

# AGRICULTURAL AND RESOURCE ECONOMICS (ARE)

## **ARE 1110E. Population, Food, and the Environment. (3 Credits)**

The role of agriculture in the growth and development of societies throughout the world. Economic, social, and environmental problems of food production and resource needs in developing and advanced societies.

**Skill Codes:** COMP. Environmental Literacy

**Content Areas:** CA2: Social Science

**Topics of Inquiry:** TOI4: Environmental Literacy, TOI5: Indiv Values Soc Inst

## **ARE 1150. Principles of Applied and Resource Economics. (3 Credits)**

An introduction to microeconomic analysis with applications to food, nutrition, health, natural resources, and the environment. Topics include consumer and firm behavior, supply, demand, markets, and economic policy.

**Enrollment Requirements:** Not open for credit to students who have passed ECON 1201.

**Content Areas:** CA2: Social Science

**Topics of Inquiry:** TOI5: Indiv Values Soc Inst

## **ARE 1333Q. Introduction to Data and Visualization. (3 Credits)**

The use of Excel tools and commands to organize, analyze, and interpret data and create reports that can be understood by lay audiences in an increasingly data-driven world.

**Skill Codes:** COMP. Quantitative Competency

## **ARE 1400. Pricing Pleasure: Controversial Consumption. (3 Credits)**

Interdisciplinary exploration of the complex and often controversial production, trade, and consumption of global commodities such as chocolate, coffee, fast fashion, and marine-based resources through both economic and social perspectives. The specific goods studied may change over time to explore timely issues relevant to society. Examines the hidden costs of production - including labor exploitation, environmental degradation, and social injustice - while also considering market dynamics, ethics of consumption, fair trade, and sustainability. Through discussions, in-class activities, and collaborative projects, students develop critical thinking, ethical reasoning, and global awareness.

**Content Areas:** CA2: Social Science, CA4INT: Div & Multi - Intl

**Topics of Inquiry:** TOI1: Creativity: Des, Expr, Innv, TOI3: Div, Equity, Soc Just

## **ARE 2150. Intermediate Applied and Resource Economics. (3 Credits)**

Applications of intermediate level microeconomic theory to problems and policy issues in agriculture, natural resources, and the environment. Topics include supply, demand, market equilibrium, consumer and producer behavior, perfect competition, and welfare economics. Emphasis will be placed on using the theory in applied and computational exercises.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; ARE 1333Q or ARE 3333 or equivalent with instructor consent.

ARE 1333Q or ARE 3333 may be taken concurrently. May not be taken out of sequence after passing ARE 3223.

## **ARE 2155. Imperfect Competition and Behavioral Economics. (3 Credits)**

Extension of intermediate microeconomic theory to include noncompetitive markets and psychology to consumer behavior. Topics include monopolies and oligopolies (and their welfare implications); game theory (including adverse selection and moral hazard); and behavioral economics (such as time inconsistency, loss aversion, and pro-social preferences). Emphasis will be placed on real-world applications of theory in agriculture, health, natural resources, and the environment.

**Enrollment Requirements:** ARE 2150 or ECON 2201 or 2211Q.

## **ARE 2210. Essentials of Accounting and Business. (3 Credits)**

An analysis of basic business principles, fundamentals and concepts for agribusiness entrepreneurs. Taught with SARE 460.

## **ARE 2215. Business Management. (3 Credits)**

Analysis of marketing, management, and financial decision-making tools in agribusiness.

**Enrollment Requirements:** ARE 1333Q or ARE 3333 or equivalent with instructor consent; may be taken concurrently.

## **ARE 2250E. Energy Economics: Sustainable Transitions. (3 Credits)**

Application of economics theory, methods and concepts to focus on electricity markets, electricity generation, financing of the power transmission grid, regulation, policies and the welfare effects of policies within the current generation and implications for future generations. Topics include energy demand and supply, energy pricing, the environmental consequences of energy consumption and production, the regulation and design of energy systems and markets, and economics of policies designed to facilitate transitions to carbon neutrality, such as carbon credits, offsets, and renewable portfolio standards. Lectures, computer applications with data, analysis of current events, and class discussions.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201.

**Skill Codes:** COMP. Environmental Literacy

**Content Areas:** CA2: Social Science

**Topics of Inquiry:** TOI4: Environmental Literacy, TOI5: Indiv Values Soc Inst

## **ARE 2260. Food Policy. (3 Credits)**

Analysis of food and agricultural policies in the United States and abroad. Designed for students with diverse departmental affiliations.

**Enrollment Requirements:** Recommended preparation: ARE 1150 or ECON 1200 or 1201; basic skills in Excel.

## **ARE 2261W. Writing in Food Policy. (1 Credit)**

A writing intensive course on issues related to food policy, integrated with course content in ARE 2260.

**Enrollment Requirements:** ARE 2260, may be taken concurrently; ENGL 1007 or 1010 or 1011; open to Applied and Resource Economics majors, others with instructor consent.

**Skill Codes:** COMP. Writing Competency

## **ARE 2434E. Environmental and Resource Policy. (3 Credits)**

Emergence of environmental policies from the local, legal, and regulatory angles. Formalization and structure of environmental policy with a focus on the hurdles, design, and implementation of policy, particularly air and water policy. Suitable for all majors.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy

**ARE 2435W. Writing in Environmental and Resource Policy. (1 Credit)**

A writing intensive course integrated with course content in ARE 2434E.

**Enrollment Requirements:** ARE 2434E, which may be taken concurrently; ENGL 1007 or 1010 or 1011; open only to Environmental and Natural Resource Economics, Economics of Sustainable Development and Management, and Applied and Resource Economics majors, others by consent.

**Skill Codes:** COMP. Writing Competency

**ARE 2464. Measuring Impact of Programs that Raise Human Well-being. (3 Credits)**

The theory and practice behind measuring impacts and costs of programs that raise human welfare through poverty alleviation, economic development, and social and environmental justice. Case studies will show how governments and organizations can best optimize programming. Examples include how to increase incomes and farm productivity, how to decrease disease and child mortality, and how to improve resilience to climate change. Topics include survey design, performance indicators, the logical framework and results matrix, sample design, impact evaluation methodologies and project appraisal.

**Enrollment Requirements:** Recommended preparation: ARE 1150 or ECON 1200 or 1201. Not open to students who have completed ARE 3464.

**ARE 2525. Sustainability Policy and Management. (3 Credits)**

What factors do we need to consider for evaluating sustainability and its implementation? How do those factors depend on the topic at hand? This course is an effort to answer these two questions and to provide perspectives and tools to better evaluate whether we should or should not pursue a particular sustainability option. We will discuss a wide array of topics in sustainability, such as waste, healthcare, energy, food, climate, and the production of animal agriculture.

**Content Areas:** CA2: Social Science

**Topics of Inquiry:** TOI1: Creativity: Des, Expr, Innv, TOI3: Div, Equity, Soc Just

**ARE 3221. Managerial Economics and Business Strategies. (3 Credits)**

The application of microeconomic analysis to decision-making techniques of businesses and management units with a particular focus on the food industry covering topics such as electing or developing products, deciding on product output and pricing, organizational design, promotional strategies, worker hiring and training, and investment and financing.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; ARE 1333Q or ARE 3333 or equivalent course, which may be taken concurrently. Recommended preparation: MATH 1071Q or 1110Q or 1120Q or 1131Q or 1151Q; or STAT 1000Q or STAT 1100Q.

**ARE 3222. Marketing and Consumer Behavior. (3 Credits)**

This course focuses on principles of contemporary marketing, including consumer behavior, social media, product, promotion, distribution and pricing strategies, with special emphasis on food and health.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201.

**ARE 3223. Business Organization and Labor Markets. (3 Credits)**

Analytical tools that economists use to evaluate the organizational and hiring decisions of firms. Emphasis on the effect of government policies and programs on how many workers are hired, how much they are paid, and how other forms of compensation are structured. Specific areas of consideration may include: minimum wages, federal income tax, payroll and self-employment taxes, unemployment insurance, immigration, health insurance, retirement account contributions, the use of contractors in place of employees (the so-called "gig economy"), legal form of organization, and business liability. Special emphasis on using original sources, including federal statistical agency data products, reports from federal oversight bodies, US Code, and IRS publications.

**Enrollment Requirements:** ARE 2150 or 3150.

**ARE 3225. Price Analysis and Futures Trading. (3 Credits)**

Principles and applications of market price determination, with special emphasis on the use of futures markets for profit and price risk management. Includes food and energy case studies, internet applications, and a futures simulation exercise.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; STAT 1000Q or 1100Q or equivalent.

**ARE 3305E. Economic Development, Environment, and Policy. (3 Credits)**

Integrating the topics of economic development and the environment. Overview of economic development and growth in developed and developing nations. Classical and modern theories of economic growth and measures of economic inequality. Population growth, sustainable economic development, rural-urban interactions, agricultural transformation, and impacts on the environment. The role of education and health, policies for economic development, and climate adaptation.

**Enrollment Requirements:** ARE 1150 or ECON 1201 or ECON 1200.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy

**ARE 3333. Computational Analysis in Applied Economics. (3 Credits)**

Learn fundamental concepts of statistics and economics through analysis of economic data using computer spreadsheets. Students should have a laptop computer in class.

**Enrollment Requirements:** STAT 1000Q or STAT 1100Q or similar. Recommended preparation: ECON 1200 or ECON 1201 or ARE 1150.

**Content Areas:** CA3LAB: Science & Tech Lab

**Topics of Inquiry:** TOI6L: Science Emp Inq (Lab)

**ARE 3437E. Marine Fisheries Economics and Policy. (3 Credits)**

Explores the various natural, human and management components of the fishery system and presents the application of economic and policy analysis for the optimal allocation of resources to a fishery.

**Enrollment Requirements:** Recommended Preparation: ARE 1150 or ECON 1200 or 1201.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy

**ARE 3438E. Climate Economics. (3 Credits)**

Analysis of the interactive relationship between the economy and climate change. Use of principles and tools of economics to focus on the costs of changes in the severity and frequency of weather events, how these costs are influenced by markets and policies, and how costs and benefits are distributed across populations within the U.S and across the globe in the short and long terms. Examination of household, firm-level, national and international decision-making as influenced by climate change, taking into account uncertainty, diverging interests, external costs, and evaluation of models used to alternative scenarios.

**Enrollment Requirements:** ARE 1150 or ECON 1201 or ECON 1200.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy, TOI5: Indiv Values Soc Inst

**ARE 4205. Market Planning and Survey Research in the Food Industry. (3 Credits)**

Overview of market planning in the food industry, with emphasis on survey design and implementation. Student groups will work with clients to develop tailored market plans.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or 1201; ARE 3333 or ECON 2311Q.

**ARE 4210. Data Science for Decision Making in Applied and Resource Economics. (3 Credits)**

This course introduces data science and its transformative role in decision-making across business and policy applications in applied and resource economics. Students will learn to analyze and interpret data using R, with hands-on practice in visualization, A/B testing, regression analysis, and machine learning. Designed for beginners, it emphasizes intuitive approaches and practical applications, preparing students to apply data science in real-world contexts.

**Enrollment Requirements:** Recommended preparation: Statistics, such as STAT 1000Q or STAT 1100Q or a similar course. Not open for credit to students who have passed ARE 5210.

**ARE 4215. Sustainable Business Planning. (3 Credits)**

The practice of creating a sustainable business plan as a critical step for entrepreneurial success. In this class you will learn principles of marketing, financial and human resource management as well as budgeting techniques and the legal and organizational structure of businesses while creating a sustainable business plan.

**Enrollment Requirements:** ARE 2210 and ARE 2215 or equivalent courses only with instructor's consent. Open to Juniors and Seniors. Not open for credit to students who have passed ARE 5215.

**ARE 4217. Business Finance and Investment Management. (3 Credits)**

Theory and practice of business finance and investment management, including sources of funding, the capital structure of corporations, the actions that managers take to increase the value of the firm, and the tools and analysis used to allocate financial resources. Emphasis on investment decision-making, corporate risk management, capital flow management, and mergers and acquisitions. Use of real-world applications to provide students with a solid background in the economic theory of business finance and investment management in food and resource industries.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or 1201; open to juniors or higher.

**ARE 4279. International Commodity Trade. (3 Credits)**

The basic principles of international commodity trade and market institutions. Applications to current problems of international commodity trade and policy.

**Enrollment Requirements:** Recommended preparation: ARE 1150 or ECON 1200 or 1201.

**ARE 4305. Sustainable Economic Development. (3 Credits)**

The role of sustainable economic development of less developed economies. Microeconomic dimensions of agricultural development, food security, agricultural production and supply, foreign assistance, and government programming.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; MATH 1071Q or 1110Q or 1120Q or 1126Q or 1131Q. Credit may not be received for both ARE 4305 and 5305.

**ARE 4438E. Valuing the Environment. (3 Credits)**

Conceptual and practical understanding of main methods used to evaluate economic benefits of environmental protection and damages from degradation. Methods include: change in productivity, hedonic pricing, travel cost method, contingent valuation, defensive expenditures, replacement costs, and cost-of-illness. Topics covered include: recreation, soil-erosion, energy, forestry, hazardous waste, air pollution, deforestation, wetlands, wildlife, biodiversity, noise, visibility, water, and water pollution.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy

**ARE 4444. Economics of Energy, Climate, and the Environment. (3 Credits)**

Economics of energy issues with special reference to local and regional environmental quality, global climate change, and energy markets. Environmental and economic implications of developing alternative sources of energy. Regulatory policies in relation to transportation, industry, commercial and residential energy use.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; open to juniors or higher.

**ARE 4462E. Environmental and Resource Economics. (3 Credits)**

Natural resource use and environmental quality analysis using economic theory. Reviews of empirical research and relevant policy issues.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or ECON 1201; MATH 1071Q or 1110 or 1120 or 1126 or 1131Q; open to juniors or higher. Credit may not be received for both ARE 4462 and 5462.

**Skill Codes:** COMP. Environmental Literacy

**Topics of Inquiry:** TOI4: Environmental Literacy

**ARE 4464. Cost-Benefit Analysis and Applications. (3 Credits)**

Foundations and applications of cost-benefit analysis for evaluation of public policies relevant to environment, protection, health, economic development, and other public policies. Applications include data-driven assignments and analysis.

**Enrollment Requirements:** ARE 2150, or equivalent course in intermediate microeconomics with instructor consent. Not open for credit to students who have passed ARE 5464.

**ARE 4476. International Trade and Policy. (3 Credits)**

Analysis of international trade and trade policy focusing on agricultural and food markets. Covers trade-related issues concerning economic development and growth. Focus on current challenges to the multilateral trading system and the theoretical foundation for understanding the economic importance of firms, international trade, and global capital flows. Introduction of methods and tools for counterfactual evaluation of trade policies. Taught concurrently with ARE 5476.

**Enrollment Requirements:** ARE 1150 or ECON 1200 or 1201.

Recommended preparation: MATH 1071Q or 1110Q or 1120Q or 1131Q or 1151Q; or STAT 1000Q or 1100Q. Not open for credit to students who have passed ARE 5476.

**ARE 4897. Honors Thesis. (3 Credits)**

**Enrollment Requirements:** ENGL 1007 or 1010 or 1011; open to seniors; open only with consent of instructor to students in the Honors Program.

**Grading Basis:** Honors Credit

**ARE 4900. Farm Credit Fellows Seminar. (1 Credit)**

Course offered with Farm Credit East. Students learn agribusiness concepts from the lender's perspective. Students taking this course will be assigned a grade of S (satisfactory) or U (unsatisfactory).

**Enrollment Requirements:** One or more of the following courses: ARE 2150, 2210, 2215; ACCT 2001; BADM 3730; or FNCE 3101.

**ARE 4991. Professional Internship. (1-6 Credits)**

Provides students with a meaningful experience in a formalized applied resource economics program under supervised conditions. Each student taking this course must submit a formal written report for evaluation and meet all other course requirements as specified by the instructor. Requires Independent Study Authorization with consent of department head and advisor.

**Enrollment Requirements:** Open to junior or senior Applied and Resource Economics majors with Independent Study Authorization.

May be repeated for a total of 6 credits

**ARE 4993. Foreign Study. (1-15 Credits)**

Special topics taken in a foreign study program. Consent of department head required, normally to be granted prior to the student's departure.

May be repeated for credit

**ARE 4995. Special Topics. (1-6 Credits)**

Topics and credits to be published prior to the registration period preceding the semester offerings.

May be repeated for credit

**ARE 4999. Independent Study. (1-6 Credits)**

Designed primarily for Resource Economics majors. Open to students with Independent Study Authorization.

May be repeated for credit