324. HISTORY OF SOUTH AMERICA. Cr. 3, each.
- 4325, 4326. HISTORY OF SPANISH NORTH AMERICA. Cr. 3, each.
4327. HISTORY OF THE AMERICAN FRONTIER, 1763-1803. Cr. 3.  
Mr. Rister.
4328. THE TRANS-MISSISSIPPI WEST, 1803 TO THE PRESENT. Cr. 3.  
Mr. Rister.
4335. HISTORY APPRECIATION FOR ELEMENTARY TEACHERS. Cr. 3.  
Enrollment limited to graduate students majoring in Elementary  
Education.
4350. PATTERNS OF WORLD HISTORY. Cr. 3. Mr. Eaves.
530. SEMINAR IN SOUTHWESTERN HISTORY. Cr. 3. Mr. Holden,  
Mr. Rister.
531. SEMINAR IN TEXAS HISTORY. Cr. 3. Mr. Wallace.

532. SEMINAR IN AMERICAN HISTORY. Cr. 3. Mr. McKay,  
Mr. Rister.
534. SEMINAR IN ENGLISH HISTORY. Cr. 3. Mr. Kinchen.
535. THE TECHNIQUE OF RESEARCH. Cr. 3.
536. SEMINAR IN EUROPEAN HISTORY. Cr. 3. Mr. Eaves.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.
- 731, 732. RESEARCH. Cr. 3, each. Staff.  
Required of students working on the Doctor's dissertation. May  
be repeated for credit as many times as the advisory committee  
recommends.
- 831-2. DOCTOR'S DISSERTATION. Cr. 6 (for bookkeeping purposes).  
Staff.  
Required as the final registration for the dissertation.

### ANTHROPOLOGY

Minors only for the Master's Degree

330. CULTURES AND PEOPLES OF THE SOUTHWEST. Cr. 3. Mr. Pearce.
333. SOCIAL CUSTOMS OF THE PLAINS INDIANS. Cr. 3. Mr. Wallace.
334. RACES, PEOPLES AND LANGUAGES OF NORTH AMERICA. Cr. 3.  
Mr. Holden.
335. ARCHAEOLOGY IN AMERICA NORTH OF MEXICO. Cr. 3.  
Mr. Holden.
- 336, 337. MEXICAN ARCHAEOLOGY. Cr. 3, each. Mr. Pearce.
430. RACES, PEOPLES, AND LANGUAGES OF SOUTH AMERICA. Cr. 3.  
Mr. Wallace.
431. FIELD ARCHAEOLOGY. Cr. 3. Mr. Holden.
- 433, 434. SOUTHWESTERN ARCHAEOLOGY. Cr. 3, each. Mr. Holden.
4350. THE ORIGIN OF SOCIAL CUSTOMS AND INSTITUTIONS. Cr. 3.  
Mr. Holden.
- 531, 532. SEMINAR. Cr. 3, each. Mr. Holden.

### SOCIOLOGY

Majors and Minors for the Master's Degree

332. MARRIAGE. Cr. 3. Mr. Little.
333. AMERICAN MINORITY PROBLEMS. Cr. 3.
334. PATTERNS OF CULTURAL TRADITIONS. Cr. 3. Mr. Eaves.
336. SOCIAL LIFE AND CULTURE OF MEXICO. Cr. 3.
337. SOCIAL ORGANIZATION. Cr. 3.
338. THE SOCIOLOGY OF THE PERSON. Cr. 3.
339. COLLECTIVE BEHAVIOR. Cr. 3.
3310. SOCIAL CONTROL. Cr. 3.
3311. POPULATION PROBLEMS. Cr. 3.
3312. COMMUNITY ORGANIZATION. Cr. 3.
431. PATTERNS OF RURAL LIFE IN THE UNITED STATES. Cr. 3.  
Mr. Wallace.
432. PROBLEMS IN SOCIAL WORK. Cr. 3.



433. CRIMINOLOGY. Cr. 3.  
 435. HUMAN ECOLOGY. Cr. 3.  
 436. DEVELOPMENT OF SOCIOLOGICAL THOUGHT. Cr. 3.  
     Mr. Kinchen.  
 437. SOCIAL CHANGE. Cr. 3.  
 438. SEMINAR IN SOCIAL PROBLEMS. Cr. 3.  
 439. CONTEMPORARY SOCIOLOGICAL THEORY. Cr. 3.  
 4310. RESEARCH METHODS (NONSTATISTICAL). Cr. 3.  
 4311. SOCIOLOGY OF CHILD DEVELOPMENT. Cr. 3.  
 531. RESEARCH METHODS (STATISTICAL). Cr. 3.  
 532. SEMINAR IN SYSTEMATIC SOCIOLOGICAL THEORY. Cr. 3.  
 631-2. MASTER'S THESIS. Cr. 6.

## HOME ECONOMICS

Dean Margaret W. Weeks, Graduate Chairman

Advisory Committee: Miss Erwin, Mrs. Adams, and Mrs. Lamb

Professors Adams, Callan, Erwin, Michie, Poindexter, and Weeks  
 Associate Professors Clewell and Lamb  
 Assistant Professors Buttrill and Nesbitt

Courses Applicable to the Degree of Master of Science  
 in Home Economics

## APPLIED ARTS

432. HOMES IN THE UNITED STATES. Cr. 3.  
 434. METAL AND PLASTIC. Cr. 3.  
 435. JEWELRY AND LAPIDARY. Cr. 3. Miss Poindexter,  
 436. HOME PLANNING. Cr. 3. Miss Poindexter.  
 437. CRAFTS DESIGN. Cr. 3. Miss Poindexter.  
 4335. THEORY AND PRACTICE OF ART FOR ELEMENTARY TEACHERS.  
     Cr. 3.  
     Enrollment limited to graduate students majoring in Elementary  
     Education.  
 531. SPECIAL PROBLEMS. Cr. 3.  
     (a) Costume Design                      (d) Leather  
     (b) Interior Design                      (e) Metal  
     (c) Textile Design                      (f) Wood

## CHILD DEVELOPMENT AND FAMILY RELATIONS

432. NURSERY SCHOOL EDUCATION. Cr. 3. Miss Callan.  
 433. FAMILY RELATIONS. Cr. 3. Miss Callan.  
 435. STUDENT TEACHING IN NURSERY SCHOOL. Cr. 3. Miss Callan.  
 531. FAMILY RELATIONS. Cr. 3. Miss Callan.

## CLOTHING AND TEXTILES

- 311. HISTORIC TEXTILES. Cr. 1. Miss Erwin.
- 331. TAILORING. Cr. 3.
- 332. ADVANCED DRESS DESIGN. Cr. 3.
- 334. FAMILY CLOTHING PROBLEMS. Cr. 3.
- 336. TEXTILE APPRECIATION. Cr. 3.
- 431. TEXTILE ECONOMICS. Cr. 3.
- 432. ADVANCED TEXTILES. Cr. 3.
- 433. HISTORY OF COSTUME. Cr. 3. Miss Erwin.
- 435. HOME FURNISHINGS. Cr. 3. Miss Erwin.
- 4335. TEXTILE TRENDS AND RESOURCES FOR ELEMENTARY TEACHERS.  
Cr. 3. Miss Erwin.  
Enrollment limited to graduate students majoring in Elementary Education.
- 511, 512, 513. ADVANCED WORK IN SPECIAL FIELDS. Cr. 1, 2, or 3.
- 531. ADVANCED GARMENT FITTING. Cr. 3.
- 532, 533. SPECIAL PROBLEMS IN CLOTHING. Cr. 3, each. Miss Erwin.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## FOODS AND NUTRITION

## Foods

- 311. HISTORY OF FOOD CUSTOMS. Cr. 1. Mrs. Lamb.
- 331. FOOD DEMONSTRATION. Cr. 3.
- 332. FOOD PURCHASING. Cr. 3.
- 333. EXPERIMENTAL COOKERY. Cr. 3.
- 335. FOOD PRESERVATION. Cr. 3.
- 431. PROBLEMS OF THE SCHOOL LUNCH PROGRAM. Cr. 3.  
Mrs. Lamb.
- 433. ADVANCED FOOD PREPARATION AND SERVING. Cr. 3.
- 531. RESEARCH METHODS IN COOKERY. Cr. 3. Mrs. Lamb.

## NUTRITION

- 431. NUTRITION IN DISEASE. Cr. 3. Mrs. Michie.
- 432. NUTRITION. Cr. 3. Mrs. Lamb.
- 433. CHILD NUTRITION. Cr. 3. Mrs. Michie.
- 434. METHODS OF TEACHING NUTRITION. Cr. 3. Mrs. Michie.
- 4335. NUTRITION TRENDS AND RESOURCES FOR ELEMENTARY  
TEACHERS. Cr. 3. Mrs. Lamb.  
Enrollment limited to graduate students majoring in Elementary Education.
- 531. TECHNIQUES OF NUTRITION RESEARCH. Cr. 3. Mrs. Lamb.
- 532. STUDIES IN ENERGY METABOLISM. Cr. 3. Mrs. Lamb.
- 533. READINGS IN NUTRITION. Cr. 3. Mrs. Michie.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## HOME MANAGEMENT

- 411, 412, 413. HOUSEHOLD EQUIPMENT WORKSHOP. Cr. 1, 2, or 3.  
 These three courses taken together are the equivalent of 433.  
 431. HOUSING, HOUSE CARE, AND MANAGEMENT. Cr. 3.  
 433. HOUSEHOLD EQUIPMENT. Cr. 3.  
 434. CONSUMER PROBLEMS. Cr. 3.

## HOME ECONOMICS EDUCATION

Courses Applicable to a Major for the Degree of Master of  
 Education or Master of Science in Home Economics

432. PROBLEMS IN TEACHING CLOTHING. Cr. 3.  
 433. METHODS OF TEACHING HOME CARE OF THE SICK AND HOME  
 SAFETY. Cr. 3. Miss Clewell.  
 434. METHODS OF TEACHING ART IN THE HOMEMAKING  
 CURRICULUM. Cr. 3. Miss Poindexter.  
 435. METHODS FOR ADULT LEADERSHIP. Cr. 3. Miss Clewell.  
 441. STUDENT TEACHING IN HOME ECONOMICS. Cr. 4.  
 532. THE DEVELOPMENT OF THE HOMEMAKING PROGRAM. Cr. 3.  
 Mrs. Adams.  
 534. TECHNIQUES OF RESEARCH IN HOME ECONOMICS. Cr. 3.  
 Mrs. Adams.  
 536. PROBLEMS IN TEACHING HOME ECONOMICS. Cr. 3.  
 Mrs. Adams, Miss Nesbitt.  
 537. TECHNIQUES OF SUPERVISION IN HOME ECONOMICS. Cr. 3.  
 Mrs. Adams, Miss Nesbitt.  
 631-2. MASTER'S THESIS. Cr. 6. Staff.  
 Required for the Master of Science in Home Economics; optional  
 for the Master of Education.

## MATHEMATICS

Professor Emmett A. Hazlewood  
 Head of the Department

Professors Fuller, Hazlewood, Heineman, Sparks, and Underwood

Majors and Minors for the Master's Degree  
 and Minors Only for the Doctor of Philosophy

321. DIFFERENTIAL EQUATIONS. Cr. 2. Staff.  
 331. APPLICATIONS OF CALCULUS. Cr. 3. Staff.  
 332. DIFFERENTIAL EQUATIONS. Cr. 3. Staff.  
 333. ADVANCED ALGEBRA. Cr. 3. Staff.  
 337. COLLEGE GEOMETRY. Cr. 3. Mr. Underwood.  
 339. STATISTICAL METHODS. Cr. 3.  
 431. THE TEACHING OF SECONDARY MATHEMATICS. Cr. 3.  
 Mr. Hazlewood, Mr. Fuller.

432. ADVANCED DIFFERENTIAL EQUATIONS. Cr. 3. Mr. Fuller.  
 433. THEORY OF EQUATIONS. Cr. 3. Mr. Heineman.  
 434, 435. ADVANCED CALCULUS. Cr. 3, each. Mr. Hazlewood.  
 436. INTRODUCTION TO FINITE GROUPS. Cr. 3. Mr. Heineman.  
 437. THEORY OF NUMBERS. Cr. 3. Mr. Underwood.  
 438. SOLID ANALYTIC GEOMETRY. Cr. 3. Mr. Heineman.  
 439. VECTOR ANALYSIS. Cr. 3. Mr. Sparks.  
 533. ADVANCED TOPICS IN ANALYSIS. Cr. 3. Mr. Fuller.  
 534. SYNTHETIC PROJECTIVE GEOMETRY. Cr. 3. Mr. Underwood.  
 535. ANALYTIC PROJECTIVE GEOMETRY. Cr. 3. Mr. Underwood.  
 536, 537. MODERN ALGEBRA. Cr. 3, each. Mr. Fuller.  
 539. SPECIAL TOPICS IN NUMBER THEORY. Cr. 3. Mr. Underwood.  
 5312, 5313. FUNCTIONS OF A COMPLEX VARIABLE. Cr. 3, each.  
     Mr. Sparks.  
 5314, 5315. FUNCTIONS OF A REAL VARIABLE. Cr. 3, each.  
     Mr. Hazlewood, Mr. Fuller.  
 631-2. MASTER'S THESIS. Cr. 6. Staff.

## MUSIC

Professor Gene L. Hemmle  
 Head of the Department

Professors Hemmle and Wiley

Majors and Minors for the Master's Degree

## APPLIED MUSIC

- 315, 316. VOICE OR PIANO. Cr. 1, each.  
 425, 426. VOICE OR INSTRUMENT. Cr. 2, each.  
 435, 436. VOICE OR PIANO. Cr. 3, each.  
 445, 446. VOICE OR PIANO. Cr. 4, each.  
 4215, 4216. VOICE OR PIANO. Cr. 2, each.  
 4415, 4416. VOICE OR PIANO. Cr. 4, each.

## MUSIC LITERATURE

- 330, 331. VOICE RÉPERTOIRE. Cr. 3, each.  
 332, 333. PIANO RÉPERTOIRE. Cr. 3, each.  
 431, 432. HISTORY OF MUSIC. Cr. 3, each.  
 4350. MUSIC IN GENERAL CULTURE. Cr. 3. Mr. Hemmle.

## MUSIC EDUCATION

- 433, 434. PIANO PEDAGOGY. Cr. 3, each.  
 437, 438. VOICE PEDAGOGY. Cr. 3, each.  
 4317. CHORAL CONDUCTING. Cr. 3. Mr. Hemmle.  
 4318. INSTRUMENTAL CONDUCTING. Cr. 3. Mr. Wiley.



4335. MUSIC FOR CHILDREN. Cr. 3. Mr. Hemmle.  
Prerequisite: 6 semester hours of Music Education or two years of teaching experience at the elementary level.  
Enrollment limited to graduate students majoring in Elementary Education.
- 530, 531. SEMINAR IN MUSIC EDUCATION. Cr. 3, each. Mr. Hemmle.
532. CHORAL MUSIC WORKSHOP. Cr. 3. Mr. Hemmle.
533. INSTRUMENTAL MUSIC WORKSHOP. Cr. 3. Mr. Wiley.

## THEORY

- 322, 323. FORM AND COMPOSITION. Cr. 2, each.
- 427, 428. INSTRUMENTATION. Cr. 2, each.
4312. PEDAGOGY OF THEORY. Cr. 3.

## PHYSICS

Professor Clarence C. Schmidt  
Head of the Department

Professor Schmidt  
Associate Professors Glaser and Merrymon  
Assistant Professor McKinney

Majors and Minors for the Master's Degree

- 312, 313. MODERN PHYSICS LABORATORY. Cr. 1, each.
331. LIGHT. Cr. 3. Mr. Merrymon.
332. HEAT AND THERMODYNAMICS. Cr. 3.
336. ELECTRICITY AND MAGNETISM. Cr. 3.
- 337, 338. INTRODUCTION TO MODERN PHYSICS. Cr. 3, each.
341. ELECTRON TUBES AND APPLICATIONS TO PHYSICAL SCIENCE.  
Cr. 4. Mr. McKinney.
- 411, 412. PHYSICS SEMINAR. Cr. 1, each. Mr. Schmidt.
- 415, 416. SPECIAL PROJECTS. Cr. 1, each.
- 423, 424. ELECTRICAL MEASUREMENTS. Cr. 2, each. Mr. Schmidt.
431. HIGH SCHOOL PHYSICS TEACHING. Cr. 3.
435. MECHANICS. Cr. 3. Mr. Merrymon.
- 436, 437. INDIVIDUAL STUDY IN SPECIFIED FIELDS. Cr. 3, each.
- 531, 532. THEORETICAL PHYSICS. Cr. 3, each. Mr. McKinney.
- 533, 534. QUANTUM MECHANICS, ATOMIC AND MOLECULAR PHYSICS.  
Cr. 3, each. Mr. Glaser.
535. NUCLEAR PHYSICS. Cr. 3. Mr. Glaser.
536. X-RAYS. Cr. 3. Mr. Glaser.
- 539, 5310. GEOMETRICAL AND PHYSICAL OPTICS. Cr. 3, each.  
Mr. Merrymon.
- 631-2. MASTER'S THESIS. Cr. 6. Staff.

## PSYCHOLOGY

Professor Lehman C. Hutchins  
Head of the Department

Professors Barnett and Hutchins  
Associate Professors Kuntz and True

Majors and Minors for the Master's Degree  
and Minors Only for the Doctor of Education  
and Doctor of Philosophy

The Department of Psychology offers graduate work leading to the Master's degree in General Theoretical Psychology, Industrial Psychology, and Pre-Clinical Psychology. Candidates for the Master's degree in these areas will be expected to have completed the equivalent of an undergraduate major in psychology, including twelve semester hours of advanced work. Students who have not previously had a course in experimental psychology will be required to take Psychology 437 and 438. Psychology 537 is required of all candidates. In cooperation with the Department of Education, work is offered which leads to the degree of Doctor of Education or Doctor of Philosophy in Counseling and Guidance.

The following courses are listed also under Educational Psychology in the Department of Education: 331, 333, 335, 337, 431, 433, 530, 531, 533, 534, 535, 537, 539, 5310, 5311, 5312, 5313, 5314, 5315, 560, and 561.

- 331. CHILD PSYCHOLOGY. Cr. 3. Miss True.
- 333. STATISTICAL METHODS. Cr. 3. Mr. Barnett.
- 335. ADOLESCENT PSYCHOLOGY. Cr. 3. Miss True.
- 336. PHYSIOLOGICAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.
- 337. COUNSELING AND GUIDANCE. Cr. 3. Mr. Barnett.
- 431. TESTS AND MEASUREMENTS. Cr. 3. Mr. Barnett.
- 432. PERSONNEL TESTING. Cr. 3. Mr. Kuntz.
- 433. MENTAL HYGIENE: THE PSYCHOLOGY OF PERSONAL ADJUSTMENT. Cr. 3. Miss True.
- 434. SOCIAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.
- 435. ABNORMAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.
- 436. PERSONALITY DEVELOPMENT. Cr. 3. Mr. Hutchins.
- 437, 438. EXPERIMENTAL PSYCHOLOGY. Cr. 3, each. Mr. Kuntz.
- 439. INDUSTRIAL PSYCHOLOGY. Cr. 3. Mr. Kuntz.
- 4310. METHODS IN CLINICAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.
- 530. ADVANCED EDUCATIONAL PSYCHOLOGY. Cr. 3. Mr. Hutchins.
- 531. INTRODUCTION TO PROJECTIVE TECHNIQUES. Cr. 3.  
Mr. Hutchins.
- 532. PROBLEMS IN PSYCHOLOGY. Cr. 3. Staff.
- 533. EXPERIMENTAL CHILD PSYCHOLOGY. Cr. 3. Miss True.
- 534. PRACTICUM IN INTELLIGENCE TESTING. Cr. 3. Mr. Barnett.
- 535. INTRODUCTION TO THE RORSCHACH TEST. Cr. 3.  
Mr. Hutchins.

537. ADVANCED STATISTICAL METHODS. Cr. 3. Mr. Kuntz.  
 539. VOCATIONAL INFORMATION. Cr. 3. Mr. Kuntz.  
 5310. TECHNIQUES OF COUNSELING AND GUIDANCE. Cr. 3.  
     Mr. Barnett.  
 5311. PRACTICUM IN TECHNIQUES OF COUNSELING AND GUIDANCE.  
     Cr. 3. Mr. Barnett.  
 5312, 5313. PRACTICUM IN ADVANCED PSYCHOLOGICAL TESTING.  
     Cr. 3, each. Staff.  
 5314. SEMINAR IN EDUCATIONAL PSYCHOLOGY. Cr. 3.  
 5315. SEMINAR IN COUNSELING AND GUIDANCE. Cr. 3. Mr. Barnett.  
 5319. ADVANCED INDUSTRIAL PSYCHOLOGY. Cr. 3. Mr. Kuntz.  
 560, 561. INTERNSHIP IN COUNSELING AND GUIDANCE. Cr. 6, each.  
 631-2. MASTER'S THESIS. Cr. 6. Staff.

## SPEECH

Professor P. Merville Larson  
 Head of the Department

Professors Larson and Pendleton

### Majors and Minors for the Master's Degree

430. ADVANCED PUBLIC SPEAKING. Cr. 3. Mr. Larson.  
 435. INTERPRETATIVE READING. Cr. 3. Miss Pendleton.  
 436. RADIO PROGRAM PLANNING, DIRECTION, AND PRODUCTION.  
     Cr. 3.  
 437. PERSUASION. Cr. 3. Mr. Larson.  
 438. ADVANCED DISCUSSION AND CONFERENCE METHODS. Cr. 3.  
     Mr. Larson.  
 439. METHODS OF TEACHING SPEECH. Cr. 3. Mr. Larson.  
     May also be taken as Education 439.  
 4310, 4311. ADVANCED STAGE DIRECTING METHODS. Cr. 3, each.  
     May also be taken as Education 4310 or 4311.  
 4314. SPEECH PATHOLOGY. Cr. 3.  
     May also be taken as Education 4314.  
 4318, 4319. SPEECH CORRECTION METHODS. Cr. 3, each.  
     May also be taken as Education 4318 or 4319.  
 4320, 4321. SUPERVISED CLINICAL PRACTICE IN SPEECH CORRECTION.  
     Cr. 3, each.  
     May also be taken as Education 4320 or 4321.  
 4325. DIRECTING SCHOOL SPEECH ACTIVITIES. Cr. 3. Mr. Larson.  
     May also be taken as Education 4325.  
 4335. BASIC SPEECH FOR ELEMENTARY TEACHERS. Cr. 3.  
     Mr. Larson, Miss Pendleton.  
     Enrollment limited to graduate students majoring in Elementary  
     Education.

4350. HISTORY OF SPEECH AND THE THEATER. Cr. 3. Mr. Larson.  
531, 532. STUDIES IN SPEECH THERAPY. Cr. 3, each.  
533, 534. PROBLEMS IN RESEARCH. Cr. 3, each. Staff.  
631-2. MASTER'S THESIS. Cr. 6. Staff.

## INTERDEPARTMENTAL MAJOR IN AMERICAN CIVILIZATION

Committee in Charge:

Professors T. W. Camp (English), J. W. Davis (Government),  
and W. C. Holden (History)

Professor Davis, *Chairman*

Majors Only for the Doctor of Philosophy

American Civilization is an interdepartmental major dealing with the historical, literary, and political development of the United States. Most of the courses are drawn from regular work in American history, American literature, and American government, but courses in economics, education, philosophy, and the fine arts may be prescribed.

Applicants will be expected to have the usual course prerequisites in at least two of the principal areas of study—government, history, and literature, but, with the consent of the advisory committee and the heads of the departments concerned, they may enroll for graduate courses in the other departments without having all of the customary prerequisites.

The dissertation must be on a subject crossing departmental lines to include at least two of the major areas of concentration.