

# AREC - AGRICULTURAL AND RESOURCE ECONOMICS

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## **AREC405 Economics of Production (3 Credits)**

The use and application of production economics in analysis of firm and policy decisions. Production functions, cost functions, multiple product and joint production, and production processes through time.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

## **AREC422 Econometric Applications in Agricultural and Natural Resource Economics (3 Credits)**

The main goal of this course is to equip students with valuable skills in econometrics and data analysis. Specifically, the main goal of the course is to teach you the basics of the theory and practice of econometrics, and to give you experience in estimating econometric models with actual data.

**Prerequisite:** AREC326; or ECON326.

**Credit Only Granted for:** ECON422, AREC422, or AREC489F.

**Formerly:** AREC489F.

## **AREC426 Economic Methods and Food Consumption Policy (3 Credits)**

An overview of major econometric tools used by policy makers, economists and social scientists to analyze the effects of food consumption policy. Major food assistance programs in the United States such as SNAP, the School Lunch Program and the School Breakfast Program will be discussed.

**Prerequisite:** AREC326; or ECON326.

**Credit Only Granted for:** AREC489O or AREC426.

**Formerly:** AREC489O.

## **AREC427 Economics of Commodity Marketing Systems (3 Credits)**

Basic economic theory as applied to the marketing of agricultural commodities. Current developments affecting market structure including contractual arrangements, cooperative marketing, vertical integration, and governmental policies.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

## **AREC430 Introduction to Agricultural and Resource Law (3 Credits)**

Survey of law with emphasis on problems and applications related to agricultural and natural resource economics. The course emphasizes strategies for managing legal risk arising from ownership, management, and use of agricultural resources. Students will get practical information to utilize in personal or professional settings. Contract law, constitutional law, tort law, property law, real estate transactions, business organization, estate planning, and debtor.

**Prerequisite:** ECON326 or AREC326.

**Credit Only Granted for:** AREC430 or AREC489K.

**Formerly:** AREC489K.

## **AREC431 Agricultural Water Quality: Policy and Legal Issues (3 Credits)**

An overview of the American and Maryland legal systems and sources of legal information as it pertains to water quality and agriculture.

**Prerequisite:** AREC326; or ECON326; or students who have taken courses with comparable content may contact the department.

**Credit Only Granted for:** AREC489L or AREC431.

**Formerly:** AREC489L.

## **AREC433 Food and Agricultural Policy (3 Credits)**

Economic and political context of governmental involvement in the farm and food sector. Historical programs and current policy issues. Analysis of economic effects of agricultural programs, their benefits and costs, and comparison of policy alternatives. Analyzes the interrelationship among international development, agricultural trade and general economic and domestic agricultural policies.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

## **AREC435 Commodity Futures and Options (3 Credits)**

The economics and institutional features of commodity futures and options markets. Students will develop a basic understanding of the underlying price relationships between cash and futures markets and will apply this information to business risk management decision making.

**Prerequisite:** AREC326; or ECON326; or students who have taken courses with comparable content may contact the department.

## **AREC445 Agricultural Development, Population Growth and the Environment (3 Credits)**

Development theories, the role of agriculture in economic development, the agricultural policy environment, policies impacting on rural income and equity, environmental impacts of agricultural development.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

## **AREC446 Sustainable Economic Development (3 Credits)**

Examine why socially equitable and environmentally sustainable economic growth is difficult to achieve. It explores the interactive dynamics of environmental degradation, human capital, inequality and institutions. Emphasis is on the role of market imperfections and political failure in explaining the persistence of extractive economic institutions that hinder sustainable development.

**Prerequisite:** AREC326; or ECON326; or students who have taken courses with comparable content may contact the department.

**Credit Only Granted for:** AREC446 or AREC489G.

**Formerly:** AREC489G.

## **AREC447 The Economy of China (3 Credits)**

An introductory survey course of economic development in China with emphasis on understanding the process of economic reform in mainland China since 1978.

**Prerequisite:** AREC326, ECON306, or ECON326.

**Restriction:** Must be in one of the following programs (Agricultural and Resource Economics; Agricultural and Resource Economics: Agribusiness).

## **AREC453 Natural Resources and Public Policy (3 Credits)**

Rational use and reuse of natural resources. Theory, methodology, and policies concerned with the allocation of natural resources among alternative uses. Optimum state of conservation, market failure, safe minimum standard, and cost-benefit analysis.

**Prerequisite:** AREC326, ECON306, or ECON326; and (BMGT230 or ECON230).

**Restriction:** Must be in one of the following programs (Agricultural and Resource Economics; Agricultural and Resource Economics: Agribusiness; Agricultural and Resource Economics: Environmental and Resource Economics; Economics Bachelor of Arts; Environmental Science & Policy-Env Economics). Cross-listed with ECON453.

**Credit Only Granted for:** AREC453 or ECON453.

**AREC454 The Economics of Climate Change (3 Credits)**

The role of economics in the formation of climate policy; basic concepts of environmental economics including efficiency, externalities, and policy instruments; economic models of intertemporal decisions and decision making in the face of uncertainty. Applied economic analysis of specific issues and current policy initiatives.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

**Credit Only Granted for:** AREC454 or AREC489C.

**Formerly:** AREC489C.

**AREC455 Economics of Land Use (3 Credits)**

Fundamentals of location theory. Microeconomics of land use decisions, including determination of rent and hedonic pricing models. Impacts of government decisions on land use, including regulation (e.g., zoning), incentives (transferable development rights), provision of public services, and infrastructure investments. Impacts of land use on environmental quality, including issues relating to sprawl, agricultural land preservation, and other topics of special interest.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

**AREC456 Energy and Environmental Economics (3 Credits)**

Economic theory and empirical methods are used to study problems of energy, the environment, and the economy. It examines the extraction, production, and use of energy and market institutions and regulatory approaches used to correct market failures. Topics covered include: oil and natural gas markets, management and design of electricity markets, renewable energy, non-market valuation, climate change, and transportation policies.

**Prerequisite:** ECON326 or AREC326; or students who have taken courses with comparable content may contact the department.

**Credit Only Granted for:** AREC456 or AREC489J.

**Formerly:** AREC489J.

**AREC457 Energy, Climate Change, and Options for a Low-Carbon Economy (3 Credits)**

Provides a primer in the physics and atmospheric chemistry of climate change, describes what the effects of climate change may be and explains how energy generation and use in various sectors of the economy contribute to greenhouse gas. It presents policy options meant to curb the use of fossil fuels (e.g., carbon taxes), improve energy efficiency (e.g., standards and incentives), and identifies possible drawbacks or unintended effects of such policies. Students will also study adaptation from the engineering, policy and anthropology points of view. The course further covers other aspects of climate change, as the potential effect of climate change on human health, cultural artifacts and the built environment, and sensitive ecological systems, and the legal implications of carbon storage options.

**Recommended:** ECON200. And AREC326; or ECON326.

**Restriction:** Junior standing or higher.

**AREC481 Environmental Economics (3 Credits)**

An exploration of the use of economic incentives for protection of the environment and the determination of appropriate (or efficient) level of environmental quality. Also covers the choice of policy instruments for the attainment of environmental standards.

**Prerequisite:** 1 course with a minimum grade of C- from (AREC326, ECON326).

**Restriction:** Must be in one of the following programs (Agricultural and Resource Economics; Agricultural and Resource Economics: Agribusiness; Environmental Science & Policy-Env Economics; Agricultural and Resource Economics: Environmental and Resource Economics).

**Credit Only Granted for:** ECON481 or AREC481.

**AREC489 Special Topics in Agricultural and Resources Economics (3 Credits)**

**AREC610 Microeconomic Applications in Agricultural and Resource Markets (3 Credits)**

Applications of graduate level microeconomic analysis to the problems of agricultural and natural resource production and distribution including demand for agricultural output, the nature of agricultural supply decisions, decision making under uncertainty, valuation of natural resources, and exploitation of natural resources.

**Prerequisite:** ECON603.

**AREC620 Optimization in Agricultural and Resource Economics (3 Credits)**

Mathematical theory of static and dynamic optimization as applied to the economics of agriculture, natural resources and the environment. Topics include necessary and sufficient conditions for constrained optimization, convexity and concavity, duality and the envelope theorem, comparative statics, fixed point theorems, optimal control theory and dynamic programming.

**Prerequisite:** Must have completed Multivariate calculus and matrix or linear algebra.

**AREC623 Applied Econometrics I (4 Credits)**

A modern introduction to empirical strategies in applied micro research in fields like public policy, development economics, labor economics, education, marketing and corporate finance. Lectures focus on concepts and applications with the view that empirical work must address economically meaningful causal questions. Some theoretical and mathematical aspects of probability and statistics will be developed to assess the significance of the relationship among economic variables.

**Prerequisite:** Introductory statistics or econometrics; or permission of instructor.

**AREC624 Applied Econometrics II (4 Credits)**

Variations of the standard linear model, simultaneous equations estimation, nonlinear regression, nonlinear simultaneous equations estimation, static and dynamic panel data models, errors in variables, Hausman tests, discrete choice models such as conditional multinomial and mixed logit models, latent class models, semi-parametric estimation, varying parameter models, unobserved variables, time series models, and model selection procedures.

**Prerequisite:** AREC623.

**AREC625 Economic Welfare Analysis (3 Credits)**

The measurement of economic well-being for producers, consumers, and resource owners. Topics include competitive equilibrium, Pareto optimality, market failure, public goods and nonmarket welfare measurement, multimarket considerations, existing distortions, and second best. Applications in economic welfare analysis of agricultural and resource policies are discussed.

**Credit Only Granted for:** AREC625 or AREC825.

**AREC632 Agricultural Policy Analysis (3 Credits)**

The economics of agricultural policies. Methods for analyzing costs and benefits of price supports, import restraints, and other policies for producers, consumers, and taxpayers. Farm programs of the U.S., other industrial countries and developing countries including interventions in both domestic markets and international trade are covered along with their consequences for factor owners and related commodity markets. Theories of the farm problem and possible remedies are offered.

**Credit Only Granted for:** AREC632 or AREC832.

**AREC645 Environment and Development Economics (3 Credits)**

Considers neoclassical and endogenous growth models; international trade theory; the role of property right institutions and factor markets; the environmental impact of trade liberalization in developing countries and the environmental effects of increasing international capital mobility; empirical studies relating the environment to growth and globalization; and policy analyses. Jointly offered with AREC845.

**Credit Only Granted for:** AREC645 or AREC845.

**AREC699 Special Problems in Agricultural and Resource Economics (1-2 Credits)**

Intensive study and analysis of specific problems in the field of agricultural and resource economics, providing in-depth information in areas of special interest to the student.

**AREC783 Environmental Taxation and Regulation (3 Credits)**

The economics of policies to address environmental externalities. Specific topics include the theory of public goods and externalities, cost-benefit and cost-effectiveness analysis of environmental regulations, regulatory instrument choice under uncertainty, environmental policy in an economy with pre-existing tax distortions, monitoring and enforcement of environmental regulations, distributional effects of environmental policy, and regulation of intertemporal externalities.

**Prerequisite:** ECON603 and ECON604; and graduate-level econometrics.

**Credit Only Granted for:** AREC783 or AREC869W.

**Formerly:** AREC869W.

**AREC784 Energy Economics, Empirical Industrial Organization, and Public Policy (3 Credits)**

Energy markets and public policy, evaluating techniques for estimating market demand and supply and for evaluating policy intervention. Comparison of reduced-form and structural approaches. Applications may include but are not limited to electricity, oil and other liquid fuels, and household travel, with examples from the United States and other countries.

**Prerequisite:** ECON603, AREC623, and AREC624; or permission of instructor.

**AREC785 Advanced Economics of Natural Resources (3 Credits)**

The use of exhaustible and renewable natural resources from normative and positive points of view. Analysis of dynamic resource problems emphasizing energy, mineral, groundwater, forestry, and fishery resources; optimal, equilibrium, and intergenerational models of resource allocation.

**Prerequisite:** Permission of AGNR-Agricultural & Resource Economics department; or (ECON603 and AREC623). Cross-listed with ECON785.

**Credit Only Granted for:** AREC785 or ECON785.

**AREC799 Master's Thesis Research (1-6 Credits)****AREC815 Experimental and Behavioral Economics (3 Credits)**

An overview of the design, implementation, and analysis of experiments motivated by behavioral economics, with a particular focus on experiments in field settings. Topics covered include social preferences, risk aversion, prospect theory, present bias, overconfidence, and limited attention.

**Prerequisite:** AREC623, AREC624, ECON603, and ECON604; or equivalent.

**Credit Only Granted for:** AREC815 or AREC869A.

**Formerly:** AREC869A.

**AREC825 Advanced Economic Welfare Analysis (3 Credits)**

Theory of economic welfare measurement, problems of path dependence in evaluating multiple price changes, welfare measurement under risk, general equilibrium welfare measurement with multiple distortions, and applications in evaluation of agricultural and resource policies.

**Credit Only Granted for:** AREC625 or AREC825.

**AREC829 Policy Design and Causal Inference for Social Science (3 Credits)**

Covers a number of empirical strategies in applied micro research to estimate the effects of a policy (or program) on the outcomes of interest. The topics covered represent the toolbox of modern causal inference in academic fields like public policy, development economics, labor economics, education, marketing and corporate finance, as well as in the industry and international organizations. Emphasis is given to the thought experiment, the hypothetical experiment that should be used to answer the causal question of interest.

**Prerequisite:** AREC624 and AREC623; or permission of instructor.

**Repeatable to:** 9 credits if content differs.

**AREC832 Advanced Agricultural Policy Analysis (3 Credits)**

Research problems in agricultural policy that include models and methods for explaining the consequences and causes of intervention in agricultural commodity markets. Quantitative, market level analysis of the implications of uncertainty, strategic behavior in international trade, second-best policies, the general equilibrium analysis of intervention, and the political economy of collective action in farm policy.

**Credit Only Granted for:** AREC632 or AREC832.

**AREC845 Environment and Development Economics (3 Credits)**

Considers neoclassical and endogenous growth models; international trade theory; the role of property right institutions and factor markets; the environmental impact of trade liberalization in developing countries and the environmental effects of increasing international capital mobility; empirical studies relating the environment to growth and globalization; and policy analyses. Jointly offered with AREC645.

**Credit Only Granted for:** AREC645 or AREC845.

**AREC846 Development Microeconomics (3 Credits)**

Development economics with focus on issues applicable to rural development and agriculture in developing countries. Content includes both theory and empirical application of theory. Subjects covered include economics of agricultural households, credit and insurance markets, technological progress and learning and institutional economics of developing countries.

**Prerequisite:** AREC624, ECON603, and AREC623; or equivalent.

**Formerly:** AREC869E.

**AREC847 Networks, Social Learning and Technology Adoption (3 Credits)**

This class will focus on networks, learning from others, and peer effects and the role of each in human capital accumulation, technology adoption and behavior. The material is focused on applications of education, health agriculture and entrepreneurship in developing countries, but will draw heavily from literatures on these effects in developed countries as well. The class will cover the theory of networks and learning but its primary focus will be on the empirical difficulty of identifying these effects and establishing causality.

**Prerequisite:** AREC624, AREC623, and ECON603; and students who have taken courses with comparable content may contact the department.

**AREC869 Advanced Topics in Agricultural and Resource Economics (1-3 Credits)**

Frontiers of research in environmental and resource economics; agricultural policy, production, and trade; and development. Topics may include decision making under risk and related market institutions, principal agent analysis, optimal policy design, technology adoption, market structure, land and credit markets, information markets, and income distribution.

**Repeatable to:** 9 credits if content differs.

**AREC891 Introduction to Prospectus Development (1 Credit)**

Critical evaluation of research, prospectus topic exploration including literature review, data identification, model development, and related presentations. Required of all second-year Ph.D. students.

**Prerequisite:** Completion of the first year of graduate study in AREC.

**Credit Only Granted for:** AREC 869K or AREC 891.

**Formerly:** AREC869K.

**AREC892 Dissertation Prospectus Development (3 Credits)**

Presentations of proposed dissertation research including literature review, model development, data identification, and written prospectus development. Required of all third-year Ph.D. students.

**Prerequisite:** Completion of two years of the AREC Ph.D. program.

**Credit Only Granted for:** AREC 869P or AREC 892.

**Formerly:** AREC869P.

**AREC898 Pre-Candidacy Research (1-8 Credits)**

**AREC899 Doctoral Dissertation Research (1-8 Credits)**