

**291 Selected Topics in Agricultural Technology**  
 Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to freshmen or sophomores in the Institute of Agricultural Technology.  
 Selected topics of current interest in agricultural science and technology.

**293 Professional Internship in Agricultural Technology**  
 Fall, Spring, Summer. 3 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to freshmen or sophomores in the Institute of Agricultural Technology.  
 Supervised professional experience in agencies, business and industry related to a student's major field of study.

**AGRICULTURAL TECHNOLOGY AND SYSTEMS MANAGEMENT**

**ATM**

**Department of Agricultural Engineering  
 College of Agriculture and Natural Resources**

**150 Metal Fabrication Technology**  
 Fall. 2(1-2) R: Open only to students in the Biosystems Engineering or Building Construction Management major.  
 Physical principles and safety techniques for electric and gas welding. Soldering, brazing, cutting, tool use, machine shop equipment use, and hot and cold metalworking.

**195 National Electrical Code Review**  
 Fall. 3(3-0) RB: (AE 094 or BCM 230) SA: AE 095  
 Electrical installation problems. Principles of and compliance with the National Electrical Code.

**240 Machine Systems and Management**  
 Spring. 3(2-2) P:M: (CSE 101 or CSE 131 or AT 090)  
 Principles, analysis, performance, operation, and management of agricultural machines.

**252 Gasoline and Diesel Engine Technology**  
 Fall. 3(2-2) SA: AE 052  
 Operating principles of gasoline and diesel engines and their systems. Operation and maintenance requirements.

**254 Fluid Power Technology**  
 Spring. 2(2-2) R: Open only to students in Agriculture and Natural Resources. SA: AE 054  
 Fluid power in mobile equipment. Operation and characteristics of system components and circuits. Component disassembly. System testing and diagnosis. Offered first ten weeks of semester.

**261 Principles of Animal Environments**  
 Spring. 2(1-2) Interdepartmental with Animal Science. SA: AE 061, ATM 326  
 Animal environment requirements. Heat and moisture production rates. Psychrometrics of air and building materials. Heat loss and ventilation systems. Offered first ten weeks of semester.

**431 Irrigation, Drainage and Erosion Control Systems**  
 Fall. 3(2-2) RB: (MTH 116 and CSS 210) R: Not open to freshmen or sophomores.  
 Principles of soil and water conservation engineering including: land and soil surveying, basic hydraulics, hydrology, soil moisture, and soil and water conservation practices with applications to irrigation, drainage and erosion control systems.

**490 Independent Study**  
 Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. RB: (ATM 240 or BCM 311) R: Open only to majors in Agricultural Technology and Systems Management. Approval of department; application required.  
 Supervised individual student research and study in agricultural technology and systems management.

**890 Special Problems**  
 Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Approval of department.  
 Individual study of selected topics.

**899 Master's Thesis Research**  
 Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in Agricultural Technology and Systems Management.  
 Masters thesis research.

**999 Doctoral Dissertation Research**  
 Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to Ph.D. students in Agricultural Technology and Systems Management.  
 Doctoral dissertation research.

**AGRICULTURE AND NATURAL RESOURCES**

**ANR**

**College of Agriculture and Natural Resources**

**101 Preview of Science**  
 Fall. 1(1-0) Interdepartmental with Natural Science; Engineering; Social Science. Administered by Natural Science. R: Approval of college.  
 Overview of natural sciences. Transitional problems. Communications and computer skills. Problem solving skills. Diversity and ethics problems in science. Science and society.

**110 New Student Seminar: Issues and Ideas in Agriculture and Natural Resources**  
 Fall. 1(0-2) R: Open only to freshmen or sophomores or juniors in the College of Agriculture and Natural Resources  
 Issues in agriculture and natural resources. Personal and professional development through discussion and interactive experiences.

**192 Environmental Issues Seminar**  
 Fall, Spring. 1 credit. A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Natural Science; Engineering; Social Science; Communication Arts and Sciences. Administered by Natural Science. R: Open only to students in the College of Agriculture and Natural Resources or College of Engineering or College of Natural Science or College of Communication Arts and Sciences or College of Social Science. Approval of college.

Environmental issues and problems explored from a variety of perspectives, including legal, scientific, historical, political, socio-economic, and technical points of view.

**202 Michigan's Agricultural and Natural Resources Heritage**  
 Fall. 2(2-0) Interdepartmental with ANR Education and Communication Systems. P:M: Completion of Tier I writing requirement.  
 Michigan's historical agricultural and natural resources. Orientation to sources for research and learning. Self-directed study integrating agricultural and natural resources heritage to family, community and careers.

**210 Pathways in Connected Learning**  
 Fall, Spring. 3(2-2) R: Approval of college.  
 Active, self-directed, and reflective learning associated with agriculture and natural resource issues, self and social development, and ethical choice making. Development of a learning plan and design of a learning portfolio. Individual and group presentations.

**289 Civilizations, Food Crops and the Environment**  
 Fall, Spring. 3(3-0) Interdepartmental with Crop and Soil Sciences. SA: TCC 289  
 Role of the major food crops in the survival of civilizations and cultures from the past to the present, and the resulting environmental impacts.

**310 Connected Learning Seminar I**  
 Fall, Spring, Summer. 3(3-0) P:M: (ANR 210)  
 Learner-directed critical analysis of contemporary issues in agriculture and natural resources. Communication of outcomes to professional communities. Collaborative learning integrated with individual experiences.

**311 Connected Learning Seminar II**  
 Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. P:M: (ANR 310)  
 Advanced analysis and presentation of contemporary issues in agriculture and natural resources.

**392 Agriculture and Natural Resources Seminar**  
 Spring. 1(2-0) R: Not open to freshmen or sophomores.  
 Current agricultural, natural resources and environmental problems and solutions. Discussion leaders from various disciplines.

**410 Connected Learning Transitions**  
 Fall, Spring. 3(3-0) P:M: (ANR 310)  
 Synthesis and analysis of structured experiences in agriculture and natural resources. Personal and interpersonal development, personal and professional integrity, communication competence, and critical and reflective thinking.

## Agriculture and Natural Resources—ANR

- 475 International Studies in Agriculture and Natural Resources**  
Fall, Spring, Summer. 2 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of college; application required.

Study-travel experience emphasizing contemporary problems affecting agriculture and natural resources in the world, national and local communities. Case studies and interviews with officials, community leaders and leading professionals.

- 489 Integrated Approaches to Agriculture and Natural Resources Problems (W)**  
Fall, Spring. 3(2-2) P:M: (MTH 110 or MTH 116) and (EC 201 or EC 202) and completion of Tier I writing requirement. R: Open only to seniors in Agriculture and Natural Resources.

Holistic solutions to resource management and allocation: an integrated, multidisciplinary team approach to case study problems.

- 490 Independent Study in Agriculture and Natural Resources**

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to sophomores or juniors or seniors or graduate students in the College of Agriculture and Natural Resources.

Supervised individual study in topics related to agriculture and natural resources.

- 491 Selected Topics**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen or sophomores.

Special topics in agriculture and natural resources.

- 493 Professional Internship in Agriculture and Natural Resources**

Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the College of Agriculture and Natural Resources. Approval of department; application required. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, CSS 493, EEP 493, FIM 493, FW 493, HRT 493, PKG 493, PLP 493, PRR 493, and RD 493.

Supervised professional experiences in agencies and businesses related to a student's major field of study.

- 810 International Food Laws and Regulations**  
Fall, Spring, Summer. 3(3-0) RB: Food science, law, food safety or related disciplines.

Survey of food laws of various countries and regions.

- 811 U.S. Food Laws and Regulations**  
Fall, Spring, Summer. 3(3-0) RB: (ANR 810) Food science, law or food safety. Not open to students with credit in FSC 421.

Food laws and regulations of the United States.

- 828 Food Safety Seminar Series**  
Fall, Spring. 1(1-0) Interdepartmental with Veterinary Medicine; Natural Science; Social Science. Administered by Veterinary Medicine. RB: Enrollment in graduate program in related discipline

Selected current topics covering the broad areas of food safety as they relate to production, processing, transport, microbiology, toxicology, and social and human dimensions.

- 829 Problems in Food Safety**  
Fall. 1(1-0) Interdepartmental with Veterinary Medicine; Natural Science; Social Science. Administered by Veterinary Medicine. RB: Enrollment in graduate program in related discipline

In-depth discussion of selected problems in food safety.

## AMERICAN STUDIES

## AMS

### Program in American Studies College of Arts and Letters

- 250 American Art**  
Spring. 3(3-0) Interdepartmental with History of Art; American Studies. Administered by Department of Art and Art History.

Major developments and themes in non-indigenous American art (painting, sculpture, architecture, material culture) from its colonial origins through the 20th century.

- 332 Technology and Culture**  
Fall. 4(4-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. P:M: Completion of Tier I writing requirement. R: Open only to juniors or seniors in the American Studies major in Lyman Briggs School.

History of technology with special emphasis on the interaction of technical innovation and other elements of culture.

- 335 The Natural Environment: Perceptions and Practices**  
Spring. 4(4-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. P:M: Completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors in the American Studies major or in Lyman Briggs School.

American attitudes toward the natural environment and related public and private institutions.

- 451 American Art through 1875**  
Spring of even years. 3(3-0) Interdepartmental with History of Art. Administered by Department of Art and Art History. P:M: (HA 120 or HA 121 or HA 250) and completion of Tier I writing requirement. SA: HA 438

Artistic production in North America from colonial times to 1875, in its cultural context.

- 453 American Art, 1875-1940**  
Fall of even years. 3(3-0) Interdepartmental with History of Art. Administered by Department of Art and Art History. P:M: (HA 120 or HA 121 or HA 250) and completion of Tier I writing requirement. SA: HA 458, HA 358

Artistic production in North America from 1875 to 1940, in its cultural context.

- 480 Seminar in American Material Folk Culture**  
Spring of odd years. 3(3-0) RB: Coursework in arts, humanities and cultural studies.

Understanding American material folk culture and folklife as sources for analysis and appreciation. Methodological approaches and fieldwork techniques.

- 491 Perspectives in American Studies**  
Fall. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. Methods and significant works in American Studies. Topics vary.

- 492 Seminar in American Studies**  
Spring. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to students in the College of Arts and Letters or James Madison College or Lyman Briggs School.

Selected topics in American life emphasizing interdisciplinary approaches. Topics vary.

- 855 Seminar in American Art**  
Spring of odd years. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with History of Art. Administered by Department of Art and Art History. R: Approval of department.

Intensive investigation of a topic in the history of American art.

- 881 American Studies Theory, Methods, and Bibliography**  
Fall. 3(3-0)

Methods and bibliographical sources of American Studies research. Interdisciplinary approaches to studying American culture.

- 890 Independent Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of college.

Special projects, directed reading, and research arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.

- 891 Special Topics in American Studies**  
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course.

Special topics supplementing regular course offerings proposed by faculty for graduate students on a group study basis.

- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of college.

Directed research leading to a master's thesis in partial fulfillment of Plan A master's degree requirements.