

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.