

**817. Electronics in Agricultural Engineering**  
Spring. 3(2-3) E E 345 or PHY 419.  
Electronic and control circuits for agricultural industry and research. Analysis and development of measurement and control systems.

**820. Research Methods in Agricultural Engineering**  
Fall. 1(1-0)  
Discussion of procedures for initiating, developing, carrying out, and completing research projects.

**822. Seminar**  
Spring. 1(1-0)

**840. Advanced Power and Machinery**  
Spring. 3(2-2) 493, 494.  
Analysis of agricultural machine components and systems. Emphasis on hydraulic power transmission, controls, and management of machinery systems.

**899. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**990. Advanced Topics in Agricultural Engineering**  
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Approval of department.

New developments in agricultural engineering. Subjects to be covered include atmospheric turbulence, optimization of agricultural systems, measurement systems, food engineering, and agricultural rheology.

**991. Soil Dynamics**  
Winter. 3(2-3) Approval of department.

Dynamic soil strength. Soil stress and strain analysis of traction and tillage devices. Experimental techniques for traction and tillage studies.

**999. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**AGRICULTURE AG**  
**College of Agriculture and Natural Resources**

**450. United States Agriculture for Overseas Students**  
Fall. 3(3-0) Advanced undergraduate or graduate students from countries other than the United States or Canada.

Orientation course for overseas students. Development of United States agriculture. Institutions serving agriculture with emphasis on Land Grant University system. Scientific developments and their impact on agriculture. Field trips.

**462. World Agriculture and Economic Development**  
Fall. Summer of even-numbered years. 3(3-0) AEC 240 or EC 201. Interdepartmental with and administered by the Agricultural Economics Department.

Food and agricultural problems of the world. Role of agriculture in the process of economic development. Relationships of agricultural trade patterns, farming systems and economic growth.

**802. Agriculture Administration**  
Winter. 3(3-0) AEC 462 or approval of department.

Administrative relationships and principles involved in agricultural development in the world's emerging countries. Case studies used to illustrate the process of change in institutions that serve agricultural economies in transition.

**803. Approaches to Accelerated Development**  
Spring. 3(3-0) 802 or approval of department.  
Examination of trained manpower needs and project priorities in agricultural and natural resource sectors. Alternative methods for organizing research and development. Case studies of national planning.

**AMERICAN STUDIES AMS**  
**College of Arts and Letters**

**301. Issues in American Civilization**  
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. ATL 113. Not applicable to major requirements.

Selected issues in American life past and present, with materials drawn from such disciplines as history, social sciences, philosophy, literature and the arts. Topics vary.

**410. Perspectives in American Studies**  
Fall. 3 credits. Juniors in American Studies or approval of American Studies Committee.

Methods and significant works, for majors in the American Studies program. Offered by members of the relevant departments.

**411. Problems in American Civilization**  
Winter, Spring. 3 credits. Majors must re-enroll for a maximum of 6 credits. 410, Juniors in American Studies or approval of American Studies Committee.

Seminar approach to selected problems in American life employing the objectives and approaches of interdisciplinary studies. Offered by members of relevant departments, for majors in the American Studies program.

**AMERICAN THOUGHT AND LANGUAGE ATL**  
**University College**

Alternative approaches or tracks are offered on an optional basis all of which meet the course objectives of 111, 112, 113. These are described briefly below and are designated by letters which are used as part of the course number for registration. No student may receive credit for more than one track within a course (111, 112, 113).

**100. Comprehensive English**  
(I S 095.) Fall, Winter, Spring, Summer. 3(4-0) Approval of department.

Instruction and practice in reading and writing. Emphasis upon mastery of fundamental skills needed for a variety of reading and writing assignments.

**111. American Thought and Language**  
Fall, Winter, Spring, Summer. 3(3-0) Satisfactory grade on English proficiency examination or ATL 100.

A. Aims to improve the student's ability to read and write and to acquaint him with his American heritage. Reading is in selected historical, social, and literary documents.

H. Adaptation of the regular program for honors students.

**112. American Thought and Language**  
Fall, Winter, Spring, Summer. 3(3-0) Three credits in a 111 track.

A. Aims to improve the student's ability to read and write and to acquaint him with

his American heritage. Reading is in selected historical, social, and literary documents.  
B. Whole books approach to regular program.  
C. Emphasizes American humanities approach to regular program.  
H. Adaptation of regular program for honors students.

**113. American Thought and Language**  
Fall, Winter, Spring, Summer. 3(3-0) Three credits in a 112 track.

A. Aims to improve the student's ability to read and write and to acquaint him with his American heritage. Reading is in selected historical, social, and literary documents.

B. Whole books approach to the regular program.

C. American humanities approach to the regular program.

H. Adaptation of regular program for honors students.

**300. Supervised Individual Study**  
Fall, Winter, Spring. 1 to 4 credits. 113; approval of department.

Selected students requesting individual study of interdisciplinary problems will work under supervision of University College professors. Variable elective credit will be determined when the student secures instructor, adviser, and department approval.

**ANATOMY ANT**  
**College of Human Medicine  
College of Veterinary Medicine**

**316. General Anatomy**  
Fall, Spring. 5(5-0) N S 193.

Designed to impart the basic concepts of the broad field of anatomy. Special requirements of the various disciplines will be met in their respective laboratories.

**401. Undergraduate Seminar**  
Fall, Winter, Spring. 1 credit.

**413. Problems in Anatomy**  
Fall, Winter, Spring, Summer. 1 to 2 credits. May re-enroll for a maximum of 6 credits. Approval of department.

Additional study in one or more of the various fields of anatomy such as gross anatomy, histology, hematology and embryology.

**420. Microscopic Anatomy and Embryology**  
(305A.) Fall. 5(2-8) Medical Technology students or approval of department.

Course 420 devoted to microscopic structure of cells and tissues and beginning embryology; 421 to structure of organs and systems and completion of embryology.

**421. Microscopic Anatomy and Embryology**  
(305B.) Winter. 5(2-8) 420. Continuation of 420.

**521. Gross and Microscopic Anatomy**  
Fall, Spring. 9(4-14) First-term Veterinary Medicine students; approval of department for graduate students.

Gross anatomy of a representative animal, the dog, is studied. Cytology, embryology, comparative histology, neuroanatomy and organology are combined with dissection, demonstration and practical applications to give complete coverage.

**522. Gross and Microscopic Anatomy**  
Winter, Summer. 9(5-11) 521. Continuation of 521.