The University of Tennessee, Knoxville does not discriminate on the basis of race, sex, color, religion, national origin, age, handicap, or veteran status in provision of educational opportunities or employment opportunities and benefits.

UTK does not discriminate on the basis of sex or handicap in the education programs and activities which it operates, pursuant to the requirements of Title IX of the Education Amendments of 1972, Pub. L. 92-318; and Section 504 of the Rehabilitation Act of 1973, Pub. L. 93-112; respectively. This policy extends to both employment by and admission to the University.

Inquiries concerning Title IX and Section 504 should be directed to the Office of the Director for Affirmative Action, 405E Andy Holt Tower, Knoxville, TN 37996-0144, phone: 974-2498. Charges of violation of the above policy should also be directed to the Office of the Director for Affirmative Action.
The University of Tennessee

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University Administration

Edward J. Boling, B.S., M.S., LL.D, Ed.D., President of the University
Joseph E. Johnson, A.B., A.M., Ed.D., Executive Vice President and Vice President for Development
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UT, Knoxville Administration

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Homer S. Fisher, B.S., M.B.A., Executive Vice Chancellor for Business, Planning, and Finance
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James A. Spencer, B.A., M.C.P., Director of the Graduate School of Planning

From Weakley County

James F. Harrison | June 1, 1990

Student Member

Ken Compton | July 1, 1986

Officers of the Board

Governor Lamar Alexander, Chairman
Ben S. Kimbrough, Vice Chairman
Edward J. Boling, President
A. David Martin, Treasurer
Beauchamp Brogan, Secretary
Linda Logan, Assistant Secretary
Table of Contents

Inside Front Cover - Contacts

Admission and Registration

Student Services

Graduate Research Centers and Institutes

General Regulations of the Graduate School

Requirements for Advanced Degrees

Academic Units

Institute of Agriculture

College of Agriculture

College of Veterinary Medicine

College of Business Administration

College of Education

School of Health, Physical Education, and Recreation

College of Engineering

College of Human Ecology

Intercollegiate Programs

College of Liberal Arts

College of Law

College of Medicine-Knoxville

College of Nursing

School of Architecture

Graduate School of Biomedical Sciences

Graduate School of Library and Information Science

Graduate School of Planning

Graduate School of Social Work

Index

*Graduate School of Social Work became the College of Social Work, effective January 1986.
### University Calendar for 1986-87

#### Summer Quarter, 1986
- June 18-19 (Wednesday-Thursday)
- June 20 (Friday)
- June 30-July 3 (Monday-Thursday)
- July 4 (Friday)
- July 8 (Tuesday)
- July 22-24 (Tuesday-Thursday)
- July 24 (Thursday)
- July 25 (Friday)
- July 21-25 (Monday-Friday)
- August 12 (Tuesday)
- August 27 (Wednesday)
- August 29 (Friday)

#### Fall Quarter, 1986
- September 22-24 (Monday-Wednesday)
- September 25 (Thursday)
- October 27-31 (Monday-Friday)
- October 29 (Wednesday)
- November 8 (Saturday)
- November 27-29 (Thursday-Saturday)
- December 4 (Thursday)
- December 12 (Friday)

#### Winter Quarter, 1987
- January 5-6 (Monday-Tuesday)
- January 7 (Wednesday)
- January 19 (Monday)
- February 2-6 (Monday-Friday)
- February 2-6 (Monday-Friday)
- March 13 (Friday)
- March 21 (Saturday)

#### Spring Quarter, 1987
- April 2-6 (Monday-Friday)
- May 25-29 (Monday-Friday)
- June 3 (Wednesday)
- June 12 (Friday)

#### Summer Quarter, 1987
- June 17-18 (Wednesday-Thursday)
- June 19 (Friday)
- June 29-July 2 (Monday-Thursday)
- July 3 (Friday)
- July 7 (Tuesday)
- July 20-24 (Monday-Friday)
- July 21-25 (Tuesday-Thursday)
- July 23 (Thursday)
- July 23 (Thursday)
- August 11 (Tuesday)
- August 26 (Wednesday)
- August 28 (Friday)

**Registration**: First or All Terms
- Classes Begin
- Change of Registration Deadline, First Term
- Classes End
- Change of Registration Deadline, Second Term
- Classes End
- Commencement
- Advance Registration for Fall 1987
- Change of Registration Deadline
- Tie College Curricula. However, the University is committed to intensive academic advising such that no student's program will be delayed due to the change to the semester calendar.

NOTE: Deadlines for degree requirements described on pp. 24-25.
CALENDAR for 1987-88

Fall Quarter

September 20 (Sunday) Graduate Student Orientation
September 21-23 (Monday-Wednesday) Registration
September 24 (Thursday) Change of Registration Deadline
October 28 (Wednesday) Advance Registration for Winter 1988
November 2-6 (Monday-Friday) Homecoming (No Classes)
November 14 (Saturday) Thanksgiving (No Classes)
December 3 (Thursday) Classes End
December 11 (Friday) Commencement

Winter Quarter, 1988

January 4-5 (Monday-Tuesday) Registration
January 6 (Wednesday) Classes Begin
January 18 (Monday) Martin Luther King's Birthday (No Classes)
February 1-5 (Monday-Friday) Advance Registration for Spring 1988
February 9 (Tuesday) Change of Registration Deadline
March 8 (Tuesday) Classes End
March 15 (Tuesday) Commencement

Spring Quarter, 1988

March 21-22 (Monday-Tuesday) Registration
March 23 (Wednesday) Classes Begin
April 1-2 (Friday-Saturday) No Classes
April 25-29 (Monday-Friday) Advance Registration for Summer 1988
April 26 (Tuesday) Change of Registration Deadline
May 16-20 (Monday-Friday) Classes End
May 24 (Tuesday) Commencement
June 1 (Wednesday) Registration

Summer Quarter, 1988

June 7-8 (Tuesday-Wednesday) Registration, First or All Terms
June 9 (Thursday) Classes Begin
June 20-24 (Monday-Friday) Advance Registration for Fall 1988
June 23 (Thursday) Change of Registration Deadline, First Term
July 4 (Monday) Independence Day (No Classes)
July 5-8 (Tuesday-Friday) Registration, Second Term
July 6-8 (Wednesday-Friday) Classes End, First Term
July 11 (Monday) Change of Registration Deadline, Full Term
July 12 (Tuesday) Classes Begin, Second Term
July 26 (Tuesday) Change of Registration Deadline, Second Term
August 10 (Wednesday) Classes End
August 12 (Friday) Commencement

NOTE: Deadlines for degree requirements on pp. 24-25.
## Majors and Degree Programs

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREE</th>
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<th>SUBJ</th>
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<th>LANGUAGE REQUIRED</th>
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*Non-degree and provisional students must obtain permission from the department/program head to register for courses in these fields.

All documents required for admission are submitted to the Office of Graduate Admissions & Records unless noted otherwise.

a International applicants only.
b American applicants only.
c G.S. Rating Form submitted to Department.
d Forms obtained from & returned to Department.
The Graduate School Administration

C.W. Minkel, B.A., M.A., Ph.D., Vice Provost and Dean of The Graduate School
Linda R. Painter, B.S., M.S., Ph.D., Assistant Dean of The Graduate School
Wayne T. Davis, B.S., M.S., Ph.D., Assistant Dean of The Graduate School
Alan D. Finnegan, B.S., M.Ed., Director, Graduate Admissions and Records
Rose Ann Trantham, Assistant Director, Graduate Admissions and Records
S. Kay Reed, B.S., M.S., M.A., Ph.D., Graduate Recruitment Coordinator
Ann L. Lacava, Thesis/Dissertation Coordinator
A.A. Mason, B.S., Ph.D., Associate Dean, UT Space Institute
Marvin Goodman, B.S., M.S., Director, Kingsport Graduate Program
Jerry D. Westbrook, B.E., M.S., Ph.D., Director, Nashville Graduate Engineering Program

The Graduate Council

Membership January 1, 1986

Ex Officio Members
C.W. Minkel, Vice Provost and Dean
Max S. Wortman, Chairman of the Research Council
Wayne T. Davis, Assistant Dean
Linda R. Painter, Assistant Dean

Appointed Members
Dr. Robert S. Garfinkel
Dr. Malcolm McInnis
Dr. Kenneth B. Kenney
Dr. Richard J. Courtney
Dr. Sam Bills

College or Unit | Elected Members | Expiration | Proxy
--- | --- | --- | ---
Agriculture | Dr. J.B. McLaren | Dec. 31, 1986 | Dr. Luther H. Keller
Business Administration | Dr. Ralph O'Brien | Dec. 31, 1987 | Dr. Ernest R. Cadotte
 | Dr. William C. Goolsby | Sept. 1, 1988 | Dr. George C. Philippatos
Communications | Dr. Mark Miller | Sept. 1, 1988 | Dr. Michael Singletary
Education | Dr. Laurence J. Coleman | Dec. 31, 1986 | Dr. Patricia A. Beitel
 | Dr. John R. Ray | Dec. 31, 1986 | To be Determined
 | Dr. Janet R. Handler | Dec. 31, 1987 | Dr. Ken L. Krick
 | Dr. Michael J. Patton | Dec. 31, 1987 | Dr. Naomi M. Meara
 | Dr. Donald J. Dessart | Sept. 1, 1988 | Dr. James H. Miller
Engineering | Dr. Jeffrey W. Hodgson | Dec. 31, 1986 | Dr. Thomas G. Carley
 | Dr. Edwin G. Burdette | Dec. 31, 1987 | Dr. John F. Fellers
Graduate Student Council | Mr. Leon Binder | Apr. 30, 1986 | Dr. John T. Smith
 | Mr. Andy S. Methven | Apr. 30, 1986 | Dr. John Muldowny
Human Ecology | Dr. Sandra L. Twardosz | Dec. 31, 1986 | Dr. Lydia M. Pulsipher
Liberal Arts | Dr. Dewey L. Bunting | Dec. 31, 1986 | Dr. Patricia Droopleman
 | Dr. Cheryl B. Travis | Dec. 31, 1987 | Dr. C. Thomas Cruthirds
 | Dr. Dorothy Habel | Sept. 1, 1988 | Dr. Roger M. Nooe
 | Dr. Raymond W. Beck | Sept. 1, 1988 |
Nursing | Dr. Mildred M. Fenske | Dec. 31, 1986 |
School of Social Work | Dr. Gideon W. Fryer | Dec. 31, 1986 | Dr. Walter Frost
 | Sept. 1, 1987 | | Dr. Michael H. Sims
UT Space Institute | Dr. Frank G. Collins | Sept. 1, 1988 | |
Veterinary Medicine | Dr. J.B. Jones | Dec. 31, 1986 | |

Proxy
Dr. J.B. Jones | Dec. 31, 1986 |
Dr. Nancy M. Goslee | Dec. 31, 1986 |
Dr. J. Michael Pemberton | Dec. 31, 1986 |
Dr. Sam C. Bills | Sept. 1, 1988 |
GRADUATE STUDY
Rules, policies, fees, and courses described in this catalog are subject to change without notice.
The University of Tennessee, Knoxville is the official land-grant institution for the State of Tennessee. It is a comprehensive institution offering a wide range of graduate programs leading to the Master’s and Doctoral degrees. The University offers Master’s programs in 104 fields of specialization and doctoral work in 51. Approximately 5,600 graduate students are enrolled both on and off campus. Administration of graduate student policies and procedures, and associated record keeping, is the responsibility of the Dean of The Graduate School. Much of the day-to-day administration of the graduate study is conducted by department heads or faculty advisors and committees responsible for particular programs. In addition to departmental units, numerous interdisciplinary programs, institutes and centers have been developed on campus and in locations throughout the state.

The Graduate School brings together faculty and graduate students as a community of scholars with a common interest in creative work and advanced study. Programs are available to students desiring full-time work toward the Master’s and Doctoral degrees or professional certification, those interested in continuing education for updating and broadening knowledge, and those pursuing postdoctoral research. Traditionally, universities have provided graduate programs primarily for full-time, degree-oriented students. Serving the needs of students engaged full-time in intensive study and pursuit of a degree continues to be a major emphasis of UTK’s graduate effort. At the same time, the University employs a variety of modes, traditional and non-traditional, in offering quality programs designed to serve students.

The policies of The Graduate School are developed by the Graduate Council, a body composed of elected representatives from each college, the Space Institute, and the Graduate Student Council. Ex-officio members include the Dean, Assistant Deans of The Graduate School, the Chair of the Research Council, the Director of Libraries, and the Dean of Continuing Education. The Graduate Office develops procedures to carry out the policies formulated by the Council, and has primary responsibility for Graduate School admissions and records.

## Admission and Registration

Admission to The Graduate School requires a Bachelor’s degree with a satisfactory grade point average from a college or university accredited by the appropriate regional accrediting agency. Admission to The Graduate School does not ensure acceptance into a specific degree program nor admission to candidacy for the degree desired.

When a student is admitted to The Graduate School prior to having received the baccalaureate degree, that degree must be awarded before the date of first registration in The Graduate School. If a student does not enroll within one year after the requested admission, the application process must be repeated.

### Types of Admissions

To earn graduate credit, a student must be enrolled in one of the categories listed below. Course work taken in any other status is unacceptable for graduate credit and cannot be changed to graduate credit.

### Admission to a Graduate Degree Program:

- Admission to a degree program requires a minimum grade point average of 2.5 out of a possible 4.0, or a 3.0 during the senior year of undergraduate study. However, many departments require a higher average. The equivalent of a minimum B average is required for international students.
- The graduate application, $15 fee, and one (1) official transcript from each institution previously attended are required for consideration as a degree student.
- In addition to meeting the minimum requirements for admission to The Graduate School, applicants at the doctoral level must have demonstrated a potential for superior academic performance. To be considered are such criteria as performance in prior undergraduate and/or graduate studies, achievement on admission tests for graduate studies, letters of recommendation from professors familiar with the applicant’s capabilities, and other evidence of scholarly achievement.
- Refer to pages 8-9 and to descriptions of programs for specific requirements for admission.

### Non-Degree Admission: Applicants may apply for non-degree status who, for example:

1. do not desire to pursue a degree program;
2. have already received an advanced degree;
3. need additional time to fulfill application requirements for a degree program. There is no specific limit on the number of courses that a student may take in non-degree status. However, before accumulating 18 hours of graduate course work in this status, the student must either:
   1. apply and be admitted to a specific degree program (see Change of Program, p. 21, for instructions); or
   2. file a Plan of Study form with the Office of Graduate Admissions and Records for approval to continue taking courses in non-degree status. The plan of study must include a stated educational objective and a
obtained. To be admitted to the non-degree or degree status, the student must earn at least a 3.0 grade average in all course work (graduate and undergraduate) taken in provisional status, to include at least six hours of graduate work. The Office of Graduate Admissions and Records will process the change to non-degree status if all requirements are met. To apply for a specific degree program, the student must submit the Request for Change of Graduate Program form to the Office of Graduate Admissions and Records.

Provisional admission does not assure admission to a non-degree or degree program. A student who wishes to enter a degree program will be directed to the appropriate department. The student who fails to complete provisional admission within seven weeks after registration will NOT be permitted to register again NOR receive a copy of the transcripts showing the course work taken, until all admission requirements are met.

An international student on a non-immigrant visa may not enroll in the provisional status.

Admission of International Students: The Graduate School accepts only students who have superior records. An international student must have an equivalent 4-year Bachelor's degree with at least a B average on undergraduate course work and a B+ on all previous graduate work. On various grading scales, this would indicate:

- a. 3.0 and 3.5 on 4.0 scale;
- b. 14 and 15 on 20 point scale;
- c. 80.0 from Chinese institutions;
- d. 1st Class or Division from Indian Institutions;
- e. Upper 2nd Class Honors on various British systems.

Other grading systems will be evaluated upon receipt of transcripts. An international student may apply for admission any quarter, but normally enters the summer or fall quarter. Deadlines for submission of applications are:

- Summer: Dec. 1
- Fall: March 15
- Winter: July 1
- Spring: Sept. 15

The Office of Graduate Admissions and Records must be notified of any change in entering date after admission has been granted. Individual departments and colleges may have further restrictions on admission dates. For this information, students should contact the department whose program they wish to enter. The following items must be received before admission will be considered:

1. A completed application form with a $15 non-refundable processing fee.
2. Official or attested university records, with certified translations if the records are not in English (Notarized copies are not acceptable).
3. Certification of English proficiency. Every student whose native language is not English must either submit a score of 525 or above on the Test of English as a Foreign Language (TOEFL), taken within the past two years, or have received a degree from an accredited U.S. institution.
4. Documentation of financial resources sufficient to support the student with at least U.S. $11,300 per calendar year during the period of enrollment.

Eligibility of Seniors: Subject to approval by The Graduate School, a senior at UTK who needs fewer than 45 quarter hours to complete the requirements for a Bachelor's degree and has at least a B average (3.0) may enroll in graduate courses for graduate credit provided the combined total of undergraduate and graduate course work does not exceed 15 credit hours per quarter. Approval must be obtained each quarter at the Office of Graduate Admissions and Records during registration. A maximum of 18 hours of graduate credit can be obtained in this status.

Enrollment of Veterinary Medicine Students in Graduate Courses: A student in good standing in the College of Veterinary Medicine may enroll in UTK graduate courses without being admitted to The Graduate School, under the following conditions:

1. The student’s advisor must approve in advance the student’s enrollment in each course.
2. The student may take a maximum of 15 quarter hours of graduate courses during the D.V.M. program.
3. Approval must be obtained each quarter at registration through the Office of Graduate Admissions and Records. The student’s progress is subject to review and approval each quarter by the Associate Dean, College of Veterinary Medicine.

Admission of Faculty Members: Faculty members of UTK or the Institute of Agriculture at the rank of assistant professor or above, and employees of the administrative staff at UTK, the UT Central Administration, and the Institute of Agriculture will not normally be admitted to candidacy for a
Admission Procedures

Anyone with a Bachelor's degree from a regionally accredited institution wishing to take courses for graduate credit, whether or not the person desires to become a candidate for a degree, must make formal application for admission to the Graduate School or apply for transient status. No action is taken until a file is completed. The applicant will be notified by mail of the action taken.

To apply for admission the following materials must be sent to The Graduate School:

1. The completed Graduate Application for Admission (inside front cover of Graduate Catalog).
2. A $15 non-refundable application fee.
3. One official transcript from all colleges and universities attended.
4. Reference letters or rating forms (pages 8-9). Forms obtained from the college or department should be returned to the same source.
5. Scores from examinations which may be required for admission. Graduate programs which require scores from the Graduate Record Examination or the Graduate Management Admission Test are shown on pages 8-9. The TOEFL is required of all students whose native language is not English, unless they have graduated from a regionally accredited U.S. institution.

Application forms for the above tests can be obtained by writing:

Educational Testing Service
Princeton, NJ 08540

UTK is an approved testing center for all examinations. Examination results reach the University in approximately six weeks. All of the above documents become the property of the University and will not be returned.

Readmission

A student who has not attended The Graduate School at UTK for more than five quarters (including Summer Quarter) must apply for readmission. A readmission application should be submitted to the Office of Graduate Admissions and Records at least two weeks prior to the desired reentry date. A student who has attended another institution since enrollment at UTK must submit one official transcript showing all course work and any degrees earned at that institution. The transcript will be notified when action has been taken by the department/program and The Graduate School. A student who is permitted to enroll and is subsequently denied readmission will receive credit for courses completed successfully. Future registration will not be allowed until readmission is granted.

Registration Procedures

Registration is required of all graduate students when using University facilities and/or faculty time. The minimum number of hours for registration is 3. Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public.

Dates of registration are listed in the University Calendar (front of Catalog). To register, students should:

1. Report to the Office of Graduate Admissions and Records to obtain registration materials (scan form and Timetable of Classes).
2. Confer with an advisor assigned by the department to obtain approval of a schedule of courses, if not done previously.
3. Sign the scan form certifying approval of the advisor and return it to the Office of Graduate Admissions and Records or alternate location designated in Timetable.
4. Consult Timetable to complete registration.

Non-degree or provisional students in unrestricted programs (see pages 8-9) may obtain permission to register from the Office of Graduate Admissions and Records. A preregistration period is scheduled each quarter for a subsequent quarter (see University Calendar). Any graduate student who has applied for admission can preregister. Information can be obtained from the Office of Graduate Admissions and Records. A student who participates in preregistration should obtain the computerized class schedule and pay fees on the first day of registration.

Failure to pay tuition and fees before the deadline listed each quarter in the Timetable of Classes will result in the assessment of a late registration fee. Retroactive registration is not permitted.

Family Educational Rights and Privacy Act

The Family Educational Rights and Privacy Act (FERPA) is a Federal law that gives students certain rights with respect to their education records. It also provides for confidentiality of student records. However, it also provides for basic identification of persons at UTK without the consent of the individual. Release of information to third parties includes directory information such as contained in the campus telephone book and sports brochures. Such information may include name, address, telephone number, date and place of birth, major, dates of attendance, degrees and awards, the most recent date the educational agency or institution attended, participation in school activities and sports, and weight and height (for special activities). Notice of the categories to be contained in a publication will be given in advance. A period of one week is provided during which a student may request that such information not be released.

Student Identification Number

UTK requires assignment of an individual student number for internal identification of each student's record. The University began using the social security number as the student identification number prior to January 1, 1975; therefore, federal law allows continued use of this number. However, if a student does not desire to use the social security number, notification to the University must be made at the time of application for admission. A student identification number will then be assigned instead. For prompt and accurate retrieval of records and for conducting business about their own records, students and alumni must give their student identification number. Student identification numbers, whether social security numbers or assigned numbers, are used administratively within the University only and are not given to third parties without expressed consent of the student.
LATE REGISTRATION FEE:

All students are required to have a validated fee receipt to complete the registration procedure. This includes students whose fees are billed, prepaid, or waived. Students who do not complete registration on or before the first official day of classes for the designated for regular registration and will be charged unless this action is completed. The appropriate percentage of fees payable at registration by students receiving individual instruction in music.

GRADUATION FEE:

Master's degree candidates $30
Doctoral degree candidates $70
Hood rental optional $5

There are no additional charges for diploma, binding, or microfilming. The graduation fee is non-refundable and is valid for three quarters after the quarter in which it is paid.

DEFERRED PAYMENT SERVICE FEE...$10

This fee is applicable when the payment of any part of a student's account is deferred, including accounts which must be billed to outside agencies, organizations, and institutions. This fee is also applicable when any additional charge (out-of-state tuition, music fee, room and board adjustment) is not paid within five regular business days after the date it was incurred.

It is the student's responsibility to take the initiative to pay all University obligations promptly.

Fees for courses audited are the same as for courses taken for credit. For fee purposes, courses listed for 0 credit hours are considered as one-hour courses.

REFUND OF FEES FOR WITHDRAWAL:

One-hour lesson per week per quarter $30
One-hour lesson per week, per quarter $60

The drop/add procedure must not be used to withdraw from school for the quarter. For a regular academic quarter, withdrawal within 7 calendar days beginning with the first day following regular registration permits a 30 percent fee refund. Withdrawal between 8 and 14 calendar days following regular registration permits a 70 percent fee refund. Withdrawal between 15 and 21 calendar days following regular registration permits a 90 percent fee refund. The above withdrawal refund policy does not apply to the off-campus Graduate Centers. Refunds, in accordance with the withdrawal by the Office of Residence Halls, will be made after the drop deadline.

Part-time students may pay fees computed at the appropriate quarter-hour rate as indicated above. No charge is made for courses dropped during the first 5 calendar days following regular registration. A 40 percent charge is made for courses dropped between 6 and 21 calendar days following regular registration, and a 100 percent charge is made for courses dropped after 21 days. Students who drop courses are eligible for a refund only if the sum of the fees charged at the quarter-hour rate for the hours continued plus the percentage assessed for the hours dropped results in an amount less than that paid. A course on a student's schedule is officially dropped, and the drop becomes effective, on the date that the change of registration form is processed on a drop/add terminal. Any refund due for dropped courses will be made after the final audit at the end of the quarter.

Rental charges and adjustments will be determined on or before the last day of registration for a given quarter, if the student is to be considered for reclassification that quarter.

The Graduate School, he/she is notified of residency classification (in-state or out-of-state) for tuition purposes. Classification is based on information supplied in the Graduate Application for Admission. A student who is classified out-of-state and (1) resides in Tennessee, (2) works full-time in the state or at Fort Campbell, Kentucky, and (3) desires to attend UTK on a part-time basis (maximum 6 hours of course work per quarter), is eligible for a waiver of out-of-state tuition. The student must apply for a waiver prior to the date of registration each quarter. Forms are available from the Admissions and Records Office of the Graduate Admissions and Records.

A student wishing to appeal a residency classification should contact the Residence Clerk, who will provide an application for reclassification and a copy of the State regulations. The application must be submitted on or before the last day of registration for a given quarter, if the student is to be considered for reclassification that quarter.

Academic Common Market

The Academic Common Market is an interstate agreement among Southern states for sharing unique programs. Participating states are able to make arrangements for their residents who are fully admitted to specific programs at UTK on an in-state tuition basis, where these programs are not available in the state of residence.

Cooperating states in the Academic Common Market are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, South Carolina, Tennessee, Texas, Virginia and West Virginia. Eighteen doctoral, one Specialist in Education, eighteen Master's programs at UTK are approved by the Academic Common Market for residents of these states to enroll at in-state tuition rates. Residents of one of the member states who seek further information about contact the Residence Clerk in the Office of Graduate Admissions and Records or the Southern Regional Educational Board, 130 Sixth Street, N.W., Atlanta, GA 30313.

Financial Aid

UTK offers several types of financial aid.
Student Services

Housing

Single Men and Women: Single graduate students may apply for accommodations in facilities conducive to academic achievement and personal development. Single graduate students have the same priority as other single students and may be assigned to any residence hall. Graduate students often prefer accommodations offered in Melrose and the Apartment Residence Halls. Melrose Hall offers community living units for groups of six to ten students with personal responsibility emphasized. The Holt Avenue Apartment Residence Hall accommodates students in groups of four. It is the responsibility of each resident to maintain the apartment to University standards. Further information can be obtained from the Office of Residence Halls, 405 Student Services Building.

A limited number of assistant head resident positions are available for graduate students. The assistant head resident aids the head resident in coordinating and supervising operation of the hall. This is a live-in position with part-time responsibilities on a nine-and-a-half month appointment. Further information can be obtained from the Office of Residence Halls, 405 Student Services Building.

Married Students: The University provides excellent apartment facilities in several locations for married students. Information and application for these facilities may be secured from the Office of Rental Properties, Stadium Hall.

Off-Campus Housing: Information and assistance in locating off-campus housing are available in the Off-Campus Housing Office, 336 University Center.

Vehicle Operation and Parking

The University of Tennessee endeavors to provide adequate facilities for vehicles operated by students and staff. However, areas available for parking are necessarily limited. To reduce traffic congestion within the campus area, large student parking areas are located on the perimeter of the campus. Presently, FREE bus service is provided from the Main Campus to the Agricultural Campus. Also, bus service is provided to Married Student Housing Units at a nominal fee.

Each person who operates a motor vehicle in connection with attendance or employment at the University must register that vehicle with the traffic section of the Security Department. A University Traffic and Parking Authority determines the parking policy, traffic regulations, and fees. This information is published each year in the "University Traffic and Parking Regulations", and is available at registration at the Security Building, 1115 UT Drive, and at the Campus Information Center at Circle Park.

Services to the Physically Disabled

Services for students with physical disabilities are coordinated by the Office of the Dean of Admissions and Records, 305 Student Services Building. In conjunction with the Physical Plant Office, the UT Bookstore, the Student Activities Office, and academic departments, the office seeks to assure that attendance at UTK is as convenient as possible for such students.

These services include assistance during registration (preregistration, collection of class schedules, payment of fees, drop and add); acquisition of special parking permits, elevator keys, tickets for special events; and similar efforts to relieve the special mobility problems of the students. The Physical Plant Office coordinates efforts to eliminate physical barriers to the extent possible, with priority being given to access and facilities for academic buildings.

The Office of the Dean of Admissions and Records assists students in the scheduling of special class sections to respond to the particular needs of the physically handicapped.


The University Library

The University of Tennessee, Knoxville Library owns approximately 1,500,000 volumes, more than 69,000 microfilm reels and 1,400,000 items of other microtext, plus recordings, tapes, United States and United Nations documents, and more than 16,000 periodicals and other serials. The library is semiannual. The library's membership in the Association of Research Libraries reflects the University's emphasis on graduate instruction and research. The library has several programs of its own, including the Graduate School and the Post-Baccalaureate Program. The library also has a large collection of library materials on a permanent basis.

Library holdings in Knoxville are housed in the James D. Hoskins (Main) Library and its branch libraries for agriculture, veterinary medicine, and music. Undergraduate library holdings are temporarily housed in Dunford Hall and Humanities & Social Sciences while the John C. Hodges Library undergoes extensive expansion.

The Special Collections section in the Main Library is a repository of regional and local materials, Tennessee, and other specialties, including legislative papers and manuscripts of many Tennessee political figures. The Radiation Biology Archives comprises the files of a group of internationally renowned scientists. Special Collections
Computing Center

The University of Tennessee Computing Center (UTCC) provides computing facilities and services for the University's teaching, research, public service, and administrative activities. UTCC offices and principal computing facilities are located on the first two floors of the Stokely Management Center (SMC) and on the P2 level and first floor of Andy Holt Tower.

Located at SMC are an IBM 3081-D and IBM 4381/3, 2 VAX-11/785, 2 VAX 8600, and a DEC PDP 11/55. A CalComp 1051 plotter is used to produce graphics output from jobs run on the IBM and VAX computers.

The IBM 3061-D and the IBM 4381/3 have 16 million bytes of memory each. The IBM 3081-D runs under MVS with JES2. The 2 VAX-11/785's and the 2 VAX 8600 run VMS. Time-sharing features, in addition to the VAX cluster, include VM/CMS on the IBM 4381/3 and CourseWriter III on the IBM 3081-D. Software includes most of the commonly used compilers and interpreters, as well as a large number of programs for statistical, mathematical, engineering, operations research, and graphics applications.

UTCC maintains eight remote job entry stations for batch work and fifteen sites for interactive computer work on the Knoxville campus, and supplies computing services to the other campuses in the UT System through remote job entry facilities. A graphics center with ten Tektronix graphics terminals, five storage and five refresh, two digitizing tablets, and a graphics plotter, is located in Ferris Hall. Additional graphics equipment, including three terminals, a large digitizing tablet, and a plotter, is located in the user work area in the Art and Architecture Building. UTCC publishes a technical bulletin, IBM User's Guide, which describes the use of the IBM computers, and the VAX system User's Guide, which describes the use of the VAX cluster. Both guides are available to the UT Book & Supply Store. The monthly UTCC Newsletter announces systems, equipment, and procedural changes and contains other items of interest to users. Program writeups and special user guides are also available.

UTCC periodically offers intensive training seminars on the utilization of the IBM and VAX computers for faculty, staff and graduate students. UTCC also offers non-credit short courses each quarter in topics such as programming languages and special purpose programs. These courses are announced in the UTCC Newsletter, the "Campus Capsule" section of the UT Daily Beacon, and Context, a publication announcing campus events.

Forms to request computing services are available from the receptionist, 200 Stokely Management Center. All users of UTCC facilities are assigned a consultant for assistance in the effective use of computing resources.

Center for International Education

The Center for International Education provides services both for international students enrolled at UTK and UTK students planning study, work, or travel abroad. The Center for International Education serves as the official University representative in all matters involving immigration authorities, international educational organizations, and foreign governments.

The Center is composed of three units:

- The General Consultation Office, located at 201 Alumni Hall, which maintains students' official immigration records and handles questions regarding immigration regulations. The office staff serve as advisors on personal and related problems. Orientation programs are held at the beginning of each term to facilitate adjustment to the campus and the community.

- The Division of International Education, located at 205 Alumni Hall, offers advice and counseling on fellowship/scholarships/travel and work abroad, including the DAAD (German Academic Exchange Service), Fulbright, Marshall, Rhodes, and Rotary programs. It has resources on most other grants and scholarships that are offered for U.S. students interested in study and/or research abroad.

- The International House, located on campus at 1515 Cumberland Ave., serves as a social, recreational, and programming center where domestic and international students, faculty and staff meet. It is open 365 days a year, 100 hours a week.

International students applying for admission should write to The Office of Graduate Admissions and Records.

Ombudsman Office

Personnel of the Ombudsman Office in the University Center assist students in the resolution of problems encountered with any aspect of the University. The office is open during the regular working day and students are welcome to drop in at their convenience. Problems are treated confidentially and are dealt with expeditiously. The office does not replace existing structures but helps to ensure their responsiveness to student needs.

Graduate Research Centers and Institutes

Energy, Environment, and Resources Center

Director: E. W. Colglazier, Jr., Ph.D. California Institute of Technology

Associate Directors:
- D. R. Alvarez, Ph.D. Tennessee
- R. A. Bohm, Ph.D. Washington
- L. A. Gilman, Ph.D. Tennessee
- J. L. Finney, MSLS Tennessee
- H. Halford, Ed.D. Tennessee

Assistant Directors:
- S. H. Jones, M.S. Tennessee
- B. McGraw, B.S. Tennessee

Research Associates:
- M. English, M.S. Tennessee
- R. Kraemer, M.S. Tennessee

The Energy, Environment, and Resources Center was created to encourage interdisciplinary research at UTK, directed at solutions to problems related to energy and the environment. The Center provides assistance to faculty interested in developing research and public service projects, manages research and development projects that involve several disciplines, and assists Tennessee government and industry in specific problems related to energy and environment. The Center has a close working relationship with researchers at the Oak Ridge National Laboratory and the Tennessee Valley Authority.

Current research includes hazardous waste management policy, industrial fuel use trends, energy conservation in buildings and industry, electric utility modeling, environmental research needs, energy education and information, probabilistic risk assessment, and ethical and value issues in technology policy.

Transportation Center

Director: M. S. Bronzin, Ph.D. Pennsylvania State, P.E.

Assistant Directors:

The Transportation Center was created in 1970 to foster and facilitate interdisciplinary research and public service in the field of transportation at The University of Tennessee. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of the University. The Center is a University-level organization administratively positioned with the Office of the Vice Provost for Research at UTK. The Center's staff is organized into five research divisions and two support divisions. The seven division managers provide the overall management needed to conduct transportation research, service, and training activities efficiently and effectively.

The Center has three goals. The first is to conduct a program of research and training in transportation that is recognized for its excellence, comprehensiveness, innovation,
productivity, and national leadership. The second is to develop and sustain the technical expertise for high-quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

The University of Tennessee Space Institute

Kenneth E. Harwell, Dean, Ph.D., California Institute of Technology
A. A. Mason, Associate Dean, Ph.D., Tennessee

The Space Institute is a graduate education and research institute established in 1964 on a 365-acre lakeshore campus in Middle Tennessee. UTSI has evolved into an international institution for graduate study and research in engineering, physics, mathematics, and computer science. The accredited academic programs and educational policies of the Space Institute have their origins in departments of the University of Tennessee, Knoxville. The more than 40 faculty members of the Institute carry out these accredited academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advance study. Programs are available to students devoting full-time effort toward M.S. and Ph.D. degrees or those interested in continuing education for updating and broadening knowledge and those who wish to pursue post-doctoral research. Graduation programs are available with majors in Aerospace Engineering, Aviation Systems, Computer Science, Electrical Engineering, Engineering Science, Industrial Engineering (Engineering Management Concentration), Mechanical Engineering, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, atmospheric science, fluid mechanics, computer graphics, knowledge engineering, energy conversion processes, thermal sciences, space systems, remote sensing, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has recently established a Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico second processes, and coherent and non-linear optics. The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute and those available at Arnold Center through appropriate contractual arrangements provide students an unusual opportunity for significant research in these areas. Students who enroll at UTSI are admitted to the Graduate School. The University of Tennessee, Knoxville, Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

Water Resources Research Center

E. W. Colglazier, Acting Director, Ph.D., California Institute of Technology
T. R. Gangaware, Assistant Director, M.S., Tennessee

The Water Resources Research Center is a federally-designated institute for the conduct of water research for the state. The purposes of the Center are: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research programs needed by the state; (2) to provide information, dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; (3) to promote education in fields relating to water resources and to encourage the entry of promising students into careers in these fields.

Off-campus Graduate Centers

Kingsport University Center: UTK offers at Kingsport resident graduate programs in science and engineering at both the Master's and doctoral levels. The program is operated within the policies formulated by the Graduate Council of UTK and is coordinated with the graduate and undergraduate offerings of East Tennessee State University.

Students who enroll in this program must be admitted to The Graduate School of UTK. Information and application forms may be obtained from Marvin K. Goodman, Director, Kingsport University Center, The University of Tennessee, University Boulevard, Kingsport, Tennessee 37660.

Oak Ridge Resident Graduate Program: UTK offers graduate study programs at Oak Ridge, with work leading to Master's degrees in Business Administration with a concentration in management, Industrial Education, and Statistics. The Master's and doctoral degrees are available in engineering, mathematics, and physical and biological sciences. Courses are given in late afternoons, evenings, and Saturdays, with research facilities provided by and used in cooperation with the Oak Ridge Associated Universities (ORAU).

This program is supported under a sub-contract with ORAU with principal support coming from the Martin Marietta Corporation. UT is one of the forty-three colleges and universities which sponsor ORAU, a nonprofit education and research management corporation.

Information and applications to the Graduate School may be obtained by writing to Director, UT-Oak Ridge Graduate School, P.O. Box 117, Oak Ridge, Tennessee 37830.

Nashville Graduate Engineering Program: Opportunities for graduate study leading to the degree of Master of Science in Industrial Engineering and other disciplines, as the need and resources permit, are offered by UTK.

Students who enroll in these programs must be admitted to The Graduate School of UTK. Information and appropriate forms may be obtained from Jerry Westbrook, Director, Nashville Graduate Engineering Program, Tenth and Charlotte, Nashville, Tennessee 37203.

Chattanooga Graduate Education Program: UTK offers a graduate program in education leading to the Specialist in Education and the Doctor of Education degrees with major in Educational Administration and Supervision and Vocational-Technical Education. Students who enroll in this program must be admitted to The Graduate School of UTK.

Information and appropriate forms may be obtained from the Director, c/o Dean, College of Education, UTC, Chattanooga, Tennessee 37403.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences: The University provides programs leading to the M.S. and Ph.D. degrees in various areas of biomedical sciences. Graduate students have the opportunity to study and do research in conjunction with the Biology Division of the Oak Ridge National Laboratory.

For complete information concerning the program see page 165.

School of Social Work: UTK offers a fully accredited two-year program leading to the degree of Master of Science in Social Work through the School of Social Work, with programs in Knoxville, Nashville, and Memphis. The UTK School of Social Work also offers a Doctor of Philosophy degree with a major in Social Work.

For complete information concerning the programs, see page 171.

General Regulations of The Graduate School

Advisor/Major Professor

Every graduate student must have an advisor from the major department. This professor advises the student about courses, supervises the student's research, and facilitates communication within the major department, to other departments and to The Graduate School. The advisor must approve the student's program each term. Many departments assign a temporary advisor to direct the entering student's work during the period in which the student is becoming acquainted with the institution and determining the focus of research interests, and in which the department is forming a judgment concerning the candidate's prom-
ise as a scholar. As early as appropriate the student requests a professor in the major department to serve as the advisor. The major professor and student together select a graduate committee.

Prerequisites
Graduate work in any program must be preceded by sufficient undergraduate work in the major and related areas to satisfy the department that the student can do graduate work successfully in the chosen field. Individual undergraduate records are examined and evaluated by the appropriate department before admission to a degree program. Questions about program prerequisites should be addressed to the advisor.

Course Listings
Each course listing in the Graduate Catalog contains information in abbreviated form. The course number indicates the level at which the course is taught. All 5000-6000 level courses are graduate courses. The 3000-4000 level courses are upper division courses available for graduate credit if listed in the Graduate Catalog, unless noted otherwise. To receive graduate credit for these, a student must so indicate on the registration material.

The official course title appears in bold-faced type following the course number. Numbers in parentheses following the course title indicate the quarter hours credit. If the credit is variable, to be determined in consultation with the instructor, the minimum and maximum are shown (e.g. 2-3). The credit hours are followed by a course description indicating the content to be covered.

Prerequisite courses must be taken prior to the course in question. Corequisite courses may be taken prior to or concurrently with the specific course. Recommended prerequisites should be taken previously but are not mandatory. Some courses may be repeated for a maximum number of hours allowable toward a degree program. This number is stated for each repeatable course with the exception of Thesis 5000 and Dissertation 6000.

Courses may be cross-listed with two or more departments, an arrangement indicated in a parenthetical statement: (Same as Psychology 5432). The course description is given only under the primary department.

'S/NC only' indicates that the course may be taken only for Satisfactory/No Credit grading. Refer to section on Grading System.

At the end of each course description is a symbol indicating the quarter or frequency that the course normally is offered: F-Fall, S-Spring, Su-Summer, W-Winter, E-Every quarter, A-Alternate years. These codes are indicated only for Knoxville campus classes and are subject to change without notice. The Timetable of Classes is published several weeks prior to each quarter, is the official notification of courses offered for a specific quarter. Students should contact the appropriate department/program head concerning courses to be offered in future quarters.

**Course Loads**
The maximum load for a graduate student is 15 hours, and 9 to 12 hours is considered a full load. Students receiving financial aid should consult with the department/program head concerning appropriate course loads. Courses audited do not count toward minimum graduate hours for financial assistance. Registration for more than 15 hours during any quarter is not permissible without prior approval of The Graduate School, which may allow registration of up to 18 hours if the student has achieved an average of 3.6 or better in at least 9 hours of graduate work. Students may enroll in only one course in a September or December mini-term.

**Change of Registration**
The permanent record will show all courses for which the student has registered except those audited and those from which the student has withdrawn during the first 5 consecutive instructional days after the beginning of classes.

Students who fail to attend the first class meeting without prior arrangement with the department may be dropped from the course to make space available to other students. Students have the responsibility to assure that they have been dropped. Otherwise they may receive a grade of F in the course.

The deadline for change of registration (e.g. from graduate to undergraduate, undergraduate to graduate, withdrawal) is set at mid-term, approximately 35 calendar days after the first day of classes each quarter. A student may change registration for a course at any time prior to and including this date by executing a change of registration form and submitting it to the Office of Graduate Admissions and Records. The student must sign the form certifying approval of the advisor. The instructor's signature is required if the course is closed and/or after the first two weeks of classes. If the student withdraws from a course or from the University after the first 5 days of classes and before the change of registration deadline, he/she will receive a grade of W on the permanent record.

Course registration may not be changed from credit to audit after the first five days of classes.

After the change of registration deadline, a student withdrawing from a course or from the University will receive a grade of F unless it can be demonstrated that the student has withdrawn during the first 5 instructional days after the last day of classes. Students who withdraw after the first five days of classes and before the deadline, a student must receive a grade of W on the permanent record.

To change registration in any way after the deadline, a student must present the request, together with documentary evidence of extenuating circumstances, to the Office of Graduate Admissions and Records. In addition, the student must complete a change of registration form and questionnaire signed by the instructor(s) and advisor as evidence of their knowledge of the request. If the request is approved, the Office of Graduate Admissions and Records will notify the Office of Admissions and Records to enter the change on the student's permanent record.

**Grading System**
An average of B (3.0) on course work taken at UTK is required to receive a graduate degree from the University. Grades in The Graduate School have the following meanings:

- A (4 quality points per quarter hour), better than satisfactory performance.
- B+ (3.5 quality points per quarter hour), better than satisfactory performance.
- B (3 quality points per quarter hour), satisfactory performance.
- C+ (2.5 quality points per quarter hour), less than satisfactory performance.
- C (2 quality points per quarter hour), performance well below the standard expected of graduate students.
- D (1 quality point per quarter hour), completion of the course with minimum passing performance and cannot be used to satisfy degree requirements.
- F (no quality points), extremely unsatisfactory performance and cannot be used to satisfy degree requirements.
- I (no quality points), a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is not given to enable a student to do additional work to raise a deficient grade. All incompletes must be removed within two quarters, excluding the summer quarter. If a supplementary grade report has not been received in the Office of Graduate Admissions and Records at the end of the second quarter, the I will be changed to an F. The course will not be counted in the cumulative grade average until a final grade is assigned. No student may graduate with an I on the record.

- S/NC (carries credit hours, but no quality points), S is equivalent to a grade of B or better, and NC means no credit earned. Courses where NC is received may not be repeated for credit.
- P/NP (carries credit hours, but no quality points), P indicates progress toward completion of a thesis or dissertation.
- NP indicates no progress or inadequate progress.
- W (carries no credit hours or quality points), indicates that the student withdrew from the course.

No graduate student may repeat a course for the purpose of raising a grade already received, with the exception of NC. A graduate student may not do additional work to raise a final grade.

**Proficiency Examinations**
A proficiency examination may be given in academic courses offered for graduate credit. Applications for proficiency examinations are available in the Office of the Registrar, 209 Student Services Building. To be eligible, a student must be admitted to The Graduate School. The request for
examination must be approved by the head of the department offering the course. A student requesting for this approval must present evidence to the department head that they have the knowledge and abilities expected of graduate students who have taken the same course. Upon passing such an examination, the student will receive graduate credit. A maximum of one-fourth of the total credit hours in a Master's degree program may be earned by this method, subject to the approval of the student's graduate committee. A fee of $22 per credit hour must be paid before each examination. Proficiency examinations may not be used to raise the grade or change the credit in a course previously completed, nor may such an examination be repeated. Proficiency examinations taken at other institutions are not transferrable.

English Proficiency

Any student whose native language is not English must present a TOEFL score of at least 255 unless he/she has received a Bachelor's or Master's degree from an accredited institution in the United States. Some departments require a higher minimum TOEFL score. The student must also pass an English proficiency examination given by the University prior to initial registration. Students whose performance on the examination indicates a need for additional English study must enroll immediately for English 1221—Written and Oral English for Foreign Students (or another course assigned by the English Department) for undergraduate credit and pass with a grade of C or better. A student may not take more than 6 additional hours of course work while enrolled in English 1221. Those students whose scores indicate that they are not prepared to enter English 1221 will be referred to a program of intensive English study prior to taking the course.

Law Courses

A graduate student may take up to 6 semester hours of law courses and apply them toward a graduate degree, upon approval of the College of Law and the student’s major professor. The graduate student must register for law courses during the registration period at the College of Law and request an S/NC grade. If the student earns a 2.0 or better, an S will be recorded on the transcript. Below 2.0, an NC will be recorded and the course cannot be used toward meeting degree requirements. Grades for law courses will not affect the cumulative grade-point average as law courses do not carry graduate credit.

Grades for law courses will not be reflected in the cumulative grade-point average as law courses do not carry graduate credit. Different rules apply to students enrolled in the Dual JD-Ph.D. Program. Grades must be earned according to the grading system of the respective colleges, e.g., numerical grades for law courses, letter grades for graduate courses. Only one cumulative GPA (law or graduate) will be carried on the student’s transcript until graduation, at which time both the graduate and law cumulative grades will be added to the permanent record. A student enrolled in the Ph.D. in Business Administration program may use 8 semester hours or more of law courses for the supporting area under the arrangement described on p. 41.

Auditors and Audited Courses

Persons who wish to attend certain classes regularly, without taking examinations or receiving grades or credit, may do so by completing a graduate application, paying the application fee, registering as an auditor, and paying regular fees. Graduate students paying regular fees also are entitled to audit courses.

The names of all auditors properly registered will appear on the intermediate class rolls, but will be removed from the final grade report. No record of audited coursework will appear on the permanent record.

Correspondence Study

No graduate credit is accepted at UTK for work done by correspondence study at any university.

Transfer Credits

Official transcripts must be sent directly to the Office of Graduate Admissions and Records from all institutions previously attended before any transfer of credit will be considered.

To be transferred into a graduate program at UTK, a course must:
1. be taken for graduate credit;
2. carry a grade of B or better;
3. be a part of a graduate program in which the student had a B average;
4. not have been used for a previous degree; and
5. be approved by the student's graduate committee and The Graduate School on the Admission to Candidacy form.

Courses transferred to any graduate program will not affect the minimum residence requirements for the program, nor will they be counted in determining the student's grade point average. Credits transferred cannot be used to meet the 5000- or 6000-level course work requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for courses taken at an unaccredited and/or foreign institution.

Master's degree: A maximum of 9 quarter hours (or 6 semester hours) taken from institutions other than the University of Tennessee system may be transferred to a student's Master's program. In addition, the student may transfer courses taken at other campuses of The University of Tennessee. The total transfer work accepted may not exceed one-half of the student's full program of course work. Transferred courses must have been completed within the six-year period prior to receipt of the degree. They will be placed on the student's UTK transcript only after admission to candidacy.

Ed.S. degree: A maximum of 9 quarter hours of course work beyond the Master's degree may be transferred to an Ed.S. program. Transferred courses in the last 45 hours taken for the degree must have been completed within the six-year period prior to the receipt of the degree. They will be placed on the student's UTK transcript only after admission to candidacy.

Doctoral degree: The number of hours the student may transfer to a doctoral program will be determined by the student's doctoral committee. Although the courses transferred may be used as part of the requirements toward the degree, they will not be placed on the student's UTK transcript.

Change of Program

Any student who wishes to change a major program of study must complete a Request for Change of Graduate Program form which can be obtained from the Office of Graduate Admissions and Records. The form requires the signature of the head of the department in which admission was previously granted. No signature is needed if a student requests to change from non-degree or provisional status to a degree to another within the same department. Acceptance into a new degree program is contingent upon a review and approval by that department. If the student is not accepted into the degree program, he/she remains in the former department/program. The results of each request for program change are communicated to the student by mail.

Residence Requirements

Residence is defined as full-time registration for a given quarter on the campus where the program is located. The summer quarter is included in this period.

Master's degree: no general Graduate School residence requirement.

Ed.S. degree: one-quarter of residence if the student has a Master's degree; two consecutive quarters of residence if the student lacks a Master's degree.

Doctoral degree: minimum of three consecutive quarters of residence. Individual doctoral programs may have additional residence requirements.

Theses and Dissertations

All theses and dissertations are submitted to The Graduate School Thesis Consultant for examination. The Thesis Consultant will review the materials and assure that they are mechanically accurate and attractively presented, free of technical errors in format, suitable for binding, and reflect credit upon the University and The Graduate School. If the thesis or dissertation is not accepted, the student must make corrections and resubmit the materials.

The student and major professor together share responsibility for the accuracy and professionalism of the final product of the student’s research. The student should confer with the Thesis Consultant regarding problems and questions in advance of preparing the final copy. The UT Guide to Preparation of Theses and Dissertations provides the correct format for theses or dissertations. Thesis Workshops are held periodically throughout the academic year. The date for each Workshop will be announced in the Graduate School News. The thesis should be written in English.

Under exceptional circumstances, however,
another language may be used if prior approval is obtained from The Graduate School. A request to write in a language other than English must be submitted to The Graduate School by the student's thesis committee, with the endorsement of the Department Head and the Dean of the College, prior to Admission to Candidacy for the degree sought. The request should include a proposal and justification for the exception. In all cases, one thesis abstract must be written in English.

Academic Termination

Graduate education requires continuous evaluation of the student. This evaluation includes not only periodic objective evaluations such as the cumulative grade point average, performance on comprehensive examinations, and acceptance of the thesis or dissertation, but also subjective appraisal by the faculty of the student's progress and potential. Continuation in a program is determined by consideration of all these points by the faculty and the department head.

Departments and programs may have regulations for continuation or graduation in addition to the minimum requirements set forth in this Catalog. It is the student's responsibility to be familiar with the special requirements of their department or program.

Appeals Procedure

The student handbook, Hill Topics, published and distributed annually, contains statements of UTK standards of conduct and of all disciplinary regulations and procedures. Normally grievances should be handled at the departmental level through the student's advisor or the department or program head. Further appeal may be made to the Dean of The Graduate School, the Graduate Council, and the Chancellor. The By-Laws of the University (Article V, section 7) provide that any individual may ultimately appeal to the Board of Trustees through the President. A copy of the Appeals Procedure is available in the Office of Graduate Admissions and Records.

Requirements for Advanced Degrees

Master's Degrees

Master's degree programs are available with thesis and non-thesis options. These programs require 45 or more graduate hours of course work. In addition to the M.A. and M.S. degrees, a number of other degrees are offered, including the MBA, and the M.S.S.W. A complete list is found under "Majors and Degree Programs," on pages 8-9. For specific degree requirements, consult individual program descriptions listed by college and department in this Catalog. See also the chart, page 24, for a summary of procedures for the degrees.

Course Requirements: A candidate for a Master's degree must complete a minimum of 45 hours of graduate credit in courses approved by the student's Master's committee. In thesis programs, a minimum of 9 quarter hours of credit in the major must be taken at UTK in courses numbered 5000 while the student is preparing the thesis. Hours applied to the Master's degree may be entirely from one major subject or may be distributed to include courses in minor areas. In a 45-hour program the major subject must include at least 18 hours of graduate course work, exclusive of course 5000, and a minor must include not fewer than 9 nor more than 18 hours of graduate credit.

At least two-thirds of the minimally required hours in a Master's degree program must be taken while the student is registered for other courses. Only 9 thesis credit hours can be counted toward this requirement.

Master's Committee: A committee composed of the major professor and at least two faculty members at the rank of assistant professor or above should be formed as early as possible in a student's program, and must be formed by the time a student applies for admission to candidacy (refer to Advisor/Major Professor, page 19). The responsibility of this committee is to assist the student in planning a course of study and research, and to assure fulfillment of the degree requirements. If the student has a minor, one member of the committee must be from the minor department.

Admission to Candidacy: Application for admission to candidacy for the Master's degree is made as soon as possible after the student has completed any required pre-requisite courses and 15 hours of graduate course work with a 3.0 average or higher. For admission to candidacy, the student must submit the Admission to Candidacy form, with appropriate signatures, to the Office of Graduate Admissions and Records no later than commencement day of the quarter preceding the quarter in which he/she plans to graduate.

Thesis Registration: A student must be registered for course 5000 each quarter during work on the thesis, including a minimum of 3 hours the quarter in which the thesis is accepted by The Graduate School. At least 9 hours are required for the thesis option. After receiving the Master's degree, a student is no longer permitted to register for Thesis 5000.

Final Examination for Thesis Students: A candidate presenting a thesis must pass a final oral (or oral and written) examination on all work offered for the degree. The examination, which is concerned with course work and the thesis, measures the candidate's ability to integrate material in the major and related fields, including the work presented in the thesis. This examination, scheduled through the Office of Graduate Admissions and Records, must be held at least three weeks before the final date for approval and acceptance of thesis by The Graduate School. Final examinations not properly scheduled must be repeated. The final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. In case of failure, the candidate may not apply for reexamination until the following quarter. The result of the second examination is final.

Thesis: The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the UTK Guide to the Preparation of Theses and Dissertations. Two copies of the thesis must be approved and accepted by The Graduate School on or before the deadline specified for each quarter minor areas. A thesis committee must include an approval sheet, signed by the members of the Master's committee, certifying that they have examined the final copy of the thesis and judged it to be satisfactory.

Non-Thesis Registration: All non-thesis students using University facilities or faculty time must be registered for course 5002 if not registered for other courses. This applies to students removing incompletes from their records.

Final Examination for Non-Thesis Students: With the exception of students pursuing the MBA, each non-thesis student must pass a final written examination. A department may require an additional oral examination. The examination is not merely a test over course work, but a measure of the student's ability to integrate material in the major and related fields. It must be scheduled through the Office of Graduate Admissions and Records in accordance with the deadlines specified in the Graduate School News and will be conducted by the Master's committee. Final examinations not properly scheduled must be repeated. Students taking the final examination but not otherwise using University facilities may pay a fee of $115 instead of registering. Students finishing incomplete courses, however, must register for a minimum of 3 quarter hours. In case of failure, the candidate may not apply for reexamination until the following quarter. The result of the second examination is final.

Time Limit: Candidates have six calendar years from the time of enrollment in The Graduate School to complete the degree. Students who change degree programs during this six-year period may be granted an extension after review and approval by The Graduate School. In any event, courses used toward a Master's degree must have been taken within six calendar years of graduation.

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered with majors in Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology and Guidance, Safety Education and Service, and Vocational-Technical Education. Admission to the Ed.S. program requires acceptance by The Graduate School, and review and acceptance by the department or area in which the student is majoring. It is recommended that students who apply for the Ed.S. have at least one year of related work experience. Additional information on admission requirements can be obtained from the departments offering the degree. Also see the chart, page 24, for a summary of procedures for this degree. All deadlines are published quarterly in the Graduate School News.
Ed.S. Committee: A committee of at least three faculty members is assigned to each student. A minimum of two members of this committee must represent the department or area of specialization. Its responsibilities include formulating the student's program of course work, supervising progress, recommending admission to candidacy, directing research, and scheduling the qualifying and final examinations.

Course Requirements: The student's program involves a minimum of six quarters of study totaling not fewer than 90 quarter hours of graduate credit beyond the baccalaureate degree. A minimum of 9 hours is required outside the major department or area.

A student admitted to the program with a Master's degree, or with acceptable work beyond the Master's degree, may have program requirements modified upon recommendation of the student's committee. However, no modifications will be permitted in the field of individual departments for course work required outside the major department or area.

Doctoral Degrees

Three doctoral degree programs are available: Doctor of Philosophy (Ph.D.), Doctor of Education (Ed.D.), and Doctor of Business Administration (DBA). Programs are listed under "Majors and Degree Programs," pages 8-9. For specific degree requirements, consult individual program descriptions listed by college and department in this Catalog. See also the chart, page 25, for a summary of procedures for doctoral degree programs.

Doctoral Programs: A major field or area of specialization and, frequently, one or more collateral fields. The latter are defined as a minimum of 9 quarter hours of graduate course work in a given area outside the student's major field.

Course Requirements: Each doctoral student must take an appropriate number of 6000-level courses, usually a minimum of 9 quarter hours, at UTK. Normally a doctoral program includes a minimum of 36 hours of graduate course work beyond the Master's degree, graded A-F, plus the minimum 36 hours of dissertation work in course 6000. Additional work taken for S/NC grading may comprise up to one-fourth of the student's total graduate hours.

Doctoral Committee: The student and the major professor identify a doctoral committee comprised of at least four faculty members, holding the rank of Assistant Professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from a department other than that of the student's major field. This committee is nominated by the department head or college dean, and approved by the Graduate School.

The committee should be formed during the student's first year of doctoral study. Subject to Graduate Council policies and individual program requirements, the committee must approve all course work applied toward the degree, certify the student's mastery of the major field and any collateral fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

Continuous Registration: The student must register continuously for course 6000 (minimum of 3 hours) from the time the doctoral research proposal is approved, admission to candidacy is accepted, or registration for course 6000 is begun, whichever comes first, including summer quarters and the quarter in which the dissertation is approved and accepted by The Graduate School. A minimum total of 36 hours of course 6000 is required before the dissertation will be accepted. A student who will not be using faculty services and/or university facilities for a term must request leaves of absence from dissertation research up to a maximum of eight quarters. The request will be considered by The Graduate School upon recommendation of the department head.

Doctoral Examinations: Departments may, at their option, administer diagnostic and/or qualifying examinations in the early stages of the student's doctoral program. Successful completion of these examinations is usually required prior to admission to candidacy.

Diagnostic and Qualifying Examinations: These examinations may be written and/or oral, may be given to students on admission to the doctoral program to help determine the student's level of preparation, areas of strength and weakness, and background. Since courses bearing the same title may vary in content from institution to institution, the diagnostic or placement examinations are designed to aid in the selection of courses and to determine the student's preparation to continue doctoral studies at UTK.

1. Diagnostic examinations, which may be written and/or oral, may be given to students near the end of their first year in the doctoral program. Diagnostic examinations are designed to test the student's progress, general knowledge of fundamentals of the field, and fitness to continue with the more specialized aspects of the doctoral program. The comprehensive examination (or the final part of this examination, when parts are given at different times) is normally taken when the student has completed or nearly completed all prescribed courses. Thus, its successful completion indicates that, in the judgment of the faculty, the doctoral student can think analytically and creatively, has a comprehensive understanding of the field and the specialty, knows how to use academic resources, and is deemed capable of completing the dissertation. The comprehensive examination must be passed prior to admission to candidacy.

The faculty of the graduate program and/or the student's doctoral committee will determine the content, nature and timing of the comprehensive examination and certify its successful completion. The department or committee may at its discretion subdivide the examination, administering portions of the examination at several times during the student's course of study. A written examination is required and an oral examination is encouraged. Students should review carefully the written statement from each doctoral degree program which details the timing, areas covered, grading procedures, and provisions for repeating a failed examination.

A final examination (oral, or oral and written) on the student's dissertation, major field, and such additional information and research as the student's doctoral committee may specify, will be administered by all members of the doctoral
committee after completion of the dissertation and all course requirements. This examination must be passed at least three weeks before the date of acceptance and approval of the dissertation by The Graduate School. The examination must be scheduled through the Graduate Office. Final examinations not properly scheduled must be repeated. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination is announced publicly and is open to all faculty members.

**Summary of Procedures for Master’s and Specialists in Education Degrees**

<table>
<thead>
<tr>
<th>PROCEDURES</th>
<th>UNDER DIRECTION OF</th>
<th>DATE</th>
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<tbody>
<tr>
<td>Admission as a potential degree candidate</td>
<td>Office of Graduate Admissions and Records and Major Department</td>
<td>Prior to completing 18 hours of graduate courses</td>
</tr>
<tr>
<td>Formation of Master's/Ed.S. committee</td>
<td>Advisor/Major professor</td>
<td>Prior to application for admission to candidacy</td>
</tr>
<tr>
<td>Submission of application for admission to candidacy</td>
<td>Master's/Ed.S. committee</td>
<td>At least one quarter prior to graduation*</td>
</tr>
<tr>
<td>Approval of admission to candidacy</td>
<td>The Graduate School</td>
<td>Prior to graduation</td>
</tr>
</tbody>
</table>

**GRADUATION REQUIREMENTS FOR NON-THESIS OPTION**

<table>
<thead>
<tr>
<th>PROCEDURES</th>
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<tbody>
<tr>
<td>Placement of name on graduation list</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Deadline available at registration</td>
</tr>
<tr>
<td>Scheduling of final examination</td>
<td>Not later than one week prior to final examination*</td>
</tr>
<tr>
<td>Final examination(s)</td>
<td>Not later than three weeks prior to Commencement*</td>
</tr>
<tr>
<td>Removal of incomplete(s)</td>
<td>Not later than one week prior to Commencement*</td>
</tr>
</tbody>
</table>

**GRADUATION REQUIREMENTS FOR THESIS/PROBLEMS OPTIONS**

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<th>PROCEDURES</th>
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<tbody>
<tr>
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<tr>
<td>Application for diploma</td>
<td>Deadline available at registration*</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Deadline available at registration</td>
</tr>
<tr>
<td>Submission of thesis/problems to Master’s/Ed.S. committee</td>
<td>At least two weeks prior to final oral examination</td>
</tr>
<tr>
<td>Scheduling of final oral examination</td>
<td>Not later than one week prior to final oral examination*</td>
</tr>
<tr>
<td>Final examination(s)</td>
<td>Not later than three weeks prior to thesis deadline*</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of thesis and thesis card</td>
<td>After final examination and not later than two weeks prior to Commencement*</td>
</tr>
<tr>
<td>Removal of incomplete(s)</td>
<td>Not later than one week prior to Commencement*</td>
</tr>
</tbody>
</table>

*Deadlines are printed in the Graduate School News quarterly.*
Admission to candidacy must be applied for and approved at least two full quarters prior to the date the degree is to be conferred. Each student is responsible for filing the admission to candidacy form, which must be signed by the doctoral committee and approved by The Graduate School. **Dissertation:** The dissertation represents the culmination of an original major research project completed by the student. The organization, method of presentation, and subject matter of the dissertation are important in conveying to others the results of such research.

A student should be registered for the number of dissertation hours representing the fraction of effort devoted to this phase of the candidate’s program. Thus, a student working full time on the dissertation should register for 12 hours of 6000 per quarter. Two copies of the dissertation (prepared according to the regulations in the UTK Guide to the Preparation of Theses and Dissertations) must be submitted to and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate scholarly excellence. Doctoral forms and a thesis card are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

**Time Limit:** Comprehensive examinations must be taken within five years, and all requirements must be completed within eight years, from the time of a student’s first enrollment in a doctoral degree program.

### Summary of Procedures for Doctoral Degrees

<table>
<thead>
<tr>
<th>PROCEDURES</th>
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<tbody>
<tr>
<td>Admission as a potential degree candidate</td>
<td>Office of Graduate Admissions and Records and</td>
<td>Prior to completing 18 hours of graduate courses</td>
</tr>
<tr>
<td>*Appointment of doctoral committee</td>
<td>Major Department</td>
<td>preferably during the first year of graduate study but, at the latest, prior to admission to candidacy</td>
</tr>
<tr>
<td>*Comprehensive examination</td>
<td>Major department</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td><em>Foreign language examination(s)</em>*</td>
<td>Office of Graduate Admissions and Records</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td>Submission and approval of application for admission to candidacy</td>
<td>Doctoral committee and The Graduate School</td>
<td>At least two full quarters prior to graduation***</td>
</tr>
<tr>
<td><strong>GRADUATION REQUIREMENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration materials</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Office of Graduate Admissions and Records</td>
<td>Deadline available at registration***</td>
</tr>
<tr>
<td>Payment of graduation fee</td>
<td>Bursar’s Office</td>
<td>Deadline available at registration***</td>
</tr>
<tr>
<td>Submission of dissertation to doctoral committee</td>
<td>Student</td>
<td>At least two weeks prior to final oral examination</td>
</tr>
<tr>
<td>Scheduling of final examination</td>
<td>Student and Office of Graduate Admissions and Records</td>
<td>Not later than one week prior to final oral examination***</td>
</tr>
<tr>
<td>Final oral examination(s)</td>
<td>Doctoral committee</td>
<td>Not later than three weeks prior to dissertation deadline***</td>
</tr>
<tr>
<td>Approval and acceptance of final copy of dissertation, doctoral forms, and thesis card</td>
<td>Doctoral committee and The Graduate School</td>
<td>After final oral examination and not later than two weeks prior to Commencement***</td>
</tr>
<tr>
<td>Removal of incomplete(s)</td>
<td>Instructor of course</td>
<td>Not later than one week prior to Commencement***</td>
</tr>
</tbody>
</table>

*The order of these items varies with individual programs.

**Not required in some programs.

***Deadlines are printed in the Graduate School News quarterly.
Institute of Agriculture

W. W. Armistead, Vice President
Bobby H. Pentecost, Assistant Vice President

Professor: J. E. Foss, (Head) Ph.D., Minnesota.

Assistant Professor: B. G. Hicks, Associate Dean

The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee’s Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled to offer instruction in agriculture and the mechanic arts for the first time. Since 1869, agricultural programs at the University have been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to rural people. Thus the Institute of Agriculture has come to include the work of three main divisions: Agricultural Experiment Station, Agricultural Extension Service, and College of Agriculture.

In 1974 the College of Veterinary Medicine was established within the Institute. The college is developing research and graduate programs in veterinary medical sciences in addition to the professional curriculum leading to the degree, Doctor of Veterinary Medicine.

Agricultural Experiment Station

D. M. Gossett, Dean
T. J. Whatley, Associate Dean
J. I. Sewell, Assistant Dean

Professors: B. N. Duck, Ph.D., Auburn; C. R. Graves, M.S., Tennessee; C. A. Mullins, Ph.D., Tennessee.

Associate Professors: B. R. Hathcock, Ph.D., Texas A&M; R. M. Hayes, Ph.D., Illinois; P. E. Hoskinson, M.S., Tennessee; D. D. Howard, Ph.D., Auburn; R. D. Miller, Ph.D., Kentucky; D. D. Tyler, Ph.D., Kentucky; J. E. Wyatt, Ph.D., Florida.

The Agricultural Experiment Station was established by the University’s Board of Trustees on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The University was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning the Station has given first attention to investigations of concern to the agriculture of Tennessee. The investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, processing, and distributing farm and forest products; to the social and economic aspects of rural living; and to consumer health and nutrition. Both farm and urban populations gain from the accomplishments of the Agricultural Experiment Station. Examples of some of these accomplishments are new and improved varieties of crops, new and better methods of controlling crop and livestock pests, more efficient production of crops and pasture through improved fertilization and mechanization, and more efficient feeding and management of livestock.

The program is designed and administered through sixteen subject matter departments located at Knoxville. A number of the staff have teaching responsibilities in addition to their research. To assist in the research program the Station supports a large number of graduate students. To serve Tennessee’s diverse agriculture, branch stations are operated at Jackson, Milan, Grand Junction, Spring Hill, Springfield, Lewisburg, Crossville, Greeneville, Martin and a forestry branch station at Oak Ridge. Professional and technical staff are in residence at these locations.

Agricultural Extension Service

M. L. Downen, Dean
T. W. Hinton, Associate Dean
M. F. Clarke, Associate Dean
B. G. Hicks, Associate Dean

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational means agricultural and home economics information to farm families and others in the state who do not have the opportunity to enroll in resident courses of instruction at colleges.

The educational program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agricultural and natural resources, community resource development, home economics, and education of young people through 4-H Clubs. County Extension staff members working directly with local people are supported in the various information fields by a specialist staff, members of which are stationed either in Knoxville, Nashville, or Jackson.

The Agricultural Extension Service operates administratively as one of four units of the Institute of Agriculture. For administration the state is divided into five districts with supervisors located in their respective districts. District headquarters are maintained in Knoxville, Chattanooga, Cookeville, Nashville, and Jackson.

The Agricultural Extension Service operates as a three-way partnership among county, state, and federal governments. The University of Tennessee represents state and federal government and a County Agricultural Extension Committee represents county government in this partnership.

College of Agriculture

O. Glen Hall, Dean
Gary Schneider, Assistant Dean

Graduate programs of the college of Agriculture are designed to prepare men and women for positions of leadership in industry, state and federal government, teaching, research, and extension.

The graduate student is expected to demonstrate a thorough knowledge of the subject matter in his/her specialized field of study and its relationship to the sociological,
economic, and environmental impact on society. The student must demonstrate the ability to plan, conduct, analyze, and report original research. More importantly, emph-
sis is given to intellectual growth and to the development of scholarly habits of study, reasoning and analysis to the end that the graduate will continue to grow and develop professionally throughout his/her career.

M A S T E R O F S C I E N C E P R O G R A M S

Programs of graduate study leading to the Master of Science degree are offered through all departments in the College of Agriculture. The general rules of The Graduate School apply to all graduate work in the college. The graduate program may be entirely in one major subject or may include subject matter areas related to the major. Both majors and minors are available in Agricultural Economics, Agricultural Engineering, Agricultural Extension, Agricultural Mechanization, Animal Science, Entomology and Plant Pathology, Food Technology and Science, Ornamental Horticulture and Landscape Design, and Plant and Soil Science. Majors only are available in Forestry and Wildlife and Fisheries Science, and minors are available in General Agriculture and Rural Sociology. The minor in General Agriculture requires 18 hours of course work. A complete listing of majors is shown on pages 6-7.

D O C T O R A L P R O G R A M S

Graduate study programs leading to the Doctor of Philosophy degree in Agricultural Science, Agricultural Economics, Agricultural Engineering, Food Technology and Science, and Plant and Soil Science are offered in the college.

D e p a r t m e n t s o f I n s t r u c t i o n

Agricultural Economics and Rural Sociology

MAJOR: Agricultural Economics

DEGREES

Agricultural Economics

M.S., Ph.D.

Professors:

J. A. Martin (Head), Ph.D. Minnesota; M. B. Badenhop, Ph.D. Purdue; J. R. Brooker, Ph.D. Florida; C. L. Cleland, Ph.D. Wisconsin; L. Dubov, Ph.D. California (Berkeley); L. H. Keller, Ph.D. Kentucky; T. H. Klindt, Ph.D. Kentucky; F. O. Leuthold, Ph.D. Wisconsin; D. L. McMahon, Ph.D. Clemson; E. R. McManus, Ph.D. Purdue; S. D. Mundy, Ph.D. Tennessee; C. B. Sappington, Ph.D. Illinois.

Associate Professors:

C. M. Cusakken, Ph.D. Michigan State; R. H. Orr, Ph.D. Illinois; W. M. Park, Ph.D. Virginia Polytechnic Institute; R. W. Todd; J. D. Tennessee.

Assistant Professor:

D. M. Markley, Ph.D. Virginia Polytechnic Institute.

The Department of Agricultural Economics and Rural Sociology offers programs of graduate study leading to the Ph.D. and M.S. The doctoral program includes concentrations in agricultural marketing and price analysis, agricultural policy, farm management and production economics, natural resource economics, and rural development. The M.S. program may be completed under a thesis or non-thesis option and may include a concentration in Rural Sociology for the M.S. program with a major in Agricultural Economics. For more information, contact the Department Head.

T H E M A S T E R ' S P R O G R A M

Thesis Option: A minimum of 45 hours of graduate coursework is required. In the agricultural economics emphasis, 18 hours of agricultural economics, 9 hours of economic theory and 6 hours of quantitative methods are required. In the rural sociology emphasis, 6 hours of sociological theory and 3 hours of statistics are required. Each student must successfully complete a final oral examination.

Non-Thesis Option: A minimum of 48 hours of graduate coursework is required. Minimum coursework in theory, quantitative methods and statistics are the same as for the thesis option. Each student must successfully complete both written and oral comprehensive exams.

T H E D O C T O R A L P R O G R A M

A minimum of 108 hours of graduate coursework and 21 hours of dissertation research, but excluding any master's research credit, is required. A minimum of 15 hours of economic theory, 9 hours of quantitative methods and 21 hours in agricultural economics are required. Comprehensive exams consist of four written exams and one oral exam. The written exams are in general agricultural economics, economic theory, quantitative methods and the area of concentration. Provisions exist for waiving the economic theory exam with a sufficient academic record in specific economic theory courses.

Agricultural Economics

4120 Farm Management (3) Principles of farm organization and operation; nature of managerial processes; economic aspects of crop, livestock, labor and machinery planning; use of budgeting techniques for planning; field trips arranged. Prereq: Agriculture 1110 and Economics 2120. 2 hrs and 1 lab. F, W

4140 Agricultural Production Economics I (3) Application of microeconomic theory to problems of resource allocation, product selection, scale of operation of agricultural firms; economic interpretation of technical, agricultural production functions. Prereq: Agriculture 1110 and Economics 2120. W

4240 World Agriculture and Trade (3) Economic bases of world agricultural production and trade: resource location, land tenure systems, international trade and commercial policy. Prereq: Agriculture 1110 and Economics 2120, or consent of instructor. F

4250 Agricultural and Rural Planning (3) Decision-making concepts applied to design and implementation of local action programs. Case examples from the U.S. and other countries. Prereq: Agriculture 1110 and Economics 2120, or consent of instructor. Su

4310 Agricultural Finance (3) Nature and source of capital; credit problems of farmers; kinds and sources of farm credit; agricultural financial policy and taxation. Prereq: Agriculture 1110 and Economics 2120. W

4320 Agricultural Policy (3) Meaning of agricultural policy in democratic society; relationship of farm groups to public policy; problems giving rise to policy; agricultural policy and appraisal of results; policy problems. Prereq: Agriculture 1110 and Economics 2120.

4330 Land Economics (3) Problems and policies of land use, conservation, development, taxation, and tenure; population growth; land use and resources; ranching principles and theories of rent, property, value, and income. Prereq: Agriculture 1110 and Economics 2120. Sp

4610 Management of Farm Supply and Marketing

Firms (3) Operation of firms selling farm supplies and merchandising agricultural products. Emphasis on accounting data and economic theories for decision making. Prereq: Agriculture 1110 and Economics 2120. F

4630 Advanced Agricultural Marketing (3) Economies of market location; imperfect market model; spatial equilibrium analysis; production and market location and transfer costs; processing and storage costs; maximizing returns, institutions and market flows; measuring efficiency. Prereq: 3120 or 3220 or consent of instructor. W

5000 Thesis (1-15) P/NP. E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated S/N/C only. E

5130 Agricultural Production Economics II (3) Theoretical and empirical concepts of agricultural allocation problems under various knowledge situations with emphasis on uncertainty. Aggregate external effects of decisions made by individual agriculture firms. Decision theory with application to agriculture. Prereq: 4140 or equivalent. W

5210 Seminar: Agricultural Policy (3) Sp

5220 Research Methodology (3) Nature of scientific method, logic, philosophy, assumptions, potential and limitations of science; methodological problems of social sciences, establishment of research priorities. Prereq: Consent of Instructor. W

5310 Research (3) Special research problems in agricultural economics and rural sociology. Gathering, tabulating and interpreting data and report writing. May be repeated. Maximum 9 hrs. S/N/C only. E

5410 Agricultural Marketing Analysis (3) Analysis of structure, conduct, and performance of agricultural marketing system; application of price theory concepts to real-world industries; methods used to examine industry conduct and performance. Prereq: Economics 3110 or consent of instructor.

5420 Advanced Land and Natural Resource Economics (3) Economic efficiency in natural resource allocation; issues in project and policy evaluation. Prereq: 4330 and Economics 5110, or consent of instructor. F

5440 Economics of Agricultural Development (3) Role of agriculture in overall economic development; impacts of world food situation on people, environment, development; natural and human resources for food production; technology and change; national and international food policy. Prereq: 4240 or consent of instructor. W

5610 Quantitative Methods in Agricultural Economics (3) Analytical techniques of functions—supply, demand and production—and prediction of economic variables. Emphasis on application of multiple regression: model specification, estimation technique using computer and interpretation of results. Prereq: Statistics 4310 or Economics 5510 or consent of instructor. W

5710 Linear Programming (3) Techniques with empirical applications to problems of firm and region; maximizing firm profit, minimizing firm costs, transportation, risk, allocation of resource space and time. Prereq: Consent of instructor. W

5820 Agricultural Price Analysis (3) Application of various research methods to analysis of price structures; specification and estimation of price determination models and interpretation of results. Prereq: 3210 and 5610 or Statistics 4310 or consent of instructor. W

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6120 Seminar in Agricultural Economics (3) Topics selected from the areas of economics of production, consumption or distribution in agriculture and related industries, and public policies concerned with agriculture and related industries. A
6210 Agricultural and Rural Transformation Problems (3) Systematic evaluation of policy and development proposals related to agricultural modernization, food supply, and rural living. Decision-making process and useful roles of social scientists. Analysis of current issues in U.S. and developing nations. Prereq: Consent of instructor. Sp

6410 Agricultural Supply Analysis (3) Estimating agricultural supply relationships using aggregative time series regression, probability functions, and linear programming. Simulation and firm growth models with emphasis on correspondence between theoretical concepts and model attributes. Prereq: 5130 or consent of instructor. A

6420 Marketing and Resource Use (3) Institutional settings for research and policy formulation; analytical tools to measure efficiencies of marketing and resource use; emerging problems in marketing and resource use. Prereq: 5410 or consent of instructor. A

6430 Consumer Demand and Food Consumption (3) Interrelationships among consumer purchase decisions are analyzed. Complete demand system models are examined in terms of the constraints which must hold in order to maximize utility. Emphasis is given to food purchase decisions. Prereq: 5111-12 or consent of instructor. A

3420 Rural Sociology (3) Nature of rural society; social systems concepts; rural-urban differences; nature of social relations; population characteristics and movements; tenure, family, farm labor, health, services, educational facilities, churches, local government; impact of industrialization. F, W

4450 Diffusion of Agricultural Technology (3) Analysis of diffusion among groups whereby new technology spreads from scientists to final adopters. Adoption process, communication behavior, mass media, role of professional change agents, opinion leadership, and two-step flow hypothesis. Prereq: 3420 or consent of instructor.

5340 Special Problems (3) Special topics in rural sociology. Prereq: 3420 or consent of instructor. May be repeated. Maximum 9 hrs. S/NCo only. E

4530 Seminar in Rural Sociology (3) Current rural sociological literature and research; relevance of general sociological theory and methodological techniques. Prereq: 3420 or equivalent. A

4560 Advanced Rural Sociology (3) Application of sociological concepts to analyze changing structure and function of rural life; rural social values, attitudes, and norms as they influence the family, formal and informal groups, population shifts, and changing farm technology. Prereq: 3420 or equivalent. A

4570 Research Problems in Rural Communities (3) Emphasis on problems that arise in survey research in rural area. Sampling procedures, questionnaire construction, interviewee selection, training, control, and legitimation needs. Prereq: Undergraduate course in statistics.

4590 Rural Population Analysis (3) Analysis of U.S. and world population changes and determinants of fertility, mortality, and migration with emphasis upon changes in rural sector. Prereq: Sociology 4110 or equivalent. A

Assistant Professor:
D. O. Baxter, M.S. Missouri.
Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with a major in Agricultural Engineering are available to graduates of a recognized curriculum in engineering, mathematics, or one of the physical or biological sciences. A graduate program leading to the Master of Science degree in Agricultural Mechanization is available to graduates in a recognized curriculum in agriculture or other related fields. Each applicant will be advised about any prerequisite deficiencies before entering a program. The student's program of study must be approved by his/her advisory committee and must comply with the requirements of The Graduate School.

A departmental application and three completed Graduate School rating forms are required in addition to the Graduate School application.

THE MASTER'S PROGRAMS
The Master's programs in Agricultural Engineering and Agricultural Mechanization can be entirely in the major subject or may include subject matter areas related to the major. A minor in another subject area requires 10 additional credits. Both programs require a thesis and the final oral exam covers coursework and the thesis.

THE DOCTORAL PROGRAM
Program concentrations for the doctoral program include agricultural power and machinery, soil and water conservation, agricultural structures and electric power and processing.

A program of each candidate consists of a major and supporting studies in one or more additional areas. The major consists of a minimum of 24 quarter hours exclusive of research and dissertation. A minimum of 24 hours must be taken outside the Department of Agricultural Engineering. Supporting courses are required in biological, physical and engineering sciences and mathematics fundamentals related to the candidate's program.

A comprehensive examination (written and oral) will be given when the student has completed all or nearly all of the prescribed coursework. The comprehensive exam must be passed prior to admission to candidacy.

A final oral examination on the student's dissertation will be given after completion of the dissertation and all course requirements.

Agricultural Engineering

4230 Selected Topics in Agricultural Engineering (3) Develop new topics as required by current trends and problems in agricultural engineering. A

4610 Design of Water Control and Waste Utilization Systems (3) Earth dams, irrigation, drainage, land grading, hydraulic transport of wastes, and application of wastes on agricultural land. Prereq: 3610 or consent of instructor. 1 hr and 2 labs. W

4620 Design of Structures for Production, Processing and Environmental Control (3) Functional planning and structural design of agricultural buildings; emphasis on complete design of structure or system, functional, structural and environmental aspects. Prereq: 3620. 1 hr and 2 labs. Sp

4630 Design of Processing and Materials Handling Systems (3) Principles of development of systems and components for integrated agricultural processing considering mass and energy balances, product characteristics, equipment size, loadings, storage, handling and economic merit. Prereq: 3630. 1 hr and 2 labs. F

4640 Design of Agricultural Machinery (3) Functional development of agricultural machinery. Elements of machine component design; synthesis of mechanisms; mechanical and hydraulic drives. Team effort in designing machinery. Prereq: 3640 or consent of instructor. 1 hr and 2 labs. Sp

5000 Thesis (1-15) P/NP only. E

5240 Environmental Control in Agricultural Structures (3) Engineering analysis of factors related to processes of animal and plant life; basis for development and design of facilities and structures for confined housing of animals, and processing of plant materials. Prereq: Agricultural Mechanization 3220, Mechanical Engineering 3110 or consent of instructor. 2 hrs and 1 lab. Sp, A

5340 Computer Modeling Applications in Agricultural Physical Systems (3) Introduction to principles, techniques, and algorithms in computer modeling and control of agricultural physical systems: water surplus, deficiency and time distribution as related to agricultural and forest purposes. Flow charting and program documentation. Prereq: Competency in advanced computer programming and consent of instructor. 2 hrs and 1 lab. W, A

5440 Instrumentation in Agricultural Systems (3) Analysis of specific instrumentation needs in agricultural, industry and research programs; principles and design in utilization of specialized instrumentation. Prereq: Engineering electronics or consent of instructor. 2 hrs and 1 lab. Sp, A

5540 Engineering Properties of Agricultural Materials and Products (3) Fundamental engineering properties of agricultural products and materials related to handling, processing, and utilization. Prereq: Engineering, materials handling systems and Engineering Science and Mechanics 3511, 2 hrs and 1 lab. SF, A

5640 Research Problems in Agricultural Engineering (3) Theoretical and experimental studies relating to current problems in agricultural engineering. May be repeated. Maximum 9 hrs. E

5710-20 Simultide in Design and Research (3, 3) Dimensional analysis in development of models; theory and types of models; prediction equations; interpretation of data; applications to machinery, soil and water structures, agricultural buildings, and other agricultural engineering-related problems. Prereq: Engineering Science and Mechanics 3110 and 3310, 2 hrs and 1 lab. F, W, A

6000 Doctoral Research and Dissertation (3-15) Pr NP only. E

6110 Seminar (1) Current research and literature related to agricultural engineering. May be repeated. Maximum 3 hrs. E

6310 Engineering Systems Analysis in Agriculture (3) Systems approach to design of engineering experiments and applications to include linear programming, computer applications, statistical evaluations, and feedback control in agricultural problems. Prereq: Mathematics 4550 or 4710. Coreq: 5710 or equivalent. 2 hrs and 1 lab. F

6510 Selected Topics in Agricultural Engineering (3) Lecture, group discussion, and individual study on specialized developments in powers and machinery, soil and water, structures, and processing. May be repeated. Maximum 3 hrs. F

6640 Research Problems in Agricultural Engineering (3) Research and manuscript writing for technical meeting presentation and submission to refereed journals. Manuscript content and presentation of theses is dissertation and other reports. Student first author. E

Agricultural Mechanization

4160 Agricultural Waste Utilization and Disposal (3) Techniques, equipment, and structures for utilizing, treating, and disposing of agricultural wastes by land spreading, lagooning, and processing. 2 hrs and 1 lab. F

4170 Small Engines (3) Concepts and mechanics of small gasoline engines; selection, operation, adjust-
ment, and repair of single cylinder engines. 2 hrs and 1 lab.

4100 Equipment and Techniques for application of Agricultural Chemicals (3) Equipment for application of liquid, solid, and gaseous chemicals; system components; operational characteristics; safety considerations; calibration; selection and management; materials handling and disposal methods. 2 hrs and 1 lab. Sp

4210 Agricultural Machinery and Tractors (4) Agricultural machinery and power units; adaptation to agricultural practices; field efficiencies, capabilities; adjustment and servicing. Prereq: Mathematics 1550. 3 hrs and 1 lab. W

5000 Thesis (1-15) P/NP only. E

5110 Research problems in Agricultural Mechanization (3) Researcher problems related to recent developments and current practices in agricultural mechanization. May be repeated. Maximum 9 hrs. E

5210 Electromechanical Systems in Agriculture (3) Integration of electric power, mechanical equipment, structures, and environmental systems to plant and animal production, crop processing, and materials handling. Prereq: 3220 and 3510. 2 hrs and 1 lab. F, A

5410 Agricultural Machinery Systems Analysis (3) Analysis of current field machinery; adaptation planning for sequential operations; machinery for unique and alternate production and harvesting systems; operational management. Prereq: 4210. 2 hrs and 1 lab. Sp, A

5510 Selected Topics in Agricultural Mechanization (3) Lecture, group discussion, and individual study on specialized agricultural mechanization developments. May be repeated. Maximum 9 hrs. F

Agricultural Extension Education

MAJOR

DEGREE

Agricultural Extension

M.S.

Professors:
Lewis H. Dickson (Acting Head), Ed.D. Cornell; C. E. Carter, Jr., Ph.D. Ohio State.

The Department of Agricultural Extension Education offers the Master of Science degree with a major in Agricultural Extension. For further information, contact the Department Head.

THE MASTER'S PROGRAM

1. A thesis is required for the Master's program. Prior to research for the thesis, the student is required to develop a detailed written research plan. Registration for a minimum of 9 hours of Thesis 5000 is required.

2. In addition to the thesis requirement, a minimum of 36 hours of graduate coursework is required. This work must be approved by the student’s committee and not more than 15 hours of the minimum 45 can be below the 5000 level. The committee may require additional coursework if the student’s progress or background indicates such need. Students may select from a wide variety of offerings in communications, economics, sociology, psychology, statistics and research methodology, supervision and administration as well as technical subject matter fields or agriculture and home economics.

3. An oral examination covering the thesis and coursework is required.

3110 Introduction to Agricultural Extension (3) History; philosophy; organization; teaching methods; relationships with other educational agencies. Graduate credit for non-majors. Sp only.

4110-20 Field Studies (3, 3) Supervised work experience with county extension in a designated county. Prereq: 3110 and consent of instructor. Requires living off-campus for a specified time. Su

5000 Thesis (1-15) P/NP only. E

5110 Special Problems in Agricultural Extension (1-6) May be repeated. Maximum 9 hrs. E

5210 Long-range Extension Program Planning (3) Development of county extension program based on effective interdepartmental communication and economic characteristics of areas. Prereq: 3110 or consent of instructor. F

5220 Seminar (3) Review of literature and developments in agricultural extension methods. Prereq: 3110 or consent of instructor. Sp

5230 Evaluation in Programs of Agricultural Extension (3) Principles, instruments, and techniques of identifying, gathering, analyzing and using data to appraise planning and teaching and to determine progress of clientele. Prereq: 5210 or consent of instructor. W, A

5310 History, Philosophy and Objectives (3) Historical and philosophical foundation of informal adult education in American agriculture form the agricultural societies (1785 to present), Key figures, issues, legislative movements, farmer organizations and programs. Emphasis on agricultural extension service, its origin, legislation and growth and nature of present day objectives and programs. Prereq: 3110 or consent of instructor. W, A

5320 Volunteer Leadership in Agricultural Extension Programs (3) Theory, principles and procedures in developing volunteer leadership for small groups and groups in rural communities through agricultural outreach programs. Emphasis on analysis of role and importance of volunteer leadership function, techniques of effective leadership in small groups and methods of developing volunteer leadership in agricultural extension work. Prereq: 3110 or consent of instructor. W, A

5330 Supervision of Agricultural Extension Programs and Personnel (3) Theories of human effectiveness, principles of successful supervision applied to various parts of county, district and other extension programs; and planning for effective office management. Prereq: 5210 or 5220 or consent of instructor. W, A

Agriculture

5120 Teaching Internship in Agriculture (1) Supervised experience in teaching; test preparation, and evaluation of agriculture students. May be repeated. Maximum 3 hrs for M.S. students, 6 hrs for Ph.D. students.

Animal Science

MAJOR

DEGREE

Animal Science

M.S., Ph.D.

Professors:
D. O. Richardson, (Head), Ph.D. Ohio State; K. M. Barth, Ph.D. Rutgers; C. M. Bell, Ph.D. Oklahoma State; J. K. Blotner (emeritus), Ph.D. Iowa State; C. C. Chamberlain (Emeritus), Ph.D. Iowa State; B. H. Erickson, Ph.D. Kansas State; O. G. Hall (Dean), Ph.D. Iowa State; S. L. Hansard (Emeritus), Ph.D. Florida; E. R. Lidwall, M. S. Tennessee; T. P. McDonald, Ph.D. Tennessee; J. B. McLaren, Ph.D. Auburn; G. M. Mennar (Emeritus), D.V.M. Michigan State; J. K. Miller, Ph.D. Georgia; W. E. Knaak, Ph.D. Wisconsin; R. L. Murray, (Emeritus), Ph.D. Wisconsin; H. V. Shirley, Ph.D. Illinois; R. R. Shrode, Ph.D. Iowa State; R. L. Tugwell (Emeritus), Ph.D. Kansas State.

Associate Professors:

Assistant Professors:
G. A. Baumbach, Ph.D. Florida; B. R. Bell, Ph.D. North Carolina State; W. Cullen, Ph.D. Minnesota; J. D. Godfrey, M.S. University of California; R. N. Heitmann, Ph.D. Maine; S. P. Oliver, Ph.D. Ohio State; T. W. Schultz, Ph.D. Tennessee; J. D. Smalling, Ph.D. Texas A&M.

The Department of Animal Science offers graduate programs leading to the degrees of Master of Science, Master of Professional Studies, and Doctor of Philosophy with a major in Animal Science. At the M.S. level, the department offers areas of specialization in nutrition, breeding and genetics, physiology and management with orientation towards beef cattle, dairy cattle, swine and poultry. Since the department is also a part of the College of Veterinary Medicine, the areas of anatomy, general physiology and histology are also available. The Ph.D. program offers concentrations in animal nutrition, animal breeding and animal physiology and animal anatomy.

THE MASTER'S PROGRAM

For admission to the M.S. program, a student must have a satisfactory grade point average in a completed undergraduate major in one of the animal sciences or closely related area, and must show promise that he/she can successfully pursue a Master of Science program. Prerequisite courses may be required. A student has insufficient undergraduate background or less than satisfactory grade point average.

The program requires the writing of a thesis based on original research and the completion of a minimum of 36 hours of graduate coursework, at least two-thirds of which must be taken at UTK in courses numbered at or above the 5000 level. Included in the course requirement are 3 hours of Animal Science 5510 (Seminar) and 2 hours of Agriculture 5120 (Teaching Internship).

The remainder of the coursework will be selected jointly by the student and the major professor depending on the student's area of specialization and professional objectives. The advisory committee will consist of the major professor, a faculty member of Animal Science, who will act as chair of the committee, and a minimum of two other members, one of whom may be outside of the Animal Science Department. The advisory committee approves the student's research problem and conducts the final oral examination which consists of a comprehensive examination and a defense of the thesis.

THE DOCTORAL PROGRAM

The doctoral program requires a minimum of 72 quarter hours of coursework and a minimum of 36 hours of dissertation research and writing. Animal Science 6000. Additional requirements are:

1. A minimum of 24 quarter hours in related fields outside of animal science.
2. At least 36 quarter hours credit at the 5000 and 6000 level, exclusive of Doctoral Research and Dissertation. Of these, a minimum of 9 hours must be at the 6000 level.
3. Three seminars carrying 1 credit hour (Animal Science 5910) not related to the dissertation research: and one seminar each on the student's M.S. thesis research, on his/her dissertation research proposal and on the completed dissertation.
4. A minimum of 2 hours of Agriculture 5120 (Teaching Internship) in addition to that required on the M.S. level.
A minimum of 5 faculty members constitutes the student's advisory committee, of which at least one must be outside agriculture. The major professor will be the chairperson. The student and the major professor select a program of study depending on the student's area of concentration and professional goal. The advisory committee approves the student's dissertation research proposal and determines if there should be a foreign language requirement. The advisory committee conducts the comprehensive examination and the final exam.

3210 Anatomy and Physiology of Farm Animals (4) Skeleton and joints, skeletal muscles, blood and microcirculation, and the nervous, cardiovascular, respiratory, digestive, renal and endocrine systems; demonstrations of physiological phenomena. Prereq: Biology 1210 or Agriculture 1130. 3 hrs and 1 lab. F, W, Sp.

3220 Physiology of Reproduction (3) Comparative anatomy and physiology of reproductive systems of higher vertebrates; gametogenesis, fertilization, implantation, prenatal growth, parturition and initiation of lactation, endocrine regulation of reproduction and homeostatic mechanisms. Prereq: 3210. 2 hrs and 1 lab of instructor. (Same as Zoology 3220). 2 hrs and 1 lab. F, W.


3330 Feeds and Ration Formulation (4) Feedstuffs, additives, feeding standards, nutrient requirements and ration formulation for beef and dairy cattle, sheep, horses, swine, poultry and laboratory animals. Prereq: 3302. 2 hrs and 2 labs. W, Su.

3410 Heredity in Animals (3) Basic, chromosomal mechanisms and Mendelian principles, and exceptions such as linkage and cytoplasmic inheritance. Introductions to the biochemical basis of heredity and to quantitative inheritance. Illustrations of principles related to species familiar to agriculture students. Prereq: Agriculture 1130. 2 hrs and 1 lab. F, W, Sp.

3420 Principles of Animal Breeding (3) Genetic principles in the breeding of economic species. Genetic basis of variation. Partitioning of variation according to various kinds of causative differences such as those in genetic makeup and environment. Selection and its consequences. Making systems and their effects on populations. Planning breeding programs. Prereq: 3410 or equivalent. 2 hrs and 1 lab. F, Sp.

3510 Animal Hygiene and Sanitation (4) Parasitic, viral and bacterial organisms in farm animals; immunity; control and protection against disease; veterinary regulations and quarantine; herd health problems. Prereq: microbiology 2910-11 or 2910-19 or consent of instructor. 3 hrs and 1 lab. F, W, Sp.

3520 Avian Diseases (3) Major disease; characteristics, prevention and treatment, management practices and systems for domestic birds, upland game birds, and water fowl. 2 hrs and 1 lab. Sp. A.

3810 Nutrition and Management of Laboratory Animals (3) Principles of feeding, breeding, and handling of animals in scientific investigations; specific species. Characteristics, care, needs, accommodations, and health. Prereq: consent of instructor. 1 hr and 2 labs. F.

4210 Physiology of Lactation (3) Development, anatomy, and function of mammary glands; interactions for mammary development and milk secretion; factors affecting yield and composition of milk. Prereq: 3210. W.

4220 Avian Physiology (3) Anatomy and physiology of the avian system with emphasis on poultry. Prereq: 3220. 2 hrs and 1 lab. Sp.

4230 Applied Reproduction in Farm Animals (3) Application of methods and techniques in collecting, evaluating, processing and maintaining reproduction potential of males and females; pregnancy determination; gestation and parturition. Male and female infertility. Prereq: 3220 and consent of instructor. 1 hr and 2 labs. F, Sp.

4330 Feeding Applications for Farm Animals (3) Detailed application of feeding principles designed to allow student to discover and exploit further feeding cofactors available to producers through problem solving. Prereq: 3330. 1 hr and 2 labs. Sp.

4340 Experimental Animal Nutrition Laboratory (2) Laboratory experience in testing basic animal nutrition concepts including preparation and feeding of experimental diets. Prereq: 3330. W.

4810 Beef Cattle Production and Management (4) Principles of nutrition, physiology, and breeding in a complete beef cattle management program. Structure of industry, enterprise establishment, systems of production, production practices and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. F, W.

4820 Dairy Cattle Production and Management (4) Principles of nutrition, physiology and breeding in a complete dairy cattle management program. Structure of industry, enterprise establishment, systems of production, production practices and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. F, W.

4830 Pork Production and Management (4) Integration of principles of selection, nutrition, breeding, physiology and management in a complete pork production and management program. Structure of industry, enterprise establishment, systems of production, production practices and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. F, Sp.

4840 Poultry Production and Management (4) Structure of poultry industry, organization and management of poultry enterprises including rearing, housing, feeding, processing and marketing. Prereq: 3330. W.

4850 Light Horse Production and Management (4) Integration of principles of nutrition, physiology and breeding in a light horse production program. Structure of industry, systems and practices of production; individual animal and herd improvement programs; tax and equipment facilities for both pleasure owners and commercial producers. Alternatives in terms of pleasure, recreation and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab.

4860 Lamb and Wool Production Management (4) Integration of principles of selection, nutrition, breeding, physiology and management in a complete lamb and wool production management program. Structure of industry, enterprise establishment, systems of production, production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. W.

5000 Thesis (1-15) P/NP only. E.

5070 Methods of Evaluating Experimental Data in Animal Science (3) Interpretation of data from experiments and complete analysis procedures as analysis of variance, covariance, linear regression and correlation, and multiple regression. Prereq: Statistics 5211 or equivalent. 2 hrs and 1 lab. W.

5170 Design and Interpretation of Experiments in Animal Science (3) Review of principles of experimental design and application to research in animal science analyzing data from experiments with unequal and disproportionate subclass frequencies; situations and procedures for use of computers in statistical analysis. Prereq: 5170. 2 hrs and 1 lab. Sp.

5240 Advanced Studies of the Secretion of Milk (3) Advanced study of milk secretion; development and physiology and Biochemistry 4110 or equivalent or consent of instructor. Biochemistry 4120 also recommended. (Same as Zoology 5510-20). 4 hrs and 1 lab. W, Sp.

5320 Advanced Experimental Animal Nutrition (3) Animal experimental techniques for digestion, absorption, metabolism and utilization concerning nutrient requirements, interrelationships, availability and deficiencies of nutrients. Nonnutritive additives, toxins, poisons, and disease effects; nutritional cience based upon up to 3330 or consent of instructor. 3 hrs and 1 lab. W.

5344 Ruminant Animal Nutrition (3) Digestive physiology of the ruminant stomach, rumen fermentation, determination of nutrient requirement and feed intake regulations of ruminant animals. Prereq: 3330. F.

5410 Genetics of Animal Populations (3) Population and individual, gene and zygotic frequencies; statistical descriptions of populations; forces influencing genetic changes, applications to livestock. Prereq: 5420 or consent of instructor. 2 hrs and 1 lab. F, A.

5510-20 Advanced Animal Physiology (5, 5) Advanced animal physiology (primarily mammalian physiology); 5510—Membrane neuron, central nervous system, muscular contractions, cardiac and skeletal muscle, nervous and endocrine systems. 5520—Respiratory, renal, gastrointestinal, and reproductive physiology, acid base mechanisms, and metabolism. Should be taken in sequence if both courses are taken. Prereq: General undergraduate anatomy and physiology and Biochemistry 4110 or equivalent or consent of instructor. Biochemistry 4120 also recommended. (Same as Zoology 5510-20). 4 hrs and 1 lab. W, Sp.


6000 Doctoral Research and Dissertation (3-15) Pr/ NP only. E.

6211 Advanced Topics in Animal Physiology (1-6) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hours. E.

6212 Advanced Topics in Animal Anatomy (1-6) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 6 hrs. E.

6220 Environmental Physiology of Farm Animals (3) Environmental factors and measurement; physiological mechanisms of response to environmental factors and measurement; relationships of animals and environment in terms of productivity and health. Prereq: Consent of instructor. 2 hrs and 1 lab. W, A.

6320 Animal Growth and Development (3) Physiological concepts, control of development, and effects of growth rates on physiological and productive
DEGREE REQUIREMENTS

Completion of a satisfactory thesis is required. A minimum of 45 quarter hours of graduate credit in courses approved by the student's committee and requiring 9 hours for a thesis, is required including at least 18 hours of graduate credit in the major exclusive of Thesis 5000. If the student elects a minor, there must be no fewer than 9 nor more than 18 hours of graduate credit in the minor field. Presentation of three acceptable seminars for 1 hour credit each is required prior to completion of program. An oral final exam must be completed to the satisfaction of the committee after the thesis is completed.

4010 Biology of Soil Microorganisms (3) Morphology and physiology of soil organisms, decomposition of organic matter, chemical transformations, and interactions between soil organisms and higher plants. Prereq: Introductory microbiology or 5130. 3 hrs and 1 lab, Sp, A

4030 Forest and Shale Tree Entomology (3) Identification, biology, ecology, and control of forest and shade tree pests. Prereq: 3210 or equivalent. 2 hrs and 1 lab, F, A

4140 Forest Pathology (3) Symptomatology, etiology, epidemiology, and control of forest trees diseases, including wood decay and other diseases important to urban and production forestry. Prereq: 3130 or Forestry 3060. 2 hrs and 1 lab, F, A

5000 Thesis (1-15) P/NP only. E

5010 Research Methods and Instrumentation in Plant Pathology and Entomology (3) Techniques for laboratory, field, and greenhouse research in plant pathology and entomology. 1 hr and 2 labs, F

5110 Plant Disease Diagnosis (3) Diagnosis of plant diseases, disease symptoms, causal agents and control measures. Prereq: 3130. Su, A

5120 Insect Diagnostic Clinic (3) Identification of insects and insect damage to crops, livestock and residences. Obtaining of insects and damaged specimens; diagnostic characteristics and control measures. Prereq: 3210 or Zoology 3110. Su, A

5130 Plant Pathogenic Fungi (4) Morphology, taxonomy, biology, and genetics of plant pathogenic fungi. Isolation and identification of plant pathogenic fungi will be emphasized. Prereq: 3130 or consent of instructor. 2 hrs and 2 labs, W, A

5210 Plant Parasitic Nematodes (4) Morphology, taxonomy, and ecology of plant parasitic nematodes with emphasis on host-parasite relationships. Prereq: 8 hrs biological science or consent of instructor. (Same as Zoology 5210.) 2 hrs and 2 labs, W, A

5220 Plant Disease Control (3) Basic problems and principles involved in controlling plant diseases. Prereq: 3130. W, A

5230 Field Crop and Vegetable Insects (3) Taxonomy, biology, and control of insects affecting field and vegetable crops. Prereq: 3210 or equivalent course in applied entomology. 2 hrs and 1 lab, F, A

5240 Plant Virology (4) Symptomatology, cytology and epidemiology of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viroids, mycoplasmas and spiroplasmas. Prereq: 3130 or consent of instructor. 2 hrs and 2 labs, W, A

5250 Medical and Veterinary Entomology (4) Morphology, taxonomy, biology and control of arthropod parasites and vectors of pathogens of humans and animals. Ecology and behavior of vectors in relation to pathogen transmission and control. Prereq: 3210, general entomology, or consent of instructor. 3 hrs and 1 lab, W

5260 Insect Pest Management (4) Principles and applications of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels. Prereq: 3210, Zoology 3110, or consent of instructor. 3 hrs and 1 lab, W, A

5310 Special Problems in Entomology (1-6) Comprehensive individual study of current problems. May be repeated. Maximum 9 hrs, E

5320 Special Problems in Plant Pathology (1-6) Comprehensive individual study of current problems. May be repeated. Maximum 9 hrs, E

5330 Special Problems in Nematology (1-6) Comprehensive individual study of current problems. May be repeated. Maximum 9 hrs, E

5410 Seminar (1) Review of literature and current research in plant pathology and entomology. May be repeated. Maximum 3 hrs, F, W, Sp

Food Technology and Science

MAJOR

DEGREES

Food Technology and Science

M.S., Ph.D.

Food Technology and Science/Institute of Agriculture

Food Science

M.S., Ph.D.

The Department of Food Technology and Science seeks the Master of Science degree, and Doctor of Philosophy degree with concentrations in food products, food chemistry and food microbiology. Various commodity interests (dairy, meats, fruits, and vegetables) can be emphasized in all three concentrations by judicious selection of courses and research areas for the dissertation. The option of a minor in a collateral area is available. For detailed information, contact the Department Head.

To be enrolled in the program, the student must have a B.S. degree in food technology, food science, or a closely related agricultural or basic science discipline. Graduate school rating forms or letters of recommendation from at least three people familiar with the student's academic ability are required.

THE MASTER'S PROGRAM

1. A thesis is required for the Master's program. Prior to research for the thesis, the student is required to develop a detailed written research plan. Registration for a minimum of 9 hours of Thesis 5000 is required. In addition to the thesis requirement, a minimum of 36 hours of graduate coursework is required. This work must be approved by the student's committee and not more than 15 hours of the minimum 45 can be below the 5000 level. The committee may require additional coursework if the student's progress or background indicates such need.

2. All students are required to include 3 hours of 5100, Seminar, in their program and are expected to participate in discussions each quarter enrolled. Completion of 5240 or equivalent is also required.

3. An oral examination covering the thesis and coursework is required.

THE DOCTORAL PROGRAM

1. Satisfactory completion of a Master's degree in the field of or a special qualifying examination are required for admission.
9 of the 36 hours must be in 6000-level required.

Following courses or their equivalent: 5420, 5310, 5720, and Nutrition and Food Sciences 5100. All candidates must complete three hours in 6010 and 6410.

Each candidate will be required to pass written and oral comprehensive examinations prior to admission to candidacy. A final oral examination is required which includes a defense of the dissertation and subject matter that the student’s committee considers desirable.

3020 Dairy Products I (4) Procurement, processing, and distribution of fluid milk. Manufacture of frozen and condensed dairy products. 3 hrs and 1 lab. W

3840 Meat Science (3) Processing methods, carcass characteristics of meat animals; slaughter, cutting, selection, curing, freezing and cooking. 2 hrs and 1 lab. W, Sp.


4030 Dairy Products II (4) Principles in the manufacture of butter, cheese and special dairy products. Prereq: 3020. 3 hrs and 1 lab. Sp, A.

4130 Food Chemistry I (3) Minerals, fats, oils, and vitamins in food as affected by processing and storage. Prereq: Nutrition and Food Sciences 3150 or equivalent. 2 hrs and 1 lab. Sp.

4140 Food Chemistry II (3) Reactions of proteins, carbohydrates and natural food colorants in food materials. Protein structure, food enzymology and browning reactions. Effects of storage and processing on proteins and carbohydrates by hydrolases with emphasis on nutritional value and functionality. Prereq: Nutrition and Food Sciences 3150 or equivalent. 2 hrs and 1 lab. F.

4200 Food Processing I (4) Prevention of spoilage and deterioration of foods. Methods of preservation. Prereq: Agricultural Mechanization 3510. 3 hrs and 1 lab.

4210 Food Additives (3) Substances used in food manufacturing with emphasis on properties and functions. Prereq: Nutrition and Food Sciences 3140 or equivalent. F.

4310 Food Packaging (3) Characteristics and applications of materials and containers to packaging requirements and methods of packaging foods. Prereq: 2300. 2 hrs and 1 lab.

4400 Food Processing II (3) Design of food quality assurance programs with emphasis on sanitation. Application of general analytical techniques, regulations and unit operations to quality control in food industry. Prereq: 3810. 3 hrs and 2 labs.

4410 Food Crop Products (3) Food products from crops with emphasis on types, manufacturing systems, quality attributes, and utility. Prereq: 2320 or equivalents. 2 hrs and 1 lab. Sp.

4420 Bakery Products (3) Baking ingredients and their interactions during production and storage of bakery products. Prereq: 4130 and Chemistry 2230 or equivalents. 2 hrs and 1 lab. Sp.

4810 Food Microbiology I (4) Standard methods for examination, cultivation, and identification of bacteria associated with food processing, food spoilage, and food poisoning. Prereq: 3810. 2 hrs and 2 labs.

4840 Meat Products Manufacturing (3) Prepared meat products with emphasis on sausage making and inspection relating to cost controls, inspection, and meat science. Prereq: 3840 or consent of instructor. 1 hr and 2 labs.

4920 Analysis of Physical Properties of Foods (4) Physical states of food materials, water, viscosity, colloids, gels, foams, crystals, color. Quantitation and changes induced by processing. Prereq: 4200 and Agricultural Mechanization 3510 or consent of instructor. 3 hrs and 1 lab. W

4940 Advanced Meat Science (3) Qualitative and quantitative characteristics of meat and poultry as related to palatability, coloration, preservation, packaging and merchandising. Prereq: 3840. F, A.

5000 Thesis (1-15) Only. E

5100 Seminar I (1) Reports and discussions of selected topics from research literature. May be repeated. Maximum 3 hrs. F, W, Sp.

5120 Food Color (3) Chemistry of natural food pigments and measurement, notation, and preservation in food. Prereq: Nutrition and Food Sciences 3140 or equivalent. 2 hrs and 1 lab. Sp.

5130 Food Enzymology (3) Commercial and native enzymes in manufacturing, processing, and spoilage of food. Prereq: Nutrition and Food Sciences 3150 or equivalent. Sp.

5140 Food Flavors (3) Food flavor maintenance and improvement. Natural and synthetic compounds in manufacture of foods with predictable consumer acceptance. Technology of flavor manufacture and formulation. Techniques for determining flavor profile. Prereq: 4200. 2 hrs and 1 lab. W, A.

5150 Fats and Oils (3) Application of scientific principles to commercial technology of fats and oils. Prereq: 4130. 2 hrs and 1 lab. W.

5200 Research (1-5) Research in selected areas. Consent of department head. Credits and hours to be arranged. May be repeated. Maximum 10 hrs.

5310 Food Products Development (3) Fundamentals or art, science, and technology applied to research, development, and marketing of new food processes and products. Prereq: 4140. 2 hrs and 1 lab.

5320 Food Thermobiology (3) Fundamentals of heat transfer as related to rate of destruction of microorganisms and to rate of loss of food quality through calculations of minimum safe thermal processes for hermetically-sealed packages of foods. Prereq: 4200. 2 hrs and 1 lab. W.

5420 Instrumental Analysis of Foods (3) Application of current instrumental methods used to control food manufacturing processes. Prereq: 4140. 2 hrs and 1 lab.

5510 Meat Technology (3) Physical and chemical changes that occur during conversion of muscle to meat; the influence these changes have on quality and composition; meat processing, preservation, and quality control. Prereq: 3840. 2 hrs and 1 lab. Sp.

5530 Advanced Food Microbiology (3) Identification of desirable and undesirable microorganisms in food products and relationship to manufacturing operations. Isolation and characterization of microorganisms from food products and plant equipment. Prereq: 4810 or Microbiology 3810. 3 labs.

6000 Doctoral Research and Dissertation (1-9) Credit for work done under the supervision of an approved advisor. Consent of department head required. May be repeated for a maximum of 10 credits. 5000 or consent of instructor.

6010 Food Toxicology (3) Basic and applied concepts in food toxicology: toxicological aspects of processed foods. Mode of action, prevention, and control of food toxicants. Prereq: 4140, 5310, 5530 or consent of instructor.

Forestry, Wildlife and Fisheries

MAJORS

DEGREES

Forestry

M.S.

Wildlife and Fisheries Science

M.S.

Profs.: J. L. Byford (Acting Head), Ph.D. Auburn; J. W. Barrett (Emeritus), Ph.D. Syracuse; R. E. Buckner, Ph.D. North Carolina State; H. A. Core (Emeritus), Ph.D. Syracuse; R. W. Dimmick, Ph.D. Oregon; C. E. McGee (Adjunct), D. F. Duke.

M.S.


Assistant Professor: S. E. Schottlaub, Ph.D. Colorado State.

Graduate study leading to the Master of Science degree with majors in Forestry and Wildlife and Fisheries Science is offered by the Department of Forestry, Wildlife, and Fisheries. The Master of Business Administration, with a concentration in Forest Industries Management, is available for qualified students. This degree program is offered by the College of Business Administration with participation by the Department of Forestry, Wildlife, and Fisheries. The Doctor of Philosophy with a major in Ecolohy can be achieved through arrangements with the University’s Graduate Program in Ecology.

THE MASTER'S PROGRAMS

Both a thesis and non-thesis option are available for the major in Forestry; a thesis is required in Wildlife and Fisheries Science. For admission the student must have a Bachelor's degree from an accredited institution in forestry, wildlife and fisheries or another natural resource area. Applicants must also have taken the GRE exam. Graduate School rating forms or letters of recommendation from three individuals familiar with the applicants academic ability are required. The department head has the authority to decide which application which must be submitted at the time of application to The Graduate School.

Thesis Option:

1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for a minimum of 9 hours of Thesis 5000 is required.

2. A graduate committee of no fewer than 3 faculty members must be selected by the student prior to the start of the thesis quarter of residence. In addition to the thesis requirement, a minimum of 36 hours of graduate coursework is required.
This work must be approved by the student's committee and no more than 15 hours of the minimum 45 can be below the 5000 level. The committee may require additional coursework if the student's progress or background indicates such need.

3. At least one member in addition to the major professor will be from the department. The committee will meet and schedule the student's program during the first quarter in residence.

3. Three hours of Forestry 5011 is required.

4. Twelve hours of coursework in the department must be at the 5000 level or above, exclusive of Forestry 5011.

5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 42 hours of approved study.

Forestry

3200 Forest Environments and Ecology (3) Environments and ecology of forests and associated lands; emphasis on the application of ecological principles to contemporary problems. Prereq: 8 hrs of biology, botany, or zoology. F

3040 Forests and Trees of Eastern North America (4) Descriptive botany and associations of North America east of Great Plains; dendrology and silvics of trees and shrubs. Identification, nonmature and mature characteristics of species. Field trips during scheduled labs plus one weekend field trip. Prereq: 8 hrs basic biology or botany. 3 hrs and 1 lab. F

3110 Forest Measurements and Biometry (4) Measurements of individuals in animal and plant populations; linear regression; sampling of forest populations; growth and potential production. Prereq: Plant and Soil Science 3610, 3 hrs and 1 lab. W

3120 Wood Technology (2) Fundamental structure, properties and uses of wood. Prereq: 3040 and 3050. 3050 may be taken concurrently. 2 hrs and 2 labs. W

3129 Wood Identification (2) Macro and micro identification of important commercial softwoods, hardwoods, and foreign woods. Will include student use of tools of the trade, binocular loupes and an inter-active wood identification program on University computing system. W

3220 Forest Products and Utilization (3) Harvesting, processing, marketing factors in stand conversion, intermediate and harvest cuts. Prereq: 3120. Sp

3320 Principles of Silviculture (3) Influence of site factors on reproduction, growth, development, and character of forest vegetation; classification of forest situations; silvicultural laws. Prereq: 3020, 3040, Plant and Soil Science 2120, W

4002 Utilization (3) Wood-using industries; processing and treating of softwoods, hardwoods, and soft hardwoods; pulpwod operations, flooring plants, treating plants, and plywood plants. Layout, flow diagrams. Prereq: 3120 or consent of instructor. Sp

4003 Field Methods of Timber Inventory (4) Field measurement of forests and forest fuels, determining appropriate sample design for specific purposes; silvicultural, species and stand growth; site evaluation; field problems. Prereq: 3110 and Agriculture Mechanization 3140. Sp

4004 Forest Practice (3) Management of forest lands by public and private organizations; "multiple-use" concept as it influences management decisions; impact of public pressure on management decisions; management prescriptions. Prereq: 3260, 4006. S/N/NC only. Sp

4008 Silvicultural Methods (4) Methods and application of intermediate and regeneration cuttings, site preparation, planting and seeding, modifications of cutting methods to obtain desired goods and benefits. Prereq: 3060, 3220, 4002, 4003. Sp

4020 Forest Watershed Management (3) Water as a factor in the hydrologic cycle; control of water quality, quantity, and regimen; watershed planning. Prereq: 3320 or consent of instructor. Two overnight field trips. W

4210 Forestry Organization and Administration (3) Planning, organizing, and leadership concepts and cases; problem analysis and decision making in forest resources management. Prereq: Consent of instructor. 2 hrs and 1 lab. W

4220 Forest Resource Management (3) Decision-making principles, forestry as integration of resource uses. Models of forestry as system; concepts of forest finance and valuation; taxation of forest firm. Prereq: 4150. W

4230 Forest-Resource Management Plans (4) Field problems and case studies in forest-resource management; the forest as a system; management of forest enterprises as a producer of timber, recreational services, watershed services, and wildlife; producing multiple services; preparation of a complete plan based on optimizing forest uses. Prereq: 4210. Sp

4240 Interpreting Forest Resources (3) Principles and techniques of interpreting forest resources; importance of environmental interpretation to management of forest resources; development and administration of interpretive services. Possible overnight field trips required. Prereq: 3240 or equivalent. 2 hrs and 1 lab. Sp

4320 Forest Policy (3) History of forestry in United States with emphasis on development of forest resources policies; current policies influencing development and management of forest resources; brief survey of policy implications of forest resource organizations in public and private sectors. Prereq: 4004. W

4340 Aerial Photography in Forest-Resource Management (3) Use of conventional aerial photographs in forest-resource management; interpretation of detail, aerial inventories, preparation of cover-type maps, uses of other remotely sensed imagery. Prereq: 3110 or equivalent. 1 hr and 2 labs. Sp

4420 Forest Tree Improvement (3) Forest tree improvement related to silviculture; nature and purposes of tree improvement and forest genetics; principles of tree cytology and population genetics; importance of seed source; selection of superior genotypes and development of seed orchards, hybridization, seed production and seed certification. Prereq: 4006 or consent of instructor. 2 hrs and 1 lab. Sp

4430 Regional Silviculture of the United States (3) Factors that influence silviculture management of important tree species in North America. Importance of forests and forest industry to a region; physiology, geology, soils, climate and weather; sites and site types, ecological adaptations and potential growth and yield characteristics of the more important species. Prereq: 4006 or consent of instructor. W

4440 Forest Recreation (3) Forest lands as a recreation resource; the interrelationships of forest recreation; development and management of forest recreation areas; socioeconomic and political determinants of recreation development and management. Prereq: 3 hrs sociology and/or economics. 2 hrs and 1 lab. Sp

4450 Recreational Behavior in Forest Environments (3) Review of sociological and psychological theories relevant to forest recreation planning, management, and administration. Examination and application of behavioral concepts to forest recreation problems, review of methodologies for assessing recreational behavior. Prereq: 3260. Prereq: 6 hrs in behavioral psychology and/or sociology, or consent of instructor.

4540 Wood Drying and Preservation (4) Concepts of wood drying including wood-moisture relations, specific gravity, moisture content, density, and shrinkage. Commercial drying practices. Relation of wood moisture content to attack by wood destroying organisms. Methods and equipment used in the forest products industry. Prereq: 3120. Mathematics 1851, Physics 1220, or consent of instructor. 3 hrs and 1 lab.

4550 Wood Composites and Gluing (4) Fundamentals of plywood and composite product manufacturing. Wood adhesive technology. Application of gluing to manufacturing processes of plywood and composite products. 3 hrs and 1 lab. Overhead weekend plant trips may be required. W

4560 Forest Products Marketing and Measurement (3) Discussion of market structure for various sectors of forest products industry including standing timber, lumber, pulp and paper, wood composites, and treated products. Systems used by industry for sale and transfer of products. Prereq: 3220, 4150 or consent of instructor.

5000 Thesis (1-15) P/NP only. E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/NC only. E

5011 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management. Identify, analyze, and prepare written report on a problem. Topic and report must have approval of all committee members. Formal presentation to faculty and students. Available only to students in the non-thesis option for the M.S. in Forestry. E

5110 Special Problems in Forestry (1-6) May be repeated. Maximum 9 hrs. E

5220 Seminar in Forest Tree Biology (3) Growth, reproduction, and physiology of forest trees; forest ecology; variability and taxonomy of forest trees. Prereq: 3240 or Botany 4310. F, A

5230 Seminar in Forest Management (3) Newly developed systems in forest management; the forest as a system; management of forest resources; brief survey of policy implications of forest resource organizations in public and private sectors. Prereq: 4004. W

5240 Seminar in Forest Genetics (3) Population genetics and speciation, variation patterns and heritability in forest trees; grows with different breeding methods, planning and conducting forest genetics research. Prereq: 4420, Biology 3110, and consent of instructor. W, A

5250 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific contemporary plans. Overnight field trips may be required. 2 hrs and 1 lab. W

5260 Industrial Forestry (3) Structure and analysis of wood-using firms and industries. Forest taxation, land tenure and wood procurement alternatives. Development and application of forestry planning models. Prereq: 4230 or consent of instructor. W

5270 Topics in Forest Industries Management (3) Current problems in the industrial forestry. Executives from public and private business sector (concerned with forest industries) will discuss selected topics. Prereq: 4230 or consent of instructor. F

5280 Seminar in Forest Biometry (3) Theory and application of forest measurements and sampling; theory and application of forest biometry. 2 hrs and 1 lab. W
5810 Cytogenetics (4) Same as Botany 5810.

Wildlife and Fisheries Science

3230 Wildlife Management (3) Lives and ecological relationships of wild animals; biological, social, and economic aspects of their management. 2 hrs and 1 lab. F

4450 Game Mammals (4) Classification, identification, distribution, natural history, and management principles of game mammals in North America. Prereq: 3230 or 1 yr of zoology. 2 hrs and 1 lab. F

4460 Game Birds (4) Biology, classification, identification, distribution and management of game birds in North America. Prereq: 3230 or 1 yr of zoology. 2 hrs and 1 lab. F

4510 Fish Populations (4) Principles and methods of fish population estimation; sampling techniques and equipment; population dynamics; age and growth. Prereq: Biology 3130, 8 hrs mathematics, or consent of instructor. 3 hrs and 1 lab or field period. W

4520 Fisheries Management (4) Methods of warm and cold water fisheries management including techniques of biological assessment, public relations, habitat manipulation, and stocking. Prereq: Biology 3130 or consent of instructor. 3 hrs and 1 lab or field period. Sp

5000 Thesis (1-15) P/NP only. E

5110 Special Problems in Wildlife and Fisheries Science (1-6) May be repeated. Maximum 9 hrs. E

5210 Seminar in Wildlife Conservation (3) Current studies, problems and issues in wildlife agencies and organizations and their programs. Prereq: 3230 or consent of instructor. W, A

5310 Seminar (1) Current developments in wildlife and fisheries science. Required of each graduate student in residence Winter Quarter. May be repeated. Maximum 2 hrs. SYNC only. W

5400 Advanced Topics in Wildlife Science (3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: 4450 and 4460 or consent of instructor. May be repeated. Maximum 6 hrs. Sp, A

5450 Wildlife Diseases (3) Necropsy of birds and mammals. Recognition of various diseases and methods of preparing pathological materials in the field and lab. Investigative procedures concerning wildlife diseases. Prereq: 1 yr zoology. 1 qtr microbiology, pathology or parasitology, 4450 or 4460, or consent of instructor. 2 hrs and 1 lab. Sp, A

5480 Predator Ecology (3) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unaltered environments. Principles of predator biology and management. Prereq: 4450 and 4460 or equivalent. W, A

5500 Advanced Topics in Fishery Science (3) Recent advances and concepts, research techniques and analysis of current problems. Prereq: 4520 or consent of instructor. May be repeated. Maximum 6 hrs. Sp, A

5550 Fish Physiology (3) Mechanisms of circulation, excretion, osmoregulation, and neural/hormonal control of these systems in fishes. Practical applications of fish physiology in water pollution assessment, fish culture, etc. Prereq: Consent of instructor. 2 hrs and 1 lab. W

5810 Agricultural Cytogenetics (4) Same as Botany 5810.

Ornamental Horticulture and Landscape Design

MAJOR

Ornamental Horticulture and Landscape Design

DEGREE

M.S.

Professors:


Associate Professors:

J. W. Day, Ph.D. Mississippi State.

The Department of Ornamental Horticulture and Landscape Design offers the Master of Science degree with specializations in floricultural science and technology, nursery science and technology, or turf science and technology. Various research and technology interests such as micropropagation, innovative ornamental plant production systems and computer aided management and production management systems can be emphasized in the chosen specialization by judicious selection of courses and research objectives for the thesis.

For admission the student must have a B.S. degree in ornamental horticulture, floriculture, plant science or closely related agricultural or basic science discipline and must have the undergraduate transcript evaluated by the department for prerequisite requirements, if any. Graduate research assistantships are available on a competitive basis. For further information, contact the Department Head.

THE MASTER'S PROGRAM

1. A thesis is required for the M.S. program. Prior to research for the thesis, a proposal must be approved by the Master's committee. Registration for a minimum of 9 hours of Thesis 5000 is required.

2. In addition to the thesis requirement, a minimum of 36 hours of graduate credit is required. Not more than 15 hours of the minimum 45 hours can be below the 5000 level. The academic program must be approved by the Master's committee, which may require additional course work if the student's progress or background indicates such need.

3. All students are required to include 3 hours of 5500, Seminar, in their program and are expected to attend this course and participate in discussions each quarter enrolled.

4. An oral examination covering the thesis and coursework is required.

3030 Plant Propagation (3) Physiology, methodology, and environment requirements for propagation. Prereq: 8 hrs of biological science. 2 hrs and 1 lab. F

3110 Greenhouse Management (3) Factors involved in management of greenhouses for production and research. Structures, soils, pest control measures, heating, ventilating, lighting, water supply, crop succession. Prereq: Consent of instructor. 2 hrs and 1 lab. F, Sp

3620 Intermediate Landscape Design (4) Application of skills acquired in 3610 to variety of landscape projects. Refinement of graphic skills. History of landscape design related to contemporary applications. Technical aspects of planting design and implementation. Use of plant material in the design of small and moderate scale landscape situations. Prereq: 3610, 3810 or equivalent. 1 hr and 2-3 hrs lab. F, W

3620 Landscape Construction and Contracting (4) Construction methods, materials and practices of landscape installation and contracting. Site layout procedures, earthwork and drainage, landscape construction materials, installed design, drawings and small scale projects. Landscape contracts, specifications and bidding procedures. Prereq: 3310, 3510; Agricultural Mechanization 2130 recommended. 1 hr. and 2-3 hrs lab. Sp


4160 Nursery Management (3) Modern management methods for wholesale and retail nurseries, garden centers, and landscape contracts. Prereq: 3310. 2 hrs and 1 lab. W

4180 Park Design (4) Design criteria for parks and outdoor recreation systems. Park site selection, analysis, planning and management as related to needs and natural and economic resources. Evaluation of aesthetic and functional quality of parks and their impact on environmental quality of rural and suburban communities. Prereq: 3610. 2 hrs and 2 labs. Sp

4190 Advanced Landscape Design (4) Comprehensive application of landscape design skills and knowledge through development of a landscape design project. Prereq: 3510, 3620, 3630, 1 hr and 2-3 hrs lab. Sp

4220 Advanced Turfgrass Management (4) Principles of scientific based turf culture adaptation, ecology, physiology, soil fertility and grass nutrition; climatic influences on grass culture; physiology of clipping and water management; traffic effects and compaction; and the physiological influences of pest infestations and control measures. Prereq: 3210. 3 hrs and 1 lab. W

4320 Specialty Floriculture (3) Specific practices in production on minor cut flower and potted plant crops. Production methods for scheduling flowering or vegetative growth of specialty florist crops in controlled environments. Prereq: 3410. 2 hrs and 1 lab. W

4400 Individual problem Study (1-3) May be repeated. Maximum 10 hrs. E

5000 Thesis (1-15) P/NP only. E

5100 Special Problems in Ornamental Horticulture and Landscape Design (1-5) May be repeated. Maximum 15 hrs. F, Sp

5210 Golf Course Design, Development, and Management (4) Principles and applications in design, development, and management of golf courses. Selection and utilization of grass varieties and other plant materials and development of specifications for nutritional, chemical, and mechanical maintenance. Financing, equipment, labor management, and public relations. Prereq: 4220 and consent of instructor. 2 hrs and 2 labs. Sp

5410 Histological Microtechnique (4) Preparation of plant tissue for microscopic examination, paraffin and plastic embedding, microtomy and mounting of sections, dyes and staining schedules and photography. Prereq: General biology or botany; general and organic chemistry; and consent of instructor. 2 hrs and 2 labs. W

5500 Seminar (1) Current literature and developments in ornamental horticulture and landscape design. May be repeated. Maximum 3 hrs. F, Sp

5610 Advanced Nursery Production (4) Preparation and use of growing media for ornamental plants; nutrition of ornamental plants including diagnosis, prevention and correction of mineral deficiencies; development of fertigation programs for container and field grown ornamentals. Prereq: 4150, Plant and Soil Science 3110; Botany 3210. 3 hrs and 1 lab. W

Graduate credit for non-majors only.
**Plant and Soil Science**

**MAJOR**

**DEGREES**

Plant and Soil Science

M.S.; Ph.D.


The Department of Plant and Soil Science offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. Concentrations for the doctoral program are offered in soils, plant breeding and genetics, and crop physiology and ecology.

For further information, contact the Chairman of the Admissions Committee.

**THE MASTER'S PROGRAM**

A thesis is required for this M.S. program. Registration for a minimum of 9 hours of the Master's 5000 level is required. An oral examination covering the thesis and coursework is required.

**THE DOCTORAL PROGRAM**

A minimum of 108 quarter hours beyond the Bachelor's degree, exclusive of credit for the Master's thesis, is required. A minimum of 39 quarter hours must be completed in courses numbered above 5000 exclusive of Doctoral Research and Dissertation, of which 9 must be in courses numbered above 6000.

*3110 Soil Fertility and Fertilizers (4) Properties of soils in relation to plant nutrient availability and uptake. Methods of soil fertility evaluation and principles of fertilizer use; manufacture and properties of fertilizers. Prereq: 2130 or consent of instructor. 3 hrs and 1 lab. W.

*3120 Grain and Oil Crops (4) Distribution improvement, morphology, culture, harvesting, and utilization of corn, small grains, grain sorghum, soybeans and related crops. Prereq: 2150, 8 hrs biological science. 2 hrs and 1 lab. W.

*3140 Forage Corps (4) Characteristics, adaptation, improvement, management, and utilization of grasses and legumes for pastures, hay and silage. Prereq: 2130, 8 hrs biological science. 3 hrs and 1 lab. F, Sp.

*3160 Cotton and Tobacco (4) Characteristics, adaptation, improvement, culture, harvesting, and marketing of cotton and tobacco. Prereq: 2130, 8 hrs biological science. 3 hrs and 1 lab. F.

*3170 Vegetable Crops (4) Characteristics, economic importance, adaptability and production of vegetables for fresh and processing markets with emphasis on both warm and cool season crops. Prereq: 2130; 8 hrs biological sciences. 3 hrs and 1 lab. Sp.

*3180 Fruit Crops Management (4) Soils, planting, cultural development of fruit crops; pests, control, harvesting, packing, storage, and pruning. Prereq: 2130; 8 hrs biological sciences. 3 hrs and 1 lab. W.

**3220 Soil Management (4) Soil management for crop production including cropping systems, fertilization, and tillage operations for specified soil and farming conditions. Prereq: 2130. 3 hrs and 1 lab. Sp.

**3250 Soils in Forestry (3) Soil as a medium for tree growth; relation of physical, chemical, and biological properties of forest soils to tree growth; management of forest stands. Soil properties of importance in road location, recreational development, and watershed management. Prereq: 2130, Forestry 3250. 2 hrs and 1 lab. W.

**3610 Statistics for Agricultural Sciences (3) Application of statistics to interpretation of agricultural research. Notation, descriptive statistics, probability distributions, confidence intervals, student's t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Math 1550 or 1850 or equivalent. 3 hrs and 1 rec. F, W.

**4110 Soil Chemistry (4)** Colloidal systems; properties and behavior of colloidal soil materials; relations of soil nutrients to crop productivity. Prereq: 2130 and Physics 1210. 3 hrs and 1 lab. F.

**4120 Principles of Crop Breeding (4) Genetic principles and techniques used in crop improvement. Prereq: Biology 3110 or equivalent. 3 hrs and 1 lab. W.

**4250 Agricultural Pesticides (4) Regulation of pesticide development, manufacture, transportation, marketing, and use; economic and social aspects of agricultural pesticides; development of action characteristics; degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 yr biological sciences and 1 yr chemistry. 3 hrs and 1 lab. F.


**4350 Soil Survey (3)** Techniques of mapping soils, development of soil maps, soil survey, and testing of mapping unit descriptions and interpretations. Prereq or coreq: 4320. 1 hr and 1 lab. Sp.

**4400 Problems in Plant and Soil Science (1-6)** May be repeated. Maximum 9 hrs. E.

**4410 Crop Physiology and Ecology (4)** Application of principles of plant physiology and ecology to crop production. Effects of environmental factors (light, water, temperature, etc.) on physiological processes (respiration, photosynthesis, germination, flowering, etc.) Prereq: Botany 3210, 2130 and any Plant and Soil Science course at 3000-level except 3610. 3 hrs and 1 lab. W.

**4710 Principles of Weed Science (4)** Principles of cultural, biological, and chemical control of weeds; effects on environment, principles of herbicide selectivity and activity, types of herbicides and specific recommendations for various crop and non-crop uses. Prereq: Agriculture 1140 or 1120; organic chemistry; 2130 and any Plant and Soil Science course at 3000-level except 3610. 3 hrs and 1 lab. Sp.

**5000 Thesis (1-15)** P/NP only. E.

**5100 Special Problems in Plant and Soil Science (1-6)** May be repeated. Maximum 9 hrs. F, A.

**5240 Soil Productivity and Management (3)** Concepts of soil productivity and management, quantitative evaluation of factors and their interaction affecting soil management decisions, cropping systems, water control and management, tillage and fertility management. Planning and evaluation of specific soil management alternatives. Prereq: 3220 and 4110 or consent of instructor. W, A.

**5250 Pedology (4)** Factors and processes of formation as related to physical, chemical, and mineralogical properties of soils; soil in an ecosystem; classification of soils. Prereq: 4320 or consent of instructor. 3 hrs and 1 lab. W, A.

**5310 Design and Interpretation of Experiments (4)** Experimental design and procedures; field plot techniques; statistical and data interpretation of agricultural experiments; linear models and contrasts; fixed and random effects; complete block designs and Latin squares; treatment arrangements; combined analyses. Prereq: 3610 or equivalent. A, Fall, or a computer science course or UGSS 6105 short course.

**5340 Soil Physics (4)** Physical and chemical relationships among soil, liquid, and gaseous phases of soil system and their relation to density, moisture, aeration, and plant growth. Beams and thermodynamics; physical characterization of a soil. Prereq: 4110 or consent of instructor. 3 hrs and 1 lab. W, A.

**5370 Advanced Soil Fertility (3)** Concepts of soil chemistry as they relate to nutrient absorption and plant roots; interrelation of these concepts to soil fertility, plant analysis and soil management. Prereq: 4110. W, A.

**5390 Advanced Soil Chemistry (3)** Structural properties of soil minerals; determining physical-chemical reactions, ion exchange. Donnan Equilibrium; double layer theory. Prereq: 4110 or consent of instructor. Sp. A.

**5600 Seminar (1)** May be repeated. Maximum 3 hrs. F, A.

**5710 Advanced Plant Genetics (3)** Mutation systems; controlling elements, induced mutations, genome organization, polyploidy, tetrasomic inheritance, extrachromosomal inheritance, intercellular systems, and genetic engineering of higher plants. Prereq: Basic genetics or consent of instructor. F, A.

**5720 Quantitative Genetics (3)** Genetic constitution of population and changes in gene frequency; recognition and measurement of continuous variables used in estimation of variable components and genetic advance under different breeding procedures. Prereq: Biology 3110 or equivalent; 3610 or equivalent. W, A.

**5750 Advanced Plant Breeding (4)** Developing breeding programs; objectives; historical and theoretical development of concepts of components of variation, heritability, selection intensity, methods of selection; linkage in relation to selection; genotype by environment interaction, and genetic resistance and vulnerability to pests. Prereq: 4129, 5310 or concurrent registration, or consent of instructor. 3 hrs and 1 lab. W, A.

**5760 Advanced Plant Breeding II (4)** Concepts and utilization of hectarosis, inbreeding, stability parameters, selection indices, methods of selection, and germplasm resources in breeding program for improvement of plant species. Prereq: 4120, 4129 or consent of instructor. 3 hrs and 1 lab. Sp. A.

**5810 Advanced Crop Climatology and Ecology (4)** Quantification of climatic and meteorological factors affecting plant growth and crop yield; world climates, crop distribution and productivity, and their interaction; general and specific relations among environmental factors, crop organisms and agricultural systems. Prereq: 3610 or equivalent; 4410, or Botany 3210 or 4310. 3 hrs and 1 lab. F, A.

**5820 Advanced Crop Physiology (4)** Photosynthetic efficiency in field and relationship with evapotranspiration, Hardiness development and tolerance for field stresses: drought, cold, heat, flooding, Photoperiodism, flowering, and seed production. Nitrogen-fixing relations of bacteria with legumes and grasses. Prereq: 4410. 3 hrs and 1 lab. W, A.


**5850 Mechanisms of Herbicide Action (3)** Principles of herbicides, their metabolism, and site of action. Pharmacology of growth and development of plants. Effects of herbicides on plant morphology, metabolic systems and enzymatic activities. Prereq: Botany 3210 or consent of instructor. A.

**5855 Plant Growth Regulation and Control (1)** Laboratory course in plant growth, regulation and...
control under field, greenhouse, laboratory and storage environments. Prereq or coreq: 5840, 5850, or 5860. May be repeated. Maximum 4 hrs. E

5860 Growth Control with Chemicals (3) Character, theories of action and use of plant growth regulators with special emphasis on practical aspects of use for controlling plant growth, development and metabolism to increase efficiency and production of agricultural and horticultural crops. Special consideration to current commercial uses. Prereq: Botany 5210 or equivalent. W. A

6000 Doctoral Research and Dissertation (3-15) P/ NP only. E

6100 Topics in Soil Sciences (1-3) Student needs and interests determine course content. Thermodynamics of soil solutions, clay structure and surface chemistry, soil mineralogy, plant mineral nutrition, soil microbiology, water movement and use by plants, soil structure, soil thermal properties, interaction in the soil-plant environment. May be repeated. Maximum 9 hrs. E

6200 Topics in Plant Breeding and Genetics (1-3) Student needs and interests determine course content. Genotypes by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 9 hrs. E

6300 Topics in Crop Physiology and Ecology (1-3) Student needs and interests determine course content. Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction, Interactions of physiology and germplasm in crop production, theory and application of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 9 hrs. E

6410 Experimental Designs (3) Principles of balanced and unbalanced designs used in agricultural research, use of linear models, dummy variables, simple and multiple linear models, response surfaces, stepwise regression, multiple regression, heterogeneity of slopes, and other techniques. Prereq: 5310 and Statistics 4310 or equivalent. F, A

*Graduate credit for non-majors only.

College of Veterinary Medicine

H. Kitchen, Dean
C. F. Reed, Jr., Associate Dean
W. H. Grau, Jr., Associate Dean

The College of Veterinary Medicine, established in 1974, offers a professional curriculum leading to the degree Doctor of Veterinary Medicine (D.V.M.). The college offers graduate studies leading to the degrees Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). Residency training programs in the various clinical specialties are also offered.

The college is organized into six academic departments; Animal Science (jointly with the College of Agriculture), Environmental Practice, Microbiology (jointly with the College of Liberal Arts), Pathobiology, Rural Practice, and Urban Practice.

Primary objective of the college is to educate and train veterinarians for private practice. However, the professional curriculum provides an excellent basic medical education, in addition to training in diagnosis, disease prevention, medical treatment, and surgery. Graduates are qualified to pursue careers in many facets of veterinary medicine and related health professions.

Most veterinarians are engaged in private practice. The majority of these are in general practices which deal with the diseases of all kinds of animals. About one-fourth of the veterinarians in the United States are engaged exclusively in pet or companion animal practice. A growing number are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species.

Veterinarians also find rewarding careers in the U.S. Public Health Service, the U.S. Army and Air Force, and in state, county, or local health agencies. A large number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases.

Excellent opportunities exist for veterinarians interested in research, both research for the direct benefit of animals and research conducted with animals but for the benefit of mankind. Such opportunities are available at colleges and universities and with governmental agencies, private research institutions, and biological and pharmaceutical companies.

FACILITIES

Administrative offices of the College of Veterinary Medicine are located in Morgan Hall on the agricultural campus. The Department of Animal Science is housed in Brehm Animal Science Building, also on the agricultural campus, and the Department of Microbiology is located in Walters Life Sciences Building on "The Hill" at The University of Tennessee, Knoxville.

The Veterinary Medicine Building on the agricultural campus houses the departments of Environmental Practice, Rural Practice, Urban Practice, and Pathobiology. Additionally, the Veterinary Teaching Hospital, clinics, and the Agriculture/Veterinary Medicine Library are contained within this modern structure of 246,000 gross square feet.

The college has research facilities on Cherokee Farm adjacent to the UT Hospital. Satellite teaching-research facilities are located in Middle and West Tennessee.

ADMISSION REQUIREMENTS

Admission to the professional program of the College of Veterinary Medicine is limited to that number for which an education of high quality can be provided with the resources available to the college.

To qualify for admission, a candidate must have completed at least the following minimum pre-veterinary requirements:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Minimum Credits</th>
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<tbody>
<tr>
<td>English, including speech</td>
<td>12</td>
</tr>
<tr>
<td>Humanities</td>
<td>12</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics through introductory</td>
<td></td>
</tr>
<tr>
<td>calculus</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry: general</td>
<td>12</td>
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<tr>
<td>Organic</td>
<td>12</td>
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<td>Biochemistry</td>
<td>6</td>
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<td>Physics</td>
<td>12</td>
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<tr>
<td>Biology or zoology</td>
<td>12</td>
</tr>
<tr>
<td>Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>Animal science, including nutrition and genetics</td>
<td>13</td>
</tr>
</tbody>
</table>

*Includes history, literature, music or art appreciation, philosophy, religion, or foreign language.
*Includes economics, anthropology, political science, psychology, sociology, and geography.
*Excluding laboratory.

Pre-veterinary requirements may be completed in any accredited college or university which offers courses equivalent to those at The University of Tennessee.

The Colleges of Agriculture and Liberal Arts of The University of Tennessee offer a three-year pre-veterinary curriculum which satisfies all the course requirements for admission to the College of Veterinary Medicine. Students who are admitted to the College of Veterinary Medicine following completion of this pre-veterinary curriculum will receive a bachelor's degree upon completion of the first year (three quarters) of the professional veterinary medicine curriculum.

ADMISSION PROCEDURE

Admission of new students will be for the fall quarter of each year. Applicants will be screened carefully by a faculty committee to determine those best qualified for admission within the college enrollment quota.

Applicants will be considered in the following order of priority: (1) residents of Tennessee; (2) residents of other states.

Forms and instructions for making application for admission may be obtained from:

Director of Admissions
202 Student Services Building
University of Tennessee
Knoxville, Tennessee 37996-0200

Applications must be completed and mailed so as to reach the Director of Admissions by January 15 each year. All pre-veterinary requirements must be completed by the end of the spring term of the year in which the student plans to enroll in the College of Veterinary Medicine.

COURSE LOAD

The professional curriculum of the College of Veterinary Medicine requires a specific number of hours each quarter. A student may enroll for fewer or more than that number only with the permission of the dean. Because of the sequential and highly integrated character of the professional curriculum, all courses in a given quarter are considered prerequisite to those in the succeeding quarter.
EXTRAMURAL PROGRAMS

The opportunity to participate in off-campus learning experiences may be available for a limited number of students during the latter half of the final year of the professional curriculum. Selection of an extramural learning experience will require approval by the department concerned and the College of Veterinary Medicine Curriculum Committee. The extramural program identified by the student must represent a learning experience not available within The University of Tennessee, Knoxville.

PROFESSIONAL CURRICULUM

The professional curriculum in veterinary medicine is an 11-academic quarter, year-round program, including summers. The first year (three quarters) consists mostly of preclinical subjects such as anatomy, physiology, microbiology, parasitology, and general pathology. The second year (four quarters) includes the study of diseases, their causes, diagnosis, treatment, and prevention. The final calendar year is devoted to intensive training in the solving of animal disease problems, including extensive clinical experience in the teaching hospital. The curriculum also provides for education in the science and art of veterinary medicine and in paramedical subjects such as animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

*Only students officially enrolled in the professional veterinary curriculum may register for 8000-level courses.*

### Fall Quarter, FIRST YEAR
- **Vet. Animal Science 8510** 4
- **Vet. Animal Science 8540** 5
- **Vet. Medicine 8310** 2
- **Microbiology 8101** 5
- **Vet. Animal Science 8240** 5

**TOTAL: 21 hours**

### Winter Quarter, FIRST YEAR
- **Vet. Animal Science 8520** 5
- **Vet. Animal Science 8550** 5
- **Microbiology 8102** 4
- **Vet. Animal Science 8250** 5
- **Environmental Practice 8611** 2

**TOTAL: 21 hours**

### Spring Quarter, FIRST YEAR
- **Microbiology 8103** 4
- **Pathobiology 8730** 4
- **Pathobiology 8710** 5
- **Vet. Medicine 8360** 1
- **Vet. Medicine 8311** 2
- **Environmental Practice 8612** 5

**TOTAL: 21 hours**

### Summer Quarter, SECOND YEAR
- **Vet. Medicine 8341** 4
- **Vet. Medicine 8362** 3
- **Vet. Medicine 8343** 5
- **Vet. Medicine 8352** 3
- **Vet. Medicine 8320** 3
- **Vet. Medicine 8363** 5

**TOTAL: 20 hours**

### Fall Quarter, SECOND YEAR
- **Vet. Medicine 8350** 6
- **Vet. Medicine 8340** 4
- **Vet. Medicine 8342** 4
- **Vet. Medicine 8353** 4
- **Vet. Medicine 8366** 4
- **Vet. Medicine 8344** 1

**TOTAL: 23 hours**

### Winter Quarter, SECOND YEAR
- **Vet. Medicine 8360** 5
- **Vet. Medicine 8361** 5
- **Vet. Medicine 8351** 4
- **Vet. Medicine 8365** 4
- **Vet. Medicine 8345** 4
- **Vet. Medicine 8344** 1

**TOTAL: 23 hours**

### Spring Quarter, SECOND YEAR
- **Vet. Medicine 8370** 9
- **Vet. Medicine 8371** 3
- **Vet. Medicine 8364** 1
- **Vet. Medicine 8375** 3
- **Vet. Medicine 8344** 1
- **Vet. Medicine 8372** 4

**TOTAL: 21 hours**

### THIRD YEAR

#### Basic Sequence (roughly equivalent to Summer and Fall Quarters)
- **Core Block—9 weeks**
  - Environmental Practice 8600-2 weeks
  - Pathobiology 8700—2 weeks
  - Radiology 8401—2 weeks
  - Special Services 8402—2 weeks
  - Rural Practice—8 weeks
  - Urban Practice—8 weeks
  - Seminars 0-8

**44 hours**

#### Advanced Sequence (roughly equivalent to Winter and Spring Quarters)
- **Core Block—9 weeks**
  - Pathobiology 8760—2 weeks
  - Radiology 8404-1 weeks
  - Free Time—5 weeks
  - Rural Practice—9 weeks
  - Urban Practice—9 weeks

**3rd Year Credits 82**

**TOTAL: 232 hours**

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**Biomedical environments and in teaching or research capacities involving humans or animals.**

### Departments of Instruction

#### Animal Science—Veterinary Medicine

**Professors:**
- D. O. Richardson, Ph.D. Ohio State;
- K. M. Barth, Ph.D. Rutgers; M. C. Bell, Ph.D. Oklahoma State; J. K. Biehn (Emeritus), Ph.D. Ohio State; C. C. Chamberlain (Emeritus), Ph.D. Iowa State; B. H. Erickson, Ph.D. Kansas State; G. G. Helis (Dean), Ph.D. Iowa State; S. L. Hansard (Emeritus), Ph.D. Florida; E. R. Lidwell, M.S. Tennessee; G. M. Mermis (Emeritus), D.V.M. Michigan State; T. P. McDonald, Ph.D. Tennessee; J. B. McLaren, Ph.D. Auburn; J. K. Miller, Ph.D. Georgia; M. J. Montgomery Ph.D. Wisconsin; R. L. Murpree (Emeritus), Ph.D. Wisconsin; H. V. Shirley, Ph.D. Illinois; R. R. Shrode, Ph.D. Iowa State; R. L. Tugwell (Emeritus), Ph.D. Kansas State.

**Associate Professors:**

**Assistant Professors:**
- B. R. Bell, Ph.D. North Carolina State; W. C. Cullen, Ph.D. Minnesota; J. D. Godkin, Ph.D. Massachusetts; R. W. Heitmann, Ph.D. Maine; S. P. Oliver, Ph.D. Ohio State; T. W. Schultz, Ph.D. Tennessee; J. D. Smalling, Ph.D. Texas A & M.

In addition, academic expertise of staff members at CARL and Oak Ridge is used on appropriate occasions.

### PROFESSIONAL COURSES

**8240-50 Veterinary Physiology (5.5)** Introduction to concepts and problems in physiology which form a base for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Order of sequence: Cellular, cardiovascular, digestive, renal, respiratory, neural and endocrine physiology. 4 hrs and 1 demonstration. F, W

**8510-20 Veterinary Histology/Embryology (4.5) Cyto-**

**logia, histology and organology of animal body systems, structural and functional interrelationships. Embryonic development from fertilization and origin of congenital defects. Correlated with 8540-50 and 8540-50. 8510: 2 hrs and 2 labs. 8520: 3 hrs and 2 labs. F, W

**8540-50 Veterinary Gross Anatomy (5.5)** Lab covering gross and applied anatomy of common domestic animals (dog, cat, horse, cow). Dissection of embalmed specimens; sections, slides, models, and living animals. Sequence of organ system studied correlated with 8510-20. F,W

**8570 Special Problems in Animal Science (2-20)**

Certain topics in anatomy, histology and physiology. May be repeated. W, Sp

**8575 Advanced Seminar in Animal Science (1-4)**

Applied anatomy, histology and physiology. F, Su

**GRADUATE COURSES**

Additional courses listed in College of Agriculture, Department of Animal Science.

**5530 Mammalian Organology (5)** Microscopic study of structure of organs of major organ systems. Prereq: Zoology 3320 or equivalent. 3 hrs and 5 labs. W

**5540 In vitro Evaluation of Toxicity (3)** Principles and techniques of in vitro evaluation of acute toxicity, mutagenesis, carcinogenesis, and teratogenesis. Prereq: Biochemistry 5610. 2 hrs and 3 labs. Su
6010 Advanced Topics in Environmental Medicine (1-3) Current and future research methodology, laboratory situation, recent advances in instrumentation in analytical techniques for environmental medicine. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hrs. E

Microbiology—Veterinary Medicine

Professors:
A. Brown (Head), Ph.D. Chicago; R. W. Beck, Ph.D. Wisconsin; J. M. Becker, Ph.D. Cincinnati; R. J. Courhey, Ph.D. Syracuse; P. C. Morris, Ph.D. Pennsylvania; M. D. Maryland, W. S. Slattery, Ph.D. Yale; T. B. Rouse, B.V.S. University of Bristol (England); Ph.D. University of Guelph (Canada); J. M. Woodward (Emeritus), Ph.D. Kansas; C. J. Wust, Ph.D. Indiana.

Associate Professors:
D. A. Bean, D.V.M.; D. A. Brain, D.V.M.; Ph.D. Michigan State; G. S. Sayder, Ph.D. Idaho.

Assistant Professors:
R. M. Moore, Ph.D. Texas-Austin; K. M. Sotkin, Ph.D. Michigan State; G. Stacey, Ph.D. Texas-Austin.

PROFESSIONAL COURSES

8101 Veterinary Bacteriology and Mycology (5) Pathogenesis of bacterial and fungal disease: Taxonomic study relating microbial structure, metabolism and genetics to patterns of disease and mode of action of antimicrobials. 3 hrs and 2 labs. F

8102 Veterinary Virology (4) Structure and replication of animal viruses, classification of viruses, mechanisms of viral pathogenesis. Techniques for quantitating viruses, viral antigens, and antiviral antibodies. Fundamental understanding best approach to viral diagnosis and immunoprophylaxis. 2 hrs and 2 labs. W

8103 Veterinary Immunology (4) Immunobiology, mechanisms of immune reaction, diagnostic immunology, role of immune response in preserving integrity of body as well as in causing disease. 2 hrs and 2 labs. Sp

8175 Advanced Seminar in Microbiology (1-4) Applied microbiology such as serologic diagnosis, clinical immunology. Su. F

GRADUATE COURSES

For specific course listings please see College of Agriculture, Department of Animal Science, and College of Liberal Arts, Department of Microbiology.

Pathobiology

Professors:
R. L. Michel (Head), V.M.D. Pennsylvania, Ph.D. Michigan State; M. D. McGavin, M.V.Sc. Queensland (Australia); Ph.D. Michigan State; L. N. D. Potgieter, B.V.Sc. Pretoria (South Africa), Ph.D. Iowa State; H. M. Schuller, D.V.M. Justus Leibig (Germany), Ph.D. Hamburg (Germany).

Associate Professors:

Assistant Professors:

PROFESSIONAL COURSES

8700 Basic Pathobiology Rotation (3) Practice and demonstration in laboratory diagnosis, postmortem examination and clinical pathological, parasitological, and microbiological techniques. Su, F

8710 Veterinary Pathology (5) Causes of disease, disturbances of cell growth, inflammation, and neoplasia. 3 hrs and 2 labs. Sp

8730 Veterinary Parasitology (4) Parasitology (protozoology, helminthology, and entomology) and relation to disease in animals. 3 hrs and 1 lab. Sp

8760 Advanced Pathobiology (3) Further training in clinical laboratory diagnostic procedures, and in postmortem examinations. W, Sp

8770 Special Problems in Pathobiology (2-10) Opportunity to design and execute research problem. May be repeated. W, Sp

8775 Advanced Seminar in Pathobiology (1-4) Diagnostic topography, electron microscopy, histological techniques. Su, F

GRADUATE COURSES

5000 Thesis (1-15) P/NP only. E

5010 Comparative Pathology (5) Lectures and lab. Pathogenic mechanisms. Comparative aspects. Lectures reinforced by lab study of gross, microscopic and ultrastructural lesions. Prerequisite: Zoology 3060, 3350. F, A

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6010 Special Topics in Pathology (1-3) E

6020 Special Problems in Pathobiology (1-5) Necropsy, high resolution pathobiology, clinical parasitology, clinical immunology, clinical bacteriology and mycology, and clinical virology. May be repeated. Maximum 20 hrs. E

6030 Veterinary Biopsy (1-2) Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning. Prerequisite: Consent of instructor. May be repeated. Maximum 4 hrs. E

6035 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hrs. E

6040 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prerequisite: Consent of instructor. May be repeated. Maximum 6 hrs. E

6045 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term enrolled. Prerequisite: Consent of instructor. May be repeated. Maximum 2 hrs. Class meets once monthly. E

6050 Ultrastructural Pathology (1) Ultrastructural changes in diseased cells and tissues. Interpretation of observations. Prerequisite: Professional medical degree or consent of instructor. F, A

6052 Pathogenesis and Diagnosis of Virus Diseases in Domestic Animals (5) Biology of viruses and therapy of viral infections in domestic animals. Prerequisite: Biochemistry 4110-20, 4119: Microbiology 4430, 4439; consent of instructor. W

6055 Techniques in Pathology (3) Fixation, processing and staining of tissue specimens; specialized gross and microscopic techniques; photography of gross specimens and photomicrography. Prerequisite: Consent of instructor. 2 hrs and 1 lab. F, A

6060 Principles of Pathology (3) Advanced topics in pathology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical and morphologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Participation in seminar on selected topics from current literature and textbooks. Prerequisite: Consent of instructor. F, A

Rural Practice

Professors:
G. M. H. Shires (Head), B.V.Sc., Pretoria (South)

Associate Professors:

Assistant Professors:

Resident:

Interns:
D. B. Kettenman, D.V.M. Purdue; M. L. Rose, D.V.M. Cornell.

PROFESSIONAL COURSES

8900 Basic Clinical Rotations in Rural Practice (12-16) introductory clinical training in food animal, equine, ambulatory and herd health practices. Su, F

8960 Advanced Clinical Rotations in Rural Practice (3-16) Advanced clinical training in food animal, equine, ambulatory and herd health practices. W, Sp

8970 Special Problems in Large Animal Medicine, Surgery, and Theriogenology (2-10) Opportunity to emphasize specific career objectives. Prereq: Enroll, Prac. 8900, Pathobiology 8700, Rural Prac. 8900, and Urban Prac. 8800. May be repeated. W, Sp

8975 Advanced Seminar in Rural Practice (1-4) Equine medicine, food animal surgery, clinical toxicology. Su, F

GRADUATE COURSES

5000 Thesis (1-15) P/NC only. E

6000 Doctoral Research and Dissertation (3-15) P/NC only. E

Interdepartmental Offerings

VETERINARY MEDICINE

PROFESSIONAL COURSES

8010 Client Relations and Communication Skills (1) Interpersonal skills as they apply to client relations and communication with colleagues, employees, general public. 1 lab S/NC only. Sp

8310 Introduction to Veterinary Medical Practice (2) Animal species, breed identification, basic care, feeding, restraint, handling. Introduction to physical diagnosis, intravenous techniques, blood sampling, etc. 1 hr and 1 lab. F

8311 Introduction to Veterinary Medical Practice (2) Physical diagnosis, history taking, and client relations, anesthetic principles, agents and techniques. 1 hr and 1 lab. F

8320 Medical Science Interaction Laboratory (3) Multidisciplinary, lab and lectures to discuss and provide integrative learning and understanding of physiologic, pharmacologic, and pathologic principles underlying mechanisms of diseases caused by common toxic agents. Prereq: Enroll, Prac. 8900 and Urban Prac. 8800. May be repeated. W, Sp

8321 Medical Science Interaction Laboratory (3) Multidisciplinary, lab and lectures to discuss and provide integrative learning and understanding of physiologic, pharmacologic, and pathologic principles underlying mechanisms of diseases caused by common toxic agents. 4 hrs and 1 lab. Sp

8330 Integumentary System (4) Diseases of integumentary system of animals, with emphasis on laboratory examination, interpretation of pathologic features, diagnosis, and treatment. 3 hrs and 1 lab. F

8341 Hematology and Introductory Clinical Pathology (4) Laboratory and clinical approach to diagnosis and treatment of hematopoietic system diseases, and principles of methods of laboratory evaluation of diseases from other system courses. 3 hrs and 1 lab. Su

8342 Alimentary Tract I (5) Physiologic basis, pathology, diagnosis and treatment of diseases of alimentary tract and digestive organs of dogs and cats. F

8343 Patterns of Disease (5) Host-agent relationshipships. Pathology, laboratory diagnosis, control and public health significance. Principles of epidemiology and application to study of diseases in animal populations. Su

8344 The Art of Veterinary Medicine (1) Specific diagnostic problems or paramedical subjects important to veterinary medical practice: differential etiology, diagnosis, and treatment of certain disease signs or symptoms; implications for veterinarian of medical jurisprudence and ethics, practice economics, veterinarian history. May be repeated. S/NC only. F, W, Sp

8345 Alimentary Tract II (4) Physiologic basis, pathology, diagnosis and treatment of diseases of alimentary tract and digestive organs of swine, sheep, goats, cows and hogs. W

8350 Reproductive System (6) Diagnosis, therapy and prevention of conditions causing reduction of fertility of domestic animals. Abnormal conditions of the mammary gland, diagnosis and prevention of mastitis. 4 hrs and 2 labs. F

8351 Urinary System (4) Understanding of urinary-renal system of animals in health and disease. 3 hrs and 1 lab. W

8352 Cardiovascular System (3) Pathology, diagnosis, and management of cardiovascular diseases of animals. Anatomic, physiologic, and pharmacologic principles which provide basis for medical and surgical treatment. 2 hrs and 1 lab. Su

8353 Endocrine, Metabolic and Nutritional Diseases (4) Biochemical and pathophysiologic mechanisms of endocrine, metabolic and nutritional diseases of animals; diagnosis, therapy and prevention. F

8360 Musculoskeletal System I (5) Pathology, diagnosis, and management of musculoskeletal diseases of small animals; pathologic changes, interpretation of radiographs and surgical procedures. 4 hrs and 1 lab. W

8361 Musculoskeletal System II (5) Pathology, diagnosis, and management of musculoskeletal diseases of large animals. Functional anatomy, radiographic interpretation, surgical procedures and medical therapy applicable to equines and ruminants. 4 hrs and 1 lab. W

8362 Veterinary Toxicology (3) Molecular mechanisms and pathologic and clinical features of animal diseases caused by chemical agents. Su

8363 Public Health (2) Public health aspects of veterinary medicine and nature of related laws, ordinances, and regulations. Veterinarian's role in the protection of environment, ecology, and quantity and quality of food. Su

8364 Animal Dietetics (1) Applied nutrition of cattle, swine, horses, and companion animals. Diets and methods of feeding for both normal and special situations. Sp

8365 Radiology (4) Basic radiologic technology, radiation safety, special procedures and radiographic interpretation in diagnosis of clinical cases. 3 hrs and 1 lab. W

8366 Respiratory System (4) Detection and diagnosis of upper and lower respiratory diseases of domestic animals. Pathophysiology and pathology of infectious and noninfectious diseases. Lectures and lab with live and simulated case studies. 3 hrs and 2 labs. W

8370 Neurosciences (5) Normal and abnormal neural structure and function in animals; clinical neurology and neuropathology. 6 hrs and 3 labs. Sp

8371 Visual and Auditory Systems (3) Diseases involving eyes and ears of animals, with emphasis on anatomic, physiologic, and pharmacologic features. 2 hrs and 1 lab. Sp

8372 Comparative Medicine (4) Diagnosis, prevention, and treatment of diseases of laboratory animals, avian species, and marine mammals seen most commonly by practicing veterinarians. Sp

8375 Principles of Medicine (3) Physiologic and pathologic principles underlying mechanisms of disease. Selected examples of human and animal diseases, recent scientific advances and effects on veterinary medicine. Sp

8401 Clinical Radiology (3) Training in radiographic techniques and interpretation of studies as part of the diagnostic process. May be repeated. E

8402 Special Medical Services (3) Clinical training in specialties such as anesthesiology and ophthalmology, with casework in both urban rural and animal clinics. Su, F

8460 Extramural Programs (3-20) Supervised off-campus educational program with an approved institution; limited enrollment. Prereq: Consent of department and College of Veterinary Medicine Curriculum Committee. W, Sp

GRADUATE COURSES

5433 Patterns of Disease (5) Host-agent relationship in disease of animals. Pathogenesis, laboratory diagnosis, control, and public health significance. Epidemiology and pathology and study of diseases in animal populations. Prereq: Consent of instructor and Director, Comparative and Experimental Medicine Graduate Program.

5362 Veterinary Toxicology (3) Pharmacologic basis and pathologic and clinical features of diseases caused by chemical toxic agents: clinical manifestation, diagnosis, and treatment. Prereq: Consent of instructor and Director, Comparative and Experimental Medicine Graduate Program.

5363 Public Health (2) Public health aspects of veter-
inary medicine and nature of related laws, ordinances and regulations. Veterinarian's role in protection of environment, ecology, and quantity and quality of food. Prereq: Consent of instructor and Director, Comparative and Experimental Medicine Graduate Program. Su

5372 Comparative Medicine (4) Diagnosis, prevention, and treatment of diseases of laboratory animals, avian species, and marine mammals, seen most commonly by practicing veterinarians. Prereq: Consent of instructor and Director, Comparative and Experimental Medicine Graduate Program. Sp

5375 Principles of Medicine (4) Physiological and pathological principles underlying mechanisms of disease. Selected examples of human and animal diseases; recent advances in principles of veterinary medicine. Prereq: Consent of instructor and Director, Comparative and Experimental Medicine Graduate Program. Sp
College of Business Administration

C. Warren Neel, Dean
John R. Moore, Associate Dean
Roger L. Jenkins, Associate Dean for Graduate Programs
Richard C. Reizenstein, Associate Dean for Undergraduate Programs
Clyde Keller, Associate Dean for External Affairs
John E. Riblett, Director of Management Development Programs
David A. Hake, Director, Center for Business and Economic Research

Graduate Programs

The College of Business Administration offers programs leading to five advanced degrees: the Doctor of Philosophy with majors in Business Administration, Economics, and Management Science, the Master of Arts with a major in Economics, the Master of Science with a major in Statistics, and the Master of Science and Doctor of Philosophy degrees. (See page 97). Also, the Department of Management Science offers an intercollegiate program leading to the Master of Science degree. (See page 98).

The two College-wide programs, the MBA and the Ph.D. in Business Administration, are described below. Descriptions of other degree programs will be found under the appropriate departmental or program headings.

Academic Common Market: An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT Knoxville on an in-state tuition basis. Programs in the College of Business Administration available to residents of the states indicated include: Ph.D. (Business Administration) West Virginia; MBA (Transportation and Logistics) Virginia and West Virginia; Industrial and Organizational Psychology (M.S. and Ph.D.) Alabama, South Carolina, and Virginia. Additional information may be obtained from the Graduate Programs office of this college.

THE MBA PROGRAM

The MBA program is designed for students with undergraduate degrees in the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. For full-time students, the MBA program is a two-year lock-step program with students beginning in the fall of each year and graduating in the spring, two years hence. Those students not having the equivalent of two quarters of undergraduate coursework in accounting, business law, and economics must either attend special UT MBA classes summer quarter or complete courses in these areas at another accredited institution prior to enrolling in the MBA program.

During the summer between the first and second year, students must complete an internship or equivalent experience. The complete MBA program with a concentration in management or entrepreneurship and new venture analysis is offered for part-time students by the regular faculty of the College. Part-time students enter in the fall quarter and take approximately 4 years to complete the program. Part-time students are required to successfully complete six hours of graduate credit per quarter. Internships are not required of part-time students.

The program consists of 17 MBA core courses and concentrations/electives of 7 courses. Each course is 3 quarter hours of graduate credit.

Application and Admission: Applications are accepted for Fall Quarter only. The application deadline for Fall Quarter is April 1. Any applications received after that date will be considered on a space available basis.

To obtain application materials, write or call:
Associate Dean for Graduate Business Programs
Suite 527, Stockely Management Center
College of Business Administration
The University of Tennessee
Knoxville, TN 37996-0550
Telephone: (615) 974-5033

For admission to the MBA program, consideration is given to (1) applicant's academic record with particular attention to the last two years of undergraduate work and previous graduate studies, (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, (3) work experience and other activities which demonstrate potential for leadership, and (4) recommendations from professors and work supervisors. The admission decision is based on all factors which make up the total application; there is no cut-off for either grade point averages or GMAT scores.

Prerequisites: Upon matriculation, the student must have received a bachelor's degree from a regionally accredited institution. College level mathematics through at least one course in calculus is the only prerequisite requirement.

Those electing the management science or statistics concentration must have com-
Academic Common Market. (See page 41.)

Concentration and Electives: A concentration area(s) may be indicated on the MBA Program Application or this declaration may be deferred until after matriculation. In any event, selection must be made no later than completion of 27 hours of MBA program course work. Requests for changes in concentration area(s) must be submitted to the Office of Graduate Business Programs.

Among the 7 courses in the concentration/electives block, at least 4 but not more than 5 must be in one of the following concentration areas (for specific courses required in each concentration area, see departmental sections on following pages):

- Controllship Economics
- Entrepreneurship and New Venture Analysis
- Finance
- Forest Industries Management
- Management
- Management Science
- Marketing
- Statistics
- Transportation and Logistics

The MBA Center of Excellence: Entrepreneurship and New Venture Analysis is an interdisciplinary concentration comprised of three specifically designed courses (one each in finance, management, and marketing). As the MBA Center of Excellence, this concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneurial activities. The Entrepreneurship and New Venture Analysis concentration will be offered to both the full- and part-time student in recognition of the growing trend in American business and its focus on product/venture development.

The remaining elective courses (2 to 3) must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the College. Up to 2 courses (8 hours) in this block may be taken outside the College of Business Administration. No more than 3 courses numbered below 5000 may be included in this 7-course block. Courses numbered below 4000 normally are not approved for the MBA program. Before beginning the concentration/electives part of the curriculum the student must have his/her program approved by the Office of Graduate Business Programs.

Transfer Credits: Graduate level courses taken at other AACSB accredited institutions that otherwise conform to University policy (page 21) may be credited toward MBA degree requirements within the following limits:

- MBA Core: 6 hours
- Concentration Area: 3 hours (provided at least 12 hours of course work at this institution are included in each concentration area)
- Elective Area: 3 hours
- The maximum number of hours that may be transferred is 9 quarter hours.

Other Requirements: The Application for Candidacy (see page 23) must be approved by two faculty members in the student's area(s) of concentration and the Associate Dean for Graduate Programs in the College of Business Administration, signed by the department head, and submitted to the Graduate Office.

To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in his/her program, a B average or higher in courses comprising the concentration area(s) and a B average or higher in the overall program. In lieu of passing a written comprehensive examination the student must satisfactorily demonstrate the ability to analyze and solve multi-functional problems of the administrative processes and policy determination and to integrate the concepts of the various disciplines embodied in the curriculum of the program. The student is tested in these areas in the courses of the MBA core, particularly in the capstone course, Business Administration 5310—Business Policy, as well as in work required in the concentration areas.

DUAL J.D.-MBA PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both Doctor of Jurisprudence and the Master of Business Administration degrees.

Admissions: Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and the Graduate School and College of Business Administration for the MBA degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to or, after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies be started prior to entry into the last 25 semester hours required for the J.D. degree and the last 24 quarter hours required for the MBA degree.

Curriculum: A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college except for courses qualifying for credit without regard to the dual program.

The College of Law will award up to 8 semester hours of credit toward the J.D. degree for each 3 hours performance in a maximum of 12 quarter hours of approved graduate level courses offered by the College of Business Administration. Three of the 12 quarter hours must be earned in Accounting 5030 or a more advanced accounting course. If College of Law credit is given for such an accounting course, the student may not receive credit for College of Law course 6590—Legal Accounting.

The College of Business Administration will award up to 12 quarter hours of credit toward the MBA degree for acceptable performance in a maximum of 8 semester hours of approved courses offered in the College of Law.

Except while completing the first year courses in the College of Law, students are encouraged to maximize the integrative facets of the dual program by taking courses in both colleges each quarter.

Awarding of Grades: In the College of Law, for grade recording purposes for graduate business courses and in the College of Business Administration for law school courses, grades awarded will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the college where such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a Law School course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course.

THE PH.D. IN BUSINESS ADMINISTRATION

The primary objective of the Ph.D. in Business Administration degree is to prepare a select number of qualified students for careers in university-level teaching and research, and for responsible positions in business and government. Students seeking a Ph.D. degree must be recommended for acceptance by the College of Business Administration to The Graduate School. Actual admission is based on the applicant's overall standing compared with other applicants and with the number of vacancies in each department. The college requires the Ph.D. application, scores from the GMAT, and 4 recommendations. All materials should be received by the College of Business Administration not later than March 1. Late applications are considered only if space is available.

Program of Study: The Ph.D. normally requires at least three years of intensive study and research beyond the MBA degree. Typically, the first two years of a student’s program consist of coursework, writing and research. The third year usually focuses on completion of the dissertation research and writing. It is emphasized that the Ph.D. program of study for Business Administration students only. Upon acceptance of a student by a particular departmental faculty, the student is expected to remain in residence until the dissertation has been completed and all requirements are met for completion of the Ph.D. degree.

Since the program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As part of the doctoral program, each student is required to serve as a teaching assistant to an undergraduate busi-
ness class, or as a research assistant to a senior faculty member. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Tennessee Ph.D. program is highly flexible, consisting of major and collateral options. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are also encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are five areas of concentration offered in the Ph.D. program:

- Accounting
- Finance
- Management
- Marketing
- Transportation and Logistics

More detailed information concerning these specific areas is available by writing directly to each department chairperson.

Degree Requirements: Doctoral students must file a program of study that has been approved by their temporary doctoral advisory committee and the Associate Dean for Graduate Business Programs by the end of the second quarter of coursework after entry into the program. This committee is nominated by the department chairperson in a student's intended area of concentration, subject to the Graduate Council's policies and procedures. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.

2. Students must complete appropriate courses at the graduate level, or other approved concentrations of coursework, in the following areas:
   - Accounting
   - Behavioral Science
   - Business Policy
   - Calculus
   - Computer Science
   - Econometrics
   - Finance
   - Legal Environment
   - Management
   - Marketing
   - Statistics
   - Economics

   All work in the above areas is subject to approval by the temporary doctoral advisory committee and the Associate Dean for Graduate Business Programs. Specific majors may have prerequisites not listed above.

3. Economics 5110-20 (or equivalent) is required, except that Management 5610-20 (or equivalent) may be substituted with prior approval.

4. A minimum of 15 quarter hours of graduate research methods must be completed. At least 6 quarter hours in statistics courses beyond Introduction to Statistical Concepts are required. The remaining 9 quarter hours can be completed in additional statistics (not to include Statistics 5050) courses or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.

5. The major area of concentration is the focal point of the Ph.D. program. Students are expected to master the literature, research techniques in their concentration area, and to do quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 18 quarter hours of coursework is required, including at least 9 hours of doctoral seminars. Graduate work in the major field taken at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework. Available major areas are: accounting, finance, management, marketing, and transportation/logistics.

6. A minimum of 12 quarter hours of graduate coursework is required in an area outside, but complementary to, the major area. The student may choose the collateral area from one of the following: one of the five major business areas listed above, economics, statistics, or a related area in another school or college of the University.

   - Comprehensive Examinations: Comprehensive written examinations over the major and collateral areas are required of each person seeking candidacy for the Ph.D. degree. The major area examination is administered in two sessions of approximately four hours each and the collateral area examination in one session of approximately four hours. Examinations may be supplemented with oral examinations. For a doctoral student having a collateral area in the College of Law, the results of only an oral examination may be determined and a written or comprehensive examinations is coordinated through the Office of Graduate Business Programs.

   When either the major or collateral area examination is passed, the remaining examination must be passed within the next 13 months. Comprehensive examinations are generally offered during the fall and spring terms.

Admission to Candidacy: Students may apply for admission to candidacy for the Ph.D. degree after maintaining at least a "B" average in coursework, successful completion of comprehensive examinations and acceptance of a research proposal for the dissertation by the student's doctoral committee.

   Doctoral students are advised to give serious attention early in their program to the composition of their doctoral committee. In accordance with the Graduate School policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be from the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

   Admission to candidacy must be approved at least two full quarters prior to the date the degree is conferred (admission in the fall quarter permits graduation in the following spring quarter). Advancement to candidacy must occur during the last two years after the student enters the program.

   Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration area and collateral area). Graduate courses accepted from other institutions must be included. Under "Other Requirements," the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student's doctoral committee and the Associate Dean for Graduate Business Programs before submission to The Graduate School.

   Dissertation (minimum of 36 quarter hours): The student must complete a dissertation embodying the results of original research. The dissertation is subject to the candidate's doctoral committee, which must certify its completion and acceptability after oral defense of the candidate's research effort.

   The dissertation normally must be completed within three years of the student's advancement to candidacy.

   Grade-Point Average: A student must maintain a cumulative GPA of 3.0 or higher in graduate courses. However, maintaining a 3.0 GPA does not guarantee the student will be allowed to continue in the doctoral program if there is overriding evidence that the student does not show promise and should be terminated from the program.

   Other Requirements: For information concerning program admission requirements, academic performance standards, fellowships and assistantships, and general rules and regulations of the Graduate School, see other parts of the College of Business Administration section and the first section of the catalog, "The Graduate School." Also see "Academic Common Market," page 41.

MINIMUM ACADEMIC PERFORMANCE STANDARDS

A graduate student in the College of Business Administration whose grade point average at any point is below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 quarter hours of course work attempted which is specified in the student's degree program. Full-time students must take 12 hours per quarter while on probation and part-time students must take 6 hours per quarter for each consecutive quarter of probation. Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Programs of the College of Business Administration upon recommendation of the student's faculty advisor.

ADMISSION REQUIREMENTS

General admission requirements for The Graduate School are stated beginning on page 13. M.Acc., MBA, and Ph.D. in Business Administration applicants are required to take the Graduate Management Admission Test (GMAT). Applicants for programs in economics, management science, and statistics may submit results of either the GMAT or the Graduate Record Examination (GRE) aptitude portion. Applicants for management science and statistics programs must have completed at least two years of college level calculus and be proficient in a computer language.

Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL). Scheduled dates and locations for taking these examinations may be obtained from Educational Testing Service, P.O. Box 966, Princeton, New Jersey 08540, and from most colleges and universities.
In addition to procedures required for admission to The Graduate School (beginning on page 13), M.Acc., MBA and Ph.D. in Business Administration applicants must submit additional information on forms provided by the College of Business Administration. The application for all programs and supporting materials should be submitted at least three months prior to desired entry date.

The College of Business Administration is fully accredited by the American Assembly of Collegiate Schools of Business and is associated with other leading graduate schools of business as a member of the Graduate Management Admission Council.

FELLOWSHIPS AND ASSISTANTSHIPS

Fellowships. Information concerning non-service fellowships administered by the Graduate School as well as application blanks may be obtained from the Graduate Office. Information on College-administered fellowships is available from the Office of Graduate Business Programs in the College of Business Administration.

Assistantships. A limited number of teaching and other assistantships that require from 10 to 20 hours of service per week are available through the departments of the College. Remuneration includes payment of fees and tuition as well as a monthly stipend. Awards are generally made on the basis of scholarship and performance on the admission test. Application forms may be obtained in any of the departments or from the office of the Associate Dean for Graduate Programs. Applications must be received by March 1 for consideration of assistantships and fellowships to be awarded for the following fall term.

Center for Business and Economic Research

The staff of the Center for Business and Economic Research engages in studies of the business and economic environment in Tennessee, the Southeast, and the nation. The Center through dissemination of various kinds of economic and socioeconomic information and supports the faculty of the College in seeking funding for research projects and, through its Computer Resources Group, provides support for integration of technology in the College of Business Administration. Staff members conduct research in regional economics, public finance, and areas related to socioeconomic problems in the region. The Center publishes the results of its own research as well as that of others in monograph form so that significant developments in the various business disciplines and economics can achieve widespread exposure. In addition, the Center staff does contract research on business and socioeconomic problems for governmental organizations and private industry. The Center publishes the Tennessee Statistical Abstract and quarterly the Survey of Business. The Center is a member of the Association for University Business and Economic Research.

Management Development Programs Department

The College's continuing education efforts are coordinated through the Department of Management Development Programs. Management Development Programs emphasizes consistent high quality programming, small class size, outstanding faculty, and a highly participatory style of instruction. The programs range from customized 'in plant' programs to the four-week University of Tennessee Executive Development Program (TEDP).

The Tennessee Executive Development Program, tailored to the needs of upper-level managers, has a strategic focus. Its major objectives are to develop executives for increasingly higher levels of management responsibility and to sharpen existing executive skills needed for comprehensive decision-making and leadership. The Management Development Program, designed for mid-level managers, is more operational in scope. It is appropriate for both the experienced manager who has not had advanced management training and the individual being developed for a mid-level position.

Other programs include: (1) The Institute for Productivity Through Quality, which teaches the techniques of statistical process control in an intensive 130-contact-hour program for both managers and executives; (2) the Senior Institute for Productivity Through Quality, a one-week program which provides a strategic overview of statistical management; (3) the Administrative Services Institute for Productivity Through Quality, a two-week program which applies the philosophy and tools of statistical management to non-manufacturing environments; (4) the Executive Development Program for Distribution Managers, which focuses on providing the distribution manager with an intensive exposure to contemporary management approaches; and other programs designed to meet the continuing education needs of business and industry.

Departments of Instruction

Accounting and Business Law

J. R. Williams (Head), Ph.D. Arkansas, C.P.A.

Accounting

MAJOR DEGREE Accounting

M.Acc.


Distinguished Lecturer: S. B. Wolfe, B.S. Virginia Polytechnic Institute.

The MASTER of ACCOUNTANCY PROGRAM

The objective of the Master of Accountancy (M.Acc.) program is to provide persons having an undergraduate accounting background and a sufficiently high level of accounting motivation with the depth and understanding of accounting which will enhance their probability of success in a career in professional accounting. Moreover, the student's educational experience should develop perspective toward the discipline of accounting in a manner that will enable the student to spearhead innovation and change in response to needs of public accounting, business, industry or government.

Foundation Requirements: Although the program is designed for students who have completed an accredited baccalaureate degree program with a major in Accounting, those with outstanding undergraduate records in any area may earn the M.Acc. degree by completing prerequisites in accounting and by including courses in other business and related disciplines to supplement the applicant's undergraduate background.

Course Requirements for the M.Acc. Program: A student's program encompasses a minimum of 45 quarter hours of graduate course work. Specifically, the student must complete courses in selected business disciplines and in the area of accounting as indicated below. Each course is 3 quarter hours of graduate credit.

Business Core (21 quarter hours):

Economics 5030, Finance 5420, Mathematics 5052 and 4 additional courses from the following areas subject to the approval of the program advisor (no more than one course may be taken in any one area): Business Policy, Business Law, Computer Science, Economics, Management, Management Science, Marketing, Finance, Statistics, and Transportation.

Accounting Core (15 quarter hours): Accounting 5110, 5120, 5210, 5420, 5950.

Accounting Electives (select 12 quarter hours): Accounting 5130, 5140, 5160, 5220, 5430, 5440, 5450, 5460, 5490, 5510, 5560, 5590.

Other Requirements: To qualify for the degree, the student must achieve a B average (3.0) in the business core courses and

1Prior course work will be considered in determining the Business Core courses.

2An exemption may be granted for Mathematics 5052 if the student has already completed a baccalaureate degree with a major in Accounting.

3Selected courses from other disciplines may be substituted for accounting electives upon approval of the M.Acc. program advisor.
also a B average in the accounting courses. Each student must pass a final written examination during the final quarter of study for the degree.

MBA Concentration: Controllership

**DBA Concentration: Accounting**

**Minimum Course Requirements for MBA Concentration**

5110, 5120, 5210, 5420, and two of the following: 5320, 5330, 5340.

The MBA Controllership concentration will provide the student with a comprehensive exposure to issues in financial management and control. The program is designed for students without an undergraduate background in accounting. Controllership core courses include Accounting 5220, 5350, 5360, and 5520. Accounting 5350 and 5360 are available for MBA students only. Students electing the Controllership option may not take courses in the M.Acc. curriculum other than Accounting 5220 and 5620.

5002 Non-Thesis Graduation Completion (3-15)

Required for the non-thesis student not otherwise registered during any quarter when such a student uses University faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5010 Financial Accounting (3)

Introduction to accounting model of firm and financial accounting information system. Not available to students with credit for 2110-20 or equivalent. F, Su

5020 Corporate Reporting Problems (3)

Analysis of uses and limitations of accounting model of firm. Emphasis on internal and external financial reporting. Prereq: 5010 or equivalent. F, W

5030 Managerial Accounting (3)

Analysis of accounting model of firm as vehicle for planning and controlling activities. Attention to development of cost data appropriate to decision-making models. Prereq: 5020, Economics 5010. W, Sp

5100 Seminar in Accounting Theory (3)

Evolution of accounting theory, concepts underlying financial reporting models, and authoritative accounting literature as each relates to measurement of periodic performance and financial position. Prereq: Consent of department head. May not be taken by students with credit for 4990.

5120 Seminar in Advanced Auditing (3)

Theory and concepts underlying the philosophy of auditing as related to current auditing issues. Prereq: 4120 or equivalent.

5130 Selected Topics—Current Accounting Practice (3)

Critical in-depth consideration of selected financial reporting topics of particular relevance to current accounting practice. Prereq: 5110.

5140 Selected Topics—Current Accounting Theory (3)

Critical in-depth consideration of current issues in the financial accounting literature. Prereq: 5110.

5160 Graduate Internship in Accounting (3)

Full-time resident professional employment for one academic quarter involving qualified job experience, written report of responsibilities, and evaluation of student performance. Prereq: Consent of instructor.

5210 Seminar in Advanced Managerial Cost Accounting (3)

Analysis of conceptual and current issues impacting on development and practice of managerial cost accounting. Cost allocation, planning and control, and interfacing of these areas. Prereq: 4220 or consent of instructor.

5220 Budgetary Planning and Control Systems (3)

Attention to approaches to organizing of planning and control systems to meet organizations needs and objectives. Control systems and corporate structure, discretionary expense centers, profit centers, investment centers, transfer pricing, and control in not-for-profit organizations. Prereq: 3220 or 5030.

5310 Auditing Concepts (3)

Concepts and theory of auditing, environment of internal and external auditing, nature of evidence, internal control evaluation, and reporting. Not intended for persons who have credit for auditing course. Prereq: 3130. Prereq or coreq: Statistics 4415 or equivalent.

5320 Advanced Auditing (3)

Case-oriented, including audit of specific aspects of financial reporting. Emphasis on reporting, data processing, statistical sampling, and internal auditing. Prereq: 4110 with C or higher, statistical sampling, and auditing 5110, 5210 for MBA students who do not have credit for 4120.

5330 Advanced Income Tax (3)

Federal income tax with emphasis on tax planning and research. Prereq: 3120 with C or higher, 3430 with C or higher. (Available only to MBA students who do not have credit for 4430.)

5340 Consolidations and Business Combinations (3)

Theory and practice of accounting for interrelated business entities—transfers, life insurance, annuities, and for persons who have credit for a course with a similar content. Prereq: 3130.

5350 Financial Accounting Issues in Business (3)

A comprehensive investigation of various financial reporting and auditing issues relating to decision making in financial management. Emphasis is upon the market role of accounting information. Available to MBA students only. Prereq: 5000.

5360 Taxation for Business Decisions (3)

A conceptual foundation and analysis of current issues in taxation impacting on the use and management of financial and investment information applied to individual, corporate, partnership, and fiduciary taxpayers. Prereq: 5030. Available to MBA students only.

5420 Tax Research (3)

Development of expertise in tax research utilizing tax service, tax periodicals, legal cases, and other available sources. Includes individual research projects. Prereq: 4430 or equivalent.

5430 Tax Planning (3)

Advanced study of income tax problems emphasizing alternatives available to minimize tax liability compatible with achieving taxpayer objectives. Prereq: 5420.

5440 Taxation of Estates and Gifts (3)

Transfers at death, inter vivos transfers, life insurance, annuities and employee death benefits, marital and other deductions and exemptions, and estate and gift tax returns. Prereq: 4430. (Not available to students with credit for 4440.)

5450 Taxation of Partnerships and Partners (3)

Formation, operation, termination, and liquidation and other special problems of partnerships. Prereq: 5420.

5460 Taxation of Corporations and Shareholders (3)

Organization and structure, distributions, liquidations, reorganizations and special problems including Subchapter S Corporations and Personal Holding Companies. Prereq: 5420.

5490 Tax Policy (3)

Current policies explored through analysis of tax policy, budgetary, and political issues. Prereq: 4430. (Not available to students with credit for 4110-20 or equivalent. F, W, Su)

5510 Not-for-Profit Accounting (2)

Theory and practice of accounting for not-for-profit organizations. May be repeated. Admission by consent of department head. S/NC only.

5590 Accounting Systems Policy (3)

Seminar in emerging topics in management of accounting information systems, auditing of advanced systems, and knowledge-based systems. Prereq: 5640.

5610 Seminar in Applied Business Analysis (3)

Discipline and environment of business analysis; case study emphasis. Prereq: 5110, 5120, 5210, 5420. (Not available to MBA students.)

5650 Management Information Systems (3)

Design of computer-based business information systems; decision support systems for business problems.

5610 Seminar in Applied Business Analysis (3)

Application of business concepts and analytical skills
to problems of small businesses in community. Students work under the supervision of participating professor. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Business Education

See College of Education

Economics

MAJOR

DEGREES

Economics

M.A., Ph.D.

Professors:
W. D. Cole (Head), Ph.D. Texas; R. A. Bohm, Ph.D. Washington (St. Louis); L. R. Bowley, Ph.D. Texas; S. L. Carroll, Ph.D. Harvard; H. S. Chang, Ph.D. Vanderbilt; G. R. Fawell*; Ph.D. McGill; C. B. Garrison, Ph.D. Kentucky; H. W. Herzog, Ph.D. Maryland; H. E. Jensen, Ph.D. Texas; F. Y. Lee, Ph.D. Michigan State; A. Mayhew, Ph.D. Texas; J. R. Moore, Ph.D. Cornell; W. C. Neal's, Ph.D. London School of Economics; K. E. Quindry (Emeritus); Ph.D. Kentucky; A. M. Schlotthman, Ph.D. Washington (St. Louis); G. A. Spiva, Ph.D. Texas.

Associate Professors:
D. P. Clark, Ph.D. Michigan State; W. F. Fox, Ph.D. Ohio State; E. Ghioud, Ph.D. Stanford; D. L. Kaserman, Ph.D. Florida; E. Phillips, Ph.D. Washington (Seattle); A. M. Schlotthman, Ph.D. Washington (St. Louis).

Assistant Professors:
J. A. Gauger, Ph.D. Iowa State; R. A. Hofer, Ph.D. North Carolina; J. W. Mayo, Ph.D. Washington (St. Louis); H. Thompson, Ph.D. Houston.

*Alumni Distinguished Service Professor

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. degrees. The M.A. degree may be completed by either a thesis or non-thesis option, while the Ph.D. degree requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics for further information. The Department also offers an area of concentration for the MBA degree. Students interested in the MBA program should contact the Associate Dean for Graduate Programs, College of Business Administration.

THE MASTERS PROGRAM

Admission to the M.A. program is based on undergraduate academic performance and on scores from the general portion of the GRE or GMAT. The degree requires a minimum of 45 quarter hours. The non-thesis option requires Economics 5111-12 and 5121-22 and an additional 18 hours of course work at the 5000 level or above, with 9 hours to be concentrated in one field of economics. Students electing the non-thesis option will be required to pass a final written comprehensive examination. The thesis option requires Economics 5111-12 and 5121-22 and an additional 9 hours of course work at the 5000 level or above. In the thesis option, the thesis gives 9 hours of credit.

The requirements for a graduate minor in economics are as follows: Either (1) 5111-12 and 5120, or (2) 5110 and 5121-22, or (3) with the consent of the head of the economics department, an alternative sequence of 9 hours to meet unusual conditions.

THE DOCTORAL PROGRAM

Admission to the Ph.D. program is based on promise of scholarship; this promise is demonstrated by previous academic performance and by scores achieved on the general portion of the GRE or GMAT. Requirements for successful completion of the program consist of the four components listed below:

1. a. Economic theory: microeconomic theory by comprehensive examination or by completion of Economics 5111-12 with a B+ average or higher and successful completion of 6111; macroeconomic theory by comprehensive examination or by completion of 5121-22 with a B+ average or higher and successful completion of 6121.

b. Economic history: Economics 5250 and 5260.

c. History of economics: Economics 5150 and 3 hours at the 6000 level.

d. Mathematical and quantitative economics: Economics 5180, 5190, and 5510. The 5510 requirement may be waived for students completing Economics 6170, 6180, and 6190.

Students must achieve a grade average of B or higher over the courses offered to fulfill requirements in subparagraphs b. or c. or, as an alternative, may petition to satisfy any one or all of these three fields by some other means such as comprehensive written examination.

2. Students are required to demonstrate their competence by comprehensive examination in two fields of specialization with the approval of the department, at least one of which must be selected from the following: economic development, economics of central planned economies, economics of labor and human resources, industrial organization, international economics, public finance, and regional and urban economics.

3. Students are required to take two elective economics courses at the 5000 level or above, outside the core subject areas and the two fields of specialization.

4. Successful completion of the dissertation, including an oral defense, to give at least 36 hours of credit (5000).

MBA Concentration: Economics

Minimum Course Requirements for MBA Concentration: As approved by the area MBA faculty advisor.

4000 Special Topics (3) Student generated course offered at convenience of department upon student initiative. Subject matter and content determined by students and instructor with approval of the department.

5000 Thesis (1-15) P/NP only. E

5002 Non-Thesis Graduation Completion (3-15)

Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5090 Workshop in Economics (3-9) Special topics in applied economics. For students completing Economics 5111-12. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs.

5910-20-30 Economics Seminar (1, 1, 1) Research in progress and preparation of outstanding student projects. May be repeated. S/NC only. E

6000 Doctoral Research and Dissertation (3-15) P/ NP only. E

ECONOMIC THEORY

4130 Business Cycles (3) Fluctuations in income, employment, prices, and output in the economic system; effects of government policies and historical events concerning booms and depressions. Statistical methods for analyzing business fluctuations, theoretical explanations of cycles, and policies that have been proposed to combat them. Prereq: 3120 or consent of instructor. Sp

4150 History of Economic Thought (3) Development of economic thought, tools of analysis, and economics as a social science, together with an analysis of socioeconomic conditions which influenced this development. Offered: 1776 through 1936. Prereq: 1 yr of principles of economics and consent of instructor. F

4170-80 Introduction to Mathematical Economics (3, 3) Application of mathematical methods in theoretical study of micro- and macroeconomic phenomena. Designed for beginning graduate students who have limited training in analytic geometry and calculus. Must be taken in sequence. Prereq: 3110 and college algebra, calculus, and analytic geometry or the equivalent. F, W

4760 Public Expenditure Evaluation (3) Benefit-cost analysis, public sector investment criteria, and the social cost of capital. Not available for credit in graduate programs in Economics.

4770 State and Local Finance (3) Emphasis on revenue systems and division of tax burden. Not available for credit in graduate programs in Economics.

5010 Introduction to Economic Analysis (3) Analytical tools of macro- and microeconomics for students without prior training in economics. Price determination, national income and determination, inflation, and banking system. Not available to students with credit for 2510-20 or equivalent. F, Su


5030 Economic Fluctuations, Forecasting, and Stabilization (3) Macroeconomics of the firm. Determination of level of output, employment and prices for economy as a whole. Implications of aggregate fluctuations for individual firms. Role of forecasting techniques and stabilization policies. Prereq: 5010 or equivalent. F, Sp, Su

5110 Fundamentals of Microeconomics (3) Verbal arguments and geometric and algebraic techniques. Theory of consumer demand and supply; theory of production and cost; long and short run theories of profit maximizing firm in both perfectly competitive and monopolistic environments; theory of derived demand. Students whose major is other than economics. Not available for students with credit for 5111. Prereq: 3110 or equivalent. F

5111-12 Microeconomic Theory I, II (3, 3) Theory of consumer choice and demand, theory of the firm; theory of production and costs; market structures; derived demand and factor pricing. Introduction to welfare economics, capital theory. Should be taken in consecutive quarters. Prereq: 3110 or equivalent. F, W

5120 Fundamentals of Macroeconomics (3) Determination of levels of employment and prices for economy as a whole; relationships between interest rates, price expectations, productivity, and quantity of money, and aggregate income and liquidity preference. For students whose major is other than economics. Not available for students with credit for 5111. Prereq: 3110 or equivalent. W

5121-22 Macroeconomic Theory I, II (3, 3) Monetarist and income-expenditure approaches to questions of income and price level determination; applications to contemporary macroeconomic problems. Should be taken in consecutive quarters. Prereq: 3120 or equivalent. W, Sp

5150 History of Economic Thought (3) Development of economic ideas from mercantilists through Alfred Marshall, emphasis given to classical and neoclassical tradition.


5520 Introduction to Econometrics (3) Statistical demand analysis, production and cost analysis, distribution of income and wealth, models of growth and cycles, macroeconomic applications. Should not be taken by students who contemplate taking Econometrics 6170-80-90. Sp

5810 Financial Markets and Intermediaries (3) (Same as Finance 5810.) W

5830 Commercial Banking (3) (Same as Finance 5830.) F, Sp

6111 Advanced Microeconomic Theory (3) Consumer behavior, production, and exchange in partial and general equilibrium settings. Prereq: 4170, 4180, 5112, or equivalent. F

6121 Advanced Macroeconomic Theory (3) Topics in macroeconomic theory and policy. Prereq: 5122 or equivalent. W

6150-60 History of Economic Doctrines (3, 3) Important ideas of economic thinkers from Middle Ages to present. W

6170-80 Econometric Methods (3, 3) Theory and techniques of statistical testing of economic hypotheses and construction and estimation of economic models. Review of classical least squares regression model, and approaches to simultaneous equation models with application to current econometric research. Prereq: 5180-90 and 5510 or equivalent. F, W, Sp

ECONOMICS OF CENTRALLY PLANNED ECONOMIES

5310 Economic Systems (3) Study and appraisal of underlying theories and operation of capitalism, socialism, communism, and other economic systems. W

6331 Theory and Practice of Economic Planning (3) Les écoles de pensée in imperialist and post-imperialist states. Prereq: 5112 or consent of instructor. May be repeated with consent of department. F

ECONOMICS OF LABOR AND HUMAN RESOURCES

4420 Economics of Human Resources (3) Analysis of current problems in human resource development and the employment relationships aimed at the solution of these problems. Problems include unemployment, education and training, poverty and income redistribution, discrimination based on sex or ethnicity, or others. Prereq: 2520. F


6450 Seminar in Industrial Relations (4) Historical development of American system of industrial relations and roots of contemporary labor problems. Nature of labor unions and collective bargaining process. Relation of industrial conflict. Prereq: 6 hrs of labor relations or consent of instructor.

6460 Seminar in Labor Economics (4) Theory of labor markets and labor unions, use of wage determination, unemployment, wage differentials, economic discrimination, and impact of unionism. Prereq: 3110 and 3120, or equivalent.

6470 Public Policy in the Labor Field (4) Governmental regulation of wages, hours, and other aspects of industrial relations. Public policy in areas of income, human resource development, equal employment opportunity, occupational health and safety, social insurance, and immigration policy. Prereq: 6450 and 6460.

INTERNATIONAL TRADE AND ECONOMIC DEVELOPMENT

4230 Problems in International Trade and Economic Development (3) Problems or problem areas of current importance in fields both of international economics and economic development. Prereq: 3210 or 3220. W

4231 The Political Economy of Latin America (3) Description, analysis, and comparison of major economic problems and policies of various Latin American countries. Sp

4232 The Political Economy of Asian Development (3) Description, analysis, and comparison of major economic problems and policies of India, China, and Southeast Asia. Sp

4260 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth on environment. Prereq: 2510. W

5250 Economic History of Europe (3) Nature and functioning of economic systems and policies in history of western civilization; examination of some major issues of method and interpretation. F

5280 Economic History of the U.S. (3) Interpretation of American economic structure and policies from colonial times. W

5610 Location and Regional Development Theory (3) Theory of industrial, agricultural, and residential location; economic basis for land use patterns and central places; examination of regional inequalities and national assistance for regional economic development. F

5620 Methods of Regional Analysis (3) Theory of regional structure and growth. Examination of regional models for impact analysis and economic forecasting. Methods of analysis include regional descriptive statistics, gravity and potential concepts, regional income and product accounts, shift and share analysis, economic base studies, and regional input-output, linear programming. Prereq: 5610. F

5611 International Economics: Trade (4) Pure theory of classical, neoclassical, and modern international trade. Comparative advantage, free trade and welfare, and technological change, growth and stagnation, tariffs and subsidies, and customs unions. Prereq: 5112 or consent of instructor.


5623 International Monetary Economics (4) Theories of exchange rate determination, approaches to balance of payments theory, balance of payments adjustment under alternative exchange rate regimes, economic policy in open economy, international capital movements. Prereq: 5121, 5030, 5120 or consent of instructor.

5621 Economic Development: Theories (4) Study of principal theories explaining economic behavior in less developed countries. Prereq: 21 hrs of undergraduate economics or consent of instructor.

5622 Economic Development: Policies (4) Policies, strategies, and planning techniques used to promote modernization in less developed countries. Prereq: 6221 or consent of instructor.

5624 Economic Development: Western Impact on Asia and Africa (4) Studies of consequences of contact between developed world and third world countries of Asia and Africa. Prereq: 21 hrs of upper division undergraduate social science or consent of instructor.

6242 Seminar in Economic Development (4) Topics vary with interests of students. Prereq: 6241 or consent of instructor.

6250 Seminar in European Economic History (3) Selected topics in economic history of Europe. Prereq: Consent of instructor. May be repeated with consent of department. W

6260 Seminar in American Economic History (3) Selected topics in American economic history. Prereq: Consent of instructor. May be repeated with consent of department. Sp

6270 Seminar in Economic History of the Third World (3) Selected topics in economic history of societies other than those of Western Europe and English-speaking North America. Prereq: Consent of instructor. May be repeated with consent of department. F, A

6610 Seminar in Regional Analysis (3) Selected topics in regional economic theory and analysis. May be repeated. Maximum 6 hrs. Sp, A

6620 Regional Economics Workshop (3) Selected topics in applied research. Emphasis on student participation in model design and estimation, forecasting, simulation, and mathematical and computer programming. May be repeated. Maximum 6 hrs. Sp, A

6650 Seminar in Environment and Resource Economics (3) Topics in environmental quality, natural resource allocation by private markets, and issues in formulating public policy towards environmental problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. Sp, A

MONETARY ECONOMICS

5820 Monetary Theory and Policy (3) Relationship of money, credit and liquidity to income, interest rates, employment and prices as well as examination of effect of monetary policy on economic activity. Prereq: 5020 or equivalent.

6510-20 Seminar: Monetary Theory (3, 3) Study of money, credit and liquidity as related to income, interest rates, employment, output, and prices. Prereq: 5112 and 5122.

PUBLIC FINANCE

5710 Public Finance and Public Policy (3) Allocative, distributional and stabilization roles of public sector. Not available for credit in PhD program in Economics. Prereq: Consent of Instructor.


Finance

Professors: W. W. Osterweil (Chairman), Ph.D. Pennsylvania; L. P. Anderson, Ph.D. Wisconsin; W. C. Booys, Ph.D. Wisconsin (Milwaukee); G. S. Kuznets (Emeritus), Ph.D. New York; R. E. Rice, Ph.D. California (Los Angeles); C. P. White, (Emeritus), Ph.D. Pennsylvania.

Associate Professors: J. L. Axier, Ph.D. Indiana; T. P. Boehm, Ph.D. Washington (St. Louis); D. Choo, Ph.D.

Finance/College of Business Administration 47
Pennsylvania State, J. M. Wachowicz, Jr., Ph.D.
Ilianos (Champaign-Urbana), C.P.A.
Assistant Professors:
R. J. Clayton, Ph.D. Georgia; M. C. Elfrhardt, Ph.D. Georgia
Institute of Technology; J. P. Ogden, Ph.D. Purdue; R. A. Weir, Ph.D. North Carolina.

1Wm. Voigt Professor of Insurance
2Blume National Bank Professor of Finance
3Distinguished Chartered Professor of Banking and Finance

MBA Concentration: Finance. The curriculum offers courses for those interested in careers in corporate financial management, security analysis and investments, banking and financial institutions, real estate investment and development, business risk management, and financial planning services.

Minimum Course Requirements for MBA Concentration: At least four and not more than six courses from the following: 4700, 5130, 5140, 5420, 5430, 5510, 5610, 5620, 5630, 5810, 5820, and 5990. Ph.D. Concentration: Finance

4700 Business and Public Risk Management (3) Identification and measurement of pure risks facing business organizations associated with property, liability and personal exposures. Implementation of most economical methods of dealing with risks at lowest cost consistent with good financial management practices. F, W, Sp

5002 Non-Thesis Graduate Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E


5130 problems in Financial Management (3) Application of decision making procedures to problems in financial management, emphasizing case approach. Financial statement analysis, short-term methodologies in selection, management, evaluation, and revision of asset portfolios. Modern analytical and statistical techniques. Prereq: 5420 or consent of instructor. F, W

5420 Investment Analysis (3) Principles and techniques for evaluation of investment desirability of marketable securities, with emphasis on common stocks and corporate bonds. Prereq: 5130. Statement of relevant concepts of determination of price-earnings ratios, and recent mathematical valuation models. Prereq: 5020 or consent of instructor. F, W


5610 Real Estate Finance (3) Valuation, financial analysis, and investment in real estate. Tax aspects of acquisition, operation and sale. Syndication and financing methods. Prereq: 5010 or consent of instructor. F

5620 Economic Analysis of Housing and Urban Land Markets (3) Metropolitan mobility, neighborhood transition and federal housing policy. Difficulties in obtaining efficient and equitable solutions to variety of urban problems. Relevance of empirical and theoretical economics literature to policy makers and entrepreneurs. Prereq: Economics 5020 or consent of instructor. W

5630 Real Estate Investment Analysis (3) Application of contemporary appraisal and feasibility analysis to real estate case studies. Use of computer models for discounted cash flow and mortgage equity analysis. Prereq: 5510 or consent of instructor. Sp

5810 Financial Markets and Intermediaries (3) Capital formation and allocation in the economy. Role of financial intermediaries and markets. Theory and structure of interest rates. Analysis of money and bond markets; study of international financial markets. Prereq or coreq: 5010. (Same as Economics 5810.) F, W

5830 Commercial Banking (3) Analysis of management policies of financial institutions, including assets, liabilities, and capital structure; proportion of loans, income, and regulatory environment, and implications for management. Examination of bank structure and competition, and banking structures of the U.S. financial system. Prereq: 5010 or coreq: Economics 5830. (Same as Economics 5830.) Sp

5990 Research in Finance (3) Directed research on topic of mutual interest to the student and the instructor. Prereq: Consent of Department Chairperson. May be repeated. Minimum 6 hrs.

6000 Doctoral Research and Dissertation (3-15) Prereq or coreq: Economics 5030. (Same as Economics 5830.) Sp


6720 Advanced Seminar in Corporate Finance (3) Recent developments in corporate finance: informational asymmetry, capital market imperfections, and international financial dynamics. Prereq: Consent of instructor. May be repeated. Minimum 6 hrs. W

6820 Advanced Seminar in Financial Markets and Intermediaries (3) Topics of financial intermediation, interest rate theory and structure of interest rates. Competition and structure within the U.S. financial system. Prereq: Consent of instructor. May be repeated. Minimum 6 hrs.

Management

As an example of the types of courses offered, the following are typical.

Management

H. D. Dewhirst (Head), Ph.D. Texas; R. W. Boling, Ph.D. Stanford, Ph.D. California; A. H. Keeley (Emeritus), MBA Pennsylvania;
J. M. Larsen, Jr., Ph.D. Purdue; S. K. Reed, Ph.D. Edinburgh; D. Ross, Ph.D. Iowa; E. R. Smith, Ph.D. Ohio; J. J. Stafford, Ph.D. Ohio State;
R. A. Wagoner (Emeritus), M.S. Indiana; G. H. Whitlock, Jr. (Emeritus), Ph.D. Tennessee; M. S. Wortman, Jr., Ph.D. Minnesota.

Professor: O. S. Fowler, Ph.D. Georgia; R. C. Maddox, Ph.D. Texas; C. W. Neel, Ph.D. Alabama; M. C. Rush, Ph.D. Akron.


William B. Stickley Professor of Strategic Management.

1970 Organization Theory and Behavior (3) Basic concepts of organization theory, organizational behavior, and management analysis.

1970-80-90 Graduate Seminar in Industrial and Organizational Psychology (3, 3, 3) Introduction to basic concepts and ideas required for graduate study in industrial and organizational psychology. Must be taken in sequence during the student's first year. (Same as Psychology 5170-80-90.) F, W, Sp

5210 Personnel Management (3) Analysis and appraisal of the personnel function. F

5220 Wage and Salary Administration (3) Analysis of problems, programs, and practices. W

5230 Human Problems in Administration (3) Review and critique of research in industrial human relations. (Same as Psychology 5450.) F, W, Su

5250-60 Industrial and Organizational Psychology (1-3, 1-3) Readings in industrial and organizational psychology. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade. F

5320 Management Problems in Industrial Research (3) Basic management and administrative problems encountered in management of industrial technological research and engineering programs, and comparable programs in other professional disciplines. E

5410-20-30 Production Management (3, 3, 3) Quantitative approach to solution of production management problems. Prereq: 5020 or consent of instructor.

5610-20 Organizational Behavior (3, 3) Behavioral methodology and perspective, including review of empirical behavioral research in organizations. Must be taken in sequence. F, W

MBA Concentrations: Management, Forest Industries Management.

5630 Research Methods in Management (3) Methodology in research. Review of experimental design, measurement problems, data sources and collection, and application of statistical methods. Lab. 3 cr. Credit by approval. Student research proposals. Prereq: MBA student status or consent of instructor. S/NC only. Sp.

5710 International Business Management (3) Analysis of environment of international business firms and impact of external and factors on managerial decisions. Sp.

5810 Energy Management: Theory and Practice (3) Management of energy resources in operating systems; decision criteria, trade-offs, system analysis, energy audits, technical parameters, conservation methods, wide range energy supply and demand, new energy technologies.

6000 Doctoral Research and Dissertation (3-15) P/ NP only. E.

6120 Advanced Organizational Theory (3) Analysis of functioning of complex organizations: structure, culture, and adaptation.

6130 Seminar in Contemporary Management Issues (3) Contemporary management policy issues. May be repeated.

6250-60-70 Seminar in Industrial and Organizational Psychology (A, 3, 3) Advanced problems in organizational psychology. Areas include performance evaluation, executive development, group process, and morale. (Same as Psychology 6580-70.)

6380 Seminar in Industrial and Organizational Psychology (3) (Same as Psychology 6380.)

6900 Field Work in Industrial and Organizational Psychology (1-15) Supervised practice. One credit hr for each 30 hrs of such practice. Maximum 15 credits. (Same as Psychology 6900.) E.

Management Science

MAJOR

DEGREE

Management Science Ph.D.

Professors:
R. S. Garfinkel (Chairperson), Ph.D. Johns Hopkins.
J. K. Ho, Ph.D. Stanford.
G. Leitnaker.
D. R. Fox, Ph.D. Purdue University.

Management Science Committee:
Robert S. Garfinkel, Chairperson; John Bradley, Psychology; John Boll, Management; Dale R. Fox, Assistant Professor; Mary S. Glaister, Assistant Professor; Kenneth C. Goett, Assistant Professor; Mary E. Kast, Associate Professor, Department of Economics; James K. Ho, Professor, Management Science; Mary G. Leitnaker, Assistant Professor, Department of Statistics; Bruce Ralston, Associate Professor, Geography Department; Ronald E. Shrieves, Professor, Department of Finance; William Sullivan, Professor, Industrial Engineering; Gary Thomson, Computer Science Department.

MBA CONCENTRATIONS

For students whose MBA concentration area is Management Science, the MBA Core is revised as follows: substitute Management Science 5310 for 5010, Statistics 5110 for 4750-60, and with approval of student advisor, substitute Statistics 5120 for 5020. The concentration area must include Management Science 5330 and 5340.

MASTER OF SCIENCE PROGRAM

See page 106 for details of the Master of Science program in Management Science.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science is designed to prepare students for research, and teaching related to the application of mathematical tools to complex decision making. Three primary objectives of the program are:

1. To provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;

2. To provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and management science.

The candidate may choose from the business functional areas (accounting, finance, marketing, production management, and transportation and logistics) or other disciplines, (e.g., computer sciences, forestry, ecology, and public administration);

3. To develop in the student, through coursework in mathematics, statistics, and computer science, a high degree of mathematical maturity which will serve the graduate well throughout a life-long career, whether in management, research, or teaching.

Admission Requirements: The doctoral program requires three Graduate School Rating Forms and the GRE. The GMAT is acceptable in lieu of the GRE.

Degree Requirements: General University requirements for the doctoral degree are stated on pages 23-24.

Course Work: A minimum of 72 quarter hours of course work taken for graduate credit (exclusive of thesis or dissertation) is required. The candidate must complete a minimum of 36 quarter hours at The University of Tennessee, Knoxville, at least 9 of which must be at the 6000 level. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which is equivalent to required courses in the program.

The program includes approximately 24 to 30 quarter hours of course work in the applied concentration which will serve the graduate well throughout a life-long career, whether in management, research, or teaching.

Qualifying Examinations: The student must demonstrate mastery of probability theory and statistical inference (Statistics 5110-20-30) by passing a written qualifying examination.

Master of 18 to 21 quarter hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis (either Mathematics 4225, 4265, 4010, or Mathematics 6555-65-75) and real analysis (Mathematics 4510-20-30). Other options may be approved. In exceptional circumstances the faculty will consider waiving the mathematics and/or statistics qualifying examinations.

These requirements generally are completed by the end of the first year of the program.

There is no foreign language requirement.

Comprehensive Examination: Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation: The student must complete 36 quarter hours of Management Science 6000, Doctoral Research and Dissertation, through which he/she is expected to make a significant contribution to the science. A final oral examination is conducted over the dissertation and such other segments of the program that the faculty committee deems appropriate. This effort, which is beyond the minimum 72 hours of course work, normally is completed in the third year of the program.

Prerequisites for Management Science Courses: The Management Science Program is interdisciplinary and students in other degree programs are encouraged to enroll in management science courses. Course prerequisites are designed to indicate the level at which courses are taught. Interested students whose prior course work does not meet the prerequisites are encouraged to seek the instructor's guidance and consent to enroll.

5000 Thesis (1-15) P/ NP only. E.

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree completion. May not be used toward degree requirements. May be repeated. S/NC only. E.

5010 Quantitative Analysis for Management Decisions (3) Assignment, transportation and general linear programming problems; decision theory, Markov chains and sequencing. Prereq: 5010 or 5101. May not be taken for credit by students who receive credit for 5310. W, Sp.


5340 Application of Management Science Methods (3) Application of mathematical programming techniques to large-scale management problems. 5350 may be taken concurrently. Su.

5810 Special Topics in Management Science (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5910 Management Science Problems (1-6) Directed study on subject of mutual interest to student and staff member. E.

6000 Doctoral Research and Dissertation (3-15) P/ NP only. E.

6110-20 Models for Production Systems (3, 3) Seminar providing practical research experience to enhance professional development of students. May not be counted toward degree requirements. May be repeated. E.

6120 Network Flows (3) In-depth treatment of advanced network optimization algorithms including transportation and transshipment; primal-dual and primal basis-tree methods; multifunctionality, multiterminal and dynamic flows; flow with gains; and other advanced topics. Prereq: 5310 or equivalent. A.

6310 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group heuristic algorithms. Prereq: 5310 or equivalent. A.

6410 Large Scale Mathematical Programming (3) Development of solution strategies for linear programming
5220 Promotion Management (3) Management of pro-

5230 Analysis and Design of Marketing Systems (3) 

5300 Marketing Research (3) Investigation and solution 

5350 Buyer Behavior Analysis for Marketing (3) Buyer 

5400 Analyzing Market Opportunity for Marketing 

5410 Advanced Marketing Strategy (3) Components of 

5450 International Marketing Management (3) Develop-

5990 Research in Marketing (3) Directed research 

5920 Management of Marketing Systems (3) Management of basic marketing functions. Integra-

5950 Urban Transportation Policy (3) Movement of 

5960 Doctoral Research and Dissertation (3-15) P/ 

5980 Independent Study in Transportation/Logistics (3) Directed study in surface and air trans-

5220 Logistics Systems Management (3) Develop-

5250 Transportation and Logistics (3) Application of current 

5270 Logistics and Transportation Management (3) Management of logistics and transportation. Prereq: 5110, 5130.

5300 Marketing and Distribution Management (3) Analysis of current marketing and distribution structure including functions, problems, and systems. Prereq: 5020.

5350 Current Topics in Marketing (3) Specific topics will vary with each course offering, but could include: nonbusiness marketing applications, macroenvironmental change, children's television advertising, international marketing issues, marketing channels, and related issues. Prereq: Consent of instructor. A

5370 Analysis of Marketing Strategy (3) Functional analysis of marketing strategy including development of mar-

5380 Analysis of Marketing Systems (3) Development and management of international marketing programs. Prereq: 5000 and 5300.

5400 Analyzing Market Opportunity for Marketing 

5410 Advanced Marketing Strategy (3) Components of 

5450 International Marketing Management (3) Develop-

5990 Research in Marketing (3) Directed research 

5920 Management of Marketing Systems (3) Management of basic marketing functions. Integra-

5950 Urban Transportation Policy (3) Movement of 

5960 Doctoral Research and Dissertation (3-15) P/ 

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