410  Advanced Professional Seminar in Agribusiness Management
Fall. 1(1-0) P:M: (ABM 210) R: Open only to juniors or seniors in the Agribusiness Management Specialization. Open only to juniors or seniors in the Agribusiness Management, Animal Science, Crop and Soil Science, or Horticulture majors. Advanced professional problems and reestablishment of career planning in the agri-food system. Industry trends, career alternatives, and job search strategies. Enhanced verbal, written, and visual communication techniques.

422  Vertical Coordination in the Agri-Food System
Fall. 3(3-0) Interdepartmental with Food Industry Management. P:M: (ABM 100 and EC 201) R: Open only to juniors or seniors. SA: FSM 443

424  Information and Market Intelligence in the Agri-Food Industry
Spring. 3(3-0) Interdepartmental with Food Industry Management. Administered by Department of Agricultural Economics. P:M: (FIM 220 or concurrently and EC 201)

425  Commodity Marketing II
Fall. 3(3-0) P:M: (ABM 225) and (STT 200 or STT 201 or STT 315 or ANS 314 or concurrently) SA: FSM 441
Advanced application of supply, space demand, and prices in commodity markets. Futures and options and their role in forward pricing. Risk management. Agricultural and food markets.

427  Global Agri-Food Industries and Markets
Fall. 3(3-0) Interdepartmental with Food Industry Management. P:M: (FIM 220 or ABM 225)
Strategic understanding of the international agri-food system. Analysis of global production, marketing, and consumption. Knowledge of changing conditions in international industries and markets. Global trends and opportunities.

430  Farm Management II
Fall. 3(4-0) P:M: (ABM 130) R: Open only to juniors or seniors. SA: FSM 330
Advanced management, planning, and control of farm production, marketing, financial activities, economic principles, budgeting and financial statements.

435  Financial Management in the Agri-Food System
Spring. 3(3-0) RB: (ACC 201 or ACC 230) and (ABM 130 or ABM 100 or EC 201 or EC 202) R: Open only to juniors or seniors. SA: FSM 412

437  Agribusiness Strategic Management (W)
Spring. 3(4-0) P:M: (FIM 220 and ABM 435) and (ABM 332 or ABM 430) and completion of Tier I writing requirement. R: Open only to juniors or seniors. SA: FSM 429
Analysis of strategic management issues for agribusiness. Formulation of business strategy and solutions to strategic problems. Integration of operations, marketing, finance, and human resource management.

480  Agribusiness Management in International Settings
Fall. Spring. Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen. Approval of department; application required. Study and travel experience emphasizing contemporary problems affecting agricultural systems in world, national, and local communities.

490  Independent Study in Agribusiness Management
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (ABM 100) R: Open only to sophomores or juniors or seniors in the Agribusiness Management major. Approval of department; application required. Students are limited to a combined total of 6 credits in ABM 490 and FIM 490. SA: FSM 490
Independent supervised study of topics in agribusiness management.

493  Professional Internship in Agribusiness Management
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (ABM 100) R: Open only to juniors or seniors in the Agribusiness Management major. 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, ANR 493, AEE 493, ANS 493, CSS, 493, EEP 493, FIM 493, FW 493, HRT 493, PKG 493, PLP 493, PRR 493, and RD 493.
Supervised professional experience in agribusiness management.

AEC—Agricultural Economics

800A  Mathematical Applications in Agricultural Economics
Fall. 1(1-0) C: AEC 800 concurrently. Basic mathematical tools for use in agricultural economics applications.

810  Institutional and Behavioral Economics
Fall. 3(3-0) Interdepartmental with Economics; Resource Development. Relationships among institutions, individual and collective actions, and economic performance. Public choice, property rights, and behavioral theories of firms and bureaucracies.

817  Political Economy of Agricultural and Trade Policy
Spring. 3(0-0) RB: (EC 805 or EC 812A) and (EC 809 or EC 813A)

818  Introduction to Econometrics
Spring. 3(3-0) Interdepartmental with Economics; Statistics and Probability. Administered by Department of Economics. P:M: (EC 801 and STT 430) R: Not open to Economics Ph.D. students. SA: EC 820

821  Econometrics II
Fall. 3(3-0) Interdepartmental with Economics; Statistics and Probability. Administered by Department of Economics. P:M: (EC 820A and EC 820B)

822  Econometrics III
Spring. 3(3-0) Interdepartmental with Economics; Statistics and Probability. Administered by Department of Economics. P:M: (EC 820A and EC 820B)
Dynamic models and time series data. ARMA models. ARCH models. Unit roots, cointegration and error correction. Rational expectations models.

829  The Economics of Environmental Resources
Fall. 3(3-0) Interdepartmental with Economics; Forestry; Park, Recreation and Tourism Resources; Resource Development. Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, conservation, development, and global environmental issues.

830  Wetlands Law and Policy
Spring of odd years. 3(3-0) Interdepartmental with Resource Development; Fisheries and Wildlife; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 801) Prior exposure to environmental and natural resource economics, management, policy, or law. An ability to do legal and other library-based research. Origin and development of wetlands law and policy. Wetland functions, mitigation, and banking. Legal, economic, political, and administrative perspectives. Cases, statutes and regulations.
Agricultural Economics—AEC

831 Food Marketing Management
Spring. 3(3-0) Interdepartmental with Marketing and Supply Chain Management. Administered by Department of Marketing and Supply Chain Management. RB: (MBA 820 or MS 825) SA: ML 831, MTA 831
Marketing management decisions in food firms. Consumer orientation, computer technologies, food system cost reduction, global opportunities, environmental and social issues.

832 Environmental and Natural Resource Law
Fall. 3(3-0) Interdepartmental with Resource Development; Crop and Soil Sciences; Forestry; Geography. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 430)
Origin and development of environmental law. Theories of power, jurisdiction, sovereignty, property interests, pollution, and other bases for legal controls of natural resources. Common law and constitutional limitations on governmental power.

835 Introductory Econometrics
Spring. 3(3-0) RB: (STT 430)
Estimation and interpretation of multiple regression models and their modifications when usual assumptions are not valid. Applications focus on problems faced by agricultural economists.

833 Land Use Law
Spring. 3(3-0) Interdepartmental with Resource Development; Forestry; Urban Planning. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 430) SA: RD 834
Public and private land use controls in the U.S. Civil rights, housing, energy problems, growth management, waste management, and land conservation. Cases, statutes and other regulations.

839 Applied Operations Research
Fall. 3(3-0) RB: (EC 801) SA: AEC 891B
Linear and nonlinear programming, spatial equilibrium models, risk programming. Applications in agribusiness management and in agricultural, environmental, and natural resource economics.

841 Analysis of Food System Organization and Performance
Spring. 3(3-0)
Industrial organization, subsector, and transaction cost approaches to analyzing coordination and performance of agricultural markets, contracting, and integration in the food systems of industrialized and developing countries. Applications to issues of organization, control, and public policy.

845 Commodity Market Analysis
Fall. 3(3-0) RB: (AEC 835)

851 Agribusiness Operations Management
Spring. 3(3-0)
Managerial processes for agribusiness operations control. Applications of linear programming, budgets, simulations, and dynamic programming. Statistical process control. Predictive and prescriptive analysis.

853 Financial Management in Agriculture
Spring. 3(3-0)
Financial and investment analysis tools and concepts and their application to decisions faced by agricultural, agribusiness, and food industry firms. Financial institutions and instruments, credit programs, and financial sector performance in low-income and high-income countries.

855 Agricultural Production Economics
Fall. 3(3-0) RB: (EC 801 and EC 805) and (AEC 835 and EC 823)
Analysis of production models using econometrics, mathematical programming, and simulation. Systems science perspective.

857 Strategic Management in Agribusiness
Fall. 3(3-0) SA: AEC 891A
Managerial problems faced by agribusiness firms. Strategies to interpret and respond to forces affecting the industry. Case study approach.

861 Agriculture in Economic Development
Fall. 3(3-0)

874 Field Data Collection and Analysis in Developing Countries
Summer of odd years. 3(3-0) RB: (AEC 861) SA: AEC 891C
Designing and conducting socioeconomic surveys to inform agricultural production, marketing, and environment/natural resource issues in developed and developing countries. Research proposal preparation, questionnaire design, sampling, data collection, and data processing and analysis using computers.

885 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 8 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.
AGRICULTURAL TECHNOLOGY AND SYSTEMS MANAGEMENT

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

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 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.

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: Approval of department.

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: Approval of department.
Doctoral dissertation research.

Agriculture and Natural Resources

College of Agriculture and Natural Resources

101 Preview of Science
Fall. 1 credit. Interdepartmental with Natural Science; Engineering; Social Science. Administered by College of Natural Science. R: Approval of college.

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

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 Engineering

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

150 Metal Fabrication Technology
Fall. 2(1-2) SA: ATM 150
Physical principles and safety techniques for electric and gas welding. Soldering, brazing, cutting, tool use, machine shop equipment use, and hot and cold metalworking.

240 Machine Systems and Management
Spring. 3(2-2) P:M: (CSE 101 or CSE 131 or AT 000) SA: ATM 240
Principles, analysis, performance, operation, and management of agricultural machines.

252 Gasoline and Diesel Engine Technology
Fall. 3(2-2) SA: ATM 252
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, ATM 254
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.