

AGRICULTURAL, FOOD AND RESOURCE ECONOMICS **AFRE**

**Department of Agricultural, Food and Resource Economics
College of Agriculture and Natural Resources**

- 801 Mathematical Applications in Economics**
Fall. 3(3-0) RB: MTH 124 or MTH 132 R: Open to graduate students. SA: AEC 801, EC 801
Mathematical tools in economic analysis. Matrix algebra, derivatives, partial derivatives, optimization, integration, and linear differential equations.
- 802 Statistical Methods for Agricultural, Food, and Resource Economists**
Fall. 3 credits. SA: AEC 802 C: AFRE 801 concurrently.
Applications of statistical tools for economic analysis.
- 805 Microeconomic Analysis**
Fall, Spring. 3(3-0) RB: AFRE 801 or concurrently R: Open to graduate students. SA: EC 805, AEC 805
Microeconomic theory with calculus. Production, costs, demand, markets, general equilibrium, and welfare theory.
- 810 Institutional and Behavioral Economics**
Fall. 3(3-0) Interdepartmental with Economics. Administered by Agricultural, Food, and Resource Economics. RB: EC 301 SA: AEC 810
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(3-0) RB: AFRE 805 or EC 812A SA: AEC 817
Concepts of policy analysis and decision. Agricultural sector problems, behavior, and policy in the development process. Macroeconomic and trade impacts. International policies affecting trade and development. Current policy issues.
- 821B Cross Section and Panel Data Econometrics II**
Spring. 3(3-0) Interdepartmental with Economics and Finance and Statistics and Probability. Administered by Economics. P: EC 821A
Analyses of quasi-maximum likelihood estimation, count data models, fractional response models, duration models, sample selection and attrition, stratified sampling, estimating treatment effects, stochastic frontier models, and other advanced topics.
- 823 Environmental Economics Methods**
Fall of odd years. 3 credits. P: AFRE 805 and AFRE 835 SA: AEC 823
Empirical and econometric methods in environmental economics focusing on theory and application of non-market valuation techniques.

- 829 Economics of Environmental Resources**
Spring. 3(3-0) Interdepartmental with Community Sustainability and Economics and Forestry and Fisheries and Wildlife. Administered by Agricultural, Food, and Resource Economics. RB: Undergraduate intermediate microeconomics, calculus, and statistics SA: AEC 829
Economic principles, theoretical models, and empirical methods related to environmental problems and policy interventions. Applications to air, land, water, forests, energy, fish and wildlife, and climate change, including in developing countries.
- 835 Introductory Econometrics**
Spring. 3(3-0) RB: STT 430 SA: AEC 835
Estimation and interpretation of multiple regression models and their modifications when usual assumptions are not valid. Applications focus on problems faced by agricultural economists.
- 841 Analysis of Food System Organization and Performance**
Spring. 3(3-0) SA: AEC 841
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.
- 851 Agribusiness Operations Management**
Spring. 3(3-0) SA: AEC 851
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) SA: AEC 853
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.
- 857 Strategic Management in Agribusiness**
Fall. 3(3-0) SA: AEC 857, 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) SA: AEC 861
Role of agriculture in economic development of low- and middle-income countries. Theories of agricultural growth. Policy issues. Case studies.
- 865 Agricultural Benefit-Cost Analysis**
Fall. 3(3-0) SA: AEC 865
Benefit-cost analysis of agricultural and natural resource projects, including financial and economic analysis. Case studies in project design and appraisal in low and high income countries.
- 874 Empirical Methods for Field Research in Developing Countries**
Spring. 3(3-0) RB: AFRE 861 and AFRE 835 SA: AEC 874, AEC 891C
Research design, sampling, questionnaire design, data collection and analysis of multi-topic household surveys for international development issues.

- 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 to graduate students in the Department of Agricultural, Food, and Resource Economics. Approval of department. SA: AEC 890
Independent study of selected topics in agricultural, food, and resource economics.
- 891 Topics in Agricultural, Food, and Resource Economics**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. SA: AEC 891
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 to master's students in the Department of Agricultural, Food, and Resource Economics. Approval of department. SA: AEC 898
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 to master's students in the Department of Agricultural, Food, and Resource Economics. Approval of department. SA: AEC 899
Master's thesis research.
- 900A Applied Microeconomics I**
Fall. 3 credits. P: (AFRE 805 or EC 812A) and (AFRE 835 or EC 820A) SA: AEC 900A
Empirical analysis of microeconomic problems with emphasis on applications to agriculture, natural resources, and the food sector.
- 900B Applied Microeconomics II**
Spring. 3 credits. P: AFRE 900A SA: AEC 900B
Extended empirical analysis of microeconomic problems with emphasis on applications to agriculture, natural resources, and the food sector.
- 923 Advanced Environmental and Resource Economics**
Fall. 3(3-0) Interdepartmental with Economics and Forestry. Administered by Agricultural, Food, and Resource Economics. RB: (AFRE 829 or concurrently) and EC 812A SA: AEC 923
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 Economics. Administered by Agricultural, Food, and Resource Economics. RB: EC 812A and AFRE 829 SA: AEC 991H, AEC 925
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.

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930 **Dynamic Analysis in Agriculture and Natural Resources**

Spring. 3(3-0) RB: AFRE 801 and EC 812A
R: Open to doctoral students in the College of Agriculture and Natural Resources or in the Eli Broad College of Business and The Eli Broad Graduate School of Management or in the College of Social Science or approval of department. SA: AEC 991E, AEC 930

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: (AFRE 810 or AFRE 841) and (EC 812A and EC 812B) R: Open to doctoral students in the College of Agriculture and Natural Resources or in the Eli Broad College of Business and The Eli Broad Graduate School of Management or in the College of Social Science. SA: AEC 932

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.

961 **Advanced Agricultural Development Economics**

Spring. 3 credits. P: EC 812A and EC 812B and EC 820A and EC 820B RB: AFRE 861 SA: AEC 961

Theoretical and empirical models of microeconomics of international agricultural development, with emphasis on household and individual behaviors related to production, investment and marketing decisions.

991 **Advanced Topics in Agricultural, Food, and Resource 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 to doctoral students in the College of Agriculture and Natural Resources or in the Eli Broad College of Business and The Eli Broad Graduate School of Management or in the College of Social Science. SA: AEC 991

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 36 credits in all enrollments for this course. R: Open to doctoral students in the Department of Agricultural, Food, and Resource Economics or in the Agricultural, Food and Resource Economics Major. Approval of department. SA: AEC 999

Doctoral dissertation research.