

443. Machinery and Tractor Systems
(A E 443.) Fall, Spring. 4(3-2) A E 243 or approval of department.

Characteristics of basic agricultural field machinery. Diesel engine, fuel injection and combustion chamber characteristics. Torque and power transmission, tractor stability and implement hitching.

AGRICULTURE **AG**

College of Agriculture and Natural Resources

124A. Introduction to Careers in Vocational and Practical Arts Education—Agriculture

Fall. 2(1-2) Interdepartmental with and administered by Education.

275. Exploring International Agriculture

Spring. 3(3-0) Interdepartmental with Natural Resources.

Exploration of overseas assignments with international agencies; potential world food actualities and potentialities; special problems of the tropics compared with those in temperate regions.

350. Leadership Development for Agriculture and Natural Resources

Winter, Spring. 3(3-0) May re-enroll for a maximum of 6 credits. Approval of department. Interdepartmental with Natural Resources.

Leadership development. Preparation for community leadership. Firsthand look at social, economic, and political problems. Series of seminars, interviews, field trips. Emphasis on awareness, action, and involvement.

399. Agriculture Internship

Fall, Winter, Spring, Summer. Zero credit. [10 credits.]† Juniors and approval of department. Interdepartmental with Natural Resources.

An opportunity for exposure to the applied aspects of a student's major. Supervision and evaluation conducted by faculty and cooperating agencies.

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.

425. Agriculture and Natural Resources Seminar

Spring. 2(2-0) Interdepartmental with Natural Resources.

Current agricultural, natural resources, and environmental problems and solutions as presented by discussion leaders from various disciplines, arranged by undergraduate students.

†See page A-2, item 3.

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

For course description, see Interdisciplinary Courses.

462. Agricultural and Rural Development in Developing Nations

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

471. Environmental Topics in Nonmetropolitan Regions

Fall. 4(4-0) Nomination of students by own department and approved by participating faculty. Interdepartmental with the College of Natural Science and Natural Resources and administered by Natural Resources.

Environmental topics in nonmetropolitan regions including issues on: production agriculture, service industries, non-agricultural uses, rural urban balance, discussion topics and case studies.

475. International Studies in Agriculture and Natural Resources

Spring, 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.

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. 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

Students may earn credit in only one of the courses in each of the following three groups:
1. 121, 131, 141, 151, 161, 171, 181, 191H
2. 122, 132, 142, 152, 162, 172, 182, 192H
3. 123, 133, 143, 153, 163, 173, 183, 193H

101A. Comprehensive English

(100.) Fall, Winter, Spring, Summer. 3(3-1) 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

(100.) Fall, Winter, Spring, Summer. 3(3-1) 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(3-1) 101A or 101B.

Continuation of 101 with emphasis on writing and reading.

103. Comprehensive English

Fall, Winter, Spring, Summer 3(3-1) 102.

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

117. Use of Libraries

Fall, Winter. 1(1-0)

The use of libraries, with emphasis on M.S.U. Library. Course will stress knowledge and use of bibliographic and reference resources.

121. American Expression

(111A.) Fall, Winter, Spring, Summer. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to improve the student's ability to read and write and to acquaint him with his American heritage. Selected reading and theme topics.

122. American Expression

(112A.) Fall, Winter, Spring, Summer. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to improve the student's ability to read and write, and to acquaint him with his American heritage. Selected reading and theme topics.

123. American Expression

(113A.) Fall, Winter, Spring, Summer. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to improve the student's ability to read and write, and to acquaint him with his American heritage. Selected reading and theme topics.

131. Major Documents in American Experience

(111B.) Fall, Winter, Spring, Summer. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with significant works, and to improve his abilities at reading and writing. Selected readings and theme topics.

**Descriptions — American Thought and Language
of
Courses**

132. Major Documents in American Experience
(112B.) Fall, Winter, Spring, Summer. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with significant works, and to improve his abilities at reading and writing. Selected readings and theme topics.

133. Major Documents in American Experience
(113B.) Fall, Winter, Spring, Summer. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with significant works, and to improve his abilities at reading and writing. Selected readings and theme topics.

141. American Humanities
(111C.) Fall, Winter, Spring, Summer. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with his American heritage with emphasis on artistic and literary expression; and to improve his ability to read and write.

142. American Humanities
(112C.) Fall, Winter, Spring, Summer. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with his American heritage with emphasis on artistic and literary expression; and to improve his ability to read and write.

143. American Humanities
(113C.) Fall, Winter, Spring Summer. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with his American heritage with emphasis on artistic and literary expression and to improve his ability to read and write.

151. American Minorities
(111D.) Fall. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with the experience of minorities in America, and to improve his ability at reading and writing. Selected readings and theme topics.

152. American Minorities
(112D.) Winter. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with the experience of minorities in America, and to improve his ability at reading and writing. Selected readings and theme topics.

153. American Minorities
(113D.) Spring. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with the experience of minorities in America, and to improve his ability at reading and writing. Selected readings and theme topics.

161. American Radical Thought
(111E.) Fall. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with ideas concerning radical social change, and to improve his ability at reading and writing. Selected readings and theme topics.

162. American Radical Thought
(112E.) Winter. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with ideas concerning radical social change, and to improve his ability at reading and writing. Selected readings and theme topics.

163. American Radical Thought
(113E.) Spring. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with ideas concerning radical social change, and to improve his ability at reading and writing. Selected readings and theme topics.

165. American Utopianism: Beginnings
Fall. 3(3-0)

Utopian and communitarian urge in early American thought and experience; improvement of the student's reading, writing, and speaking abilities.

166. American Utopianism: Middle Years
Winter. 3(3-0)

Utopian and communitarian urge in American thought and experience in the middle years; improvement of the student's reading, writing, and speaking abilities.

167. American Utopianism: Contemporary
Spring. 3(3-0)

Utopian and communitarian urge in contemporary American thought and experience; improvement of the student's reading, writing, and speaking abilities.

171. America on Film
(111F.) Fall. 3(4-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with cinematic and fictional representation of experience, and to improve his ability at reading and writing. Selected readings and theme topics.

172. America on Film
(112F.) Winter. 3(4-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with cinematic and fictional representation of experience, and to improve his ability at reading and writing. Selected readings and theme topics.

173. America on Film
(113F.) Spring. 3(4-0) Three credits in the second term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with cinematic and fictional representation of experience, and to improve his ability at reading and writing. Selected readings and theme topics.

181. Women in America
(111J.) Fall. 3(3-0) Satisfactory grade on English proficiency examination or in Comprehensive English.

Aims to acquaint the student with women's experience in America, and to improve the student's ability at reading and writing. Selected readings and theme topics.

182. Women in America
(112J.) Winter. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with women's experience in America, and to improve the student's ability at reading and writing. Selected readings and theme topics.

183. Women in America
(113J.) Spring. 3(3-0) Three credits in the second term of any ATL sequence numbered from 121 or above; or satisfactory performance in Comprehensive English.

Aims to acquaint the student with women's experience in America, and to improve the student's ability at reading and writing. Selected readings and theme topics.

191H. Honors Work in American Experience
(111H.) Fall. 3(3-0) Satisfactory grade in entrance examination.

Students read and write on selected topics to improve their knowledge of the American heritage and their ability at reading and writing.

192H. Honors Work in American Experience
(112H.) Winter. 3(3-0) Satisfactory grade in the first term of any ATL sequence numbered 121 or above.

Students read and write on selected topics to improve their knowledge of the American heritage and their ability at reading and writing.

193H. Honors Work in American Experience
(113H.) Spring. 3(3-0) Satisfactory grade in the second term of any ATL sequence numbered 121 or above.

Students read and write on selected topics to improve their knowledge of the American heritage and their ability at reading and writing.

205. Reading for University-Level Understanding
Fall, Winter, Spring. 2(0-4) May re-enroll for a maximum of 4 credits.

Individualized instruction in techniques for improving vocabulary, comprehension, rate, study skills and test taking skills in order to achieve a better understanding of university-level materials.

232. American Humor
Winter. 4(4-0) Sophomores.

An interdisciplinary study of the relationship between American humor and the developing American experience, especially of the nineteenth and twentieth centuries.

300. Supervised Individual Study
Fall, Winter, Spring. 2 to 4 credits. 9 credits in a composition course; 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.

380. The Role of Women in America: Arts and Self

Winter. Summer of even-numbered years. 4(4-0) Juniors.

Various art forms by women and the exploration of a feminine sensibility; sex, race, and class interactions, sexual stereotypes; male views of women and themselves; the impact of the media.

381. The Role of Women in America: Movements and Ideology

Spring. Summer of odd-numbered years. 4(4-0) Juniors.

Key personalities and philosophical currents in the women's movement; biological and cultural myths and realities; the historical role of the family, "The Culture of Romance".

439. Writing the Research Report

Winter, Spring. 4(4-0) Juniors.

Advanced methods and organization of written research reports will be taught by providing examples, exercises, and writing practice based on research submitted by the students.

ANATOMY

ANT

College of Human Medicine

College of Osteopathic Medicine

College of Veterinary Medicine

316. General Anatomy

Fall, Spring. 5(5-0)

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

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

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

505A. Anatomy in Physical Diagnosis (505.)

Fall. 1 to 3 credits.

Exercises in which students study systemic anatomy in a physical diagnosis context. Pre-self-instruction precedes exercises.

505B. Anatomy in Physical Diagnosis

Winter. 1 to 3 credits. 505A or approval of department.

Exercises in which students study regional anatomy in a physical diagnosis context. Pre-self-instruction precedes exercises.

505C. Anatomy in Physical Diagnosis

Spring. 1 to 3 credits. 505B or approval of department.

Exercises in which students study regional anatomy in a physical diagnosis context. Pre-self-instruction precedes exercises.

520. Veterinary Anatomy

Summer. 5(3-6) Admission to professional veterinary program.

A general histology course for veterinary students which includes a survey of the tissue of the animal body.

521. Veterinary Anatomy

Fall. 6(3-9) Admission to professional veterinary program.

Gross anatomy of a representative animal, the dog, is studied. Lecture, dissection of embalmed specimen, study of prosections, slides, models and living animals.

522. Veterinary Anatomy

Fall. 4(2-6) 520.

Microscopic anatomy of the digestive, urinary, respiratory, male and female reproductive systems, integumentary system, central nervous system and special sense organs of domesticated animals.

523. Veterinary Anatomy

Winter. 4(2-6) 521 or approval of department.

Lecture, dissection of embalmed specimens and the study of prosections, models and live animals related to the anatomy of the 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

Winter. 3(1-3) Human Medicine students; approval of department for graduate students.

The principles of microscopic anatomy, utilizing self-instructional units and laboratory experience with organ sections viewed through the light microscope.

545. Neuroanatomy

Spring. 3(4-0) Admission to medical school or approval of Neuroscience Committee.

Introduction to gross and microscopic anatomy of the human nervous system, to related basic neurophysiologic concepts and to a problem-solving approach to the diagnosis of nervous system disease.

560. Functional Medical Cytology and Histology

Fall. 2(1-3) Approval of department

Self-study and laboratory instruction are combined in presenting the mutual relationship between the structure and function (physiological and biochemical) of cells and tissues. The emphasis is on the medical relevance of cytophysiology.

565. Introduction to Human Gross Anatomy

Fall. 5(3-6) Approval of department.

Core concepts in regional, systemic and topographical human gross anatomy: Prosection, discussion and lecture methods using audiovisual aids and frequent review.

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

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, Winter, 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. 5(3-6) 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.

415. Special Problems

Fall, Winter, Spring. 1 to 3 credits. May re-enroll for a maximum of 5 credits. Seniors and approval of department.

Special studies in fields not covered by other animal husbandry courses.

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

For course description, see Interdisciplinary Courses.

451. Swine Production

Fall. 4(3-3) ANS 325 or approval of department.

Historical aspects with emphasis on current trends. Breeds, breeding, selection, nutrition requirements, management practices, marketing, housing and environmental needs, disease and parasite problems. Visits to representative farms.