

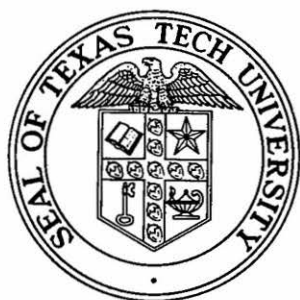
BULLETIN
OF
TEXAS TECH UNIVERSITY

VOL. XLVIII

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NO. 5

*Catalog
of the
Graduate School
1972-1973*



"This institution is an integrated institution of higher learning at all levels."—*Policy Statements of the Board of Regents of Texas Tech University.*

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Office of the Dean of the Graduate School

J. KNOX JONES, JR., Dean
THOMAS A. LANGFORD, Associate Dean
DILFORD C. CARTER, Associate Dean
CHARLES LEONARD AINSWORTH, Assistant Dean
IRENE NEALE TEMPLE, Administrative Assistant

University Calendar, 1972-1973

Forty-eighth Annual Session

Fall Semester 1972

- August 22** Tuesday. Fall semester begins.
10 a.m., residence halls open for occupancy.
First meal, breakfast, Wednesday, August 23.
- August 23-26** Wednesday-Saturday noon. Registration for the fall semester.
- August 28** Monday. 7:30 a.m., classes begin.
- September 26** Tuesday. Grade of W will be given for all courses dropped on or before this date.
- November 11*** Saturday. Homecoming.
- November 22** Wednesday. 12:30 p.m., classes dismissed for Thanksgiving holidays.
- November 27** Monday. 7:30 a.m., classes resume.
- December 1** Friday. Last day for December degree candidates to complete correspondence courses.
Last day for December degree candidates to remove grades of I and PR.
Last day for December degree candidates to submit to the Graduate Dean the final copy of theses and dissertations and pay binding fee.
Last day for December degree candidates to file statement of intention to graduate in the academic dean's office and to pay graduation fee in the Comptroller's office.
- December 11-18** Monday-Monday. Final examinations for the fall semester.
- December 19** Tuesday. 10 a.m., residence halls close.
Fall semester ends.
- December 21** Thursday. Final grade reports due in the Registrar's office.

Spring Semester 1973

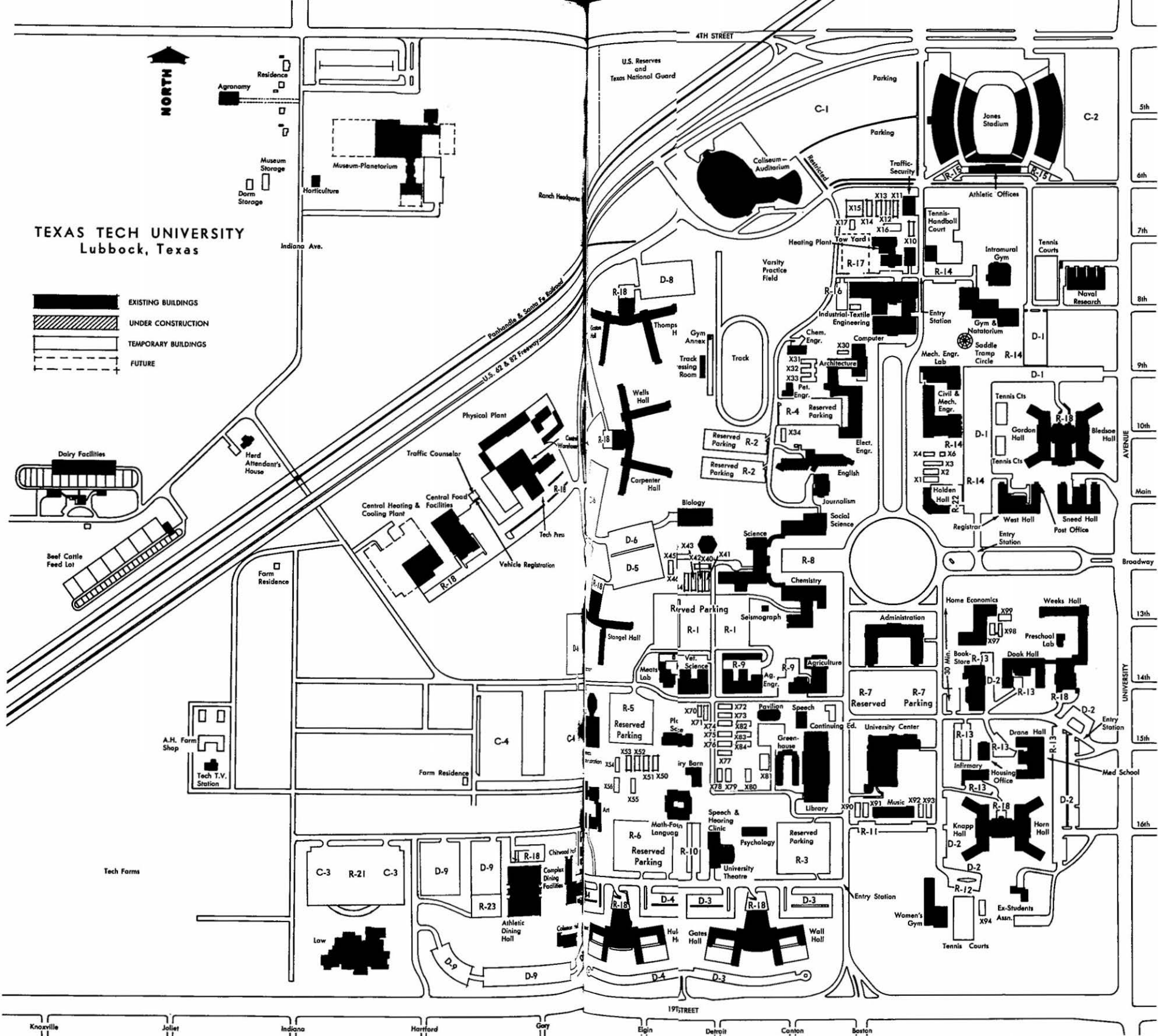
- January 9** Tuesday. Spring semester begins.
10 a.m., residence halls open for occupancy.
First meal, breakfast, Wednesday, January 10.
- January 10-13** Wednesday-Saturday noon. Registration for the spring semester.

*Subject to change

January 15	Monday. 7:30 a.m., classes begin.
February 12	Monday. Grade of W will be given for all courses dropped on or before this date.
March 11	Sunday. All-University Recognition Service.
March 12	Monday. Last day for May degree candidates to order academic regalia and invitations at the Bookstore.
March 24	Saturday. 12:30 p.m., classes dismissed for Spring Vacation.
April 2	Monday. 7:30 a.m., classes resume.
April 19	Thursday. Last day for May degree candidates to complete correspondence courses. Last day for May degree candidates to remove grades of I and PR. Last day for May degree candidates to submit to the Graduate Dean the final copy of theses and dissertations and pay binding fee. Last day for May degree candidates to file statement of intention to graduate in the academic dean's office and to pay graduation fee in the Comptroller's office.
April 30-May 7	Monday-Monday. Final examinations for the spring semester.
May 8	Tuesday. 10 a.m., residence halls close. Degree candidates may occupy rooms until 10 a.m., Sunday, May 13.
May 9	Wednesday. Final grade reports due in the Registrar's office.
May 12	Saturday. 8 p.m., Commencement exercises. Spring semester ends.
Summer Session 1973	
May 28	Monday. First summer term begins.
July 7	Saturday. First summer term ends.
July 9	Monday. Second summer term begins.
August 18	Saturday. Second summer term ends.

TEXAS TECH UNIVERSITY
Lubbock, Texas

-
- EXISTING BUILDINGS
- UNDER CONSTRUCTION
- TEMPORARY BUILDINGS
- FUTURE



Officials and Graduate Faculty

Board of Regents 1971-1972

Officers

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BILL E. COLLINS, Vice Chairman

MRS. FRED A. PIERCE, Secretary

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Term Expires January 31, 1973

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FIELD SCOVELL	Dallas
JUDSON F. WILLIAMS	El Paso

Term Expires January 31, 1975

R. TRENT CAMPBELL	Houston
FRANK JUNELL	San Angelo
CHARLES G. SCRUGGS	Dallas

Term Expires January 31, 1977

BILL E. COLLINS	Lubbock
CLINT FORMBY	Hereford
JOHN HINCHEY, M.D.	San Antonio

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 Glenn E. Barnett, Ed.D., Executive Vice President and Professor of Education
 Sabe McClain Kennedy, Ph.D., Vice President for Academic Affairs and Professor of Government
 Bill J. Parsley, J.D., Vice President for Public Affairs
 Orlo E. Childs, Ph.D., Vice President for Research and Special Programs and Professor of Geosciences
 John A. Buesseler, M.D., Vice President for Health Affairs and Dean of the School of Medicine
 Leo E. Ellis, M.B.A., Comptroller and Treasurer

Graduate Council

The Graduate Council is composed of ten members, eight of whom are elected by the Graduate Faculty and two of whom are appointed by the dean. The dean is *ex officio* chairman of the council; the associate and the assistant deans are *ex officio* members of the council as is the vice president for academic affairs. Members serve for a period of three years and are not eligible for immediate

reelection unless they have been chosen to fill an unexpired term. By a system of rotation, some new members join the council each year, replacing those whose terms of office have expired. The date after a name indicates the year of expiration of the individual's term of office.

The Graduate Council, assisted by the Graduate Faculty, is charged with the responsibility of formulating the policies of the Graduate School and the requirements for graduate degrees. These policies are administered by the dean.

J. Knox Jones, Jr., Ph.D., Professor of Biology and Dean of the Graduate School
 Thomas Alexander Langford, Ph.D., Associate Professor of English and Associate Dean of the Graduate School
 Dillford C. Carter, Ph.D., Associate Professor of Biology and Associate Dean of the Graduate School
 Charles Leonard Ainsworth, Ed.D., Associate Professor of Education and Assistant Dean of the Graduate School
 Mary Jeanne van Appledorn, Ph.D., Professor of Music (1973)
 Neville Hasso Bremer, Ed.D., Professor of Education (1974)
 Vincent Peter Luchsinger, Ph.D., Professor of Management (1972)
 George Francis Meenaghan, Ph.D., Professor of Chemical Engineering (1974)
 Harley Dean Oberhelman, Ph.D., Professor of Classical and Romance Languages (1972)

- James Verdo Reese**, Ph.D., Associate Professor of History (1973)
Robert Lyle Rouse, Ph.D., Professor and Chairman of the Department of Economics (1972)
Russell William Strandman, Ph.D., Professor of Biology (1974)
Henry Albert Wright, Ph.D., Associate Professor of Range and Wildlife Management (1974)
S. P. Yang, Ph.D., Professor and Chairman of the Department of Food and Nutrition (1973)

Graduate Faculty

Members. Members of the Graduate Faculty participate in all phases of the graduate program, assist in determining policy, and vote on candidates for graduate degrees. Membership is conceived of as a means of recognizing the distinguished members of the faculty as evidenced by scholarship, creativity, and direction of graduate research and study.

- Joe Alfred Adamcik**, Ph.D., Associate Professor of Chemistry
Charles Leonard Ainsworth, Ed.D., Associate Professor of Education and Assistant Dean of the Graduate School
Robert Custer Albin, Ph.D., Associate Professor of Animal Science
Theodor Walter Alexander, M.S., Professor of Germanic Languages
Bonnie L. Allen, Ph.D., Professor of Agronomy
Robert Daniel Amason, Ph.D., Professor of Marketing and Director of Administrative Services in the College of Business Administration
Ali Reza Amir-Moez, Ph.D., Professor of Mathematics
John Arthur Anderson, Ph.D., Associate Professor of Chemistry
Robert Paul Anderson, Ph.D., Professor of Psychology
Ronald Myles Anderson, Ph.D., Associate Professor of Mathematics
Norwood Andrews, Jr., Ph.D., Professor and Chairman of the Department of Classical and Romance Languages
Theodore Andreychuk, Ph.D., Professor and Chairman of the Department of Psychology
James E. Archer, Ph.D., Professor and Chairman of the Department of Engineering Analysis and Design and Professor of Computer Science
Clifford Charles Ashby, Ph.D., Professor of Speech and Theatre Arts
Donald Ashdown, Ph.D., Professor of Entomology
Billy Earl Askins, Ed.D., Associate Professor of Education
Thomas Andrew Atchison, Ph.D., Associate Professor of Mathematics
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Mohamed Mohamed Ayoub, Ph.D., Professor of Industrial Engineering and Statistics
Robert James Baker, Ph.D., Associate Professor of Biology
Howard Lloyd Balsey, Ph.D., Professor of Marketing and Statistics
Irol Whitmore Balsey, Ed.D., Professor of Business Education
James Joseph Barber, A.Mus.D., Professor of Music
Glenn E. Barnett, Ed.D., Professor of Education and Executive Vice President

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Robert Morrison Bethea, Ph.D., Associate Professor of Chemical Engineering
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Craig C. Black, Ph.D., Professor of Geosciences and Director of the Museum
Lowell Lawrence Blaisdell, Ph.D., Professor of History
Jack L. Boddien, Ph.D., Assistant Professor of Psychology
Eric George Bolen, Ph.D., Associate Professor of Range and Wildlife Management
Thomas Loris Bouillion, Ph.D., Associate Professor of Mathematics and Statistics
Oswald Donice Bowlin, Ph.D., Professor of Finance and Administrator of Research and Special Programs in the College of Business Administration
Floyd D. Boze, Ed.D., Professor of Education and Dean of Admissions
Nancy Smith Boze, Ed.D., Associate Professor of Education
John Ross Bradford, Ph.D., Reg. Prof. Engr. (Ohio, Texas), Professor of Chemical Engineering and Dean of the College of Engineering
Neville Hasso Bremer, Ed.D., Professor of Education
Faye Laverne Bumpass, D.Litt., Horn Professor of Romance Languages
John M. Burns, Ph.D., Assistant Professor of Biology
Earl D. Camp, Ph.D., Professor of Biology
Truman Wildes Camp, Ph.D., Professor of English
Sam Lewis Campbell, Ph.D., Associate Professor of Psychology
Deore J. Cannon, Ph.D., Associate Professor of Psychology
Mary Sue Carlock, Ph.D., Associate Professor of English
David Wesley Carlyle, Ph.D., Assistant Professor of Chemistry
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Walter Joseph Cartwright, Ph.D., Professor and Chairman of the Department of Sociology
Owen LaVerne Caskey, Ed.D., Professor of Education and Associate Vice President for Academic Affairs

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- Alfred Cismaru**, Ph.D., Professor of Classical and Romance Languages
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- John Allen Ryan**, Ph.D., Professor of Marketing
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- Billy Joe Sandlin**, Ph.D., Associate Professor of Physics
- Elizabeth Skidmore Sasser**, Ph.D., Professor of Architecture
- Joseph Lawrence Schuster**, Ph.D., Professor and Chairman of the Department of Range and Wildlife Management
- Russell Holland Seacat, Jr.**, Ph.D., Professor and Chairman of the Department of Electrical Engineering
- Lloyd Bruce Sherrod**, Ph.D., Associate Professor of Animal Science
- Henry Joseph Shine**, Ph.D., Horn Professor and Chairman of the Department of Chemistry
- Charles William Shoppee**, Ph.D., D.Sc., D. Phil., F.R.S., F.A.A., Welch Professor of Chemistry
- Deskin Hunt Shurbet**, M.A., Professor of Geosciences
- Milton Louis Smith**, Ph.D., Assistant Professor of Industrial Engineering
- Pill-Soon Song**, Ph.D., Professor of Chemistry
- Jack D. Steele**, D.B.A., Professor of Management and Dean of the College of Business Administration
- Carl Herbert Stem**, Ph.D., Associate Professor of Economics and Finance and Administrator of the Area of Finance in the College of Business Administration
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- John Paul Strain**, Ph.D., Associate Professor of Education
- Russell William Strandmann**, Ph.D., Professor of Biology
- Metin Tamkoc**, Ph.D., Professor of Government
- Jan Dalton Tarwater**, Ph.D., Professor of Mathematics
- Donald Wayne Thayer**, Ph.D., Assistant Professor of Biology
- Henry Coffman Thomas**, Ph.D., Professor and Chairman of the Department of Physics
- Leland Floyd Tribble**, Ph.D., Professor of Animal Science
- William Pierce Tucker**, Ph.D., Professor of Government
- Willie Lee Ulich**, Ph.D., Reg. Prof. Engr. (Texas), Professor and Chairman of the Department of Agricultural Engineering
- Elo Joe Urbanovsky**, B.S., Horn Professor and Chairman of the Department of Park Administration, Horticulture, and Entomology and University Landscape Architect
- C. V. Girija Vallabhan**, Ph.D., Assistant Professor of Civil Engineering
- Mary Jeanne vanAppledorn**, Ph.D., Professor of Music
- Tinco E. A. Van Hylckama**, Ph.D., Part-time Professor of Civil Engineering
- Emmanuel T. Van Nierop**, Ph.D., Associate Professor of Park Administration, Horticulture and Entomology
- David Martell Vigness**, Ph.D., Professor and Chairman of the Department of History
- Darrell Lee Vines**, Ph.D., Associate Professor of Electrical Engineering and Computer Science
- Franklin Alton Wade**, Ph.D., Horn Professor of Geosciences
- Warren Stanley Walker**, Ph.D., Horn Professor of English
- Ernest Wallace**, Ph.D., Horn Professor of History
- Morris Sheppard Wallace**, Ed.D., Professor of Education
- Arun Govind Walvekar**, Ph.D., Associate Professor of Industrial Engineering and Statistics
- Dan Moody Wells**, Ph.D., Professor of Civil Engineering
- George Arthur Whetstone**, Ph.D., Professor of Civil Engineering

Carlton James Whitehead, Ph.D., Associate Professor of Management and Administrator of Undergraduate Programs in the College of Business Administration
Richard Edward Wilde, Jr., Ph.D., Associate Professor of Chemistry
Doyle Z. Williams, Ph.D., Professor of Accounting
Maynette Derr Williams, Ph.D., Professor of Clothing and Textiles
Willard Forest Williams, Ph.D., Horn Professor of Agricultural Economics
Herald W. Winkler, Ph.D., Professor and Chairman of the Department of Petroleum Engineering
Ilse Hildegard Wolf, Ed.D., Professor of Home and Family Life
Henry Albert Wright, Ph.D., Associate Professor of Range and Wildlife Management
S. P. Yang, Ph.D., Professor and Chairman of the Department of Food and Nutrition
Dale Wendel Zinn, Ph.D., Professor and Chairman of the Department of Animal Science
Edward William Zukauckas, Jr., M.S., Associate Professor of Horticulture

Associate Members. Associate Members of the Graduate Faculty teach courses of all graduate levels and act as members of students' advisory committees except that they may not serve as chairmen of doctoral committees.

Eugene R. Alesch, Ph.D., Associate Professor of Art
Archie Cornelious Allen, Ph.D., Associate Professor of Biology
James George Allen, M.A., Professor of English
Dwane Elmer Anderson, Ph.D., Assistant Professor of Mathematics and Statistics
Hugh Allen Anderson, M.A., Associate Professor of Economics
William Burnside Arper, Ph.D., Professor of Geosciences
Elizabeth Carolyn Ater, Ph.D., Associate Professor of Home and Family Life
Cecil Irvy Ayers, M.S., Professor of Agronomy
Frank Lorenzo Baird, Ph.D., Associate Professor of Government
George Lewis Baldwin, Ph.D., Associate Professor of Mathematics
John H. Baumgardner, M.S., Professor of Animal Science
Camille Graves Bell, Ed.D., Professor and Chairman of the Department of Home Economics Education
Gary L. Blackmer, Ph.D., Assistant Professor of Chemistry
Brian Layton Blakeley, Ph.D., Associate Professor of History
Lee E. Blakely, Ph.D., Assistant Professor of Food Technology
Francis Eldon Bloomer, Ph.D., Assistant Professor of Education
Michael W. Bobo, Ph.D., Assistant Professor of Health, Physical Education, and Recreation for Men
John James Bodoh, Ph.D., Associate Professor of Classical Languages
Robert Lester Bonnington, Ph.D., Associate Professor of Economics
John Paul Brand, Ph.D., Professor of Geosciences
Peter Drago Bubresko, M.A., Associate Professor of Romance Languages
Henry Edsel Buchanan, M.A., Associate Professor of Health, Physical Education, and Recreation for Men

Charles Louis Burford, Ph.D., Reg. Prof. Engr. (Oklahoma), Associate Professor of Industrial Engineering and Computer Science
Tommy R. Burkes, Ph.D., Assistant Professor of Electrical Engineering
John Edward Burkhardt, Ph.D., Assistant Professor of Health, Physical Education, and Recreation for Men
John Howard Burnett, Ph.D., Assistant Professor of Government
Larry Clark Burton, Ph.D., Assistant Professor of Electrical Engineering
Charles E. Butler, Ph.D., Assistant Professor of Economics
William Gaston Cain, Jr., Ph.D., Professor of Management
James C. Caldwell, Ph.D., Assistant Professor and Administrator of Accounting in the College of Business Administration
Robert G. Campbell, Ph.D., Assistant Professor of Anthropology
Richard Howard Carlson, Ph.D., Associate Professor of Psychology
Thomas G. Carpenter, Ph.D., Associate Professor of Agricultural Engineering
Valerie M. Chamberlain, Ph.D., Associate Professor of Home Economics Education
Charles Ray Chandler, Ph.D., Assistant Professor of Sociology
Kwong Shu Chao, Ph.D., Assistant Professor of Electrical Engineering
Douglas C. Chaffield, Ph.D., Assistant Professor of Psychology
Samuel Whitten Chisholm, M.B.A., C.P.A., Professor of Accounting
Aubry Duane Christian, Ph.D., Assistant Professor of Education
Billy Joe Claborn, Ph.D., Associate Professor of Civil Engineering
John William Cobb, Jr., P.E.D., Professor and Chairman of the Department of Health, Physical Education, and Recreation for Men
Clarke E. Cochran, Ph.D., Assistant Professor of Government
Rosemary Cogan, Ph.D., Assistant Professor of Psychology
Alfred Eugene Coleman, Ed.D., Assistant Professor of Health, Physical Education, and Recreation for Men
Jacquelin Collins, Ph.D., Associate Professor of History
Charles W. Conatser, Ph.D., Assistant Professor of Mathematics
William Cornette, Ph.D., Assistant Professor of Management
Alberto Cortes, Ph.D., Assistant Professor of Philosophy
Kyle Jane Coulter, Ed.D., Assistant Professor of Home and Family Life
Murray Whitfield Coulter, Ph.D., Associate Professor of Biology
Duane Austin Crawford, M.S., Reg. Prof. Engr. (Texas), Associate Professor of Petroleum Engineering
James E. Crowder, Ph.D., Assistant Professor of Psychology
James William Culp, Ph.D., Professor of English
Charles Edwin Dale, LL.B., Professor of Finance
Claud M. Davidson, Ph.D., Assistant Professor of Geography
Lewis James Davies, Ph.D., Associate Professor of Sociology
Dale W. Davis, Ph.D., Assistant Professor of English
Robert Waldo Deahl, M.M., Professor of Music
William F. Dean, Ed.D., Assistant Professor of Mass Communications

- John Fred Deethardt, Jr., Ph.D.,** Assistant Professor of Speech
- Virgil Thomas Dock, Ph.D.,** Assistant Professor of Management
- James Francis Donaldson, Ph.D.,** Assistant Professor of Philosophy
- John T. Donnelly, M.A.,** Assistant Professor of Management
- William Parks Dukes, Ph.D.,** Associate Professor of Finance
- Roy Sylvan Dunn, M.A.,** Associate Professor of Sociology and Director of the Southwest Collection
- Benjamin S. Duran, Ph.D.,** Assistant Professor of Mathematics
- Donald Durland, M.A.,** Associate Professor of Art
- William Henry Duvall, Ed.D.,** Assistant Professor of Education
- Marvin J. Dvoracek, M.S.,** Associate Professor of Agricultural Engineering
- Ulrich Lewis Eggenberger, Ph.D.,** Professor of Agricultural Education
- James Leroy Eigsti, B.A.,** Assistant Professor of German
- Arthur McAuley Elliot, Ph.D.,** Associate Professor of Biology
- Leonard Ellis, Ph.D.,** Assistant Professor of Speech and Theatre Arts
- Paul Raymond Ellsworth, M.A.,** Professor of Music
- Laura Katherine Evans, Ed.D.,** Professor of Education and Coordinator of Curriculum and Instruction
- Billy Cotton Everton, Ed.D.,** Associate Professor of Art
- Dee Earl Ezell, Ph.D.,** Associate Professor of Management and Administrator of Administration and Human Resources in the College of Business Administration
- Dorothy Jane Filgo, M.A.,** Associate Professor of Education
- Aldo Finco, D.M.L.,** Associate Professor of Classical and Romance Languages
- Jerran T. Flinders, Ph.D.,** Assistant Professor of Range and Wildlife Management
- Eugene P. Foerster, Ph.D.,** Associate Professor of Agricultural Engineering
- Leona Mitchell Foerster, Ed.D.,** Assistant Professor of Education
- James Maurice Foster, Ph.D.,** Assistant Professor of English and Linguistics
- Stanley E. Fowler, Ph.D.,** Professor and Chairman of the Department of Home and Family Life
- Margarete Elisabeth Freitas, Ph.D.,** Assistant Professor of Germanic and Slavonic Languages
- James Rankin Gammill, Ed.D.,** Associate Professor of Education
- Thomas C. Gee, Ph.D.,** Assistant Professor of Education
- Edward V. George, Ph.D.,** Associate Professor of Classical and Romance Languages
- Hugh Gibbons, M.A.,** Assistant Professor of Art
- John S. Gibson, Jr., Ph.D.,** Assistant Professor of Mass Communications
- Beverly Dianne Gilbert, Ph.D.,** Assistant Professor of English
- George W. Goldman, Ph.D.,** Assistant Professor of Mechanical Engineering
- Preston Frazier Gott, M.A.,** Associate Professor of Physics
- Roy Russell Graham, Ph.D.,** Assistant Professor of Chemical Engineering
- Lola Beth Green, Ph.D.,** Associate Professor of English
- Jack A. Griggs, Ph.D.,** Assistant Professor of Finance
- Donald Lloyd Gustafson, Ph.D.,** Assistant Professor of Electrical Engineering
- Dan Miller Guy, Ph.D.,** Assistant Professor of Accounting
- John D. Hamilton, Ph.D.,** Assistant Professor of Mathematics
- Paul Dean Hanna, Jr., M.F.A.,** Associate Professor of Art
- Donald R. Haragan, Ph.D.,** Associate Professor of Geosciences
- Charles Sidney Hardwick, Ph.D.,** Associate Professor and Chairman of the Department of Philosophy
- James William Harper, Ph.D.,** Assistant Professor of History
- Lynn LaMar Hatfield, Ph.D.,** Assistant Professor of Physics
- Robert Ames Hayes, Ph.D.,** Assistant Professor of History
- Ray Wayne Hellberg, Ph.D.,** Associate Professor of Art
- June M. Henton, Ph.D.,** Associate Professor of Home and Family Life
- Richard Wayne Henton, Ph.D.,** Associate Professor of Art
- David Leon Higdon, Ph.D.,** Assistant Professor of English
- Patricia M. Hopkins, Ph.D.,** Assistant Professor of Romance Languages
- Doris Ann Horton, Ph.D.,** Professor of Health, Physical Education, and Recreation for Women
- Larry M. Hovey, Ph.D.,** Assistant Professor of Education
- David Allen Howe, Ph.D.,** Associate Professor of Physics
- James Dean Howze, M.S.,** Professor of Art
- Dorothy Beatrice Hoyle, Ph.D.,** Professor of Health, Physical Education, and Recreation for Women
- Alexander Pope Hull, Ph.D.,** Associate Professor of German
- Louis Roberts Hunt, Ph.D.,** Assistant Professor of Mathematics
- Mitsuko Inano, Ph.D.,** Assistant Professor of Food and Nutrition
- Chester Cartwright Jaynes, M.S.,** Associate Professor of Agronomy
- Harry Jebson, Jr., Ph.D.,** Assistant Professor of History
- Joseph J. Johnson, Ph.D.,** Assistant Professor of English
- Richard Garner Jones, Ph.D.,** Assistant Professor of Psychology
- Charles W. Keller, Ph.D.,** Assistant Professor of Psychology
- Joan M. Kelley, Ed.D.,** Associate Professor of Home Economics Education
- Rex Page Kennedy, M.S.,** Associate Professor of Agricultural Economics
- Richard Orville Keslin, Ph.D.,** Associate Professor of Anthropology
- Panzer Butler Kimmell, Ed.D.,** Associate Professor of Education
- Charles D. King, Ph.D.,** Assistant Professor of Sociology
- Joseph E. King, Ph.D.,** Assistant Professor of History
- Mary Elizabeth King, Ph.D.,** Associate Professor of Anthropology
- Gerald S. Kirby, Ph.D.,** Assistant Professor of Mechanical Engineering
- Dwight Louis Kirk, Ed.D.,** Professor of Education
- Bill Kozar, Ph.D.,** Assistant Professor of Health, Physical Education, and Recreation for Men
- Lynwood Alois Kreneck, M.F.A.,** Assistant Professor of Art

- Daniel R. Krieg**, Ph.D., Assistant Professor of Agronomy
- Allan James Kuethe**, Ph.D., Assistant Professor of History
- Lyle Carlton Kuhnley**, Ph.D., Associate Professor of Biology
- James Edward Kuntz**, Ph.D., Professor of Psychology
- Raymond LaGarce**, Ph.D., Assistant Professor of Marketing
- Eddy Landers**, Ph.D., Assistant Professor of Home Economics Education
- Robert Ernest Larson**, Ph.D., Associate Professor of Home and Family Life
- Hong Y. Lee**, Ph.D., Associate Professor of Agricultural Economics
- Samuel Hunt Lee, Jr.**, Ph.D., Professor of Chemistry
- Thomas F. Lee**, Ph.D., Assistant Professor of Finance and Administrator of Information Systems and Quantitative Science in the College of Business Administration
- Daniel E. Lees**, Ph.D., Assistant Professor of English
- Archie Max Lennon**, Ph.D., Assistant Professor of Animal Science
- Ruth Levinsky**, Ph.D., Assistant Professor of English
- Stanley Robert Liberty**, Ph.D., Assistant Professor of Electrical Engineering
- Jan Michael Libourel**, Ph.D., Assistant Professor of History
- Ivan Lee Little**, Ph.D., Professor of Philosophy and Associate Dean of the College of Arts and Sciences
- Diana Marie Love**, M.F.A., Assistant Professor of Health, Physical Education, and Recreation for Women
- Laura Louise Luchsinger**, D.B.A., Associate Professor and Administrator of Marketing
- William M. Lyle**, Ph.D., Associate Professor of Agricultural Engineering
- James Richard McDonald**, Ph.D., Associate Professor of Civil Engineering
- Walter R. McDonald**, Ph.D., Associate Professor of English
- Richard Patrick McGlynn**, Ph.D., Assistant Professor of Psychology
- Clara Mueller McPherson**, M.S., Associate Professor of Food and Nutrition
- Max Manley**, Ph.D., Assistant Professor of Education
- Glen Alan Mann**, Ph.D., Associate Professor of Physics
- Dell R. Marcoux**, Ph.D., Assistant Professor of English
- Phillip H. Marshall**, Ph.D., Assistant Professor of Psychology
- Danny Raymond Mason**, Ed.D., Assistant Professor of Health, Physical Education, and Recreation for Men
- Henry James Maxwell**, Ph.D., Professor of Romance Languages
- Lawrence Clark Mayer**, Ph.D., Assistant Professor of Government
- Shamus Mehaffie**, Ph.D., Assistant Professor of Education
- James D. Mertes**, Ph.D., Assistant Professor of Park Administration
- Harold D. Meyer**, Ph.D., Assistant Professor of Mathematics
- Ronald Max Miller**, Ph.D., Assistant Professor of Food Technology
- Jerry L. Mills**, Ph.D., Assistant Professor of Chemistry
- Paul R. Milosevich**, M.A., Assistant Professor of Art
- Evelyn Ina Montgomery**, Ph.D., Associate Professor of Anthropology
- Robert A. Moreland**, Ph.D., Assistant Professor of Mathematics
- Robert Jeffry Morris**, Ph.D., Assistant Professor of Classical and Romance Languages
- John T. Morrow**, M.S., Assistant Professor of Art
- Otto Millard Nelson**, Ph.D., Associate Professor of History
- Benjamin Havelock Newcomb**, Ph.D., Assistant Professor of History
- Robert Lee Newell**, M.S. in M.E., Professor of Mechanical Engineering and Associate Dean of the College of Engineering
- David K. Northington**, Ph.D., Assistant Professor of Biology
- Charles William O'Brien**, Ph.D., Research Scientist, Park Administration, Horticulture and Entomology
- Richard L. Oden**, Ph.D., Assistant Professor of English
- Mary Seymour Owens**, M.A., Professor of Health, Physical Education, and Recreation for Women
- Thomas Richard Owens**, Ph.D., Associate Professor of Agricultural Economics
- Shrikant S. Panwalker**, Ph.D., Assistant Professor of Industrial Engineering
- Steve W. Panyan**, Ph.D., Assistant Professor of Government
- Roderick Parkinson**, M.A., Associate Professor of Art
- L. E. Parsons**, B.S., Professor of Textile Engineering
- William Taylor Patterson**, Ph.D., Associate Professor of Romance Languages
- Earlene L. Paynter**, Ph.D., Assistant Professor of Speech and Theatre Arts
- Neale J. Pearson**, Ph.D., Assistant Professor of Government
- Dianne S. Peters**, Ph.D., Assistant Professor of Education
- Russell Dean Pettit**, Ph.D., Assistant Professor of Range and Wildlife Management
- Marilyn Phelan**, D.B.A., Assistant Professor of Accounting
- Florence Phillips**, Ed.D., Professor of Psychology
- Robert Henry Pinder**, Ph.D., Associate Professor of Home and Family Life
- Juanita Tittle Pollard**, M.A., Associate Professor of Art
- Louis David Ponthieu**, Ph.D., Assistant Professor of Management
- Charles William Post**, M.A., Associate Professor of Music
- J. C. Prabhakar**, Ph.D., Assistant Professor of Electrical Engineering
- Forrest Weldon Price**, D.B.A., Assistant Professor of Management
- John William Queen**, M.F.A., Associate Professor of Art
- Donna R. Read**, M.S., Assistant Professor of Art
- Charles Wesley Rebstock**, Ph.D., Associate Professor of Education
- Maryanne Reid**, Ed.D., Assistant Professor of Education
- Eibert Brunner Reynolds, Jr.**, Ph.D., Associate Professor of Mechanical Engineering
- Stephen James Reynolds**, M.A., Assistant Professor of Art
- Charles Lathan Riggs**, Ph.D., Professor of Mathematics
- George Stiegler Robbert**, Ph.D., Associate Professor of History
- Louise Buenger Robbert**, Ph.D., Assistant Professor of History
- Arthur Theophile Roberts**, Ph.D., C.P.A., Professor of Accounting

Delilah Manire Roch, Ph.D., Associate Professor of Clothing and Textiles
Ruth M. Rogers, Ph.D., Associate Professor of Health, Physical Education and Recreation for Women
Robert Alan Rooker, M.A., Associate Professor of Mass Communications
Brent S. Roper, Ph.D., Assistant Professor of Sociology
S. Bernard Rosenblatt, D.B.A., Associate Professor of Mass Communications
Billy Irvan Ross, Ph.D., Professor and Chairman of the Department of Mass Communications
Sujit Kumar Roy, M.S.A., Associate Professor of Agricultural Economics and Statistics
Manuel Ruiz-Urbieto, Ph.D., Assistant Professor of Mechanical Engineering
Michael Kent Rylander, Ph.D., Assistant Professor of Biology
John Hay Salazar, Ph.D., Assistant Professor of Sociology
John Sanders, J. D., Assistant Professor of Business Law
Betty Johnson Sands, Ed.D., Associate Professor of Education
Albert Joseph Sanger, M.S., Associate Professor of Civil Engineering
Lester C. Sartorius, Ph.D., Professor of Marketing
Ronald Edward Schulz, M.A., Professor of Speech
Herman Brazill Segrest, Ed.D., Professor of Health, Physical Education, and Recreation for Men
Ralph Louis Sellmeyer, M.A., Associate Professor of Mass Communications
Don Graves Shane, Ph.D., Associate Professor of Education
Vera Loie Simpson, M.A., Assistant Professor of Speech
Margaret Ann Wilson Sitton, Ed.D., Professor of Home Economics Education and Assistant Dean of the College of Home Economics
Gerald D. Skoog, Ed.D., Assistant Professor of Education
Jimmy Hiram Smith, Ph.D., Assistant Professor of Civil Engineering
Ronald E. Smith, Ph.D., Assistant Professor of Government
James M. Solar, Ph.D., Assistant Professor of Food and Nutrition
Ronald Eugene Sosebee, Ph.D., Assistant Professor of Range and Wildlife Management
Lorum H. Stratton, Ph.D., Assistant Professor of Classical and Romance Languages
Monty J. Strauss, Ph.D., Assistant Professor of Mathematics
Betty A. Street, M.S., Assistant Professor of Art
Robert M. Sweazy, Ph.D., Assistant Professor of Civil Engineering
Alexis S. Tan, Ph.D., Assistant Professor of Mass Communications
Haskell Grant Taylor, M.A., C.P.A., Professor of Accounting
Fred A. Teague, Ed.D., Associate Professor of Education
Otis Worth Templar, Jr., Ph.D., Assistant Professor of Geography
George Tereshkovich, Ph.D., Associate Professor of Horticulture
Dahlia Jewel Terrell, Ph.D., Associate Professor of English
Arthur Dudley Thompson, M.S., Associate Professor of Architecture
Paul Edward Thompson, Ed.D., Associate Professor of Mathematics
Richard Earl Tolley, M.S., Associate Professor of Music

Myron L. Trang, Ed.D., Assistant Professor of Education
Idris Rhea Traylor, Jr., Ph.D., Associate Professor of History
Thomas Frederic Trost, Ph.D., Assistant Professor of Electrical Engineering
Roger Monroe Troub, Ph.D., Assistant Professor of Economics
Lloyd V. Urban, Ph.D., Assistant Professor of Civil Engineering
Gene Carlton Uelton, Ph.D., Assistant Professor of Economics
Stuart Van Auker, Ph.D., Assistant Professor of Marketing
William G. Vanderbok, Ph.D., Assistant Professor of Government
Charles Ernest Wade, Ph.D., Associate Professor of Finance
Jack Douglas Wages, Ph.D., Assistant Professor of English
Fred P. Wagner, Ph.D., Assistant Professor of Civil Engineering
Homer F. Walker, Ph.D., Assistant Professor of Mathematics
Norma Peden Walker, Ph.D., Professor and Chairman of the Department of Clothing and Textiles
John Frank Walkup, Ph.D., Assistant Professor of Electrical Engineering
Estelle Hays Wallace, M.S., Professor of Home and Family Life
Derald Dee Walling, Ph.D., Associate Professor of Mathematics
Charles Richard Ward, Ph.D., Assistant Professor of Park Administration
Drage Hall Watson, Ed.D., Associate Professor of Education
James Taggart Watt, Ph.D., Associate Professor of Business Education
Russell R. Wheeler, Ph.D., Assistant Professor of Government
John Thomas White, Ph.D., Associate Professor of Mathematics
William Elmer Whittington, Ph.D., Professor of Accounting
Ira Lawson Williams, M.S., Reg. Prof. Engr. (Texas), Professor of Agricultural Engineering
Billie Frances Williamson, M.A., Professor of Home Economics Education and Assistant Dean of the College of Home Economics
Welborn Kiefer Willingham, Ph.D., Associate Professor of Education
Margaret Eileen Wilson, Ph.D., Professor and Chairman of the Department of Health, Physical Education, and Recreation for Women
Charles N. Wise, Ph.D., Associate Professor of Speech
John Wittman, Jr., Ph.D., Associate Professor of Economics
Eleanor Woodson, Ed.D., Associate Professor of Clothing and Textiles
Ruth Cowart Wright, Ph.D., Assistant Professor of Government
Ehud Yairi, Ph.D., Assistant Professor of Speech
James T. Yates, Ph.D., Assistant Professor of Speech
Kenneth Young, Ph.D., Assistant Professor of Agricultural Economics
Wolodymyr Taras Zyla, Ph.D., Associate Professor of Germanic and Slavonic Languages

General Information

Texas Tech University, which was founded in 1923 and enrolled its first students in the fall of 1925, is a state-supported, coeducational institution comprising the instructional colleges of Agricultural Sciences, Arts and Sciences, Business Administration, Education, Engineering, and Home Economics, the School of Law, the Graduate School, and a number of special departments and divisions. The 61st Legislature of the State of Texas authorized the creation of the Texas Tech University School of Medicine as a separate educational institution.

Lubbock, the home of Texas Tech, is a city of approximately 150,000 inhabitants. It is situated in the South Plains area of West Texas at an altitude of 3,250 feet. Dry, crisp air and sunny days throughout practically the entire year provide a healthful and invigorating climate.

The University campus, a contiguous tract of 1,839 acres, lies at the western edge of the business section of the city. University buildings number 212, of which 88 are considered permanent.

The first president of Texas Tech was Paul Whitfield Horn (1925-1932). He was followed by Bradford Knapp (1932-1938), Clifford Bartlett Jones (1938-1944, President Emeritus, 1944-), William Marvin Whyburn (1944-1948), Dossie Marion Wiggins (1948-1952), Edward Newlon Jones (1952-1959), Robert Cabaniss Goodwin (1959-1966), and Grover Elmer Murray (1966-).

Graduate work has been offered at Texas Tech since 1927. In 1937 the graduate program became a separate unit under its own dean and council. Between 1928, when the first master's degree was awarded, and August 31, 1971, a total of 5,898 masters' degrees had been conferred; and since 1952, when the doctorate was first awarded, 462 degrees have been conferred, of which 288 were Ph.D's, 146 were Ed.D's, and 28 were D.B.A's.

Professors who have served as Graduate Dean are William Albert Jackson (1937-1938), Robert Cabaniss Goodwin (1938-1945), William Curry Holden (1945-1950), William Bryan Gates (1950-1963), Fred Durnford Rigby (1963-1968); Interim Graduate Deans Lawrence Lester Graves (1968-1970) and Thomas A. Langford (1970-1971); and current Graduate Dean J. Knox Jones, Jr. (1971-).

Special Facilities

Housing Accommodations. Prospective graduate students who are interested in living in a University residence hall should address an inquiry to the Reservation Center, Box 4629, Tech Station, Lubbock, Texas 79409.

ICASALS. The International Center for Arid and Semi-Arid Land Studies (ICASALS) was established in 1966 when the Board of Regents adopted as the special mission of the University the study of arid and semi-arid lands, which comprise over half of the exposed surface of the earth. "Arid and semi-arid lands studies" is interpreted to mean not only the land itself and its plant and animal life, but man in all the varieties of his experiences in arid environments.

An integral part of the University, ICASALS has its foundations in the entire undergraduate and graduate academic structure. Guidance and coordination are provided by an Advisory Council composed of the University deans, the Vice President for Research, the Associate Vice President, and the Chairman of the Executive Committee of the Faculty Council. Programs and research are originated and implemented through a Projects Board consisting of nineteen members of the faculty.

ICASALS is the medium of stimulation, coordination, and implementation of symposia, public service programs, research activities, and information exchange pertaining to arid lands. It is directly concerned, also, with the application of data and techniques to human needs. It supports and facilitates the publication of results of arid and semi-arid land research. It serves as a laboratory as well as a library and to the best of its abilities and resources encourages and assists projects of all types, wherever a useful function may be performed—regionally, nationally or internationally. ICASALS hopes by this means to render a significant contribution towards the social, technological, and economic advancement of arid and semi-arid regions.

Library. The University Library houses 1,062,483 volumes and 243,184 units of microforms. The Library is one of two Regional Depositories for U. S. Government

Documents in Texas. The total figure of well over 1,250,000 items includes annual subscriptions to 6,773 periodicals which have been carefully chosen by subject specialists in the University to support its academic programs and plans. The above figures indicate adequate basic materials in the humanities and social sciences as well as in sciences and engineering. All materials are housed in a modern, well-equipped building with an open stack arrangement, with study tables conveniently placed throughout the subject areas.

Thirty-six professional, experienced librarians are on duty to give assistance to the library user, and these professional librarians are assisted by fifty subprofessionals and over one hundred students. The Library is open to students and faculty until 12 midnight most of the year, according to the following schedule: 7:20 a.m. to 12 midnight, Monday through Friday; 8 a.m. to 5 p.m., Saturday; 2 p.m. to 12 midnight, Sunday. Closed holidays. Summer terms: 7:20 a.m. to 10 p.m., Monday through Friday; 9 a.m. to 5 p.m., Saturday; 2 p.m. to 10 p.m. Sunday.

The Library has sixteen rapid copy machines in use at the nominal price of five cents a page. The Library is a member of the Texas Information Exchange, which instantly links the Library with over 30 other Texas libraries and some libraries outside the state with teletype equipment.

A specially equipped student service center providing study rooms, reading rooms, braille books, and tape machines is available to aid visually handicapped students.

Museum. The Museum of Texas Tech University offers a total program of education, research, and public service in museum-related fields. The Museum contains important research collections in anthropology, art, biology, geosciences, and history. Graduate students and faculty members whose scholarly studies relate to the museum's collections may be assigned research space in the building. The Museum's library and public displays are open daily except Monday.

Placement Service. Graduate students are urged to file their complete records (including photographs) with the Placement Service even though they may not contemplate immediate use of its facilities. Experience has shown that sooner or later almost every graduate with a master's or doctor's degree needs to have his record on file in the Placement office. To assemble such a record after a person has left the campus is difficult and sometimes impossible.

Southwest Collection. The Southwest Collection is both the University archives and a repository for historical information pertaining to the American Southwest.

Its quarters in the Social Science Building provide facilities for study and research, as well as space for storage of research materials such as personal papers, biographical data, noncurrent business records, maps, microfilms, tape recordings, periodicals, photographs, newspapers, and a library of Southwestern books and periodicals.

Manuscript holdings alone total over four million leaves, and data pertaining to collections are published by the Library of Congress in the *National Union Catalog of Manuscript Collections*.

All materials may be used by both students and the general public for research or reference. Service is provided during the following hours: 8 a.m. to 5 p.m., Monday through Friday (open until 7 p.m., Tuesday); 8 a.m. to 12 noon, Saturday. Inquiries are welcomed.

University Health Center. The University Hospital provides limited accommodations for regularly enrolled students who are ill enough to require constant supervision but who do not require surgery or the services of specialists. The University cannot provide students with hospital service elsewhere, and it cannot assume responsibility for the continued medical care of students suffering from chronic diseases.

Additional details about the University Health Center may be found in the *General Catalog* of Texas Tech University.

Fees and Deposits

The following information concerning fees and deposits applies only to semesters of long sessions; the *Summer School Catalog* carries details about fees required in the summer terms.

Payment of Fees. Texas Tech University reserves the right to change fees in keeping with acts of the Texas State Legislature or the Board of Regents. All fees are

payable in full within 7 days after the day of registration, and a student is not registered until all his fees are paid in full. Payment may be made by checks printed with the magnetic ink characters or money orders payable to Texas Tech University. All checks and money orders are accepted subject to final payment. Cash will be accepted and receipts given for the payment of registration fees only by the University Cashier and only on the days and times announced.

Veterans of the Spanish-American War, World War I, World War II, or the Korean War, who are residents of Texas, may be eligible for exemptions under the Hazlewood Act. See the Coordinator of Veterans' Affairs in the Registrar's office.

Tuition Fees as Set by Recent Action of the Texas Legislature.

Tuition Fee for Resident Students: For legal resident students of the state of Texas, the tuition fee, each semester, is \$4 per semester hour, but the total of such charge shall not be less than \$50.

Tuition Fee for Nonresident Students not Enrolled in Spring 1971: For nonresident students who were not enrolled at Texas Tech in the spring semester of 1971, who were enrolled in spring 1971 but who have not continuously enrolled, or who have completed the degree program in which they were enrolled in spring 1971, the tuition fee, each semester, is \$40 per semester hour.

Tuition Fee for Nonresident Students Enrolled in Spring 1971: For nonresident students who were enrolled at Texas Tech in the spring semester of 1971, who have continuously enrolled at Texas Tech, and who have not completed the degree program in which they were enrolled in spring 1971, the tuition fee, each semester, is \$200. For such students who enroll for less than 12 semester hours in any semester, the tuition fee is computed on the following basis:

For 11 semester hours—\$184	6 semester hours—\$100
10 semester hours— 167	5 semester hours— 84
9 semester hours— 150	4 semester hours— 67
8 semester hours— 134	3 semester hours
7 semester hours— 117	or less— 50

Tuition Fee for Foreign Students: For foreign students the tuition fee, each semester, is \$14 per semester hour, but the total of such charge shall not be less than \$200.

Miscellaneous General Fees.

1. *General Property Deposit:* Each student enrolled in the University must make a general property deposit of \$7. This deposit is subject to charges for property loss, damages, breakages, or violation of rules in the Library or laboratories.

A student is required to maintain a balance of \$7 in his property deposit account. If the balance is below this amount he will be charged an additional fee sufficient to bring the account balance to \$7. At his request this deposit, less charges, will be returned to the student upon termination of his tenure here as a student. Deposits will be held at least 60 days after the close of a semester, or after a student withdraws during a semester, so that all charges and fines may be accumulated from the various departments.

Under state law, deposits which remain without call for a refund for a period of four years from the date of last attendance will be forfeited and transferred to the Student Property Deposit Scholarship Account.

2. *Laboratory Fees:* A laboratory fee of \$2 per semester is charged for all courses in which the combined lecture and laboratory credit is from 1 to 3 semester hours. For courses in which the semester credit is 4 semester hours or more the laboratory fee is \$4 per semester.

3. *Student Services Fee:* Every student must pay a \$26 fee each semester of the long session if he is enrolled for 6 semester hours or more.

4. *University Center Fee:* This is a \$5 fee authorized by state law, to be paid each semester of the long session by every student enrolled for 3 semester hours or more.

5. *Building Use Fee:* This is a fee authorized by state law to be paid each semester by every student enrolled in the University. The charges per semester are as follows:

12 or more Semester Credit Hours	\$50.00
11 Semester Credit Hours	46.50
10 Semester Credit Hours	42.50
9 Semester Credit Hours	38.50
8 Semester Credit Hours	34.00

7 Semester Credit Hours	\$31.00
6 Semester Credit Hours	26.50
5 Semester Credit Hours	22.00
4 Semester Credit Hours	18.00
3 Semester Credit Hours or less	15.00

6. *Fee for Change in Class Schedule:* Each time a student initiates a change in his previously approved class schedule he must pay a fee of \$3 for each approved request. No charge will be made when the change is made for the convenience of the University. This fee will not be collected after the tenth week of any semester.

7. *Auditing a Course for No Grade:* Students enrolled for 11 semester credit hours or less must pay a fee of \$10 for the privilege of auditing a course.

Students enrolled for 12 semester credit hours or more who have obtained written permission from the dean may audit a course without paying an additional fee.

8. *Motor Vehicle Fees:* A fee is required for all motor vehicles to be parked on the campus at any time. A schedule of these fees, together with other vehicle information, is contained in the publication *Campus Traffic and Parking Regulations*, available at the Traffic and Parking Counselor's office or at the University Police Department.

9. *Replacement of Lost Identification Cards:* Students who lose their ID Cards may have them replaced by applying at the Registrar's office. A fee of \$5 will be charged any time during the semester for replacement of a lost ID Card.

10. *Duplicate Certificate of Enrollment Fee:* A fee of 50 cents will be charged for each duplicate Certificate of Enrollment issued.

11. *Transcript Fee:* Copies of a student's transcript are available upon written request to the Registrar's office. A copy of the transcript includes only the academic record accumulated at Texas Tech University; copies of transcripts furnished from other institutions become the property of Texas Tech and will not be furnished by the University. The first copy of the transcript is free of charge; thereafter, the cost is \$1 per copy, payable in advance. All transcripts must be requested by the student and must be made in writing. Adequate advance notice, normally one week, is required for transcript processing.

Miscellaneous Special Fees.

1. *Music Fees for Private Instruction:* The University registration fee does not cover the following costs for individual instruction offered by the Department of Music in voice and in wind and string instruments. When instruction is given in one of the following courses in applied music, the charges listed are made for each course, payable in full at the time of registration:

Applied Music 115, 116, 215, 216, 315, 316, 515	\$15
Applied Music 125, 126, 145, 146, 225, 226, 235, 236, 245, 246,	
325, 326, 345, 346, 425, 426, 435, 436, 445, 446, 525, 535, 545	\$30

The following charges are made for practice room use and piano rentals; they are payable at the University Cashier's office:

One hour per day per semester	\$ 5.00
Each additional hour per day per semester	\$ 2.50
Musical instrument rental for class strings, woodwinds, brasses (each class)	\$ 2.50

2. *Fees for Use of Gymnasium Facilities:* Students not enrolled in a physical education laboratory course who wish to use the University gymnasium facilities will pay a fee of \$1 per semester for use of lockers, if they are available. Towel service may be secured by payment of a \$2 laundry fee plus a \$1 deposit which will be refunded upon return of the towel.

3. *Graduation Fee:* Graduating students will be charged a graduation fee of \$5 for each degree granted. The fee will be refunded, provided the student cancels his graduation intentions before the diploma has been printed and before other related steps are taken. If the student's intention to graduate is not cancelled in time, he will be charged \$2 for reordering the diploma insert. If both the insert and the cover have to be reordered, the charge will be \$5, as in the initial order.

4. *Fee for Binding Theses and Dissertations:* This fee is usually \$3.10 per copy (plus state and city taxes) but is subject to change without notice. The fee for the microfilming of a doctoral dissertation is \$25. Details are given in the section on Dissertation Fees.

Refund of Fees. Any student officially withdrawing during a semester, either at his request or at the request of the University because of failure to comply with a condition upon which his enrollment was approved, will receive a refund on registration fees, building use fees, applied music fees, and activity fees according to the following schedule:

1st class day through 14th class day	80 percent
15th class day through 20th class day	60 percent
21st class day through 25th class day	40 percent
26th class day through 30th class day	20 percent
After 30th class day	None
For courses of less than six weeks duration	None

Refunds of tuition and fees will be made according to the above schedule except (1) in no case will fees be refunded to a student suspended from the University by University authorities, and (2) full refund of tuition and fees will be made when the University is at fault. After a student has registered for a laboratory class and has once attended the class, no refund of the laboratory fee will be made unless the University is at fault. If the student is permitted to reenter school during the same semester in which he officially withdrew or was suspended, an additional reentrance fee of \$5 will be charged.

Fellowships, Traineeships, and Assistantships

All inquiries concerning fellowships, traineeships, and assistantships should be addressed to the chairman of the department concerned. The following programs of assistance are available for graduate study in 1972-73 and are ordinarily renewable upon satisfactory work. Additional information is available in the *Scholarships and Financial Aids* bulletin.

Federal Fellowships and Traineeships.

- Education (Mexican-American Counselor Program)
- Psychology (rehabilitation counselor training)
- Research and Training Center (research in mental retardation)
- Special Education (training in educating the handicapped)
- Speech (training in speech-hearing problems)

Assistantships. (Available in nearly all departments.)

- Teaching Assistantships
- Part-time Instructorships
- Research Assistantships

Other Assistance.

- Fellowships and loans through the Office of Student Financial Aids.

Policies and Regulations

Graduate study is much more than a continuation of undergraduate work. Its true spirit is one of inquiry and the desire to add something to human knowledge. Graduate study should therefore be contemplated only by students who have already demonstrated in their undergraduate programs unusual intellectual attainments and the power of independent thought and investigation.

For this reason, practically all graduate schools exercise some type of selectivity in their admission of students. Selective entrance requirements are partly for the maintenance of the high standards that must always characterize graduate study and partly for the benefit of students in helping them decide early whether they should undertake such work.

The Graduate School of Texas Tech University recognizes its obligation both to the standards mentioned above and to the citizens of Texas by a twofold classification of graduate students. In connection with the first obligation, the Graduate School requires evidence of an applicant's special ability for admission to its degree programs and reserves the right to decline to accept any applicant whose admission would not be to his best interest or that of the University. On the other hand, to fulfill its obligation to the citizens of Texas, the Graduate School makes its facilities available to a wide variety of students who are not eligible for advanced degrees or do not wish to become applicants for such degrees.

General

The Graduate School, like other colleges and schools of Texas Tech, reserves the right to institute, after due notice and during the course of a student's work toward a degree, any new ruling which may be necessary for the good of the University and therefore, ultimately, of recipients of its degrees. Normally a student may graduate under the provisions of the catalog in effect at the time he enrolls in the Graduate School.

Responsibility of Students. Graduate students are expected to make themselves thoroughly familiar with the regulations of the Graduate School and the requirements for degrees. Failure to follow the regulations and requirements almost inevitably results in complications for which the Graduate School cannot assume responsibility.

To facilitate communications, graduate students should promptly notify the Graduate Office of their changes of address.

Graduate Advisers. The Dean of the Graduate School is the general adviser for all graduate students, but, insofar as the particular courses are concerned, a student is counseled by the chairmen of his major and minor departments or by other professors designated for such counseling. Adviseement in matters pertaining to teachers' certificates is the responsibility of the Director of Teacher Certification.

Enrollment by Faculty and Staff. Full-time members of the faculty and staff of Texas Tech University may enroll for courses by permission of the department chairman concerned. In registering for graduate work, they become subject to the usual regulations of the Graduate School. However, no member of the faculty who has held rank higher than instructor at Texas Tech normally is eligible to pursue a graduate degree program at this institution; exceptions require prior approval of the Graduate Dean.

Enrollment by Undergraduates. An undergraduate student who is within 12 hours of graduation and who has at least a B average in his major subject may enroll for courses carrying graduate credit, subject to the approval and certification of an acceptable grade-point average by the dean of his instructional college and the approval of the Dean of the Graduate School. This approval must be obtained on special forms at the time of registration. No course taken without this approval may be counted for graduate credit.

An undergraduate who is permitted to enroll for graduate work as indicated above is required to take the Aptitude Test of the Graduate Record Examinations the first time it is administered after his enrollment for graduate work—if he has not taken it before.

The maximum amount of work that may be scheduled by an undergraduate taking courses for graduate credit is 16 hours in a semester or 6 hours in a summer term, including graduate and undergraduate work. Undergraduates permitted to enroll for graduate work are expected to receive their bachelor's degrees within a year of their first enrollment for graduate credit.

An undergraduate may not receive credit for more than 12 semester hours of graduate work completed prior to his admission to the Graduate School as an applicant for a graduate degree.

Extracurricular Activities. Graduate students may participate in extracurricular activities within University policies. They are encouraged to participate in honor societies for which they may be qualified. Graduate students who are satisfactorily pursuing full-time programs of graduate work are eligible to serve as officers in organizations of this type.

Work Load. A full graduate load may vary from 9 to 16 hours in a semester or from 3 to 6 hours in a summer term. Students employed by the University in teaching or research capacities will normally adjust their enrollment to assure adequate time for fulfillment of their obligation to the University. Any questions concerning permissible course loads should be referred to the Graduate Dean.

Full-time employees of the University are limited to 3 hours of graduate work in any semester or summer term.

Included in a graduate student's total load are extension courses and correspondence courses and also any courses that are being audited.

Prerequisites for a Graduate Major. For a graduate major, an applicant must have completed, or must take, sufficient undergraduate work to insure adequate background for successful graduate work in the proposed field. With the approval of his department, the student may receive credit by examination for such leveling requirements. Any department

may specify additional prerequisites if they are considered necessary and may require an applicant to pass an examination before his acceptance.

Residence. Study leading to a graduate degree involves sustained residence as well as the completion of courses. Residence, which is expressed in terms of weeks, months, or years, is credited for work done on the campus of Texas Tech University and for certain types of courses (theses, field courses, practicums, internships, individual study, or any other such course) when offered at a place and under circumstances specifically established by the department concerned and approved by the Graduate Council in advance of the offering of the course.

Residence is not credited for work completed in the Division of Continuing Education. Courses transferred from another graduate school will not reduce the minimum residence for the master's degree by more than six weeks.

The minimum residence for the master's degree and the doctor's degree will be found in the appropriate sections of this catalog.

Grades. The grades used in the Graduate School are the same as those used in undergraduate work (A, B, C, D, and F), but graduate credit is allowed only for courses completed with grades of A, B, and C, although grades of D and F are used in computing grade-point averages.

Upon departmental request and approval of the Graduate Dean, individually arranged courses, professional seminars, and certain other courses may (at departmental option) be graded P (pass) or F (fail).

For graduate credit, no assigned grade may be raised unless an error has been made. Every final grade of A, B, C, D, or F received by a student in courses taken for graduate credit in the major and minor subjects will be counted in the calculation of grade-point averages. The substitution of another course for one completed with a low grade is not permitted.

Work completed at another graduate school with a grade less than B will not be accepted. In any case, grades on transferred work will not raise the grade average on courses completed in this Graduate School.

Symbols PR and I. The symbol PR (in progress) is assigned for every enrollment for a master's thesis (Course No. 631), or doctor's dissertation (Course No. 831) until the completed document has been approved by the student's adviser or committee and accepted by the Dean of the Graduate School. At that time the professor in charge will file change-of-grade cards replacing the symbol PR with letter grades.

PR may be given by a professor when a student's work in a research course is not quite finished but is satisfactorily in progress at the end of a semester. This symbol must be replaced by a standard letter grade before credit can be granted for the work.

The symbol I (incomplete) may be given by a professor when a student's work in a regularly organized class has not been completed at the end of a semester and when the failure to complete the work has been solely due to causes beyond the student's control. It is not used as a substitute for F. When I stands for a year without action on the part of the student, it may become F.

Proficiency in English. A student found deficient in English may be required to complete satisfactorily certain specified courses in English usage (without graduate credit) before he is considered for admission to candidacy for a graduate degree.

Statement of Intention to Graduate. A student planning to graduate on a particular date must advise the Graduate Office of his desire at least 12 weeks before that date. He must also file the "Statement of Intention to Graduate" not later than the date specified in the official University calendar published annually in the General Catalog. 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 by the specified deadline.

A candidate who fails to graduate at the expected time is required to file a new "Statement of Intention to Graduate" for any subsequent graduation.

Teacher Certification. Prospective students should understand that the material in this catalog applies only to requirements for graduate degrees and has no direct relation to certificates for public school teachers. The Graduate School gives no assurance that a program for a graduate degree and a program for a certificate will coincide. Students interested in certificates should confer with the Director of Teacher Certification at the outset of their work.

Admission to the Graduate School

Two types of admission are granted: (1) general admission to the graduate school (that is, admission as an "Unclassified Graduate Student") and (2) admission to a graduate degree program. The requirements are explained in the following paragraphs.

General Admission to the Graduate School. This is granted through the office of the Dean of Admissions. The basic prerequisite for admission to the Graduate School, regardless of the type of admission sought, is the possession of an acceptable bachelor's degree from a recognized college or university. In addition, any student transferring from another school must be a student in good standing when he applies for admission to this Graduate School. General admission is granted on the basis of a formal application and satisfactory transcripts of the applicant's previous academic work. These documents should be submitted at least 30 days prior to the proposed enrollment—60 days by applicants outside the United States. Credentials accepted for admission become the property of the University.

Admission to a Graduate Degree Program. This is granted through the office of the Dean of the Graduate School and is restricted to applicants whose undergraduate records and scores on the Aptitude Test of the Graduate Record Examinations (GRE)* indicate probable success in such work. Admission to any particular graduate degree program is also contingent upon acceptance by the department or other institutional division concerned, and it is essential that the student communicate with that department or division.

Procedure for Admission to a Graduate Degree Program. All applicants must obtain general admission to the Graduate School before they can be considered for admission to a master's or doctor's degree program. Applicants should take the Aptitude Test of the GRE* early enough to have their test scores sent to the Dean of the Graduate School prior to their enrollment.

An applicant who has been granted general admission to the Graduate School but has not taken the Aptitude Test of the GRE will be permitted to enroll in the Graduate School *with the understanding that he will take the test the first time it is administered after his initial enrollment.* This policy applies to any enrollment, whether graduate credit is involved or not, and is basically for the protection of the student. Graduate credit toward a degree should not be expected for any course completed after the first semester unless the GRE has been taken. It is much to a student's advantage to ascertain as soon as possible whether he has satisfied the requirements for admission to a degree program.

An applicant who has been granted general admission to the Graduate School and who has already taken the Aptitude Test of the GRE should ask the Educational Testing Service to send his test scores to the Dean of the Graduate School.

As soon as the Graduate Office receives the test scores of an applicant who has been granted general admission, the Dean of the Graduate School will evaluate the record, confer with the chairman of the student's proposed major department, and inform the applicant whether or not he has been accepted into a degree program. Students should understand, however, that the Educational Testing Service usually requires about a month to process test papers and distribute reports, and that the Graduate Dean and department chairman need some time in which to complete their evaluation of an applicant's record.

Applicants for admission to graduate degree programs must be accepted by their proposed major departments as well as by the Dean of the Graduate School. Such acceptance is merely provisional, however, and does not constitute admission to candidacy for a degree.

A student who has been accepted by one department and who wishes to transfer to another is required to present at the Graduate Office a written statement from his present major department certifying that the transfer is authorized.

Admission to a Second Graduate Degree Program. Permission to work toward a second graduate degree of the same level as the first is granted only in exceptional circumstances, and the applicant is subject to all requirements as a new student. No courses used for the first degree will be credited toward a second degree of the same level.

*Students seeking admission to graduate programs in the College of Business Administration may submit scores on the Admission Test for Graduate Study in Business (ATGSB) instead of the GRE. Scores on the ATGSB or GRE may not be submitted if more than seven years has elapsed, at the time of application to a degree program, since the examination was taken.

Procedure for Nondegree Enrollment. Students who wish to enroll for courses for some nondegree purpose are required merely to secure general admission to the Graduate School.

Such students may later gain admission to a graduate degree program by petitioning the Dean of the Graduate School and by satisfying the requirements for admission to degree work. In general, however, degree credit cannot be expected for any courses completed prior to the student's official admission to a graduate degree program.

The Aptitude Test of the Graduate Record Examinations. The Aptitude Test is an objective type examination requiring approximately three hours and yielding two scores—Verbal Factor (vocabulary and reading comprehension) and Quantitative Factor (logical and mathematical reasoning).

All of the Graduate Record Examinations, of which the Aptitude Test is merely one, are prepared and scored by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. (It has no connection with Princeton University.) A western office is maintained at 1947 Center Street, Berkeley, California 94704. Applicants from Texas should direct their correspondence to the Berkeley office.

The Graduate Record Examinations are administered in at least one center (usually several centers) in each of the 50 states and the District of Columbia, and in many foreign countries. In some of these centers, the tests are administered only once or twice a year; in many others, they are given six times a year, usually in January, February, April, June, October, and December.

Application blanks and details about the Aptitude Test and examination dates may be obtained from the University Counseling Center of Texas Tech University (which administers the tests in Lubbock), from similar agencies in other colleges and universities, or from the Educational Testing Service.

Each applicant is individually responsible for making arrangements to take the Aptitude Test and for having his scores sent to the Dean of the Graduate School, Texas Tech University, Lubbock, Texas 79409.

The completed application form and the examination fee (currently \$8) must reach the proper office of the Educational Testing Service approximately a month in advance of the test date. Upon receipt of the application and the fee, the Educational Testing Service will mail the applicant a ticket of admission to the examination, specifying the room and the hour at which it will be held.

Continuation in the Graduate School. Every student enrolled in the Graduate School, whether he is working toward a degree or not, is required to be diligent in his studies and to comply fully with the policies of the institution. The Graduate School reserves the right to place on probation or to drop from its rolls any graduate student who does not maintain a satisfactory academic standing or who fails to conform to the regulations of the University or to the conventions of good citizenship.

Registration

Students who have been granted either type of admission to the Graduate School are expected to register in the Graduate School whether they contemplate degree work or not.

The details of registration are under the jurisdiction of the Registrar, who furnishes to each enrollee complete instructions for all steps in the procedure. Students should follow carefully those instructions and the additional ones listed below.

Departmental Approval of Courses. The student should have his complete schedule of courses made out by an official representative of his major department and then have each individual course approved by a representative of the department offering it. It is the student's responsibility to see that course cards issued him correspond exactly to the courses listed on his schedule card.

Enrollment of a graduate student in any course that carries graduate credit is automatically considered to be for graduate credit and affects relevant grade-point averages accordingly.

Registration in Session of Graduation. Every candidate for a graduate degree must be registered in the Graduate School in the long session or the summer session in which his degree is conferred. For graduation in a long session (that is, at the spring commencement in May), a student who completes all of his requirements in the fall semester is not

required to register in the succeeding spring semester; for graduation in a summer session a student who completes all of his requirements in the first summer term is not required to register in the second term. Failure to graduate at the expected time necessitates additional registrations as may be necessary.

Registration for Thesis Courses. Registration for a master's thesis (Course No. 631) is required at least twice; for a doctor's dissertation (Course No. 831), at least four times. Concurrent multiple registration for these courses is permissible. Students should be enrolled in thesis or dissertation courses every semester they are receiving direction or using University facilities on such projects.

Enrollment for thesis courses is permitted only during a regular registration period. Students away from the campus may, however, register for a thesis course by mail, provided they make arrangements with the Registrar at least 30 days prior to the beginning of a registration period.

Registration when Using University Facilities. A student who is not regularly enrolled in the Graduate School is required to register for the appropriate course in any term or semester in which he expects to receive assistance or use the facilities of the University.

Changes in Schedule and Withdrawal. A graduate student who wishes to drop a course or to withdraw from the Graduate School is required to make his request at the Graduate Office. A student who quits a course without official withdrawal will receive an F in that course.

After a schedule has been approved and the fees have been paid, each change will be subject to a charge of \$3 unless it is made for the convenience of a department of the University.

Degree Programs

The Master's Degree

The requirements set forth in this section are in addition to those listed under the heading of "Policies and Regulations."

Prerequisites. Admission to a master's degree program is dependent upon the applicant's undergraduate record, his scores on the Aptitude Test of the Graduate Record Examinations, and the recommendation of his proposed major department.

A substantial body of undergraduate work in the major subject and considerable breadth of background are essential for graduate study. Therefore, students whose undergraduate programs are seriously deficient in breadth or depth may be required to complete additional preparatory work without degree credit.

Degrees Offered. In the "Program for the Master's Degree" and on the title approval page of a report or thesis, the exact and official designation of the degree must be used:

- Master of Arts
- Master of Business Administration
- Master of Education
- Master of Engineering
- Master of Fine Arts
- Master of Music
- Master of Music Education
- Master of Science
- Master of Science in Accounting
- Master of Science in Agricultural Engineering
- Master of Science in Chemical Engineering
- Master of Science in Civil Engineering
- Master of Science in Electrical Engineering
- Master of Science in Home Economics
- Master of Science in Industrial Engineering
- Master of Science in Mechanical Engineering
- Master of Science in Speech Pathology and Audiology

Major Subject. Every program for a master's degree not granted special exception must embody a major comprising at least 18 semester hours of graduate work (which may include a thesis) in a subject which has been approved for major work and for which the student has, or completes without degree credit, the necessary prerequisites for a graduate major as explained in an earlier section of this catalog.

Minor. Programs for a master's degree normally embody a minor representing approximately one-fifth to one-fourth of the total program. Departments offering masters' programs may, however, permit students to take all of their work for the degree within the department. A minor may be completed in a single department or in several departments, but the courses comprising the minor are subject to the following limitations: (a) they must carry graduate credit; (b) they must be acceptable to the student's major department; and (c) each course (except those specially designed and numbered 5335) must be approved by the department offering it. This approval is indicated in the degree plan by the signature of the department chairman (or graduate adviser) concerned. Its purpose is to make sure that a student does not enroll for a course for which he is not prepared.

Basic Plans for the Master's Degree. There are two basic plans for master's degree work: (1) a minimum of 24 hours of graduate course work plus 6 hours of the thesis course (631); (2) a minimum of 36 hours of graduate course work without a thesis. (Some degrees have a greater minimum hour requirement. An example is the Master of Fine Arts degree program, which requires 60 hours of graduate course work including a thesis or an exhibition.) The option between thesis and nonthesis programs is a departmental decision.

Form for the Master's Degree Program. Early in his first semester of graduate study, a student contemplating master's degree work is required to submit to the Dean of the Graduate School a "Program for the Master's Degree" as prepared by an official representative of the proposed major department and of other departments as indicated under "Minor" in the preceding section. Delay in submission of a degree program may result in

postponement of admission to candidacy and graduation. The forms for the "Program" are available at the Graduate Office.

When the student receives his approved copy of his "Program" from the Graduate Office, he is expected to keep it and use it as the basis of all subsequent enrollments. Substitutions of courses (except the special group numbered 5335) can be made only on the written recommendation of the department or departments concerned and the approval of the Graduate Dean.

Approval of a "Program for the Master's Degree" does not, however, constitute admission to candidacy for a master's degree. It merely signifies that the proposed program will be acceptable if the student satisfies all of the regulations of the Graduate School and all of the requirements connected with his degree program.

Minimum Residence. The minimum residence for any master's degree is a full academic year (nine months) of graduate work or its approximate equivalent in five 6-week summer terms. Part-time enrollment is evaluated on a fractional basis.

Transferred and Extension Work. There is no automatic transfer of credit toward a master's degree, but, in general, work completed *in residence* at another accredited graduate school may, on the recommendation of the departments concerned, be accepted for as much as 6 semester hours toward a master's degree (except in the case of the Master of Engineering degree, where credit may be accepted for as much as one-half the formal course-work requirement). Credit accepted from another graduate school will in no instance reduce the minimum residence by more than six weeks. Work completed at another graduate school with a grade less than B will not be accepted.

A maximum of 6 semester hours of extension work completed through the Division of Continuing Education of Texas Tech may be credited on the course work for a master's degree (or a maximum of 9 hours on a 36-hour program) if the student had been officially admitted to the Graduate School prior to his enrollment for the extension work. Residence is not credited for extension work. Graduate credit is not granted for courses taken by extension at another university.

Not more than 9 semester hours (or 12 hours on a 36-hour program) of any combination of extension courses and courses completed elsewhere can be credited toward a master's degree.

Graduate credit is never granted for courses taken by correspondence.

Language Requirement. Although it is not a school-wide requirement, many departments require a reading knowledge of one or more foreign languages. (For information on this requirement, where it exists, see the appropriate departmental section in this catalog.) The essential purpose is to assure that the student gains access to scholarly literature of his field in more than one language. A foreign student may use his native language (if it is not English) to meet this requirement if this essential purpose is served thereby and his major department approves.

To qualify for Admission to Candidacy for a degree which requires knowledge of a foreign language, the applicant must demonstrate proficiency in one of the following ways (as specified by his department): (1) A student may fulfill the reading knowledge requirement by taking for undergraduate credit, and successfully passing, the 231, 232 (or 233, 234) sequence in the required language. A grade of B or higher is required in the second course of the sequence taken, which must not be more than seven years old when a student's degree plan is approved. (2) The student may enroll in one of the special 6-hour programs for graduate students offered by the departments of foreign languages. He must pass the second half of this program with a grade no lower than B. (3) The third plan for fulfilling the reading requirement is by examination. Under this plan the student passes one of the examinations furnished by the Educational Testing Service. Arrangements for taking these examinations in French, German, Russian, and Spanish can be made at the University Counseling Center which administers the tests for the Educational Testing Service. The examinations are given three or four times each year; the student should consult with the Counseling Center for specific dates. The departments of Classical and Romance Languages and Germanic and Slavonic Languages will continue to administer the examinations in any acceptable foreign languages other than those listed above.

Grade Requirement for Graduation. For the master's degree, the minimum requirement for graduation is an average of B in the major subject, exclusive of credits for the master's thesis, and an overall average of B on all courses comprising the official program for the degree.

Admission to Candidacy. Every applicant for a master's degree is required to make formal application for admission to candidacy for the master's degree as soon as he has completed 9 to 12 semester hours of the work listed in his "Program for the Master's Degree," other than leveling courses. This application is submitted to the Dean of the Graduate School on a form obtainable at the Graduate Office.

The minimum interval between submission of the application for admission to candidacy and graduation is four months.

Admission to candidacy will be granted at such time as all of the following requirements have been met.

- (1) Official admission to master's degree work has been received.
- (2) At least 9 semester hours of the graduate work required for the master's degree have been completed.
- (3) All required leveling work has been completed.
- (4) An average grade of B or higher has been maintained in
 - (a) all completed graduate work, exclusive of thesis, required for the master's degree,
 - (b) all work taken for graduate credit in the major and minor subjects.
- (5) Proficiency in English and independent study has been acceptably demonstrated to the department, and certified by the department in approving the application for admission to candidacy.
- (6) Proficiency in a foreign language required for the particular degree has been acceptably demonstrated.
- (7) Required courses in statistics have been taken.
- (8) The general field of the thesis has been stated and approved.
- (9) Work to date is acceptable to the departments concerned, as attested by their approval of the application for admission to candidacy.
- (10) The entire program conforms with the general requirements of the Graduate School and with the requirements of the particular degree.

Thesis. The master's thesis is expected (1) to represent independent work by the student, conducted under the supervision of his committee, and (2) to be written clearly and concisely in good English (or whatever other language may be appropriate). As soon as the student's area for thesis research has been determined, an advisory committee will be appointed by the Graduate Dean upon the recommendation of the major department. The committee must consist of at least two members of the Graduate Faculty. All members of the committee must approve and sign the thesis.

Available at the Texas Tech University Bookstore is a pamphlet entitled *Instructions for Preparing and Submitting Reports, Theses, and Dissertations*. All manuscripts must conform to the published policies. An original and two copies of the thesis are required by the University.

Time Limit. All work credited toward a master's degree must be completed within six years. Students whose graduate study here is interrupted by military service will be granted an extension of time for the period of their military duty, not exceeding five years.

Final Examination. Within the term or semester in which he plans to graduate, at a time specified by his major department, every candidate for a master's degree is required to pass a final comprehensive examination in his major field. It is the student's responsibility to confer with the chairman of his advisory committee or the chairman of his major department about the time and place of the examination.

A student who fails the final examination may repeat it once, but not until after an interval of four months or more.

At the discretion of the department concerned, a student who passes the examination but does not graduate within 12 months may be required to repeat the examination.

The Doctor's Degree

The requirements set forth in this section are in addition to those listed under "Policies and Regulations."

Admission to Doctoral Study. Admission to doctoral study is restricted to applicants whose backgrounds show definite promise of success on this, the highest level of academic endeavor. The formal requirements for admission to the doctoral program are a

distinguished record in previous work (undergraduate and graduate) and a high score on the Aptitude Test of the Graduate Record Examinations. Each doctoral department has additional requirements which applicants must satisfy for admission. It is essential that the student communicate with departmental advisers on this matter.

Degrees Offered. Major work leading to the Doctor of Philosophy degree is offered in the departments of Biology, Chemical Engineering, Chemistry, Civil Engineering, Classical and Romance Languages, Economics, Electrical Engineering, English, Geosciences, Government, History, Industrial Engineering, Mathematics, Mechanical Engineering, Physics, and Psychology. The Doctor of Philosophy degree is also offered in engineering on an interdisciplinary basis, and in agriculture with options in three departments. The Doctor of Education degree is offered in several areas by the College of Education. The Doctor of Business Administration degree is offered with several areas of concentration.

Years of Study. A minimum of three years of graduate study beyond the bachelor's degree is required for the doctorate. Work completed for the master's degree is considered one of these years if it forms part of a logical sequence in the entire program.

Work completed in the doctoral program of another recognized graduate school will be considered on the recommendation of the departments concerned, but no assurance can be given that such work will reduce the course or residence requirements in this Graduate School. In no case can transferred credit reduce the minimum residence (see below).

Doctoral study cannot be calculated solely in terms of credit hours, but the program for the doctorate normally requires the completion of 60 to 80 or more semester hours of work beyond the bachelor's degree, exclusive of credit for the dissertation. All work beyond the master's degree must be in courses open only to graduate students.

Major and Minor. An applicant for the doctorate will devote most of his time to his major subject, but his program must include at least 18 semester hours beyond the bachelor's degree in a field(s) other than the major.

In exceptional circumstances and with special approval, programs at variance with this description may be acceptable. Such a program must be clearly specified and approved by the major department and the Dean of the Graduate School.

In addition to any work completed elsewhere in a minor area, at least 6 semester hours must be completed here in that subject if it is to be considered an official minor.

An applicant for the Ed.D. degree not having a minor in the College of Education may take as part of his work outside of education those courses which are numbered 5335 but which are not restricted to students in elementary education.

Residence Requirement. Regardless of the amount of graduate work he may have completed elsewhere, every applicant for the doctorate is required to complete in residence in this Graduate School at least one year of graduate study beyond the master's degree or beyond the equivalent of this degree if he proceeds to doctoral work without taking a master's degree.

This residence is normally accomplished by the completion of a full schedule (at least 12 semester hours) of graduate work in each of the two consecutive semesters of a long session. However, other patterns of residence may be acceptable if they include completion of at least 24 semester hours in a given 12-month period. The plan for completing this requirement should be submitted to the Graduate Dean prior to beginning residence. No part of this requirement can be satisfied by any type of off-campus enrollment.

Preliminary Examination. As early in his doctoral study as possible, the applicant will undergo a preliminary examination (oral or written or both), administered by the major and minor departments. This examination will serve as the basis of further counseling of the applicant. Its results will be reported to the Graduate Office on forms entitled "Doctoral Proposal and Report of Preliminary Examination" and obtainable in the Graduate Office.

Languages and Statistics.

Doctor of Philosophy. Each department offering a doctoral program determines its language requirements, subject to the approval of the Graduate Council. Language requirements, if any, are described in the sections of this catalog devoted to instructional departments. In order to qualify for admission to candidacy in those programs which have a language requirement, applicants must demonstrate their competence in one of the following ways:

(1) Students may fulfill the reading knowledge requirement by taking for undergraduate credit and successfully passing the 231, 232 (or 233, 234) sequence in two languages. Those seeking to present a high level of competency in a single language will complete the 331, 332 sequence (except in the Department of English, which requires this level to be satisfied by making a B in a graduate course of an approved language). The second course of the sequence taken must be passed with a grade of B or higher not more than seven years prior to the student's approval for doctoral work. (2) Students may enroll in one of the special 6-hour programs for graduate students offered by the departments of foreign languages. The second half of such a program must be passed with a grade no lower than B. (3) The third method of fulfilling the language proficiency requirement is by examination. The student will take one of the examinations furnished by the Educational Testing Service. Under this plan the student may demonstrate higher proficiency by surpassing an examination threshold score which is higher than that required for basic reading knowledge. Arrangements for taking these examinations in French, German, Russian, and Spanish can be made at the University Counseling Center. The examinations are given four or five times each year; consult with the Counseling Center for specific dates. The examination must not be more than seven years old at the time the student submits his "Doctoral Proposal" form.

The departments of Classical and Romance Languages and Germanic and Slavonic Languages will continue to administer the examinations in any acceptable foreign languages other than those listed above.

Doctor of Education. In order to qualify for admission to candidacy, applicants for the Ed.D. degree are required to show competency in educational evaluation and educational statistics and also a foreign language if their research requires such competency. The examination in educational statistics is administered by a committee representing the College of Education.

Doctor of Business Administration. Applicants for the D.B.A. will follow a core curriculum which includes a course in business statistics.

Advisory Committee. As soon as an applicant has passed the preliminary examination administered by his major and minor departments, an advisory committee will be appointed by the Graduate Dean on the recommendation of the departments concerned. This committee will hold meetings as often as necessary with the applicant and will direct his work at all stages. From time to time, the chairman of the committee will file written reports with the Graduate Dean and the chairmen of the departments concerned, indicating the applicant's progress.

Doctoral Proposal. The applicant and his major and minor departments will jointly complete and file at the Graduate Office the form "Doctoral Proposal and Report of Preliminary Examination," on which will be indicated the results of the doctoral preliminary examination, a statement concerning the applicant's proficiency in English composition, and his plans for meeting requirements of residence, languages and/or statistics, and the course requirements in his major and minor subjects. The student's advisory committee will also be listed on this form. The form should be submitted as soon as possible after the results of the preliminary examination have been determined.

Qualifying Examination. The Qualifying Examination for Admission to Candidacy for the doctor's degree is one of the major features of the doctoral program. This examination will be administered in both the major and minor areas of study. An applicant is eligible to attempt this examination only after he has satisfied the following requirements: (1) he must have been officially admitted to the doctoral program; (2) he must have passed the preliminary examination and have been provisionally accepted by his major and minor departments; (3) he must have received approval of his doctoral proposal from the Dean of the Graduate School; (4) he must have completed most of the course work prescribed by his committee.

The Qualifying Examination is prepared and administered by the candidate's advisory committee and any other professors the committee or the Graduate Dean may consider necessary. The major portion of the examination is an essay-type test, of at least six hours' duration. It usually includes also an oral examination under the supervision of the committee and any other professors who may be invited to participate.

Procedure When the Examination Is Satisfactory. If the Qualifying Examination is considered satisfactory and the requirements in languages (including English) and/or statistics have been met, the chairman of the advisory committee will send to the Graduate Dean, for consideration by the Graduate Council, a formal written recommendation that the applicant be admitted to candidacy for the doctor's degree.

Procedure When the Examination Is Not Satisfactory. If the Qualifying Examination is not satisfactory, the chairman of the advisory committee will so notify the Graduate Dean, in writing. An applicant who does not pass the Qualifying Examination may be permitted to repeat it once, after a lapse of at least a semester or 15 weeks.

Admission to Candidacy. Authority for admitting an applicant to candidacy for a doctor's degree is vested in the Graduate Council. Upon receipt of a recommendation from the advisory committee, the Graduate Dean will submit it to the Graduate Council for action. The Council may approve the committee's recommendation, or it may, after consultation with the committee, suggest additional requirements which the applicant must satisfy.

By written communication, the Graduate Dean will transmit the results of the council's action to the applicant, to the chairman of his advisory committee, and to the chairmen of the departments concerned.

A student must be admitted to candidacy for the doctorate at least four months prior to his proposed graduation date.

Dissertation. A dissertation is required of every candidate for the doctorate.

The subject of the dissertation must be approved by the advisory committee and the Graduate Dean at least four months before the candidate's proposed date of graduation. The dissertation must demonstrate a mastery of the techniques of research, a thorough understanding of the subject matter and its background, and a high degree of skill in organizing and presenting the materials. The dissertation should embody a significant reevaluation of existing knowledge or some contribution to learning. The work on the dissertation is constantly under the supervision of the advisory committee and any other professors the committee or the Graduate Dean may consider necessary.

Available at the Texas Tech University Bookstore is a pamphlet entitled *Instructions for Preparing and Submitting Reports, Theses, and Dissertations*. All manuscripts must conform to the published policies.

An original and two copies of the dissertation are required by the University. They must be accompanied by two copies of an abstract, not more than 600 words in length.

Dissertation Fees. When a doctoral dissertation and its abstract have been approved by a student's advisory committee and accepted by the Dean of the Graduate School, the candidate will pay the University Cashier a "Microfilming and Shipping Charge" of \$25 for the microfilming of the complete dissertation by University Microfilms, Inc., of Ann Arbor, Michigan, and the publication of the abstract in *Dissertation Abstracts*. Other services rendered by University Microfilms, Inc., are explained in the local pamphlet of instructions.

In addition to the fee indicated above, the doctoral candidate will pay to the Texas Tech Press the fee for binding the three official copies of the dissertation. Currently, this fee is \$3.10 per copy (plus 5% city and state sales taxes), but like other fees, it is subject to change without notice as circumstances may require. If he wishes to do so, the student may have additional copies of his dissertation bound at the prevailing rate.

Grade Requirement. For the doctor's degree, the minimum requirement for graduation is an average of B in the major subject, exclusive of credits for the doctoral dissertation, and an average of B in all other courses taken for graduate credit outside the major. No grade of less than B is acceptable for the dissertation.

Time Limit. All work for the doctorate must be completed within four years after the applicant has been admitted to candidacy.

Intervals Between Examinations. At least three months must intervene between the preliminary examination and the qualifying examination and at least four months between the latter and the final examination.

Final Examination. A final oral examination, usually over the general field of the dissertation, is required of every candidate for the doctorate. It may be scheduled at any suitable time after the dissertation (not necessarily the final version) has been approved by the advisory committee. The examination may not be administered until at least three weeks have elapsed following the candidate's submission to the Graduate Office of 60 copies of an announcement giving the time, place, and other information pertaining to the examination. (This announcement should conform to a standard format available from the Graduate Office.) The examination is conducted by the advisory committee under the supervision of the Graduate Dean or a professor designated to act in his place. Professors other than members of the student's committee may participate in the examination, but they have no vote in determining the outcome. At the conclusion of the examination, the chairman of the advisory committee will send a written notice to the Graduate Office, giving the result of the examination.

Instructional Departments and Courses

Not all of the courses listed in this catalog are offered every year. A class schedule, published just before the opening of each term or semester, indicates the courses to be available in that term or semester and the hours at which they will meet. The University reserves the right, however, to cancel any scheduled course, as well as to withdraw any program from the list of graduate offerings, if the best interests of the institution require such action.

Indication of Credit. The number of semester hours' credit for each course is shown immediately following its title, usually in this form: (3:2:3). The first digit in parentheses indicates the credit in semester hours for the course; the second, the number of lecture hours per week; and the third, the number of laboratory hours per week. If the third digit is zero, the course requires no laboratory work. A single number in parentheses indicates the credit in semester hours.

Prerequisites for Courses. Certain general prerequisites apply to all courses listed in this catalog. For example, all courses in this bulletin are numbered in the 500 series or above and are for graduate students. Graduate standing is a prerequisite for enrollment in such courses (except for seniors within 12 hours of graduation, whose enrollment may be authorized by the Graduate Dean).

Enrollment in any course must be approved by the department offering it.

College of Agricultural Sciences

Professor Anson Rabb Bertrand, Dean

Agricultural Economics. Professor Marquis L. Fowler, Chairman.
Professors Bennett, Foote, Grubb, and Williams; Associate Professors Graves, Kennedy, Lee, Osborn, Owens, and Roy; Assistant Professor Young.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND OPTION FOR THE DOCTOR'S DEGREE

- 511. Seminar (1:1:0)
- 520. Research Methodology in Economics. (2:2:0)
- 530. Special Study in Agricultural Economics. (3)
- 531. Advanced Production Economics. (3:3:0)
- 532. Agriculture and Public Policy. (3:3:0)
- 533. Seminar in Agricultural Marketing. (3:3:0)
- 534. Research in Agricultural Economics. (3)
- May be repeated for credit.
- 535. Contemporary Agricultural Economics. (3:3:0)
- 536. Agricultural Distribution Economics. (3:3:0)
- 537. Advanced Statistical Methods in Economic Research. (3:3:0)
- 538. Advanced Agricultural Resource Economics. (3:3:0)
- 539. Rural Economic Development. (3:3:0)
- 5311. Econometric Methods. (3:3:0)
- 5312. Operations Research in Agricultural Economics. (3:3:0)
- 5313. Application of Computer Programming Techniques in Agricultural Economics. (3:3:0)
- 631. Master's Thesis. (3)
- Enrollment required at least twice.

Agricultural Education. Professor T. L. Leach, Chairman.
Professor Eggenberger.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

- 531. Investigation in the Field of Agricultural Education. (3)
- May be repeated for credit.
- 532. Research Methods and Analysis in Agricultural Education. (3:3:0)
- 533. Methods of College Agricultural Teaching. (3:2:3)
- 534. Administration and Supervision of Agricultural Education. (3:3:0)
- 535. Problems. (3)
- May be repeated for credit.
- 536. Advanced Methods of Teaching Agricultural Mechanics. (3:3:0)
- 537. History and Principles of Vocational Education. (3:3:0)
- 538. Program Development in Agricultural and Extension Education. (3:3:0)
- 5310. Advanced Methods in High School Vocational Agriculture. (3:3:0)
- 5311. Advanced Methods in Adult Agriculture Education. (3:3:0)
- 5312. Advanced Methods in Future Farmer Work. (3:3:0)
- 5313. Organization and Administration of Vocational Education. (3:3:0)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
- Enrollment required at least twice.

Agricultural Engineering. Professor Willie L. Ulich, Chairman.
Professor Williams; Associate Professors Carpenter, Dvoracek, Foerster, Grub, and Lyle.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE AGRICULTURAL ENGINEERING

This program is jointly administered by the College of Engineering and the College of Agricultural Sciences.

Before being recommended for admission to a master's degree program with a major in this department, the student may be required to take a preliminary examination to determine proficiency in background for graduate work, or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department. The basic degree requirements of the Graduate School determine the policy of the department.

511. Seminar. (1:1:0)
May be repeated for credit.
530. Agricultural Engineering Research. (3)
532. Instrumentation and Research Methods. (3:3:0)
533. Advanced Theory of Farm Machinery Design. (3:2:2)
534. Theory of Agricultural Structures Design. (3:3:0)
535. Design Theory of Earth Structures. (3:3:0)
536. Advanced Farm Electrification and Processing Systems. (3:3:0)
537. Advanced Theory of Water Utilization. (3:3:0)
538. Advanced Technical Problems in Agricultural Engineering. (3)
539. Bioengineering—Environmental Control. (3:3:0)
5312. Similitude and Dimensional Analysis. (3:2:3)
5314. Operations Research in Water Resources. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.
731. Research (3)
May be repeated for credit.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

MECHANIZED AGRICULTURE

531. Investigations in Advanced Agricultural Mechanics. (3)

Agronomy. Professor Harold E.

Dregne, Chairman.

Professors Allen, Ayers, Bennett, Bertrand, Downes, and Harvey; Associate Professors Coleman, Jaynes, and Meyer; Assistant Professor Krieg.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

Students seeking a master's degree in the Department of Agronomy should consult the chairman of the department about their programs before enrolling for any courses. Major programs are available in crop science and soil science.

Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to take a preliminary examination to determine proficiency in background for graduate work, or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

AGRONOMY

511. Seminar (1:1:0)
May be repeated for credit.
512. Problems in Field Crops. (1)
May be repeated for credit.
513. Problems in Soils. (1)
May be repeated for credit.
520. Instrumental Analysis for Plants and Soils. (2:1:3)

530. Pasture Management. (3:3:0)
531. Soil Fertility and Fertilizers. (3:3:0)
533. Pedology. (3:3:0)
534. Research. (3)
May be repeated for credit.
535. Inorganic Plant Metabolism. (3:3:0)
536. Soil and Plant Relationships. (3:3:0)
537. Methods in Plant Breeding. (3:3:0)
538. Laboratory Methods in Plant Breeding. (3:0:9)
5310. Soil Physics. (3:2:3)
5311. Organic Plant Metabolism. (3:3:0)
5312. Environmental Crop Physiology. (3:3:0)
5313. Soil Mineralogy. (3:3:0)
5314. Advanced Soil Classification. (3:2:3)
5315. Herbicidal Action in Plants. (3:2:3)
5316. Radioisotopes in Plant Research. (3:2:3)
631. Master's Thesis. (3)
Enrollment required at least twice.
632. Advanced Genetics. (3:3:0)
633. Cytogenetics. (3:2:3)
634. Advanced Soil Chemistry. (3:2:3)
635. Advanced Soil Physics. (3:2:3)
636. Advanced Soil Microbiology. (3:2:3)
637. Advanced Experimental Design and Analysis. (3:2:3)
638. Metabolism of Crop Plants. (3:2:3)

PRODUCTION HORTICULTURE

511. Seminar. (1:1:0)
531. Fruit and Vegetable Research. (3)
532. Fruit and Vegetable Crop Behavior. (3:3:0)
534. Selected Topics in Fruit Production. (3:3:0)
535. Selected Topics in Vegetable Production. (3:3:0)
536. Post Harvest Physiology of Fruit and Vegetable Crops. (3:3:0)
537. Breeding of Fruit and Vegetable Crops. (3:3:0)
538. Horticultural Research Methodology. (3:2:3)

Animal Science. Professor Dale W.

Zinn, Chairman.

Professors Baumgardner, Curl, Durham, Hudson, and Tribble; Associate Professors Albin, Klett, O'Brien, Ramsey, and Sherrod; Assistant Professor Lennon.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND OPTION FOR THE DOCTOR'S DEGREE

The Department of Animal Science offers majors in animal breeding, animal nutrition, and meat science.

Proficiency in a foreign language is not required in the doctoral program; however, the student will be required to exhibit proficiency in a tool subject or other scientific discipline as recommended by his advisory committee.

511. Seminar. (1:1:0)
Enrollment required in each semester of student's residence.
531. Developmental Growth and Fattening. (3:3:0)
532. Environmental Physiology of Domestic Animals. (3:3:0)
533. Techniques in Animal Research. (3)
534. Research in Animal Science. (3)
535. Endocrinology. (3:3:0)
536. Biometry. (3:2:2)
537. Advanced Animal Breeding. (3:3:0)
538. Animal Nutrition I—Ruminant. (3:3:0)
539. Physiology of Reproduction. (3:2:2)
541. The Science of Meat and Meat Products. (4:3:3)

542. Computer Processing of Biological Data. (4:3:1)
 543. Advanced Analysis of Biological Data. (4:3:1)
 5311. Animal Nutrition II—Monogastric. (3:3:0)
 5312. Advanced Studies in Specialized Areas of Animal Science. (3:3:0)
 5321. Advanced Meat Science. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731. Research. (3)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Food Technology. Professor M. L. Peebles, Acting Chairman.
 Assistant Professors Miller and Blakely.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

530. Research in Food Industry. (3)
 May be repeated for credit.
 532. Selected Topics in Food Technology. (3:3:0)
 533. Research in Food Technology. (3)
 534. Additives for Food Processing. (3:3:0)
 535. Processing Characteristics of Major Food Constituents. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Park Administration, Horticulture, and Entomology. Professor E. J. Urbanovsky, Chairman.

Professors Ashdown and Huddleston; Associate Professors Kitchen, Tereshkovich, Van Nierop, and Zukauckas; Assistant Professors Mertes and Ward.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

PARK ADMINISTRATION

531. Park Administration Research. (3)
 May be repeated for credit.
 532. Research Methods in Park Administration. (3:3:0)
 534. State, Regional, County, and Metropolitan Park Systems of the Country. (3:3:0)
 535. National Park System and Other Federal Agencies Administering Federal Lands. (3:3:0)
 536. Interpretation Techniques. (3:3:0)
 538. Contemporary Problems in Management of Renewable Natural Resources. (3:3:0)
 540. Advanced Park Administration. (4:3:2)
 541, 542. Advanced Park Planning and Design. (4:1:8 each)
 5333. Outdoor Recreation Systems Planning. (3:3:0)
 5334. Recreational Programming and Analysis. (3:3:0)
 5335. Principles of Tourism. (3:3:0)
 5336. Regional Resource Analysis. (3:3:0)
 5337. Field Studies in Regional Resource Analysis. (3:3:0)
 5339. Plants in an Urban Society. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

HORTICULTURE

511. Horticulture Seminar. (1:1:0)
 May be repeated for credit.
 531. Horticulture Research. (3)
 May be repeated for credit.
 532. Ornamental Plant Behavior. (3:3:0)

533. Horticultural Plant Evaluation Techniques. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

ENTOMOLOGY

531. Entomology Research. (3)
 May be repeated for credit.
 532. Literature and History of Entomology. (3:3:0)
 533. Advanced Insect Taxonomy. (3:1:6)
 534. Advanced Economic Entomology. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Range and Wildlife Management. Professor Joseph L. Schuster, Chairman.
 Associate Professors Bolen, Dahl, and Wright;
 Assistant Professors Flinders, Pettit, and Sosebee.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND OPTION FOR THE DOCTOR'S DEGREE

Students seeking a master's or doctor's degree in the Department of Range and Wildlife Management should consult the chairman of the department about their programs before enrolling for any courses. Major programs are available in range science and wildlife management.

Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to take a preliminary examination to determine proficiency in background for graduate work, or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

If the preliminary examination for admission to doctoral studies reveals serious weaknesses in the student's subject matter background, the student may be required to take remedial courses designated by the graduate faculty of the department. The student's advisory committee will make recommendations concerning language requirements and basic work in other sciences.

All doctoral candidates are required either to demonstrate a reading knowledge of one language or to complete a 12-hour block of closely related courses outside the College of Agricultural Sciences. Courses taken to satisfy language requirements will not count toward degree requirements.

510. Range Seminar. (1)
 May be repeated for credit.
 511. Wildlife Seminar. (1)
 May be repeated for credit.
 512. Problems in Range Management. (1)
 May be repeated for credit.
 513. Problems in Wildlife Management. (1)
 May be repeated for credit.
 522. Wildlife Behavior. (2:2:0)
 530. Fire Behavior and Ecology. (3:2:3)
 531. Synecology. (3:3:0)
 532. Vegetation Influences. (3:3:0)
 533. The Physiological Basis for Grazing Management. (3:2:3)
 534. Range Research. (3)
 535. Wildlife Research. (3)
 May be repeated for credit.
 536. Ecology of Arid Lands. (3:3:0)
 537. Range Research Methods. (3:2:3)
 538. Contemporary Resource Use. (3:3:0)
 539. Experimental Design and Analysis. (3:2:2)
 540. Advanced Range Management Planning. (4:3:3)

5310. Advanced Studies in Wildlife Habitat. (3:2:3)
 5311. Waterfowl Ecology. (3:2:3)
 5313. Advanced Wildlife Ecology and Management. (3:2:3)
 5314. Plant Autecology. (3:3:0)
 5315. Plant Ecophysiology. (3:3:0)
 5316. Advanced Range Ecology. (3:2:3)
 5318. Wildlife Conservation and Management. (3:3:0)
 5319. Ecology of Renewable Natural Resources. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731. Research. (3)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

College of Arts and Sciences

Professor Lawrence Lester Graves, Dean

Anthropology. Professor William J. Mayer-Oakes, Chairman.
 Associate Professors King, Keslin, and Montgomery; Assistant Professor Campbell.

MINORS FOR THE MASTER'S DEGREE

531. Anthropological Theory. (3)
 532. Seminar in Anthropological Theory and History. (3:3:0)
 May be repeated for credit as the topic varies.
 533. Seminar in Ethnology. (3:3:0)
 May be repeated for credit as the topic varies.
 5335. Origins of Social Customs and Institutions. (3:3:0)

Art. Professor B. C. Lockhart, Chairman.
 Professors Hastie, Howze, Kincaid, and Stephen; Associate Professors Alesch, Durland, Everton, Hanna, Hellberg, Henton, Parkinson, Pollard, and Queen; Assistant Professors Gibbons, Kreneck, Milosevich, Morrow, Read, Reynolds, and Street.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

The graduate faculty of the Department of Art offers a program of study leading to the Master of Fine Arts degree (M.F.A.) with a major in Art. The two year program is comprised of 60 semester hours of graduate work. Within the program a student may declare a major area of concentration in one of the following areas: art education, two-dimensional studio, or three-dimensional studio. The Department of Art also offers a Master of Fine Arts degree (M.F.A.) with a major in Interior Design that requires 36 semester hours of graduate work to prepare majors for careers in research and college training.

Entrance into these programs presumes an undergraduate Bachelor of Fine Arts degree with an Art major of at least 70 semester hours of art or its equivalent. A Graduate Committee, composed of three graduate faculty members in the Department of Art, will examine a portfolio of the student's art work and hold a personal interview with each student. On the basis of these examinations, recommendations will be made concerning the admission of the student to the M.F.A. programs. The faculty committee will determine and prescribe any leveling work to be completed before or after admission.

511. Advanced Art Unit. (1)
 May be repeated for credit.
 518. Art Seminar. (1:1:0)
 May be repeated for credit.
 530. Readings in Art Education. (3:3:0)
 531. Special Problems in Art. (3)
 May be repeated for credit.
 532. Research Methods in the Visual Arts. (3:3:0)
 533. Environmental Studies Related to Interior Design. (3:3:0)
 May be repeated for credit.
 534. Advanced Studio: Two-dimensional. (3)
 May be repeated for credit.
 535. Advanced Studio: Three-dimensional. (3)
 May be repeated for credit.
 536. Art in Home Economics. (3:1:6)
 May be repeated for credit.
 537. Art for Exceptional Children. (3:1:4)
 538. Art for the Culturally and Economically Disadvantaged. (3:3:0)
 539. Methods and Materials Laboratory in Art. (3:0:9)
 May be repeated for credit.
 5310. Aesthetic Theory as Applied to Art. (3:3:0)
 5311. Experimental Methods in Teaching Art. (3:2:3)
 May be repeated for credit.
 5312. The Interrelationship of the Arts. (3:3:0)
 5313. Curriculum Development in Art Education. (3:3:0)
 5314. Supervision and Administration in Art Education. (3:3:0)
 5315. Historical Survey of the Teaching of Art. (3:3:0)
 5316. History and Theory of Interior Design. (3:3:0)
 May be repeated for credit.
 5317. Research into the Effects of the Interior Design Environment on the User. (3:3:0)
 May be repeated for credit.
 5318. Advanced Problems in Interior Design. (3:0:9)
 May be repeated for credit.
 5319. Production Procedures for Interior Designers. (3:1:4)
 May be repeated for credit.
 5320. Structure in Interior Design. (3:1:4)
 May be repeated for credit.
 5321. Home Furnishings Industry. (3:3:0)
 May be repeated for credit.
 5322. Interior Design Seminar. (3:1:4)
 May be repeated for credit.
 5323. Special Unit Course in Interior Design. (3:0:9)
 May be repeated for credit.
 5330. Graduate Seminar in Art History. (3:3:0)
 5331. Graduate Problems in Art History. (3:3:0)
 5333. Advanced Photography. (3:0:9)
 May be repeated for credit.
 5334. Advanced Design. (3:0:9)
 May be repeated for credit.
 5335. Theory and Practice of Art for Elementary Teachers. (3:1:4)
 5336. Graduate Sculpture. (3:0:9)
 May be repeated for credit.
 5337. Graduate Painting. (3:0:9)
 May be repeated for credit.
 5338. Graduate Textile Design. (3:0:9)
 May be repeated for credit.
 5339. Graduate Pottery. (3:0:9)
 May be repeated for credit.
 5340. Graduate Jewelry. (3:0:9)
 May be repeated for credit.
 5341. Graduate Printmaking. (3:0:9)
 May be repeated for credit.

630. Master's Report. (3)
Enrollment required at least once.
631. Master's Thesis. (3)
Enrollment required at least twice.

Biology. Professor Raymond C. Jackson, Chairman.

Professors Behal, Camp, Jones, Mecham, Packard, Proctor, and Strandmann; Associate Professors Allen, Baker, Baugh, Berlin, Carter, Coulter, Elliot, George, Goodin, Kuhnley, Mitchell, Morey, and Rose; Assistant Professors Atchley, Burnes, Felkner, Northington, Rylander, and Thayer.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

The graduate faculty of the Department of Biology offers studies in biology, botany, microbiology, and zoology.

Before being recommended for admission to a master's degree program, the student may be required to take an examination which includes the subject matter usually required of undergraduates.

If the preliminary examination for admission to doctoral studies reveals serious weaknesses in the student's subject-matter background, the student may be required to take remedial courses designated by the graduate faculty of the department. The basic degree requirements of the Graduate School determine the policy of the department.

The Department of Biology has no general requirement of a foreign language for the Ph.D. degree. However, it may be necessary for a student to demonstrate a proficiency in a foreign language (s) in certain programs.

The student's advisory committee will make recommendations concerning language options and basic work in other sciences.

BIOLOGY

511. Seminar. (1:1:0)
May be repeated for credit.
512. Advanced Experimental Heredity. (1:0:3)
513. Special Problems in Biometry. (1)
521. Biological Electron Microscopy. (2:2:0)
532. Population Genetics. (3:2:3)
533. Selected Topics in Radiation Biology. (3:2:3)
534. Application of Radioactive Tracers in Biology. (3:2:3)
535. Biological Fine Structure. (3:3:0)
536. Techniques in Biological Electron Microscopy. (3:0:9)
537. Special Problems in Genetics. (3)
538. Advanced Population Biology. (3:2:3)
551. Cytogenetics. (5:3:6)
552. Biometry. (5:4:3)
5313. Biochemical Genetics. (3:3:0)
731. Research. (3)
May be repeated for credit.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

BOTANY

531. Problems in Botany. (3)
May be repeated for credit.
532. Vector Relationships in Plant Diseases. (3:2:3)
533. Developmental Plant Physiology. (3:2:3)
534. Advanced Plant Anatomy. (3:0:9)
535. Field Botany. (3:3:0)
May be repeated for credit.
536. Taxonomy of Lower Green Plants. (3:2:3)

537. Morphology of the Vascular Plants. (3:2:3)
538. Advanced Taxonomy of the Vascular Plants. (3:2:3)
539. Plant Speciation. (3:3:0)
5311. Morphogenesis and Plant Growth Regulators. (3:2:3)
5331. Plant Growth and Development. (3:2:3)
5332. Plant Pathology for Advanced Students. (3:2:3)
5333. Plant-Water Relationships. (3:3:0)
5335. Advanced Structure and Physiology of Woody Plants. (3:0:9)
5336. Readings in Plant Geography. (3:3:0)
5338. Morphology of Fungi for Advanced Students. (3:2:3)
5339. Experimental Plant Anatomy. (3:2:3)
5341. Plant Chemosystematics. (3:2:3)
630. Master's Report. (3)
631. Master's Thesis. (3)
Enrollment required at least twice.
731. Research. (3)
May be repeated for credit.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

MICROBIOLOGY

521. Instrumental Methods of Microbiology. (2:0:6)
531. Research in Microbiology. (3)
May be repeated for credit.
532. Selected Topics in Microbiology. (3:3:0)
May be repeated for credit.
533. General Virology. (3:2:3)
534. Microbial Genetics. (3:2:3)
536. Immunochemistry. (3:2:3)
537. Microbial Metabolism. (3:3:0)
5323. Laboratory Microbial Physiology. (3:0:9)
5330. Advanced General Microbiology. (3:2:3)
5332. Immunobiology. (3:2:3)
5333. Advanced Bacterial Physiology. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.
731. Research. (3)
May be repeated for credit.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

ZOOLOGY

521. Selected Topics in Invertebrate Physiology. (2:2:0)
531. Problems in Zoology. (3)
May be repeated for credit.
532. Principles and Methods of Systematic Zoology. (3:2:3)
533. Herpetology. (3:2:3)
534. Advanced Invertebrate Zoology. (3:2:3)
535. Field Zoology. (3:3:0)
May be repeated for credit.
536. Advanced Studies in Mammalogy. (3:2:3)
537. Physiological Ecology of the Vertebrates. (3:3:0)
538. The Arachnids. (3:2:3)
5118. Laboratory in Comparative Endocrinology. (1:0:3)
5311. Biology of the Acarina. (3:2:3)
5313. Advanced Ornithology. (3:2:3)
5314. Zoogeography. (3:3:0)
5317. Experimental Embryology. (3:2:3)
5318. Comparative Endocrinology. (3:3:0)
5319. Ichthyology. (3:2:3)
5320. Advanced Vertebrate Anatomy. (3:2:3)
5337. Vertebrate Zoology for Advanced Students. (3:2:3)
5338. Physiology of Animal Cells. (3:2:3)
5339. Comparative Physiology for Advanced Students. (3:2:3)
630. Master's Report. (3)

631. Master's Thesis. (3)
Enrollment required at least twice.
731. Research. (3)
May be repeated for credit.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Chemistry. Horn Professor Henry J. Shine, Chairman; Associate Professor Robert G. Rekers, Assistant Chairman. Welch Professor Shoppee; Professors Dennis, Herndon, Lee and Song; Associate Professors Adamcik, Anderson, Draper, Redington and Wilde; Assistant Professors Blackmer, Carlyle, Marcoux, Marx, Mills, Mitchell and O'Brien.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Each student majoring in this department for an advanced degree must take four written preliminary diagnostic examinations to ascertain his comprehension of chemistry. The examinations are based on the undergraduate curriculum. Each student is expected to take examinations in organic and physical chemistry plus two selected from the areas of analytical, inorganic, and biochemistry. Those students who desire to major in biochemistry will take examinations in physical, organic, biochemistry, and either analytical or inorganic chemistry. These examinations are given during the first week of each semester, according to schedules posted on the departmental bulletin board. Students will have an opportunity to register for such remedial courses as the examinations may show to be necessary.

Each graduate student in this department is expected to do some teaching before receiving an advanced degree. The minimal requirements are one laboratory for a master's and two for a doctor's degree.

Special Regulations Concerning the Master's Degree

A satisfactory proficiency in one approved language is required of each degree candidate. Approved languages are French, German, and Russian.

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.

A minor of 18 semester hours of work may be taken within the department.

A satisfactory proficiency in two approved languages or high proficiency in one language is required for each degree candidate.

A cumulative examination system is used as the written part of the qualifying examination, with cumulatives offered eight times each school year. Passing a graduated number each year over a three-year period is required, together with a successful oral defense of an original research proposal, to satisfy the qualifying examination requirement.

- 511, 512. Seminar. (1:1:0 each)
May be repeated for credit.
- 531, 532. Research. (3 each)
May be repeated for credit.
- 5221, 5222. Laboratory Techniques in Modern Organic Chemistry I and II. (2:0:6 each)
- 5301, 5302. Advanced Inorganic Chemistry I and II. (3:3:0 each)
5303. Modern Inorganic Chemistry. (3:3:0)
5304. Topics in Inorganic Chemistry. (3:3:0)
May be repeated for credit.
5312. Modern Techniques of Chemical Analysis. (3:2:3)

5314. Advanced Analytical Chemistry. (3)
5315. Spectrographic Analysis I. Emission Spectra. (3:2:3)
5316. Spectrographic Analysis II. Absorption Spectra. (3:2:3)
5317. Selected Topics in Analytical Chemistry. (3:3:0)
May be repeated for credit.
- 5321, 5322. Advanced Organic Chemistry I and II. (3:3:0 each)
- 5323, 5324. Modern Principles of Organic Chemistry I and II. (3:3:0 each)
5325. Topics in Organic Chemistry. (3:3:0)
May be repeated for credit.
- 5327, 5328. Physical Organic Chemistry I and II. (3:3:0 each)
- 5330, 5331. Biochemistry I and II. (3:2:3 each)
5334. Topics in Biological Chemistry. (3:3:0)
May be repeated for credit.
5335. Physical Biochemistry. (3:3:0)
5336. Biochemical Mechanisms. (3:3:0)
5337. Enzymes. (3:3:0)
5338. Biochemical Methods. (3:1:6)
- 5340, 5341. Physical Chemistry Principles I and II. (3:3:0 each)
5342. Advanced Physical Chemistry. (3:3:0)
5343. Quantum Chemistry. (3:3:0)
5344. Kinetics of Chemical Reactions. (3:3:0)
5345. X-Rays and Crystal Structure. (3:3:0)
5346. Statistical Mechanics for Chemists. (3:3:0)
5347. Chemical Thermodynamics. (3:3:0)
5348. Topics in Physical Chemistry. (3:3:0)
May be repeated for credit.
631. Master's Thesis. (3)
Enrollment required at least twice.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Classical and Romance Languages.

Professor Norwood H. Andrews, Jr., Chairman.

Professors Bumpass, Christiansen, Cismaru, Maxwell, and Oberhelman; Associate Professors Bodoh, Bubresko, Finco, George, and Patterson; Assistant Professors Hopkins, Morris, and Stratton.

The departments of Classical and Romance Languages, English, and Germanic and Slavonic Languages offer interdepartmental programs in linguistics and comparative literature at the master's and doctor's levels. See section entitled Interdepartmental Programs in this bulletin.

In order to qualify for admission to candidacy, applicants for the Ph.D. degree in Spanish are required to demonstrate a reading knowledge of French and another language outside the major field and approved by the advisory committee as appropriate to their individual research. Candidates for the M.A. degree in this department must demonstrate a reading knowledge of a second foreign language.

FRENCH

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

- 531, 532. Research in French. (3 each)
May be repeated for credit.
533. Studies in Medieval Language and Literature. (3:3:0)
May be repeated for credit.
534. The Romantic Movement in France. (3:3:0)
- 5312, 5313. Studies in French Language and Literature I and II. (3:3:0 each)
May be repeated for credit.

5317. Seminar in Seventeenth Century Literature. (3:3:0)
 5318. Seminar in Eighteenth Century Literature. (3:3:0)
 5319. Seminar in Nineteenth Century Literature. (3:3:0)
 5320. Seminar in Twentieth Century Literature. (3:3:0)
 5341, 5342. Intensive French for Graduate Research I and II. (3:3:0 each)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

GREEK**MINORS FOR THE MASTER'S DEGREE**

- 531, 532. Research in Greek. (3 each)
 May be repeated for credit.

ITALIAN**MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE**

- 531, 532. Research in Italian. (3 each)
 May be repeated for credit.

LATIN**MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE**

- 531, 532. Research in Latin. (3 each)
 May be repeated for credit.

LINGUISTICS**MAJORS AND MINORS FOR THE MASTER'S DEGREE**

530. Romance Linguistics. (3:3:0)
 5311. Linguistic Techniques in Teaching Romance Languages. (3:3:0)
 5335. Methods of Teaching Spanish and English to Bilingual Children. (3:3:0)

PORTUGUESE**MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE**

- 531, 532. Research in Portuguese. (3 each)
 May be repeated for credit.
 5341, 5342. Intensive Portuguese for Graduate Research I, II. (3:3:0 each)

SPANISH**MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE**

- 531, 532. Research in Spanish. (3 each)
 May be repeated for credit.
 533. History of the Spanish Language. (3:3:0)
 534. Old Spanish. (3:3:0)
 535. Metrics. (3:3:0)
 536. Stylistics. (3:3:0)
 537. Bibliography and Methods of Research. (3:3:0)
 538, 539. Summer Language Institute. (3:3:0 each)
 Offered in Mexico.
 5310. Methods of Literary Criticism. (3:3:0)
 5312, 5313. Studies in Spanish and Spanish American Literature. (3:3:0 each)
 May be repeated for credit.
 5314. Medieval Literature. (3:3:0)
 May be repeated for credit.
 5315. Renaissance Literature. (3:3:0)
 May be repeated for credit.
 5316. Cervantes. (3:3:0)
 5317. Seminar in Golden Age Literature. (3:3:0)
 May be repeated for credit.
 5318. Eighteenth Century Literature. (3:3:0)
 May be repeated for credit.

5319. Studies in Modern and Contemporary Spanish Literature. (3:3:0)
 May be repeated for credit.
 5320. Seminar in Modern Spanish Literature. (3:3:0)
 May be repeated for credit.
 5321. Studies in the Latin American Novel. (3:3:0)
 May be repeated for credit.
 5322. Seminar in Latin American Literature. (3:3:0)
 May be repeated for credit.
 5323. Modernism. (3:3:0)
 5341, 5342. Intensive Spanish for Graduate Research I and II. (3:3:0 each)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731, 732. Research. (3 each)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Economics. Professor R. L. Rouse,**Chairman.**

Professors Clover and Hill; Associate Professors Anderson, Bonington, Stem, and Wittman; Assistant Professors Butler, Troub, and Useton.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

The student must demonstrate reading knowledge in one foreign language and competence in a tool subject.

531. Economic Research. (3:3:0)
 532. Current Problems in Public Finance. (3:3:0)
 535. Seminar in Economic Policy. (3:3:0)
 536. Advanced International Economics. (3:3:0)
 537. Seminar in Public Finance. (3:3:0)
 538. The Nature, Method, and Scope of Economics. (3:3:0)
 539. Classical Economic Thought. (3:3:0)
 5242. Managerial Economics. (2:2:0)
 5311. Philosophy and Historiography of Economic History. (3:3:0)
 5312. Seminar in Economic History. (3:3:0)
 5313. Survey of Theories of Economic Growth and Development. (3:3:0)
 5314. Seminar in Economic Growth and Development. (3:3:0)
 5315. Seminar in Ecological Economics. (3:3:0)
 5321. Seminar in Mathematical Economics. (3:3:0)
 5331. Individual Study in Economics. (3:3:0)
 5335. Human Geography. (3:3:0)
 5341. Price and Income Theory. (3:3:0)
 5351. Advanced Micro-Economic Analysis. (3:3:0)
 5352. Advanced Macroeconomic Analysis. (3:3:0)
 5360. Seminar in Advanced Economic Analysis. (3:3:0)
 5362. Empirical Studies in Macroeconomics, a Seminar. (3:3:0)
 5371. Theory of Monetary Economics. (3:3:0)
 5372. Seminar in Monetary Economics. (3:3:0)
 5331. The Economic Environment. (5:5:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731. Research. (3)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

English. Professor Marion C. Michael,**Chairman.**

Professors Allen, Camp, Carlock, Collmer, Culp, K. Davis, Gillis, McCullen, Mogan, Nall, and

Walker; Associate Professors Berry, Crider, Edleman, Green, Langford, McDonald, and Terrell; Assistant Professors D. Davis, Foster, Gilbert, Higdon, Johnson, Lees, Levinsky, Marcoux, Oden, and Wages.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Students seeking the master's or doctor's degree in English should consult with the chairman of the department or the Chairman of Graduate Studies in English about their program before enrolling in any courses.

The Master of Arts program offers English majors the opportunity to study in seven fields: English literature before 1700; English literature after 1700; American literature; comparative literature; English language; folklore; and literary criticism. The requirements for the degree include a thesis and 24 semester hours beyond the Bachelor of Arts degree: 18 semester hours within the specialized areas listed above, and 6 semester hours in an appropriate minor. The student must also demonstrate a reading knowledge of one foreign language.

Candidates for the doctor's degree are offered the opportunity for specialized studies in ten fields: English literature to 1500; English literature, 1500-1700; English literature, 1700-1832; English literature, 1832-present; American literature to 1865; American literature since 1865; comparative literature; English language/linguistics; folklore; and literary criticism. The course work for the doctoral program includes approximately 48 semester hours beyond the Master of Arts degree including the doctoral dissertation under the supervision of a doctoral committee. A high level of competence in one foreign language (as demonstrated by a grade of B or better in a graduate-level course) or a reading knowledge of two foreign languages is required for the doctoral degree.

The departments of Classical and Romance Languages, English, and Germanic and Slavonic Languages offer interdepartmental programs in linguistics and comparative literature at the master's and doctor's levels. See section entitled Interdepartmental Programs in this bulletin.

- 530. Studies in Medieval Literature. (3:3:0)
- 531. Studies in Comparative Literature. (3:3:0)
- 532. Teaching of College English. (3:3:0)
- 533. Studies in Renaissance Literature. (3:3:0)
- 534. Old English. (3:3:0)
- 535. Studies in Early Victorian Literature. (3:3:0)
- 536. Beowulf. (3:3:0)
- 538. Studies in Early English Romantics. (3:3:0)
- 539. Studies in the Neo-Classical Age. (3:3:0)
- 5311. Studies in Seventeenth Century Literature. (3:3:0)
- 5312. Studies in Drama. (3:3:0)
- 5313. Studies in Modern European Literature. (3:3:0)
- 5314. Studies in Literary Criticism. (3:3:0)
- 5315. Studies in Folklore. (3:3:0)
- 5318. Studies in Eighteenth Century American Literature. (3:3:0)
- 5319. Studies in Shakespeare. (3:3:0)
- 5322. Studies in Modern British Literature. (3:3:0)
- 5323. Studies in Nineteenth Century American Literature. (3:3:0)
- 5324. Studies in Twentieth Century American Literature. (3:3:0)
- 5325. American Novel to 1900. (3:3:0)

- 5326. American Novel since 1900. (3:3:0)
- 5327. Studies in the English Novel. (3:3:0)
- 5329. Studies in Modern Poetry. (3:3:0)
- 5335. Principles of Language. (3:3:0)
- 5337. Studies in Linguistics. (3:3:0)
- 5338. Linguistic Analysis I: Syntax. (3:3:0)
Prerequisite: ENG 3338 or 5335.
- 5339. Linguistic Analysis II: Phonology. (3:3:0)
Prerequisite: ENG 5338 or consent of instructor.
- 5341. Studies in Bibliography. (3:3:0)
- 5351. Studies in Later Victorian Literature. (3:3:0)
- 5381. Studies in Later English Romantics. (3:3:0)
- 5391. Studies in the Age of Johnson. (3:3:0)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
Enrollment required at least twice.
- 731, 732. Research. (3 each)
- 831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Note: Graduate courses that are studies or seminars may be repeated for credit with permission of department as topics vary.

Geography. Professor William B. Conroy, Chairman.

Assistant Professors Templer and Davidson.

MINORS FOR THE MASTER'S DEGREE

- 531. Seminar in Geographic Thought and Methodology. (3:3:0)
- 532. Seminar in Regional Geography. (3:3:0)
- 533. Seminar in Historical and Cultural Geography. (3:3:0)
- 534. Seminar in Urban and Economic Geography. (3:3:0)
- 535. Seminar in the Conservation of Natural Resources. (3:3:0)
- 5310. Readings in Geography. (3)

Geosciences. Professor William D. Miller, Chairman.

Professors Arper, Black, Brand, Childs, Conselman, Harris, Jacka, Mattox, Murray, Shurbet, and Wade; Associate Professors Cebull, Hargan, and Reeves.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Regulations Concerning the Master's Degree
Before being recommended for admission to candidacy for the master's degree in this department, the student must satisfy the graduate staff that he is qualified. Students may be required to take written qualifying examinations in one or more of the following subjects: physical geology, historical geology, mineralogy and crystallography, structural geology, paleontology and field methods. Examinations will be given during the first week of each semester and students will have the opportunity to register for the remedial courses which are recommended. No language is required for the master's degree.

Regulations Concerning the Doctor's Degree
The basic regulations and requirements for the degree of Doctor of Philosophy determine the policy of this department. Knowledge of one foreign language is required for the Ph.D. degree. Proficiency may be demonstrated by (1) passing two 300-level courses with a grade of B or higher in the second course of the sequence, or by (2) surpassing an Educational Testing Service examination threshold score which will demonstrate a sound reading knowledge. The language will be French, German, or Russian unless specific written permission is received from the chairman.

ATMOSPHERIC SCIENCE

530. Advanced Problems in Atmospheric Science. (3:3:0)
 5311. Biometeorology. (3:3:0)
 5312. Applied Meteorology. (3:3:0)
 5314. Physical and Dynamical Climatology. (3:3:0)

GEOCHEMISTRY

- 531, 532. Geochemistry I, II. (3:3:0 each)
 533. Selected Topics in Geochemistry. (3:3:0)
 534. Advanced Problems in Geochemistry. (3:3:0)

GEOLOGY

511. Seminar. (1:1:0)
 521. Clay Mineralogy. (2:1:3)
 531. Advanced Physical Geology. (3:3:0)
 532. Advanced Historical Geology. (3:3:0)
 533. Petrology of Igneous Rocks. (3:3:0)
 535, 536. Advanced Work in Specific Fields. (3 each)
 538. Geology of the Southwest. (3:3:0)
 539. Vertebrate Paleontology. (3:2:3)
 541. X-Ray Diffraction and Analysis. (4:3:3)
 542. X-Ray Crystallography. (4:3:3)
 543. Carbonate Petrology and Petrography. (4:2:6)
 544. Sedimentary Petrography and Petrology. (4:2:6)
 563. Advanced Field Geology. (6)
 5311. Stratigraphic Micropaleontology. (3:2:3)
 5312. Economic Geology. (3:2:3)
 5313. Application of Geology in Engineering Projects. (3:2:3)
 5314. Paleozoic, Mesozoic, Cenozoic Stratigraphy. (3:3:0)
 5315. Metamorphic Microtextures. (3:1:6)
 5316. Remote Sensing Techniques. (3:2:3)
 5317. Selected Topics in Structural Geology. (3:3:0)
 5324. Advanced Sedimentation. (3:2:3)
 5327. Problems in Paleontology. (3:2:3)
 5328. Advanced Structural Geology. (3:2:3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731, 732. Research. (3 each)
 Required of all doctoral candidates.
 733. Advanced Problems in Geology. (3)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

GEOPHYSICS

531. Wave Propagation in Layered Media. (3:3:0)
 532. Introduction to the Theory of Elastic Waves. (3:3:0)
 533. Selected Topics in Geophysics. (3:3:0)
 534. Advanced Problems in Geophysics. (3:1:6)

Germanic and Slavonic Languages.

Professor Carl Hammer, Jr., Chairman.
 Professor Alexander; Associate Professors Hull and Zyla; Assistant Professors Eigsti and Freitas.

The departments of Classical and Romance Languages, English, and Germanic and Slavonic Languages offer interdepartmental programs in linguistics and comparative literature at the master's and doctor's levels. See section entitled Interdepartmental Programs in this bulletin.

GERMAN**MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE**

- 531, 532. Research in German. (3 each)
 May be repeated for credit.

- 533, 534. Intensive German for Graduate Research I and II. (3:3:0 each)
 5312, 5313. Studies in German Language and Literature I and II. (3:3:0 each)
 May be repeated for credit.
 5316. Middle High German. (3:3:0)
 5317. The German Novelle. (3:3:0)
 5318. Old Icelandic. (3:3:0)
 5321, 5322. Seminar in Modern German Literature I, II. (3:3:0 each)
 May be repeated for credit.
 631. Master's Thesis. (3)
 Enrollment required at least twice.

RUSSIAN**MINORS FOR THE MASTER'S DEGREE**

- 531, 532. Research in Russian. (3 each)
 May be repeated for credit.

Government. Professor Jack W. Hopkins, Chairman.

Professors Davis, Henderson, Jones, Kennedy, Oden, Tamkoc, and Tucker; Associate Professors Baird and Kyre; Assistant Professors Burnett, Cochran, Mayer, Panyan, Pearson, Smith, Vanderbok, Wheeler, and Wright.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Graduate study is offered in the following special fields: American government and politics, comparative government and politics, international relations, political theory, public administration, and public law.

All students seeking admission to the graduate program must submit at least three letters of recommendation, preferably from former teachers, to the chairman of the department and must have a total GRE score of at least 1,000 and an overall average of B. Graduate students in other departments who choose government as a minor must have had or must complete at least 18 hours of undergraduate work in government.

Reading knowledge of two foreign languages is required for the doctor's degree (or a knowledge of one language and a tool-subject such as statistics).

Additional information regarding requirements and procedures may be obtained from the department.

531. Readings and Research—Individual Study. (3)
 May be repeated for credit.
 532. Seminar in American Government and Politics. (3:3:0)
 533. Seminar in Political Theory. (3:3:0)
 534. Seminar in Public Administration. (3:3:0)
 535. Seminar in Public Law. (3:3:0)
 536. Seminar in International Relations. (3:3:0)
 537. Seminar in Comparative Government and Institutions. (3:3:0)
 538. Seminar in Parties and Politics. (3:3:0)
 539. Seminar in National Security Affairs. (3:3:0)
 5320. Scope and Methods of Political Science. (3:3:0)
 5321. Advanced American Government and Politics. (3:3:0)
 5331. Advanced Political Theory. (3:3:0)
 5332. Survey Research. (3:3:0)
 5333. Empirical Theory Building. (3:3:0)
 5334. Causal Modelling. (3:3:0)
 5341. Advanced Public Administration. (3:3:0)
 5351. Advanced Constitutional Law. (3:3:0)
 5361. Advanced International Relations. (3:3:0)

5371. Advanced Comparative Government and Politics. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731, 732. Research. (3 each)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Health, Physical Education, and Recreation for Men. Professor John W. Cobb, Chairman.

Professors Kireilis, Philbrick, and Segrest; Associate Professor Buchanan; Assistant Professors Bobo, Burkhardt, Coleman, Kozar, and Mason.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

Unless otherwise specified, all courses are open to both men and women.

531. Administration of Physical Education. (3:3:0)
 532. Supervision of Physical Education. (3:3:0)
 533. Facilities for Physical Education. (3:3:0)
 534. Administration of the School Health Program. (3:3:0)
 535. Techniques of Research in Health, Physical Education, and Recreation. (3:3:0)
 536. Problems in Health, Physical Education, and Recreation. (3)
 537. Seminar in Health, Physical Education, and Recreation. (3:3:0)
 538. Physiology of Exercise. (3:3:0)
 539. Advanced Measurement in Physical Education. (3:3:0)
 5302. Motor Activity for the Atypical. (3:3:0)
 5304. Physiological Kinesiology. (3:3:0)
 5305. Psychological Kinesiology. (3:3:0)
 5306. Mechanical Analysis of Motor Performance. (3:3:0)
 5322. Organization and Administration of Interscholastic and Intercollegiate Athletic Programs. (3:3:0)
 5324. Organization and Administration of Intramural Sports. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Health, Physical Education, and Recreation for Women. Professor Margaret E. Wilson, Chairman.

Professors Dabney, Horton, Hoyle, Love, Owens, and Rogers.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

- All courses are open to both men and women.
 531. Administration of Physical Education. (3:3:0)
 532. Supervision of Physical Education. (3:3:0)
 533. Facilities for Physical Education. (3:3:0)
 534. Administration of the School Health Program. (3:3:0)
 535. Techniques of Research in Health, Physical Education, and Recreation. (3:3:0)
 536. Problems in Health, Physical Education, and Recreation. (3)
 May be repeated for credit.
 537. Seminar in Health, Physical Education, and Recreation. (3:3:0)
 May be repeated for credit.
 538. Physiology of Exercise. (3:3:0)
 539. Advanced Measurement in Physical Education. (3:3:0)

5302. Motor Activity for the Atypical. (3:3:0)
 5304. Physiological Kinesiology. (3:3:0)
 5305. Psychological Kinesiology. (3:3:0)
 5306. Mechanical Analysis of Motor Performance. (3:3:0)
 5324. Organization and Administration of Intramural Sports. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

History. Professor D. M. Vigness, Chairman.

Professors Blaisdell, Connor, Graves, Manning, and Wallace; Associate Professors Barr, Blakeley, Chong, Collins, Johnson, Nelson, Reese, G. Robbert, and Traylor; Assistant Professors Harper, Hayes, Jebben, King, Kueth, Libourel, Newcomb, and L. Robbert.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Departmental Regulations Governing the Doctoral Program

In both preliminary and qualifying examinations the applicant will choose five fields within the three areas designated below. At least two of his fields must be outside the major area. The advice and counsel of the Graduate Adviser will be an important aspect of the applicant's selection of fields. At the discretion of the advisory committee, the qualifying examination in one field may be waived.

A reading knowledge of one foreign language is required for the master's candidate. A reading knowledge of two languages, both acceptable mutually to the student, his major professor and committee, and/or the Graduate Adviser, is required for the Ph.D. degree.

The department offers three major areas of study, subdivided into fields:

American—Early American; Nineteenth Century; Recent; Social, Cultural, and Urban; Diplomatic; South and the Negro; West and Southwest; Economic and Labor.

Latin American—Colonial; National.

European—Classical; Medieval; Early Modern European to 1789; Great Britain; Modern Britain and the Empire—Commonwealth; Modern European.

Applicants for the doctorate in other departments who choose history as a minor must show proficiency in one or more of the above fields.

The applicant will be guided in his program by the graduate adviser of the department until the appointment of the advisory committee. History 534 and at least one seminar in the 600 course series are required of all candidates for the master's degree. History 535 and at least two seminars in the 600 course series are required of all candidates for the doctor's degree.

(Courses may be repeated for credit as topics vary.)

511. Teaching of History in College. (1:1:0)
 531. Readings and Research. (3)
 534. Historical Methods and Historiography. (3:3:0)
 Required of all masters' candidates.
 535. Historians and Historical Literature. (3:3:0)
 Required of all doctoral candidates.
 5311. Studies in Southern History. (3:3:0)
 5312. Studies in Recent United States History. (3:3:0)
 5313. Studies in United States Social and Cultural History. (3:3:0)
 5314. Studies in the Frontier and Western American History. (3:3:0)

5315. Studies in United States History. (3:3:0)
 5316. Studies in Modern European History. (3:3:0)
 5317. Studies in Medieval History. (3:3:0)
 5318. Studies in the Renaissance and Reformation History. (3:3:0)
 5319. Studies in Asian History. (3:3:0)
 5321. Studies in British History. (3:3:0)
 5322. Studies in United States Diplomatic History. (3:3:0)
 5323. Studies in American Constitutional History. (3:3:0)
 5324. Studies in English Colonial American History. (3:3:0)
 5325. Studies in American Economic History. (3:3:0)
 5327. Studies in Texas History. (3:3:0)
 5328. Studies in Colonial Latin American History. (3:3:0)
 5329. Studies in Ancient History. (3:3:0)
 5330. Studies in American Urban History. (3:3:0)
 5331. Studies in British Empire History. (3:3:0)
 5332. Studies in National Latin American History. (3:3:0)
 5333. Studies in Mexican History. (3:3:0)
 5334. Studies in American Labor History. (3:3:0)
 5335. History Appreciation for Teachers. (3:3:0)
 5336. Studies in Nineteenth Century United States History. (3:3:0)
 5340. Studies of Black People in the United States. (3:3:0)
 5341. Studies in Tudor-Stuart England. (3:3:0)
 5342. Studies in French Revolutionary and Napoleonic Years. (3:3:0)
 5343. Studies in East European and Russian History. (3:3:0)
 5344. Studies in Modern European Social Movements. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 633. Seminar in Southwestern History. (3:3:0)
 634. Seminar in American History. (3:3:0)
 635. Seminar in European History. (3:3:0)
 636. Seminar in Latin American History. (3:3:0)
 637. Seminar in British History. (3:3:0)
 731, 732. Research. (3 each)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Mass Communications. Professor Billy I. Ross, Chairman.

Associate Professors Hsia, Rooker, Rosenblatt, and Sellmeyer; Assistant Professors Dean, Gibson, and Tan.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

Students seeking the Master of Arts degree in Mass Communications should consult with the chairman of the department or the graduate adviser about the program before enrolling in any courses. The master's program consists of 30 hours of graduate work, including a thesis, or 36 hours without a thesis. Within the program a student may declare an area of concentration in one of the following areas: advertising, journalism, or telecommunications. Students without an undergraduate major in one of these fields may be required to take up to 6 hours of graduate leveling work. Such courses do not count towards fulfillment of the core requirement.

In addition to options allowed by the Graduate School for fulfilling the language require-

ment, Mass Communications majors can take 3 hours of computer science and 3 hours of statistics in lieu of language courses. Credits taken here do not count for the core requirement.

MASS COMMUNICATIONS

511. Studies and Problems in Mass Communications. (1)
 532. Seminar in Public Opinion and Propaganda. (3:3:0)
 533. Seminar in Legal Problems of Mass Communications. (3:3:0)
 534. Methods of Research. (3:3:0)
 535. Administration of Communication Media. (3:3:0)
 5311. Studies in International Communications. (3:3:0)
 5312. Seminar in Mass Communications Theory. (3:3:0)
 5313. Seminar in Communication History. (3:3:0)
 5314. Readings and Research. (3:3:0)
 5330. Problems in Mass Communications. (3:3:0)
 5335. Seminar in Public Relations. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

JOURNALISM

530. Seminar in Education for Journalism. (3:3:0)
 531. Seminar in Modern Editing. (3:3:0)
 536. Problems in Investigative Reporting. (3:3:0)
 537. Seminar in the Press and Society. (3:3:0)
 5315. School Publications. (3:3:0)
 5316. Individual Study in Journalism. (3)
 5331. Journalism Problems—Advanced. (3:3:0)

ADVERTISING

5331. Advertising Problems—Advanced. (3:3:0)
 5332. Studies of Problems of Advertising/Public Relations. (3)
 5334. Advertising in a Contemporary Society. (3:3:0)
 5336. Advertising and the Consumer. (3:3:0)
 5337. Seminar in Advertising and Mass Communication Media. (3:3:0)

TELECOMMUNICATIONS

531. Studies and Problems in Telecommunications. (3:3:0)
 532. Educational Television. (3:3:0)
 533. Contemporary Issues in Telecommunications. (3:3:0)
 5331. Telecommunications Problems—Advanced. (3:3:0)

PHOTOGRAPHY

531. Photography and Film Problems. (3)

Mathematics. Professor Henry Luther Gray, Chairman.

Professors Amir-Moez, Komkov, Lewis, Milnes, Odell, Rigby and Riggs; Associate Professors Anderson, Atchison, Baldwin, Bouillion, Ford, Hildebrand, Kellogg, Miller, Mitra, Newman, Tarwater, Thompson, Walling, and White; Assistant Professors Anderson, Bennett, Conatser, Duran, Hamilton, Hunt, Meyer, Moreland, Strauss, and Walker.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Graduate work in the Department of Mathematics is offered leading to the M.S., M.A., and Ph.D. degrees. Under the Ph.D. program a mathematical curriculum leading to a Ph.D. in mathematics with emphasis in any one of twelve areas of mathematics, including statistics, is offered. The department does not have a language requirement for the master's degree. Two languages (French, German, Russian) are required for the Ph.D. degree. Computer Science may be used as a substitute for one language in certain major areas and will be determined by the student's Doctoral Advisory Committee. Students seeking the master's or doctor's degree in mathematics should consult with the Director of Graduate Studies in Mathematics before enrolling in any courses.

- 511, 512. Seminar. (1:1:0 each)
- 531. Advanced Problems. (3)
- 532, 533. Intermediate Analysis I, II. (3:3:0 each)
- 534, 535. Theory of Numbers I, II. (3:3:0 each)
- 536, 537. Modern Algebra I, II. (3:3:0 each)
- 538. Foundations of Mathematics. (3:3:0)
- 539. Dimension Theory. (3:3:0)
- 5312, 5313. Functions of a Complex Variable I, II. (3:3:0 each)
- 5314, 5315. Functions of a Real Variable I, II. (3:3:0 each)
- 5316, 5317. Topology I, II. (3:3:0 each)
- 5318. Operational Calculus. (3:3:0)
- 5319. Fourier Analysis. (3:3:0)
- 5321, 5322. Methods of Applied Mathematics I, II. (3:3:0 each)
- 5323, 5324. Theory of Ordinary Differential Equations I, II. (3:3:0 each)
- 5325, 5326. Partial Differential Equations I, II. (3:3:0 each)
- 5329, 5330. Numerical Analysis I, II. (3:3:0 each)
- 5331, 5332. Advanced Topics in Analysis I, II. (3:3:0 each)
- 5333, 5334. Functional Analysis I, II. (3:3:0 each)
- 5335, 5336. Advanced Mathematics for Teachers I, II. (3:3:0 each)
- 5337, 5338. Topics in Numerical Analysis I, II. (3:3:0 each)
- 5339. Advanced Linear Algebra. (3:3:0)
- 5341, 5342. Advanced Topics in Algebra I, II. (3:3:0 each)
- 5345, 5346. Algebraic Topology I, II. (3:3:0 each)
- 5347, 5348. Riemann Surface Theory I, II. (3:3:0 each)
- 5349. Nonparametric Statistical Inference. (3:3:0)
- 5351. Advanced Topics in Geometry. (3:3:0)
- 5352. Differentiable Manifolds. (3:3:0)
- 5353, 5354. Theory of Generalized Functions I, II. (3:3:0 each)
- 5355, 5356. Theory of Groups I, II. (3:3:0 each)
- 5357, 5358. Theory of Rings I, II. (3:3:0 each)
- 5361, 5362. Advanced Topics in Topology I, II. (3:3:0 each)
- 5363. Decision Theory. (3:3:0)
- 5367. Advanced Statistical Methods. (3:3:0)
- 5369. Advanced Stochastic Processes. (3:3:0)
- 5371. Design of Experiments. (3:3:0)
- 5372. Theory of Linear Statistical Models. (3:3:0)
- 5373. Stochastic Processes. (3:3:0)

- 5374, 5375. Advanced Mathematical Statistics I, II. (3:3:0 each)
- 5376, 5377. Advanced Probability I, II. (3:3:0 each)
- 5378. Statistical Multivariate Analysis. (3:3:0)
- 5379. Statistical Sampling Theory. (3:3:0)
- 5380. Intermediate Probability Theory. (3:3:0)
- 5383, 5384. Intermediate Mathematical Statistics. (3:3:0 each)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
Enrollment required at least twice.
- 731. Research. (3)
- 831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Music. Professor Gene L. Hemmle, Chairman.

Professors Barber, Deahl, Ellsworth, Kenney, Killion, Marple, Mastroianni, Maynard, Redcay, and vanAppledorn; Associate Professors Cutter, Post, and Tolley.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

The Department of Music offers the Master of Music (Performance, Music History and Literature, or Music Theory) and Master of Music Education degrees. The M.M. degree consists of 30 hours of graduate work including thesis on the Music History and Literature and Music Theory majors. Two performances are required of the Performance major: one solo recital, and a second performance the nature of which will be determined and approved by the divisional faculty in each performance area. The student is responsible for submitting two tape recordings of both performances. The M.M.E. degree may be attained with a 30-hour program including thesis or a 36-hour program without thesis.

There is no foreign language requirement for the M.M.E. degree, nor for the M.M. degree in Music Theory, or in Performance except for the vocal major which assumes one year each of French, German, and Italian at the undergraduate level. The M.M. degree in Music History and Literature requires one foreign language, preferably French or German.

Placement tests will be given in applicable areas to assure the student the proper selection of courses. Any deficiencies may be removed by leveling work. A student who does not take and pass the placement examination (in music literature) within the first twelve hours of graduate study must take M LT 531. A satisfactory score on the placement examination or successful completion of M LT 531 is prerequisite to seminar courses in music literature.

APPLIED MUSIC

- 515, 525, 535, 545. Instrument or Voice. (1:0:½; 2:0:1; 3:0:1; 4:0:1)
- 530. Pedagogy of Applied Music. (3:3:0)
- 533. Applied Music Literature. (3:3:0)

MUSIC EDUCATION

- 513, 523, 535. Workshop of Contemporary Trends in Elementary Music Education. (1:0:2; 2:0:4; 3:0:6)
- 530, 531. Seminar in Music Education. (3:3:0 each)
- 532. Choral Music Workshop. (3:3:0)
- 533. Instrumental Music Workshop. (3:3:0)
- 534. Marching Band Direction. (3:3:0)
- 537. Instrumental Repertoire. (3:3:0)

- 538, 539. Instrumental Conducting Techniques and Analysis. (3:0:3 each)
 5231, 5232, 5233, 5234, 5235. Teaching Applied Music in the Public Schools I, II, III, IV, V. (2:2:0 each)
 5311, 5312. Advanced Choral Methods and Techniques. (3:0:3 each)
 5314. Special Problems in Music Education. (3:3:0)
 May be repeated with a new problem.
 5329. Administration and Supervision of Music Education. (3:3:0)
 5330. New Approaches to Music in Junior and Senior High Schools. (3:3:0)
 5331. Music in Early Childhood and Kindergarten. (3:3:0)
 5335. Music for Children. (3:3:0)
 5340. Philosophy and Problems of Teaching Music in Junior and Senior Colleges. (3:3:0)
 5341. Class Piano Techniques. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

MUSIC ENSEMBLE

510. Graduate Ensemble. (1:0:5)
 Sec. 1. Chorus
 Sec. 2. Orchestra
 Sec. 3. Band
 Sec. 4. Music Theater
 Sec. 5. Chamber Music
 Sec. 6. Collegium Musicum
 Sec. 7. Music Theater Activities

MUSIC LITERATURE

531. The Great Historical Periods of Music. (3:3:0)
 532. Choral Repertoire. (3:3:0)
 537, 538. Seminar in the History of Opera. (3:3:0 each)
 5331, 5332, 5333, 5334, 5335, 5336. Seminar in the History and Literature of Music: Middle Ages (5331), Renaissance (5332), Baroque (5333), Classic Period (5334), Romantic Period (5335), Twentieth Century (5336). (3:3:0 each)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

MUSIC THEORY

- 521, 522. Styles. (2:2:0 each)
 524, 525. 18th Century Counterpoint and Fugue. (2:2:0 each)
 531. Seminar in Music Theory. (3:3:0)
 533. Acoustics. (3:3:0)
 534. Pedagogy of Theory. (3:3:0)
 537, 538. Composition. (3:3:0 each)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Philosophy. Associate Professor Charles Sidney Hardwick, Chairman.
 Professor Little; Assistant Professors Cortes and Donaldson.

MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

531. Studies in Philosophical Classics. (3)
 532. Studies in Greek Philosophy. (3:3:0)
 533. Studies in Medieval Philosophy. (3:3:0)
 534. Studies in American Philosophy. (3:3:0)
 535. Basic Issues in Contemporary Philosophy. (3:3:0)
 536. Continental Rationalism. (3:3:0)
 537. British Empiricism. (3:3:0)
 5310. Aesthetics. (3:3:0)

5311. Existentialism. (3:3:0)
 5312. Analytic Philosophy. (3:3:0)
 5313. Social Philosophy. (3:3:0)
 5314. Philosophy of Science. (3:3:0)

Physics. Professor H. C. Thomas, Chairman.

Professors Das Gupta, Marshall, Mires and Quade; Associate Professors Gott, Howe, Kim, Lodhi, Mann, and Sandlin; Assistant Professor Hatfield.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

The Department of Physics requires one foreign language—French, German, or Russian—for an advanced degree.

- 511, 512. Seminar. (1:1:0 each)
 Required of all graduate majors in physics.
 513. Techniques of Experimental Physics. (1:0:3)
 530. Advanced Topics. (3:3:0)
 May be repeated for credit.
 531, 532. Advanced Topics in Quantum Mechanics I, II. (3:3:0 each)
 533. Advanced Topics in Solid State Physics. (3:3:0)
 535. Introduction to Statistical Physics. (3:3:0)
 536. Advanced Dynamics. (3:3:0)
 541, 542. Theoretical Physics. (4:4:0 each)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 633, 634. Quantum Mechanics. (3:3:0 each)
 635, 636. Electromagnetic Theory. (3:3:0 each)
 637, 638. Structure of Matter. (3:3:0 each)
 639. Advanced Statistical Physics. (3:3:0)
 733, 734. Advanced Solid State Physics. (3:3:0 each)
 735, 736. Atomic and Molecular Spectra. (3:3:0 each)
 737, 738. Advanced Topics in Theoretical Physics. (3:3:0 each)
 739. Individual Study. (3)
 7311, 7312. Advanced Nuclear Physics. (3:3:0 each)
 831. Doctor's Dissertation.
 Enrollment required at least four times.

Psychology. Professor Theodore Andreychuk, Chairman.

Professors Anderson, Cobb, George, Halcomb, Kuntz, Mahone, Phillips, and Ray; Associate Professors Campbell, Cannon, Carlson, D. Cogan, and Locke; Assistant Professors Bodden, Chatfield, R. Cogan, Crowder, Jones, Landers, Lawlis, Marshall, and McGlynn.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

Prior to enrollment in a graduate program in psychology, students should consult the chairman of the department for advice and approval. Admission to the Graduate School does not imply admission to a degree program, for which the consent of the department is also necessary. Students who are not officially approved for a degree program may not enroll in any practicum-type courses. Students majoring in departments other than education may not take practicum-type courses toward a minor in psychology.

Master's Degree Programs

Applicants for the master's degree may pursue one of three courses of study: (1) general experimental psychology, (2) counseling psychology, or (3) clinical psychology.

In the area of counseling psychology the student has a choice of two programs: (a) general counseling and (b) rehabilitation counseling. The latter program is offered in cooperation with the Office of Vocational Rehabilitation of the United States Department of Health, Education and Welfare. Traineeships are available for qualified students.

The master's degree program in counseling or clinical psychology requires a one-semester internship in an approved facility.

Conducted jointly with the College of Education is a program leading to certification as a counselor in the public schools. Students interested in this program are invited to write to the College of Education.

Doctor's Degree Programs

A doctoral program is offered which may emphasize one of several areas of interest. Among the several options are general experimental, learning, physiological and comparative, industrial, counseling, and clinical psychology. Doctoral students who emphasize counseling or clinical psychology in their programs will be expected to complete a year of internship in an approved facility.

- 532. Problems in Psychology. (3)
- 534. Practicum in Psychological Testing. (3:3:0)
- 539. Occupational Information and Career Patterns. (3:3:0)
- 5311, 5312. Projective Techniques I, II. (3:3:0 each)
- 5314. Tests and Measurements. (3:3:0)
- 5315. Practicum in Personality Assessment. (3:3:0)
- 5316. Introduction to Adjustment Counseling and Psychotherapy. (3:3:0)
- 5317. Techniques of Counseling: Career Guidance. (3:3:0)
- 5318. Practicum in Techniques of Counseling. (3:2:3)
- 5319. Behavioral Aspects of Mental Retardation. (3:3:0)
- 5320. Seminar in Mental Retardation. (3:3:0)
May be repeated for credit.
- 5321. Practicum in Mental Retardation. (3:1:3)
May be repeated for credit.
- 5322. Family Counseling. (3:3:0)
- 5323. Group Counseling and Psychotherapy. (3:3:0)
- 5324. Seminar in Personality Theory. (3:3:0)
- 5325. Case Studies in Vocational Rehabilitation. (3:3:0)
- 5326. Medical Aspects of Rehabilitation. (3:3:0)
- 5327. The Psychology of Disability. (3:3:0)
- 5328. Seminar in Social Psychology. (3:3:0)
- 5329. Seminar in the Psychological Analysis of Social Systems. (3:3:0)
- 5330. Attitude Organization and Change. (3:3:0)
- 5333. Seminar in Behavior Modification. (3:3:0)
- 5334. Advanced Counseling Psychology. (3:3:0)
- 5335. Seminar in Developmental Psychology. (3:3:0)
- 5336. Advanced Child Psychology. (3:3:0)
- 5337. Play Therapy. (3:3:0)
- 5338. Seminar in Psychopathology. (3:3:0)
- 5343. Seminar in Psychometrics. (3:3:0)
- 5344. Introduction to Mathematical Models in Psychology. (3:3:0)
- 5345. Research Seminar in Clinical and Counseling Psychology. (3:3:0)
- 5346. Seminar in Human Factors. (3:3:0)
- 5347. Advanced Correlational Methods and Factor Analysis. (3:3:0)

- 5348. Advanced Statistical Methods and Experimental Design. (3:3:0)
- 5349. Seminar in the Teaching of Psychology. (3:3:0)
- 5350. Systems of Psychology. (3:3:0)
- 5351. Advanced Experimental Psychology. (3:3:0)
- 5352. Seminar in Learning Theory. (3:3:0)
- 5353. Seminar in Physiological Psychology. (3:3:0)
- 5354. Seminar in Perception. (3:3:0)
- 5355. Seminar in Comparative Psychology. (3:3:0)
- 5356. Seminar in Motivation. (3:3:0)
- 5357. Seminar in Mathematical Models of Learning. (3:3:0)
- 5358. Electrophysiological Instrumentation. (3:2:3)
- 5359. Advanced General Psychology. (3:3:0)
- 5360. Seminar in Verbal Behavior. (3:3:0)
- 5361. Advanced Practicum in Counseling and Clinical Psychology. (3:1:3)
- 5362. Master's Internship in Counseling and Clinical Psychology. (3)
- 5363. Doctoral Internship in Counseling and Clinical Psychology. (3)
Enrollment required four times.
- 5370. Engineering Psychology. (3:3:0)
- 5371. Seminar in Psychopharmacology. (3:3:0)
- 5372. Human Performance. (3:3:0)
- 5373. Advanced Seminar in the Physiological Basis of Learning and Memory. (3:3:0)
May be repeated for credit.
- 5374. Advanced Seminar in Animal Learning. (3:3:0)
- 5375. Advanced Seminar in Operant Conditioning. (3:3:0)
- 5376. Seminar in Advanced Perception. (3:3:0)
- 5377. Advanced Seminar in Human Learning. (3:3:0)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
Enrollment required at least twice.
- 731, 732. Research. (3 each)
- 831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Sociology. Professor Walter J. Cartwright, Chairman.

Professors Minnis and Rodnick; Associate Professors Davies and Dunn; Assistant Professors Chandler, King, Roper, and Salazar.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

The student shall establish proficiency in a foreign language by one of the methods acceptable to the Graduate School. In unusual cases 6 hours of graduate credit in a tool-subject approved in advance by the department may be substituted. Burden of proof shall be on the student to show that such substitution will be more valuable to his degree program and/or career plans than a standard foreign language.

- 531. Graduate Studies in Sociology. (3)
May be repeated for credit.
- 532. Seminar in the Person and Society. (3:3:0)
- 533. Seminar in Contemporary Sociological Theory. (3:3:0)
- 534. Seminar in Sociological Research Methods. (3:3:0)
- 535. Seminar in Deviant Behavior. (3:3:0)
- 536. Seminar in Sociological Uses of Historical Data. (3:3:0)
- 537. Seminar in Demography. (3:3:0)

538. Seminar in the Origins of Social Theory. (3:3:0)
May be repeated for credit as the topic varies.
539. Seminar in Techniques of Social Measurement. (3:3:0)
May be repeated for credit as the topic varies.
5311. Seminar in Criminology. (3:3:0)
May be repeated for credit as the topic varies.
5312. Seminar in Urban Problems. (3:3:0)
May be repeated for credit as the topic varies.
5313. Seminar in Minority Relations. (3:3:0)
May be repeated for credit as the topic varies.
5314. Seminar in Comparative Sociology. (3:3:0)
May be repeated for credit as the topic varies.
5315. Seminar in Social Change. (3:3:0)
May be repeated for credit as the topic varies.
5316. Seminar in Social Gerontology. (3:3:0)
May be repeated for credit as the topic varies.
5318. Seminar in Sociological Studies of Culture. (3:3:0)
5335. Society and Its Institutions. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.

Speech and Theatre Arts. Professor William K. Ickes, Chairman.
Professors Ashby, Larson, and Schulz; Associate Professor Wise; Assistant Professors Deethardt, Ellis, Paynter, Yairi, and Yates.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

A reading knowledge of one foreign language is required for the Master of Arts degree. The student may be allowed to substitute 12 hours of undergraduate tool courses or 6 hours of graduate tool courses for this requirement. For the Master of Science degree in Speech Pathology and Audiology, 6 hours of statistics are required and there is no language requirement.

GENERAL SPEECH

511. Studies and Problems in Speech. (1)
521. Studies and Problems in Speech. (2)
531. Studies and Problems in Speech. (3)
532. Research Methods in Speech. (3:3:0)
533. Quantitative Research Methods in Speech Communication. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.

ORAL INTERPRETATION

531. Studies and Problems in Oral Interpretation. (3)
532. History of Oral Interpretation. (3:3:0)
533. Seminar in the Theories of Oral Interpretation. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.

PUBLIC ADDRESS AND GROUP COMMUNICATION

531. Studies and Problems in Public Address and Group Communications. (3)
532. Advanced Discussion, Debate, and Conference Methods. (3:3:0)
533. Classical Rhetoric and Public Address. (3:3:0)

534. British and American Public Address. (3:3:0)
535. Contemporary Rhetorical Theory and Practice. (3:3:0)
536. Seminar: Oral Communications in Group Processes. (3:3:0)
537. Medieval and Renaissance Rhetoric and Oratory. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.

SPEECH EDUCATION

531. Studies and Problems in Speech Education. (3)
532. Seminar in the Psychology of Speech. (3:3:0)
533. Seminar in College Speech Teaching. (3:3:0)
534. Seminar in International Speech Education. (3:3:0)
535. Studies in the History of Speech Education. (3:3:0)
5335. Basic Speech for Elementary Teachers. (3:3:0)
631. Master's Thesis. (3)
Enrollment required at least twice.

SPEECH PATHOLOGY AND AUDIOLOGY

531. Studies and Problems in Speech Pathology and Audiology. (3)
533. Seminar in Speech Pathology: Stuttering. (3:3:0)
534. Seminar in Speech Pathology: Articulation and Voice Disorders. (3:3:0)
535. Seminar in Audiology: Psychophysics of Audition. (3:3:0)
536. Seminar in Audiology: Aural Rehabilitation. (3:3:0)
537. Seminar in Audiology: Clinical Audiology. (3:3:0)
538. Seminar in Speech Pathology: Language Problems in Children. (3:3:0)
539. Seminar in Speech Pathology: Language Problems in Adults. (3:3:0)
5311. Instrumentation in Speech and Hearing Science. (3:3:0)
5312. Speech Disorders Associated with Cleft Palate. (3:3:0)
5313. Speech and Language Disorders Associated with Cerebral Palsy. (3:3:0)
5314. The Modification of Speech and Language Disorders. (3:3:0)
5315. Neuropathologies of Speech and Language. (3:3:0)
5326. Graduate Clinical Practice: Speech (3)
5327. Graduate Clinical Practice: Audiology. (3:0:9)
631. Master's Thesis. (3)
Enrollment required at least twice.

THEATRE ARTS

531. Studies and Problems in Theatre Arts. (3)
532. Studies in Modern Theatre. (3:3:0)
533. Studies in the Production of Pre-Modern Drama. (3:3:0)
534. Theory and Practice of Scene Design. (3:2:3)
535. Theatre Costume Design. (3:2:3)
536. Theory and Practice of Stage Lighting. (3:2:3)
- 537, 538. Advanced Practicum in Repertory Theatre I, II. (3:0:9 each)
539. Seminar in Theatre History. (3:3:0)
5311. Advanced Directing. (3:2:3)
5312. Theatre Management. (3:2:3)

5313. Dramatic Criticism. (3:3:0)
 5314. Advanced Studies in Children's Theatre. (3:2:3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Interdepartmental Programs

Comparative Literature. W. T. Zyla, Chairman of the Interdepartmental Committee on Comparative Literature. Courses taught by faculty of participating departments.

The departments of English, Classical and Romance Languages, and Germanic and Slavonic Languages offer programs in comparative literature at the master's and doctor's levels.

At the master's level the program is administered by the interdepartmental committee, which is composed of faculty members from the departments involved in the program. The degrees offered are the Master of Arts with a major in English and a program in comparative literature; and the Master of Arts with a major in French, German, or Spanish with a program in comparative literature. Credit is offered on a reciprocal basis for courses taken in these departments.

The doctor's degree is offered by the Department of English with a major in English and a field of specialization in comparative literature and by the Department of Classical and Romance Languages with a major in Spanish and a field of specialization in comparative literature.

Candidates for admission to the graduate programs in comparative literature should have completed one year of university-level study (or equivalent) in a classical language and/or two years of university-level study in a modern foreign language in addition to having met the general requirements of the Graduate School. Inquiries about the master's and doctor's programs in comparative literature should be addressed to the Chairman of the Department of Classical and Romance Languages.

At the master's level, candidates complete 24 hours of course work in the participating departments, the greater part of which, including the thesis, will be in the field of comparative literature. A 6-hour minor is also required.

At the doctor's level, the program includes approximately two years of course work beyond the master's degree. This program is supervised by a doctoral advisory committee appointed for the purpose.

530. Studies in Medieval Literature. (3:3:0) (ENG 530)
 534. Old English. (3:3:0) (ENG 534)
 536. Beowulf. (3:3:0) (ENG 536)
 5312. Studies in Drama. (3:3:0) (ENG 5312)
 5313. Studies in Modern European Literature. (3:3:0) (ENG 5313)
 5314, 5315. Studies in French Language and Literature I, II. (3:3:0 each) (FREN 5312, 5313)
 5316, 5317. Studies in German Language and Literature I, II. (3:3:0 each) (GERM 5312, 5313)
 5318, 5319. Studies in Spanish and Spanish American Literature. (3:3:0 each) (SPAN 5312, 5313)
 5325. The German Novelle. (3:3:0) (GERM 5317)
 5326, 5327. Seminar in Modern German Literature I, II. (3:3:0 each) (GERM 5321, 5322)
 5333. Studies in Literary Criticism. (3:3:0) (ENG 5314)

5341. Studies in Bibliography. (3:3:0) (ENG 5341)
 731, 732. Research. (3 each) (ENG 731, 732)
 831. Doctor's Dissertation. (3) (ENG 831, SPAN 831)

Enrollment required at least four times.

Students with advisor's permission may take 531, 532, 630, 631, and other courses in English, French, German, Greek, Italian, Latin, Portuguese, Russian, and Spanish, to be applied toward the comparative literature programs.

Latin American Area Studies. Harley D. Oberhelman, Chairman of the Latin American Area Studies Committee. Courses taught by faculty of participating departments.

MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

A doctoral minor in Latin American Area Studies is administered by the Latin American Area Studies Committee. The minor consists of 18 hours of graduate level Latin American content courses taken in the participating departments and approved by the student's doctoral committee. No courses from the student's major field may be included in the minor. At least three different fields must be represented in the minor, and the maximum number of hours permitted in any one field is 9.

Minors in the program must demonstrate a speaking knowledge of either Spanish or Portuguese and a reading knowledge of the other.

Courses marked with an asterisk will be considered acceptable as part of the minor when the topic studied deals with Latin America.

ANTHROPOLOGY

- *531. Anthropological Theory. (3:3:0)
 *533. Seminar in Ethnology. (3:3:0)

ECONOMICS

- *531. Economic Research. (3:3:0)
 *536. Advanced International Economics. (3:3:0)
 *5313. Survey of Theories of Economic Growth and Development. (3:3:0)
 *5314. Seminar in Economic Growth and Development. (3:3:0)

GEOGRAPHY

- *532. Seminar in Regional Geography. (3:3:0)
 *533. Seminar in Historical and Cultural Geography. (3:3:0)
 *5310. Readings in Geography. (3:3:0)

GOVERNMENT

- *531. Readings and Research—Individual Study. (3:3:0)
 *536. Seminar in International Relations. (3:3:0)
 *537. Seminar in Comparative Government and Institutions. (3:3:0)
 *5361. Advanced International Relations. (3:3:0)
 *5371. Advanced Comparative Government and Politics. (3:3:0)
 *731. Research. (3)

HISTORY

- *531. Readings and Research. (3:3:0)
 5328. Studies in Colonial Latin American History. (3:3:0)
 5332. Studies in National Latin American History. (3:3:0)
 5333. Studies in Mexican History. (3:3:0)

636. Seminar in Latin American History. (3:3:0)

*731. Research. (3)

PORTUGUESE

- *531, 532. Research in Portuguese. (3 each)

SOCIOLOGY

- *531. Graduate Studies in Sociology. (3)

SPANISH

- *531, 532. Research in Spanish. (3 each)

538, 539. Summer Language Institute. (3:3:0 each) Offered in Mexico.

- *5312, 5313. Studies in Spanish and Spanish American Literature. (3:3:0 each)

5321. Studies in the Latin American Novel. (3:3:0)

5322. Seminar in Latin American Literature. (3:3:0)

5323. Modernism. (3:3:0)

Linguistics. William T. Patterson, Chairman of the Interdepartmental Com- mittee on Linguistics.

Courses taught by faculty of participating depart-
ments.

The departments of Classical and Romance Languages, English, and Germanic and Slavonic Languages offer a program in linguistics at the master's level. Credit for course work is offered on a reciprocal basis, each department offering major credit for courses listed in the program which are taught by staff members in the other departments. Credit for the master's report or thesis is also offered on a reciprocal basis, each department allowing its majors to select a thesis director from another department if feasible. The degree offered is the Master of Arts. In the departments of Classical and Romance Languages or Germanic and Slavonic Languages the majors would be in French, German, or Spanish with a field of specialization in linguistics. In the Department of English the major would be in English with a field of specialization in linguistics.

The program consists of 24 hours of course work to be approved by the Chairman of the Interdepartmental Committee on Linguistics. Candidates will be urged to take courses from each of the participating departments.

530. Romance Linguistics. (3:3:0)

531, 533. Research in French. (3 each)
(FREN 531, 532)

534. Old English. (3:3:0) (ENG 534)

535. Research in Portuguese. (3) (PORT 531)

536. Beowulf. (3:3:0) (ENG 536)

537. Research in Spanish. (3) (SPAN 531)

538, 539. Research in German. (3 each)
(GERM 531, 532)

5310. Research in Portuguese. (3)
(PORT 532)

5311. Linguistic Techniques in Teaching
Romance Languages. (3:3:0)

5335. Spanish and English as Second Languages
in the Elementary School. (3:3:0)

5340. Studies in Medieval Language and
Literature. (3:3:0) (FREN 533)

5341. Research in Spanish. (3) (SPAN 532)

5342, 5343. Studies in French Language and
Literature I, II. (3:3:0 each)
(FREN 5312, 5313)

5344. Principles of Language. (3:3:0)
(ENG 5335)

5345. Studies in Linguistics. (3:3:0)
(ENG 5337)

5346. Linguistic Analysis I: Syntax. (3:3:0)
(ENG 5338)

5347. Linguistic Analysis II: Phonology. (3:3:0) (ENG 5339)

5348, 5349. Research. (3 each) (ENG 731, 732)

5350. Middle High German. (3:3:0)
(GERM 5316)

5351. Old Icelandic. (3:3:0) (GERM 5318)

5352, 5353. Studies in German Language and
Literature I, II. (3:3:0 each)
(GERM 5312, 5313)

5354, 5355. Research in Russian. (3 each)
(RUSN 531, 532)

5356, 5357. Research in Latin. (3 each)
(LAT 531, 532)

5358, 5359. Research in Greek. (3 each)
(GRK 531, 532)

College of Business Administration

Professor Jack D. Steele, Dean

Professors Amason, H. Balsley, I. Balsley, Barton, Bowlin, Cain, Chisholm, Dale, Gilliam, Imke, V. Luchsinger, Pasewark, Roberts, Ryan, Sartorius, Taylor, Whittington, and Williams; Associate Professors Dukes, Ezell, L. Luchsinger, Needles, Stem, Wade, Watt, and Whitehead; Assistant Professors Caldwell, Cornette, Dock, Donnelly, Griggs, Guy, LaGarce, Lee, Phelan, Ponthieu, Price, and Van Auken.

The Master of Business Administration degree is offered with a major in one of the areas of the College of Business Administration; students with an undergraduate degree from a school of business administration may complete the requirements in one calendar year. The Master of Business Administration degree is also offered as a two-year program for students with undergraduate degrees outside a school of business administration. The degree of Master of Science in Accounting is offered especially for the practicing accountant and the recent undergraduate in liberal accounting study programs.

The Doctor of Business Administration degree is offered with all of the areas participating as first-field and second-field concentrations. The program has three emphases for the student: to provide a broad, integrated knowledge of business; to develop specialized knowledge in at least three fields of concentration; and to develop research skills. Course work and competence examinations are required in tool fields. The successful candidate can expect to complete requirements with about two years of full-time study beyond the master's degree.

The College of Business Administration requires that its master's students maintain at least a 3.08 grade-point average. Doctoral students must maintain a 3.20 average. Students falling below these averages will be subject to probationary action.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

BUSINESS ADMINISTRATION

511. Seminar in Computer Science in Business. (1:1:0)

5342. Business Policy. (3:3:0)

5351. Business and Its Environment. (3:3:0)

5352. Research Methods and Management. (3:3:0)

5395. Practicum in Education for Business. (3:1:3)

630. Master's Report. (3)

631. Master's Thesis. (3)
Enrollment required at least twice.
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

ACCOUNTING

531. Controllershship. (3:3:0)
532. Internship. (3:3:0)
533. Current Accounting Theory. (3:3:0)
535. Seminar in Accounting. (3:3:0)
- 536, 537. CPA Review I, II. (3:3:0 each)
538. Advanced Corporation Accounting. (3:3:0)
539. Seminar in Federal Taxes. (3:3:0)
5311. 5312. Advanced Accounting Problems I, II. (3:3:0 each)
5315. Estate, Trust, and Gift Taxation. (3:3:0)
5316. Oil and Gas Taxation. (3:3:0)
5317. Contemporary Approaches to the Development of Accounting Theory. (3:3:0)
5318. Income Tax Research and Planning. (3:3:0)
5319. Seminar in Auditing. (3:3:0)
5320. Industrial Cost Control. (3:3:0)
5321. Federal Income Tax Law for Partnerships. (3:3:0)
5322. Federal Income Taxation of Corporations and Shareholders. (3:3:0)
5341. Managerial Accounting I. (3:3:0)
5351. Advanced Accounting Theory and Practice. (3:3:0)
5331. Principles of Accounting. (5:5:0)
5341. Managerial Accounting II. (5:5:0)
731. Research. (3)
*Master's Report. (3)
*Master's Thesis. (3)
Enrollment required at least twice.
*Doctor's Dissertation. (3)
Enrollment required at least four times.

BUSINESS EDUCATION

530. Foundations of Business Education. (3:3:0)
535. Seminar in Business Education. (3:3:0)
May be repeated for credit.
536. Research and Improvement of Instruction in Bookkeeping. (3:3:0)
537. Research and Improvement of Instruction in Office Procedures. (3:3:0)
538. Research and Improvement of Instruction in Shorthand. (3:3:0)
539. Research and Improvement of Instruction in Typewriting. (3:3:0)
5311. Organization and Administration of Vocational Education. (3:3:0)
5312. Cooperative Vocational Education Programs. (3:3:0)
5331. Problems in Business Education. (3:3:0)
5351. Collegiate Education for Business. (3:3:0)
731. Research. (3)
*Master's Thesis. (3)
Enrollment required at least twice.
*Master's Report. (3)
*Doctor's Dissertation. (3)
Enrollment required at least four times.

FINANCE

531. Current Financial Problems. (3:3:0)
532. Advanced International Finance. (3:3:0)
533. Seminar in Investment Analysis. (3:3:0)
534. Portfolio Theory and Capital Asset Pricing. (3:3:0)
535. Seminar in Current Banking Problems. (3:3:0)
536. The Money and Capital Markets. (3:3:0)
537. Risk Administration. (3:3:0)

538. Seminar in Contemporary Financial Theory. (3:3:0)
539. History of Financial Thought. (3:3:0)
5331. Business Finance. (3:3:0)
5341. Current Business Financial Practices. (3:3:0)
5342. Financial Management in a Dynamic Economy. (3:3:0)
5351. Financial Policies of Business. (3:3:0)
5352. Financial Problems of Entrepreneurship. (3:3:0)
731. Research. (3)
*Master's Report. (3)
*Master's Thesis. (3)
Enrollment required at least twice.
*Doctor's Dissertation. (3)
Enrollment required at least four times.

BUSINESS LAW

5331. Legal Environment of Business. (3:3:0)

MANAGEMENT

511. Individual Problems. (1)
530. Individual Research in Management. (3)
531. Current Problems in Management. (3:3:0)
533. Quantitative Analysis for Business. (3:3:0)
535. Human Behavior in Business. (3:3:0)
536. Management of Human Resources. (3:3:0)
537. Seminar in Personnel Administration. (3:3:0)
538. Advanced Production Management. (3:3:0)
539. Seminar in Operations Management. (3:3:0)
5311. International Business Management. (3:3:0)
5312. Administrative Policy and Strategy. (3:3:0)
5313. Business and Management Systems. (3:3:0)
5314. Philosophy and Thought in Management. (3:3:0)
5315. Mathematical Programming for Business. (3:3:0)
5316. Computer Models for Business, Industry, and Government. (3:3:0)
5317. Management Information Systems. (3:3:0)
5318. Seminar in Labor and Collective Bargaining. (3:3:0)
5319. Seminar in Research and Development Management. (3:3:0)
5331. Organization and Human Behavior. (3:3:0)
5341. Management Decision Making. (3:3:0)
5342. Production Management. (3:3:0)
5351. Decision Theory and Management Science. (3:3:0)
5352. Administrative Organization. (3:3:0)
5353. Advanced Organization Theory. (3:3:0)
731. Research. (3)
*Master's Report. (3)
*Master's Thesis. (3)
Enrollment required at least twice.
*Doctor's Dissertation. (3)
Enrollment required at least four times.

MARKETING

531. Advanced Marketing Problems. (3:3:0)
532. Advanced Marketing Research. (3:3:0)
533. Marketing Theory. (3:3:0)
535. Advanced Business Forecasting. (3:3:0)
- 536, 537. Individual Study in Marketing I and II. (3 each)

538. Legal and Political Aspects of Marketing. (3:3:0)
 539. Statistical Evaluations of Resources. (3:3:0)
 5331. Marketing Foundations. (3:3:0)
 5332. Statistical Methods in Business. (3:3:0)
 5334. Advertising in a Contemporary Society. (3:3:0)
 5335. Sales Planning, Measurement, and Administration. (3:3:0)
 5336. Multinational Marketing. (3:3:0)
 5341. Marketing Administration. (3:3:0)
 5342. Advanced Statistical Methods. (3:3:0)
 5343. Seminar in Industrial Marketing. (3:3:0)
 5344. Marketing Models and Measurement. (3:3:0)
 5351. Marketing Thought. (3:3:0)
 5352. Statistical Decision Making. (3:3:0)
 5353, 5354. Marketing Strategy I and II. (3:3:0 each)
 5355. Seminar in Current Marketing Problems. (3:3:0)
 5360. Advanced Marketing Administration. (3:3:0)
 5362. Advanced Experimental Statistics. (3:3:0)
 5372. Advanced Inference Problems. (3:3:0)
 5382, 5383. Advanced Business Statistical Analysis I and II. (3:3:0 each)
 5392. Applied Distribution-Free Statistics in Business. (3:3:0)
 731. Research. (3)
 *Master's Report. (3)
 *Master's Thesis. (3)
 Enrollment required at least twice.
 *Doctor's Dissertation. (3)
 Enrollment required at least four times.

College of Education

Professor Gordon C. Lee, Dean

Professors Barnett, Biggers, F. Boze, Bremer, Caskey, Ellis, Evans, Fallon, Freeman, Fudell, Jones, Kirk, Livingston, Mattson, McDonald, Nagle, Rogers, and Wallace; Associate Professors Ainsworth, Askins, Beckner, N. Boze, Cornett, Costello, Crowder, Filgo, Gammill, Kimmel, Rebstock, Rooze, Sands, Strain, Teague, Watson, and Willingham; Assistant Professors Bloomer, Christian, Duvall, Foester, Gee, Hovey, Manley, Mehaffie, Peters, Reid, Skoog, and Trang.

The College of Education offers instruction and research programs leading to the degrees of Master of Education and Doctor of Education. The student may choose and emphasize the various special areas of education in working toward these programs and should consult the office of the Associate Dean for Graduate Studies in Education regarding them.

The professional certification program requires work on the graduate level and may lead to the Professional Teachers Certificate in the areas of elementary and secondary education. In secondary education, teaching emphases are available in the fields of biology, English, French, German, government, health and physical education, history, music, Spanish, speech-drama, vocational agriculture, and home economics. Programs are also available for professional certification in the special service areas of counselor, supervisor, and administrator. The student should note that these programs are not necessarily coincidental with degree programs and should consult the Director of Teacher Certification in the office of the Dean of the

College of Education for special guidance as needed.

Professional preparation is also offered for persons intending to occupy or occupying positions in universities, senior colleges, and community junior colleges. Instruction related to administration, curriculum, teaching, counseling, educational planning, public relations, and other specialized aspects of higher education is available.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

All courses in the College of Education have been renumbered. The former course number is shown in parentheses.

EDUCATIONAL FOUNDATIONS AND SERVICES

5191. Advanced Workshop in Guidance and Counseling. (1:1:0) (ED 5180)
 5310. Philosophy of Education. (3:3:0) (ED 532)
 5313. Seminar in Philosophy of Education. (3:3:0) (ED 5352)
 5314. History of Education. (3:3:0) (ED 531)
 5319. Comparative Education. (3:3:0) (ED 5353)
 5321. Behavioral Sciences and Education. (3:3:0) (ED 535)
 5323. Advanced Educational Sociology. (3:3:0) (ED 534)
 5326. Seminar in Education Sociology. (3:3:0) (ED 5354)
 5331. Human Development in Education. (3:3:0) (ED 5331)
 5332. Advanced Educational Psychology. (3:3:0) (ED 530)
 5349. Seminar in Educational Psychology. (3:3:0) (ED 5364)
 5350. Introduction to Guidance and Personnel Services. (3:3:0) (ED 5381)
 5352. Guidance and Counseling in Elementary School. (3:3:0) (ED 5385)
 5353. Guidance Services for Exceptional Children and Youth. (3:3:0) (ED 5386)
 5354. Group Techniques in Guidance. (3:3:0) (ED 5384)
 5355. Information Services in Guidance. (3:3:0) (ED 5383)
 5356. Individual Appraisal in Guidance and Counseling Services. (3:3:0) (ED 5387)
 5357. Techniques in School Guidance Services. (3:3:0) (ED 5388)
 5358. Organization and Administration of Guidance and Personnel Services. (3:3:0) (ED 5372)
 5359. Student Personnel Services in Higher Education. (3:3:0) (ED 5389)
 5360. Practicum in Guidance. (3:3:0) (ED 5390)
 5361. Consulting Techniques in Consulting and Guidance. (3:3:0)
 5369. Seminar in Guidance and Counseling. (3:3:0) (ED 5393)
 5380. Introduction to Educational Statistics. (3:3:0) (ED 5315)
 5381. Advanced Educational Statistics. (3:3:0) (ED 5323)
 5384. Introduction to Educational Research. (3:3:0) (ED 5317)
 5385. Foundations of Educational Research. (3:3:0) (ED 5322)
 5387. Educational Evaluation. (3:3:0) (ED 5373)
 5393, 5394. Internship in Education. (3 each) (ED 635, 636)
 5399. Individual Study. (3) (ED 5321)
 630. Master's Report. (3) (ED 630)

631. Master's Thesis. (3) (ED 631)
Enrollment required at least twice.
6309. General Education Seminar. (3:3:0)
(ED 5351)
6354. Practicum in Group Leadership
Techniques. (3:3:0)
6360. Practicum for Counselor Educators.
(3:3:0)
6366. Counseling Supervision. (3:3:0)
- 731, 732. Research. (3 each) (ED 731, 732)
831. Doctor's Dissertation. (3) (ED 831)
Enrollment required at least four times.

CURRICULUM AND INSTRUCTION

5191. Advanced Education Workshops in
Elementary Education. (1:1:0)
(E ED 5138)
5192. Advanced Education Workshops in
Secondary Education. (1:1:0) (S ED 5137)
5300. The Junior High School. (3:3:0)
(S ED 5317)
5306. Seminar in Elementary Education.
(3:3:0) (E ED 5355)
5307. Seminar in Secondary Education.
(3:3:0) (S ED 5356)
5310. Study of the Kindergarten Child.
(3:3:0) (E ED 5332)
5311. Developing Kindergarten Programs.
(3:3:0) (E ED 5333)
5312. Facilities, Materials, and Methods for
Kindergarten. (3:3:0) (E ED 5334)
5313. Problems in Kindergarten Education.
(3:3:0) (E ED 5337)
5320. Advanced Curriculum Development.
(3:3:0) (ED 5346)
5322. Development and Utilization of Instruc-
tional Television. (3:3:0)
5323. Audiovisual Communications and
Technology. (3:3:1) (ED 5311)
5324. Selecting and Evaluating Instructional
Materials. (3:3:0) (ED 5318)
5325. Planning and Developing Instructional
Materials. (3:3:0) (ED 5319)
5326. Administration and Supervision of
Educational Media Programs. (3:3:0)
(ED 538)
5327. Design and Application of Instructional
Communications Systems. (3:3:0)
(ED 5363)
5328. Development and Utilization of
Programmed Instruction. (3:3:0)
5329. Seminar in Educational Communications
and Technology. (3:3:0)
5330. Studies in Curriculum of English and
Social Studies in Secondary Schools.
(3:3:0) (S ED 5332)
5331. Improvement of Instruction in the
Secondary School. (3:3:0)
5333. Teaching the Educationally Deprived.
(3:3:0) (ED 5348)
5335. Curriculum Problems: Overcoming
Student Learning Difficulties.
(3:3:0) (ED 5350)
5340. Developing Reading Programs in
Elementary Education. (3:3:0)
(E ED 5342)
5341. Reading Development in the Elementary
School. (3:3:0) (E ED 5326)
5342. Determining Reading Achievement and
Planning for Continuous Growth.
(3:3:0) (E ED 5352)
5343. Clinical Teaching of Reading. (3:1:4)
(E ED 5362)
5344. Teaching Reading in the Secondary
School. (3:3:0) (S ED 5334)
5350. Developing Language Arts Programs
in Elementary Education. (3:3:0)
(E ED 5344)

5351. Children's Literature for Elementary
School Teachers and Librarians. (3:3:0)
(E ED 5348)
5352. Studies in Youth Literature for Secondary
School Teachers. (3:3:0) (S ED 5335)
5354. Modern Linguistics in the Elementary
School. (3:3:0) (E ED 5354)
5360. Developing Social Studies Programs in
Elementary Education. (3:3:0)
(S ED 5345)
5370. Developing Arithmetic Programs in
Elementary Education. (3:3:0)
(E ED 5341)
5375. Developing Natural and Physical En-
vironment Concepts in Elementary
Education. (3:3:0) (E ED 5343)
5377. Science Curriculum and Instruction.
(3:3:0) (S ED 533)
5378. Seminar in the Curriculum and Teaching
of Science. (3:3:0) (S ED 534)
5399. Individual Study. (3) (E ED 5321,
S ED 5321)
630. Master's Report. (3)
(E ED 630, S ED 630)
631. Master's Thesis. (3) (E ED 631,
S ED 631)
Enrollment required at least twice.
- 731, 732. Research. (3 each) (E ED 731, 732,
S ED 731, 732)
831. Doctor's Dissertation. (3) (E ED 831,
S ED 831)
Enrollment required at least four times.

SPECIAL EDUCATION

5191. Advanced Education Workshops in Spe-
cial Education. (1:1:0) (SPED 5136)
5300. Exceptional Children and Youth.
(3:3:0) (SPED 5310)
5301. Educational Appraisal of Exceptional
Children. (3:3:0) (SPED 5311)
5302. Use of Consultative Techniques with
Parents of Exceptional Children.
(3:3:0) (SPED 5312)
5303. Administration and Supervision of
Special Education. (3:3:0) (SPED 5313)
5305. Children and Youth with Multiple
Disabilities. (3:3:0) (SPED 5380)
5310. Gifted Children and Youth.
(3:3:0) (SPED 5382)
5320. Mentally Retarded Children and Youth.
(3:3:0) (SPED 5320)
5321. Curriculum and Methods for the Educable
Mentally Retarded. (3:3:0) (SPED 5322)
5322. Curriculum and Methods for the Trainable
Mentally Retarded. (3:3:0) (SPED 5323)
5323. Vocational Adjustment of Mentally
Retarded Youth. (3:3:0) (SPED 5326)
5324. Reading for the Mentally Retarded.
(3:3:0) (SPED 5324)
5325. Advanced Curriculum Development for
the Mentally Retarded. (3:3:0)
(SPED 5325)
5326. The Mentally Retarded in Society.
(3:3:0) (SPED 5327)
5327. Problems in Mental Retardation. (3:3:0)
(SPED 5328)
5330. Minimal Brain Dysfunction in Children
and Youth. (3:3:0) (SPED 5340)
5331. Education of Children with Minimal
Brain Dysfunction. (3:3:0) (SPED 5341)
5332. Advanced Methods and Materials for the
Education of Children with Minimal
Brain Damage. (3:3:0) (SPED 5342)
5333. Perceptual—Motor Development of
Children with Minimal Brain Dysfunction.
(3:3:0) (SPED 5343)
5340. Physically Handicapped Children and
Youth. (3:3:0) (SPED 5330)

5341. Education of Physically Handicapped Children and Youth. (3:3:0) (SPED 5331)
 5342. Visually Handicapped Children and Youth. (3:3:0) (SPED 5370)
 5350. Deaf Children and Youth. (3:3:0) (SPED 5350)
 5351. Education of Deaf Children and Youth. (3:3:0) (SPED 5351)
 5353. Signs and Fingerspelling for the Deaf. (3:3:0) (SPED 5352)
 5360. Emotionally Disturbed Children and Youth. (3:3:0) (SPED 5360)
 5361. Education of Emotionally Disturbed Children and Youth. (3:3:0) (SPED 5361)
 5390. Seminar in Special Education. (3:3:0) (SPED 5314)
 5393, 5394. Internship in Special Education. (3 each) (SPED 635, 636)
 5399. Individual Study in Special Education. (3) (SPED 5321)
 630. Master's Report. (3) (SPED 630)
 631. Master's Thesis. (3) (SPED 631)
 Enrollment required at least twice.
 731, 732. Research. (3 each) (SPED 731, 732)
 831. Doctor's Dissertation. (3) (SPED 831)
 Enrollment required at least four times.
5301. Higher Education in the United States. (3:3:0) (ED 5395)
 5302. Comparative Higher Education. (3:3:0) (ED 5394)
 5320. The Administration of the Junior College. (3:3:0) (ED 5357)
 5321. The Administration of Higher Education. (3:3:0) (ED 5391)
 5322. Long Range Planning in Higher Education. (3:3:0) (ED 5396)
 5323. Development Work in Higher Education. (3:3:0) (ED 5397)
 5330. The Student in Higher Education. (3:3:0) (ED 5398)
 5340. The Junior College. (3:3:0) (ED 5316)
 5341. Curriculum and Instruction in the Junior College. (3:3:0) (ED 5314)
 5390. Seminar in Higher Education. (3:3:0) (ED 5392)
 5393, 5394. Internship in Education. (3 each) (ED 635, 636)
 5399. Individual Study. (3) (ED 5321)
 630. Master's Report. (3) (ED 630)
 631. Master's Thesis. (3) (ED 631)
 Enrollment required at least twice.
 731, 732. Research. (3 each) (ED 731, 732)
 831. Doctor's Dissertation. (3) (ED 831)
 Enrollment required at least four times.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

5191. Advanced Education Workshops in Teaching and Administration. (1) (ED 5139)
 5300. General Public School Administration. (3:3:0) (ED 533)
 5301. Elementary School Administration. (3:3:0) (ED 536)
 5302. Secondary School Administration. (3:3:0) (ED 537)
 5310. General Supervision. (3:3:0) (ED 5371)
 5311. Supervision in the Elementary School. (3:3:0) (ED 5312)
 5312. Supervision in the Secondary School. (3:3:0) (ED 5313)
 5318. Seminar in Supervision. (3:3:0) (ED 5359)
 5320. Administration of School Business Services. (3:3:0) (ED 539)
 5321. School Finance. (3:3:0) (ED 5367)
 5330. Organizing and Administering the Instructional Improvement Program. (3:3:0) (ED 5349)
 5340. Legal Bases of Education. (3:3:0) (ED 5325)
 5350. The Administration of School Staff Personnel. (3:3:0) (ED 5366)
 5351. School Public Relations. (3:3:0) (ED 5369)
 5360. School Housing. (3:3:0) (ED 5368)
 5391. Local, State, and Federal Interaction in Education. (3:2:1)
 5393, 5394. Internship in Education. (3 each) (ED 635, 636)
 5399. Individual Study. (3) (ED 5321)
 630. Master's Report. (3) (ED 630)
 631. Master's Thesis. (3) (ED 631)
 Enrollment required at least twice.
 731, 732. Research. (3 each) (ED 731, 732)
 831. Doctor's Dissertation. (3) (ED 831)
 Enrollment required at least four times.

HIGHER EDUCATION

5191. Advanced Education Workshops in Higher Education. (1:1:1)
 5300. The History of Higher Education in the United States. (3:3:0) (ED 5399)

College of Engineering Professor John Ross Bradford, Dean

The graduate courses offered by the College of Engineering are specifically designed for students interested in achieving the degree of Master of Science in Chemical, Civil, Electrical, Industrial, or Mechanical Engineering, the degree of Master of Engineering and/or the degree of Doctor of Philosophy, with a conventional major in any of the principal engineering disciplines. Also available is a complex of interdisciplinary courses leading to the doctorate. In the latter, a flexible variety of options is available which permits a measure of specialization in one of the conventional engineering fields, as well as breadth through pursuit of two additional interdisciplinary programs chosen from such areas as systems engineering, environmental control, operations research, computer science, and biomedical and bioengineering studies.

Requirements for the Doctor of Philosophy degree under the interdisciplinary program do not specifically include a foreign language. However, development of research tool requirements, which may include foreign languages, is an integral part of the student's degree program, as determined by his advisory committee.

Regulations governing the graduate programs at Texas Tech University apply to the degrees of Master of Science and Doctor of Philosophy offered through the College of Engineering. In the program culminating in the degree of Master of Engineering, devised especially for the off-campus practicing engineer, is found the following modification:

Thirty-six hours of graduate course work are required, three of which shall be devoted to the Master's Report (Course 630) unless the department elects to substitute another course for this requirement.

In addition to the regulations governing admission to the Graduate School, a baccalaureate degree in engineering, or its equivalent, is required for entrance into the Master of Engineering program.

Agricultural Engineering. Professor Willie L. Ulich, Chairman.
Professor Williams; Associate Professors Carpenter, Dvoracek, Foerster, Grub, and Lyle.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

This program is jointly administered by the College of Engineering and the College of Agricultural Sciences. Please see the course offerings under Agricultural Engineering, College of Agricultural Sciences.

Architecture. Professor N. E. Barrick, Chairman.
Professor Sasser; Associate Professor Thompson.

MINORS FOR THE MASTER'S DEGREE

Persons wishing to minor in architecture should confer with the department chairman.

- 521. Research. (2)
- 531. Graduate Seminar. (3:3:0)
- 532. Techniques of Architectural Research, Restoration and Preservation. (3:2:3)
- 5331. Special Problems in City Planning. (3)

Chemical Engineering. Professor George F. Meenaghan, Chairman.

Professors Bradford, Gully, and Oberg; Associate Professors Bethea, Halligan, Heichelheim, and Parker; Assistant Professor Graham.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

The Chemical Engineering Department has a structured master's program requiring the four core courses noted by asterisks.

There are no language requirements for the doctor's degree. However, all doctor's degree plans supervised by the department must contain 9 to 12 hours of course work outside the major and minor fields.

- 5121. Graduate Seminar. (1)
- 5310. Advanced Chemical Engineering Techniques. (3:3:0)
- *5311. Transport Phenomena—Heat Transmission. (3:3:0)
- *5312. Transport Phenomena—Fluid Dynamics. (3:3:0)
- 5313. Transport Phenomena—Diffusion Processes. (3:3:0)
- 5314. Process Dynamics and Automatic Control. (3:3:0)
- 5315. Textile Chemical Unit Process Theory. (3:3:0)
- 5316. Textile Chemical Unit Operations Theory. (3:3:0)
- *5321. Advanced Chemical Engineering Thermodynamics. (3:3:0)
- 5322. Equilibrium Systems. (3:3:0)
- 5323. Digital Computation for Chemical Engineers. (3:3:0)
- 5331. Special Problems in Chemical Engineering. (3)
May be repeated for credit.
- 5332. Experimental Studies in Chemical Engineering. (3)
May be repeated for credit.
- *5341. Mass Transfer Operations. (3:3:0)
- 5343. Reaction Kinetics. (3:3:0)
- 5351. Chemical Engineering Design. (3:2:3)
- 5361. Biochemical Engineering. (3:3:0)
- 5362. Engineering Design and Economics for Pollution Abatement. (3:2:3)
- 5365. Instrumental Analysis of Air Pollutants. (3:2:3)

- 5367. Air Pollution Control for Chemical and Processing Industries. (3:3:0)
- 5371, 5372. Principles of Nuclear Engineering. (3:3:0 each)
- 5373, 5374. Nuclear Chemical Engineering. (3:3:0 each)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
Enrollment required at least twice.
- 731, 732. Research. (3 each)
- 7121. Doctoral Seminar. (1:1:0)
- 7314. Advanced Modelling of Chemical Processes. (3:3:0)
- 7343. Analysis of Heterogeneous Catalytic Reaction Systems. (3:3:0)
- 831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Civil Engineering. Professor Ernst W. Kiesling, Chairman.

Professors Van Hylckama, Wells, and Whetstone; Associate Professors Claborn, McDonald, Mehta, and Sanger; Assistant Professors Smith, Sweazy, Urban, Vallabhan, and Wagner.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

- 5121, 5122. Advanced Soil Engineering Laboratory I, II. (1:0:3 each)
- 5237. Construction Management. (2:2:0)
- 5310. Numerical Methods in Engineering. (3:3:0)
- 5311. Advanced Mechanics of Solids. (3:3:0)
- 5313. Theory of Elastic Stability. (3:3:0)
- 5314. Theory of Plates and Shells. (3:3:0)
- 5316. Theory of Elasticity. (3:3:0)
- 5317. Theory of Plasticity. (3:3:0)
- 5321, 5322. Advanced Soil Engineering I, II. (3:3:0 each)
- 5331, 5332. Advanced Work in Specific Fields. (3 each)
- 5333. Advanced Work in Water Resources. (3)
- 5342. Advanced Plastic Design. (3:3:0)
- 5343. Advanced Structural Analysis. (3:3:0)
- 5344. Advanced Reinforced Concrete Design. (3:3:0)
- 5345. Special Topics in Reinforced Concrete. (3:3:0)
- 5346. Design of Structures for Dynamic Loads. (3:3:0)
- 5347. Matrix Methods of Structural Analysis. (3:3:0)
- 5351. Open Channel Hydraulics. (3:3:0)
- 5352. Hydrodynamics. (3:3:0)
- 5353. Water Resources Engineering I. (3:3:0)
- 5354. Water Resources Engineering II—System Simulation and Analysis. (3:3:0)
- 5355. Flow in Porous Media. (3:3:0)
- 5356. Earth Dams. (3:3:0)
- 5357. Water Resources Engineering III—Institutions. (3:3:0)
- 5372. Advanced Water Treatment. (3:3:0)
- 5373. Advanced Waste Treatment. (3:3:0)
- 5374. Water and Wastewater Analysis. (3:1:6)
- 5375. Unit Processes Laboratory. (3:0:9)
- 5376. Water Quality Networks. (3:3:0)
- 5377. Special Studies in Sanitary Engineering. (3)
- 5378. Solid Waste Treatment. (3:3:0)
- 5379. Air Pollution Control. (3:3:0)
- 5380. Microclimatology. (3:3:0)
- 630. Master's Report. (3)
- 631. Master's Thesis. (3)
Enrollment required at least twice.
- 731, 732. Research. (3 each)
May be repeated for credit.

831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Electrical Engineering. Professor R.H. Seacat, Chairman.

Professor Kristiansen; Associate Professors Craig, Ferry, Hagler, Portnoy, Reichert, and Vines; Assistant Professors Burkes, Burton, Chao, Gustafson, Liberty, Prabhakar, Trost, and Walkup; Adjunct Professors Gunther and Lipscomb.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

5311. Stability of Nonlinear Systems. (3:3:0)
5312. Optimal and Adaptive Control Systems. (3:3:0)
5313, 5314. Solid-State Electronics I and II. (3:3:0 each)
5315. Sampled Data and Digital Control Systems. (3:3:0)
5317. Advanced Transients. (3:3:0)
5318. Pulse and Timing Circuits. (3:3:0)
5319. Electronic Circuits and Systems. (3:3:0)
5321. Digital Systems. (3:3:0)
5322, 5323. Advanced Network Theory I and II. (3:3:0 each)
5324. Symmetrical Components. (3:3:0)
5325. Information Theory. (3:3:0)
5326. Network Applications of Linear Graph Theory. (3:3:0)
5327. Multistage Decision Processes. (3:3:0)
5328. Statistical Theory of Communications. (3:3:0)
5331. Theoretical Investigations in Engineering Applications. (3:3:0)
5332. Experimental Investigations in Engineering Applications. (3)
5341, 5342. Advanced Electromagnetic Theory I, II. (3:3:0 each)
5343. Radio Propagation. (3:3:0)
5344. Antennas and Radiating Systems. (3:3:0)
5345. Field Theory of Guided Waves. (3:3:0)
5354. Direct Energy Conversion. (3:3:0)
5355, 5356, 5357. Plasma Theory, I, II, III. (3:3:0 each)
5358. Optics, Radiation, and Noise in Quantum Electronics. (3:3:0)
5359. Quantum Electronics. (3:3:0)
5360. Physical Optics and Engineering Applications. (3:3:0)
5361, 5362. Reliability of Electronic Systems I, II. (3:3:0 each)
5363. Systems Engineering I. (3:3:0)
5364. Applied Network Theory I. (3:3:0)
5371. Advanced Engineering Analysis I. (3:3:0)
5391. Circuit Theory for Behavioral and Biological Scientists. (3:3:0)
5392. Feedback Control Systems II. (3:3:0)
5393. Digital Computer Design. (3:2:3)
5394. Electronic Circuits for Behavioral and Biological Scientists. (3:3:0)
5395. Biomedical Instrumentation for Behavioral and Biological Scientists. (3:3:0)
630. Master's Report. (3)
631. Master's Thesis. (3)
Enrollment required at least twice.
6311. Solid-State Electronics IV; Special Topics. (3:3:0)
6312. Solid State Electronics III. (3:3:0)
6321. Advanced Detection Theory. (3:3:0)
6322. Switching Circuit Theory II. (3:3:0)
6351. Theory of Plasma Waves. (3:3:0)
6352. Solid State Plasma Theory. (3:3:0)
6371. Advanced Engineering Analysis II. • (3:3:0)
731, 732. Research. (3 each)
831. Doctor's Dissertation. (3)
Enrollment required at least four times.

Engineering Analysis and Design. Professor James E. Archer, Chairman. Professor Griffith.

MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

5313. Field Theory. (3:3:0)
5314, 5315. Analysis of Engineering Systems I and II. (3:3:0 each)
5331. Special Problems in Advanced Engineering Analysis and Design. (3)
May be repeated for credit.
5332. Special Problems in System Engineering. (3)
May be repeated for credit.
5333. Special Problems in Advanced Computer Science and Technology. (3:3:0)
May be repeated for credit.
5341. Dynamic Programming. (3:2:2)
5342. Applications of Topological Methods. (3:2:3)
5350. Programming, Systems, and Languages. (3:3:2)
5351. Computer Logic Design and Switching Theory. (3:3:0)
5352, 5353. Computer Systems Organization and Programming I and II. (3:3:0 each)
5354. Simulation Techniques. (3:3:0)
5355. Heuristic Techniques. (3:3:0)
5356. Formal Computer Language. (3:3:0)
5357. Information Retrieval I. (3:3:0)
5358. Introduction to Artificial Intelligence. (3:3:0)
5359. Statistical Computer Techniques. (3:3:0)
5361, 5362. Analysis and Synthesis of Complex Systems I, II. (3:3:0 each)
5367. Management of Technical Innovation. (3:3:0)
5368. Industrial Innovation. (3:3:0)
5370, 5371. Information Systems I and II. (3:3:2 each)
5381. Complex Analysis for Engineers. (3:3:0)
5382. Engineering Applications of Generalized Fourier Series. (3:3:0)

Industrial Engineering. Professor R. A. Dudek, Chairman.

Professor Ayoub; Associate Professors Burford, Lambert, Martz, Ramsey, Sandel and Walvekar; Assistant Professors Smith and Panwalker.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

The department has no specific foreign language requirement. However, research tools are included as an integral part of the degree program in the leveling, minor, or major courses of each student. Those courses are determined by the student's doctoral advisory committee.

- 512, 513. Seminar. (1 each)
535. Engineering Controls for Industrial Safety. (3:3:0)
5111, 5212, 5213, 5214. Industrial Engineering Case Analysis. (1, 2 each)
5301, 5302. Biotechnology and Human Performance I, II. (3:2:3 each)
5303. Physiological Systems Analysis. (3:2:3)
5304. Human Mechanics. (3:2:3)
5305. Measurement of Human Performance. (3:2:3)
5307. Inventory Systems. (3:3:0)
5308. Activity Scheduling. (3:3:0)
5311. Principles of Optimization. (3:3:0)
5312. Queueing Theory. (3:3:0)
5313. Network Flows. (3:3:0)
5314. Multistage Decision Processes. (3:3:0)
5315. Non-linear Programming. (3:3:0)
5316. Reliability Theory. (3:3:0)

5317. Design of Experiments. (3:3:0)
 5318. Selected Topics in Advanced Statistics. (3:3:0)
 May be repeated for credit.
 5319. Engineering Stochastic Processes. (3:3:0)
 5321, 5322. Decision Theory and Management Science. (3:3:0 each)
 5331. Theoretical Studies in Advanced Industrial Engineering Topics. (3)
 May be repeated for credit.
 5332. Experimental Investigation in Advanced Industrial Engineering Topics. (3)
 May be repeated for credit.
 5341. Simulation Models for Operations Analysis. (3:3:0)
 5351. Manufacturing Analysis. (3:2:3)
 5352. Advanced Manufacturing Engineering. (3:2:3)
 5361. Advanced Engineering Economic Analysis. (3:3:0)
 5362. Economics Decision Theory. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731, 732. Research. (3 each)
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Mechanical Engineering. Professor

L. J. Powers, Chairman.
 Professors Helmers, Koh, and Newell; Associate Professors Davenport, Jordan, Lawrence, and Reynolds; Assistant Professors Goldman, Kirby, and Ruiz-Ubrieta.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

5121. Graduate Seminar. (1)
 May be repeated for credit.
 5311. Biothermodynamics. (3:3:0)
 5314. Stress Analysis I. (3:2:3)
 5316, 5317. Mechanical Vibrations I, II. (3:3:0 each)
 5321, 5322, 5323. Thermodynamics I, II, III. (3:3:0 each)
 5324, 5325, 5326. Heat Transmission I, II, III. (3:3:0 each)
 5327, 5328, 5329. Aerodynamics I, II, III. (3:3:0 each)
 5331. Theoretical Studies in Advanced Topics. (3)
 May be repeated for credit.
 5332. Experimental Studies in Advanced Topics. (3)
 May be repeated for credit.
 5333. Design I. (3:2:3)
 5341, 5342. Metallurgy I, II. (3:3:0 each)
 5343. Thermodynamics of Solids. (3:3:0)
 5351. Boiling Heat Transfer. (3:3:0)
 5361. Control Systems Engineering. (3:3:0)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.
 731, 732. Research. (3 each)
 May be repeated for credit.
 831. Doctor's Dissertation. (3)
 Enrollment required at least four times.

Petroleum Engineering. Professor
 Herald W. Winkler, Chairman.
 Associate Professor Crawford.

MINORS FOR THE MASTER'S DEGREE

5121. Graduate Seminar. (1:1:0)
 May be repeated for credit.
 5315. Economic Analysis of Oil-producing Properties. (3:3:0)

5328. Advanced Well Log Analysis and Formation Evaluation. (3:3:0)
 5331. Special Problems in Petroleum Engineering. (3)
 May be repeated for credit.
 5332. Experimental Studies in Petroleum Engineering. (3)
 May be repeated for credit.
 5334. Theory of Multiphase Flow in Conduits. (3:3:0)
 5335. Advanced Production Technology. (3:3:0)
 5337. Analysis and Design of Artificial Lift Systems. (3:3:0)
 5343. Advanced Studies in Fluid Flow Through Porous Media. (3:3:0)
 5344. Transient Behavior and Analysis. (3:3:0)
 5345. Numerical Methods in Petroleum Engineering. (3:3:0)
 5347. Numerical Simulation of Reservoirs. (3:3:0)
 5350. Advanced Reservoir Analysis. (3:3:0)
 5353. Advanced Studies in Reservoir Recovery Processes. (3:3:0)

Textile Engineering. Professor Robert
 L. Newell, Acting Chairman.
 Professors Johnson and Parsons.

MINORS FOR THE MASTER'S DEGREE

- 531, 532. Theory of Color Measurement I and II. (3:2:3 each)
 535. Physical Properties of Textile Materials. (3:3:0)
 536. Mechanics of Textile Protostructures and Structures. (3:3:0)
 537, 538. Dynamics of Textile Protostructuring and Structuring I, II. (3:3:0 each)
 5331. Special Problems in Textile Engineering. (3)
 5332. Experimental Studies in Textile Engineering. (3)

College of Home Economics

Professor Donald S. Longworth,
 Interim Dean

The College of Home Economics offers majors and minors for the master's degree as indicated, a general minor for the Doctor of Education degree, and, in the Department of Food and Nutrition, a minor for the doctor's degree.

Clothing and Textiles. Professor
 Norma E. Walker, Chairman.
 Professor Williams; Associate Professors Roch and Woodson.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

511. Advanced Clothing Problems. (1:0:3)
 May be repeated for credit.
 518. Seminar in Clothing and Textiles. (1:1:0)
 May be repeated for credit.
 530. Clothing and Human Behavior. (3:3:0)
 531. Special Problems in Clothing and Textiles. (3:1:4)
 May be repeated for credit.
 532. New Developments in Textiles. (3:3:0)
 536. Advanced Clothing Design. (3:1:4)
 539. Economics of Textiles and Clothing Industries. (3:3:0)
 5302. Cultural Bases of Clothing. (3:3:0)
 5303. Readings in Clothing and Textiles. (3:3:0)
 5304. Methods for Teaching Paraprofessionals in Clothing and Textiles. (3:3:0)

5335. Textiles for Elementary Teachers. (3:3:0)
 5340. Tailoring Problems. (3:1:4)
 630. Master's Report. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Food and Nutrition. Professor Shiang P. Yang, Chairman.

Professor Lamb; Associate Professors Kassouny and McPherson; Assistant Professors Inano and Solar.

MAJORS AND MINORS FOR THE MASTER'S DEGREE AND MINORS FOR THE DOCTOR'S DEGREE

516. Nutrition and the Adolescent. (1:1:0)
 517. World Nutrition. (1:1:0)
 518. The Consumer and Food Technology. (1:1:0)
 519. Nutrition and Gerontology. (1:1:0)
 520. Vitamins and Minerals. (2:2:0)
 521. Proteins and Amino Acids. (2:2:0)
 522. Lipids and Carbohydrates. (2:2:0)
 523. Seminar in Food and Nutrition. (2:2:0)
 524. Relations Between Nutrition and Diseases. (2:2:0)
 525. Methods of Teaching Nutrition. (2:2:0)
 526. Advanced Problems in Food Service Management. (2:2:0)
 527. Seminar in Food Service. (2:2:0)
 530. Introduction to Food and Nutrition Research. (3:3:0)
 532. Food Service Systems. (3:3:0)
 534. Advanced Problems in Human Nutrition and Foods. (3)
 May be repeated for credit.
 535. Methods of Food Research. (3:1:6)
 536. Methods of Nutrition Research. (3:1:6)
 5335. Principles and Applications of Nutrition for Elementary Teachers. (3:3:0)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Home Economics Education. Professor Camille Graves Bell, Chairman.

Professors Sittin and Williamson; Associate Professors Chamberlain and Kelly; Assistant Professor Landers.

MAJORS AND MINORS FOR THE MASTER'S DEGREE

A professional certificate program is offered in the specialization area of home economics education. This certification requires approximately 30 graduate semester hours as directed by certification policies and may not be coincidental with the degree program.

514. Specific Problems in Teaching Home Economics. (1:1:0)
 May be repeated for credit.
 518. Seminar in Home Economics. (1:1:0)
 May be repeated for credit.
 530. Readings in Home Economics Education. (3:3:0)
 531. Administration and Supervision of Home Economics Education. (3:3:0)
 532. Curriculum Development in Home Economics. (3:3:0)
 533. Evaluation in Home Economics. (3:3:0)
 534. Techniques of Research in Home Economics. (3:3:0)
 535. Analysis and Organization of Teaching Media. (3:3:0)
 536. Problems in Home Economics Education. (3)
 May be repeated for credit.
 537. Techniques of Supervision in Home Economics. (3:3:0)

538. Communication Designs in Teaching-Learning. (3:3:0)
 539. Organization and Administration of the Home Economics Gainful Employment Program. (3:3:0)
 5341. Vocational-Technical Curriculum Development. (3)
 631. Master's Thesis. (3)
 Enrollment required at least twice.

Home and Family Life. Professor Stanley E. Fowler, Chairman.

Professors Longworth, Wallace, and Wolf; Associate Professors Ater, Henton, Larson, and Pinder; Assistant Professors Coulter and Landers.

MINORS FOR THE MASTER'S DEGREE CHILD DEVELOPMENT

518. Seminar in Child Development and Family Relations. (1:1:0)
 May be repeated for credit.
 530. History and Philosophy of Child Development. (3:3:0)
 531. Individual Study in Child Development. (3)
 532. Development of Basic Processes in Young Children: Psychomotor, Affective, Cognitive, and Social. (3:3:0)
 533. International and Intercultural Aspects of Child Development. (3:3:0)
 534. Special Topics in Child Development. (3:3:0)

FAMILY RELATIONS

530. Marriage Counseling. (3:3:0)
 531. Individual Study. (3)
 532. Issues in Family Life Education. (3:3:0)
 533. Materials and Procedures in Teaching Family Life Education. (3:3:0)
 536. Theory and Research in Family Life. (3:3:0)
 5336. Advanced Interpersonal and Family Relations. (3:3:0)

HOME MANAGEMENT

511. Individual Problems. (1:1:0)
 May be repeated for credit.
 518. Seminar in Home Management. (1:1:0)
 May be repeated for credit.
 532. Socioeconomic and Psychological Foundations of Home Management. (3:3:0)
 533. Work Analysis in the Home. (3:3:0)
 534. Family Economics. (3:3:0)
 535. Current Consumer Issues. (3:3:0)
 536. Home Management and Housing for the Physically Handicapped. (3:1:4)

Interdisciplinary Programs

Computer Science.

Courses taught by faculty of participating departments.

A program in computer science is available as a minor or option for the master's or doctor's degree for students in all colleges at Texas Tech. The program is supervised by the Computer Science Committee, and students desiring admission to the program should apply to the committee. Admission is subject to the approval of the academic department which will grant the major degree.

The master's degree requirements include CS 5312 and additional courses in computer science or computer-related areas to total 9 hours. Courses not listed as computer science but which may be defined as computer-related, may be

counted toward minors and options with the approval of the committee and the academic department involved.

The doctor's degree requirements include CS 5312, 5313, 5316, and additional courses in computer science or computer-related areas to total 18 hours.

MINORS FOR THE MASTER'S DEGREE AND THE DOCTOR'S DEGREE

- 511. Seminar. (1:1:0) (I E 512)
- 531. Special Problems in Advanced Computer Science and Technology. (3:3:0) (EA&D 5333)
- 5310. Programming, Systems, and Languages. (3:3:2) (EA&D 5350)
- 5311. Computer Logic Design and Switching Theory. (3:3:0) (EA&D 5351)
- 5312, 5313. Computer Systems Organization and Programming I, II. (3:3:0 each) (EA&D 5352, 5353)
- 5316. Formal Computer Language. (3:3:0) (EA&D 5356)
- 5317. Information Retrieval I. (3:3:0) (EA&D 5357)
- 5318. Introduction to Artificial Intelligence. (3:3:0) (EA&D 5358)
- 5320. Sampled Data and Digital Control Systems. (3:3:0) (E E 5315)
- 5321. Digital Systems. (3:3:0) (E E 5321)
- 5325. Information Theory. (3:3:0) (E E 5325)
- 5329. Digital Computer Design. (3:2:3) (E E 5393)
- 5331. Simulation Models for Operations Analysis. (3:3:0) (I E 5341)
- 5341. Computer Models for Business, Industry, and Government. (3:3:0) (MGT 5316)
- 5343. Management Information Systems. (3:3:0) (MGT 5317)
- 5370, 5371. Information Systems I, II. (3:3:2 each) (EA&D 5370, 5371)

Admission

The Office of Admissions controls admission to the instructional colleges of the University. Each new student is required to file an application on a form which may be secured from the Admissions office, located in West Hall. In addition, regular students must submit complete high school transcripts and complete transcripts from all colleges previously attended. The new student is urged to send in credentials well in advance of the registration date.

To enter the University as a freshman, an applicant takes the following steps:

1. Applies for admission on forms furnished by the Office of Admissions.
2. Provides the Admissions office with an official transcript of his high school record. The applicant must assume the responsibility for having his records forwarded to the Office of Admissions.
3. Files a health data form. This form is to be completed and returned by a physician to the University Health Center.
4. Furnishes scores on the Scholastic Aptitude Test of the College Entrance Examination Board.
5. Decides which college or degree program he wishes to enter. A student needing advice or counseling may come to the campus before registration begins and consult with any of the academic deans or the Counseling Center.

When an applicant's file is complete, that is, after his completed application form and all necessary supporting transcripts and records have been received, the application will be evaluated. Normally the applicant will be notified of his acceptance or rejection before he reaches the campus.

6. Reports to the University campus on the day indicated in notices sent in reply to his application. All entering freshmen must report for freshman orientation on June 4.

Uniform Minimum Requirements for Admission. Graduation from an accredited high school is the first entrance requirement for beginning freshmen. The following units are the uniform requirements for admission to the University:

- | | |
|---|---|
| 1. English | 3 |
| 2. Mathematics* (algebra, geometry, trigonometry) | 2 |
| 3. Social science | 2 |
| 4. Laboratory science | 1 |
| 5. Electives | 7 |

Removal of Deficiencies. A student who is admitted with deficiencies must remove them during his first two semesters of attendance at Texas Tech.

Special Admission Requirements. For admission to the colleges of Agricultural Sciences, Business Administration, Education, and Home Economics, there are no requirements beyond those listed above. For special programs in the College of Arts and Sciences and for entrance into the College of Engineering, see the annual **General Catalog**.

Admission of Out-of-State Students. An applicant for admission who is not a legal resident of Texas (for tuition purposes) must meet the following minimum requirements:

*Related Math I and II may be accepted to satisfy the mathematics requirement in the nonscience, nonengineering majors. One unit in general mathematics may be accepted as a substitute for one of the required units in mathematics in the nonscience, nonengineering majors. Courses falling under the description of arithmetic are not accepted as one of the uniform required units in mathematics.