Agricultural Economics—AEC

85 Leadership in Natural Resources and Environmental Management
Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife; Forestry, Park, Recreation and Tourism Resources. Administered by Department of Fisheries and Wildlife. Theory and practice of leadership in natural resource and environmental management. Integration across disciplinary and jurisdictional divisions.

890 Independent Study
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 graduate students in Agricultural Economics. Approval of department. Independent study of selected topics in agricultural economics.

891 Topics in Agricultural Economics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. Selected topics in analytical methods, agri-food systems economics and management, and agricultural and natural resource development and policy.

898 Master's Research
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 master's students in the Agricultural Economics major. Approval of department. Master's degree Plan B research.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in the Agricultural Economics major. Approval of department. Master's thesis research.

923 Advanced Environmental and Resource Economics
Fall. 3(3-0) Interdepartmental with Economics; Forestry; Park, Recreation and Tourism Resources; Resource Development. RB: (AEC 829 and EC 812A)
Advanced economic theory of environmental management and policy. Treatment of externalities and market and non-market approaches to environmental improvement. Topics in conservation and sustainable economic growth. Applications to research and policy.

925 Advanced Natural Resource Economics
Spring. 3(3-0) Interdepartmental with Forestry; Resource Development; Park, Recreation and Tourism Resources; Economics. RB: (EC 812A and AEC 829 and FOR 866) SA: AEC 991H
Economic theory of managing nonrenewable and renewable resources, including optimal use, the incentives for use under decentralized markets, and public policy design. Analysis of the co-evolution of economic and ecological systems.

930 Dynamic Analysis in Agriculture and Natural Resources
Spring. 3(3-0) RB: (EC 801 and EC 812A) R: Open only to Ph.D. students in the College of Agriculture and Natural Resources or College of Business or College of Social Science or approval of department. SA: AEC 991E
Methods of dynamic optimization and their application to agricultural and natural resources problems. Discrete time dynamic programming, calculus of variations, and discrete time maximum principle.

932 Information Economics and Institutions in Agriculture and Natural Resources
Fall. 3(3-0) RB: (AEC 800 or AEC 810 or AEC 841) and (EC 812A and EC 812B) R: Open only to Ph.D. students in the Colleges of Agriculture and Natural Resources or Business or Social Science.
Applications to issues in agriculture, agribusiness, the food system, natural resources, and the environment. Asymmetric information, incomplete markets, principal/agent issues, transaction costs, and the design of contracts and other institutions.

977 Professional Practice in Agricultural Economics
Spring. 3(3-0) R: Open only to Ph.D. students in the Department of Agricultural Economics or Department of Economics. SA: AEC 947
Matching appropriate tools to applied problems in agricultural and resource economics. Individual and team preparation, under tight deadlines, of professional analyses and oral presentations for diverse audiences. Use of peer review.

978 Research Methodologies in Agricultural and Resource Economics
Spring. 3(3-0) R: Open only to Ph.D. students in the College of Agriculture and Natural Resources or College of Business or College of Social Science. SA: AEC 991F

991 Advanced Topics in Agricultural Economics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to Ph.D. students in the colleges of Agricultural and Natural Resources, Business, and Social Science; or with department approval.
Advanced topics such as price analysis, finance, risk and modeling techniques, agri-food systems, environmental economics and management, and agricultural and natural resource development and policy.

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 Economics. Approval of department. Doctoral dissertation research.

AGRICULTURAL TECHNOLOGY

Institute of Agricultural Technology
College of Agriculture and Natural Resources

290 Independent Study in Agricultural Technology
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 freshmen or sophomores in the Institute of Agricultural Technology. Supervised individual study on experimental, theoretical or applied topics related to agricultural science and technology.

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

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

150 Metal Fabrication Technology
Fall. 2(1-2)
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: (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 diag-
nosis. Offered first ten weeks of semester.

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

431 Irrigation, Drainage and Erosion Control
Systems
Fall: 2(2-2) RB: (MTH 116 and CSS 210) R:
Not open to freshmen or sophomores.
Principles of soil and water conservation engineer-
ing including: land and soil surveying, basic hydrau-
lies, 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 stu-
dent may earn a maximum of 6 credits in all
enrollments for this course. RB: (ATM 240
or BCM 311) R: Open only to majors in Ag-
cultural Technology and Systems Manage-
ment. Approval of department; applica-
tion required.
Supervised individual student research and study in
agricultural technology and systems management.

890 Special Problems
Fall, Spring, Summer. 1 to 4 credits. A stu-
dent 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 stu-
dent 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 stu-
dent may earn a maximum of 99 credits
in all enrollments for this course. R: Open
only to Ph.D. students in Agricultural Tech-
nology and Systems Management.
Doctoral dissertation research.

101 Preview of Science
Fall. 1 credit. Interdepartmental with Natu-
ral Science; Engineering; Social Science.
Administered by College of Natural Science.
R: Approval of college.
Overview of natural sciences. Transitional problems.
Communications and computer skills. Problem-
solving skills. Diversity and ethics problems in sci-
ence. Science and society.

101A Academic and Career Decision Making
Fall, Spring. 2(2-0)
Exploration of the career possibilities in agriculture,
natural resources and related areas.

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 Ag-
culture and Natural Resources
Issues in agriculture and natural resources. Per-
sonal and professional development through discus-
sion 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. Admin-
istered by College of Natural Science. R: Open
only to students in the College of Ag-
culture and Natural Resources or College
of Engineering or College of Natural Sci-
cence or College of Communication Arts and
Sciences or College of Social Science. Ap-
proval 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:
Completion of Tier I writing requirement.
Michigan's historical agricultural and natural re-
sources. 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 associ-
ated 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 presen-
tations.

491 Selected Topics
Fall, Spring. 1 to 4 credits. A stu-
dent 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.

ANR—Agriculture and Natural Resources