

494. Systems of Agricultural Machines
Fall. 4(3-2) 353.

Systems of machines used in field and farmstead operations. Engineering principles for machines dealing with biological materials.

804. Agricultural Mechanization in Developing Countries

Spring. 3(3-0) Approval of department.

Principles of mechanical equipment selection for organized agricultural enterprises. Machinery specifications and standards, performance efficiency, cost and use, and management factors. Domestic and foreign considerations.

805. Environmental Measurements
Fall. 3(2-2)

Methods and techniques for accurate measurement and interpretation of environmental parameters. Temperature, humidity, wind and air flow characteristics, radiation, light intensity, gaseous and particulate concentrations in atmospheric microclimates will be discussed.

811. Technical Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 9 credits.

812. Bio-Processing Engineering

Winter. 3(3-0) Approval of department.

Topics will be presented pertaining to thermodynamics, heat and mass transfer, thermal processing, fluid flow, dehydration and freeze drying of biological products or biological processes.

814. Physical Properties of Agricultural Products

Winter. 3(3-0) Approval of department.

Physical and mechanical behavior of fruits and vegetables, forages, grains and other agricultural products under constant and dynamic loading. Related to design parameters for production, handling and processing machinery.

815. Instrumentation for Agricultural Engineering Research

Fall. 3(3-0)

Theory, method and techniques of measuring temperature, pressure, flow, humidity, and moisture for biological materials. Associated recording and indicating equipment.

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.

999. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

AGRICULTURE

AG

College of Agriculture and Natural Resources

401. Agriculture and Natural Resources Communications

Winter, Spring. 3(2-2) JRN 201 or other writing course and approval of department.

Techniques, strategies and practices in development of agricultural and natural resources information programs. Including writing, public relations, TV and radio production for specialized and general audiences.

402. Agriculture and Natural Resources Communications Internship

Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll for a maximum of 6 credits. 401, approval of college.

Internship with professionals in communications field with emphasis on student's areas of interest—writing, radio, TV, publications, etc.

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. Rural Transformation in Developing Societies

Fall. 3(3-0) PAM 201 or EC 201; PAM 260 recommended. Interdepartmental with Public Affairs Management and Food Systems Economics and Management.

Traditional agricultural systems and the incentive environment for economic growth in rural areas. Adjustment to technological, institutional and human change. Strategies for rapid agricultural transformation.

475. International Studies in Agriculture and Natural Resources

Summer. 3 to 9 credits. Approval of the college. Interdepartmental with Natural Resources.

Study-travel experience emphasizing contemporary problems affecting agriculture in the world, national, and local communities. Field trips, case studies, interviews with leading experts, government officials, community leaders. Supervised individual study.

488. The Impact of Animal Resource Management Upon the World's Developing Nations

Winter. 3(4-0)
For course description, see Interdisciplinary Courses.

865. Rural Development Administration I

(802.) Winter. 3(2-2) Approval of department. Interdepartmental with and administered by the Department of Agricultural Economics.

Administrative concepts and their application in the analysis of the processes and structures through which agricultural and rural development activities are formulated and implemented in less developed countries.

866. Rural Development Administration II

(803.) Spring. 3(3-0) 865. Interdepartmental with and administered by the Department of Agricultural Economics.

Comparative analysis of major cases of intensive, purposeful change in less developed countries with emphasis on economic, administrative, political and other relevant factors which help explain program or policy effectiveness.

880. Soils and Land Use in Tropical and Subtropical Regions

Spring. 3(3-0) Approval of department. Interdepartmental with and administered by Soil Sciences.

Problem oriented studies of soils and land use in the tropics and subtropics in relation to their genesis, morphology, taxonomy, and management.

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).

101A. Comprehensive English

(I S 095; 100.) Fall, Winter, Spring, Summer. 3(4-0) No student may receive credit in both 101A and 101B. Admission by examination or 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.

101B. Comprehensive English

(I S 095; 100.) *Fall, Winter, Spring, Summer.* 3(4-0) *No student may earn credit in both 101A and 101B. Admission by examination or approval of department.*

Instruction and practice in reading and writing. Instruction in reading is emphasized.

102. Comprehensive English

Fall, Winter, Spring, Summer. 3(4-0) 101A or 101B.

Continuation of 101 with emphasis on writing and reading.

103. Comprehensive English

Fall, Winter, Spring, Summer. 3(4-0) 102.

Continuation of 102 with emphasis on reading and writing on American cultural topics.

111. American Thought and Language

Fall, Winter, Spring, Summer. 3(3-0) *Students may not receive credit for 111 and 102. Admission by examination or approval of department.*

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.

D. American minorities track. Subject matter for writing will be accounts of the experience of blacks, Indians and immigrants during the nineteenth and twentieth centuries.

E. American Radical Thought and Literature. Subject matter for writing will be radical literary and social documents of the seventeenth and eighteenth centuries.

F. Film track. Written exposition is based on both cinematic and fictional versions of literary and historical documents.

H. Adaptation of the regular program for honors students.

112. American Thought and Language

Fall, Winter, Spring, Summer. 3(3-0) *Students may not receive credit for 112 and 103. 111 or 102.*

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.

D. American minorities track. Subject matter for writing will be accounts of the experience of blacks, Indians and immigrants during the nineteenth and twentieth centuries.

E. American Radical Thought and Literature. Subject matter for writing will be radical literary and social documents of nineteenth and early twentieth century.

F. Film track. Written exposition is based on both cinematic and fictional versions of literary and historical documents.

H. Adaptation of regular program for honors students.

113. American Thought and Language

Fall, Winter, Spring, Summer. 3(3-0) 112 or 103.

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.

D. American minorities track. Subject matter for writing will be accounts of the experience of blacks, Indians and immigrants

during the nineteenth and twentieth centuries.

E. American Radical Thought and Literature. Subject matter for writing will be radical literary and social documents of the twentieth century.

F. Film track. Written exposition is based on both cinematic and fictional versions of literary and historical documents.

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 Osteopathic 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.

420. Microscopic Anatomy

Fall. 5(2-8) *Medical Technology students or approval of department.*

Microscopic study of the structure of cells, tissues and organs.

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.

523. Anatomy of Areas of Surgical and Clinical Importance in Domestic Animals

Winter, Summer. 8(3-14) *Sixth-term Veterinary Medicine students.*

Lectures, dissection of fresh material and the study of prosections, models, radiographs and reprints related to areas of surgical and clinical importance in domestic animals.

540. Gross Biomedical Structure

Fall, Winter, Spring. *Variable credit. May re-enroll for a maximum of 15 credits. Human Medicine students; approval of department for graduate students.*

Human structure, systemic and regional, is studied in self-instructional and dissection sequences. Application of this knowledge to recognition of normal and abnormal structure in appropriate medical contexts is accomplished through self-instructional and clinical sessions.

543. Microscopic Anatomy

Fall. 5(3-6) *Human Medicine students; approval of department for graduate students.*

The normal structure of cells, tissues and organs as they appear under the light and electron microscope.

801. Seminar

Fall, Winter, Spring. 1(1-0) *Approval of department.*

813. Problems in Anatomy

Fall, Winter, Spring, Summer. *Variable credit. May re-enroll for a maximum of 15 credits. Basic disciplines in various areas and approval of department.*

Various anatomical fields such as gross anatomy, histology, hematology, tissue culture, cytology, neurology and embryology will be studied.

815. Anatomy of the Nervous System

(415.) *Fall.* 5(3-5) *Approval of department.*

Developmental, gross and microscopic anatomy of the nervous system. Organizational and functional aspects of the peripheral and central nervous system are stressed. Gross demonstrations include brain and dog dissections.

899. Research

Fall, Winter, Spring, Summer. *Variable credit. Majors.*

901. Seminar

Fall, Winter, Spring. 1(1-0) *Approval of department.*

999. Research

Fall, Winter, Spring, Summer. *Variable credit. Majors.*

ANIMAL HUSBANDRY A H

**College of Agriculture and
Natural Resources**

111. Livestock and Meat Industry

Fall, Spring. 4(3-4)

Adaptation, distribution and numbers of livestock throughout the world; significance and economic importance. Trends in livestock production. Evaluating, grading, classifying and marketing of livestock and meat. Relationship of live animal conformation to carcass merit.

241. Meat Production

Winter. 4(2-6) 111.

Principles of meat evaluation and selection. Carcass certification programs. Influence of production factors on carcass desirability. Practice in slaughtering, cutting and meat processing.

242. Meats, Poultry and Fishery Products I

Fall. 3(2-2) *Interdepartmental with and administered by Food Science.*

Principles of evaluation and nutritive value. Identification of grades and cuts of beef, pork, lamb and poultry products.

245. Meat Evaluation and Grading

Fall, Spring. 1 to 3 credits. *May re-enroll for a maximum of 4 credits subject to a maximum of 10 credits in 245 and 335 combined. 241.*

Evaluation of carcasses and wholesale cuts of beef, pork, veal and lamb in accordance with federal and commercial grading standards. Inspection trips through large meat packing plants.

335. Livestock Selection

Fall, Winter, Spring. 1 to 3 credits. *May re-enroll for a maximum of 9 credits subject to a maximum of 10 credits in 245 and 335 combined. 111.*

Evaluation of productive merit of individual animals. Comparison of type with a standard. Relationship of form to function. Field trips to prominent livestock breeding establishments and to major livestock events.