DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

Office in Clark Building, Room B320
(970) 491-6325
dare.agsci.colostate.edu (http://dare.agsci.colostate.edu)

Professor Hayley Chouinard, Head
Professor Marshall Frasier, Chair of Undergraduate Program
Professor Christopher Goemans, Chair of Graduate Program

Undergraduate Majors

• Agricultural Business (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/business-major/)
  • Agricultural Economics Concentration (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/business-agricultural-economics-concentration/)
  • Farm and Ranch Management Concentration (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/business-farm-ranch-management-concentration/)
  • Food Systems Concentration (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/business-major/food-systems-concentration/)
  • Agricultural Education (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/education-major/)
  • Teacher Development Concentration (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/education-teacher-development-concentration/)
  • Agricultural Literacy Concentration (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/education-literacy-concentration/)

• Environmental and Natural Resource Economics (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/environmental-natural-major/)

Minors

• Agricultural Business (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/agricultural-business-minor/)
• Agricultural Literacy (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/literacy-minor/)
• Environmental and Natural Resource Economics (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/environmental-natural-resource-economics-minor/)
• Food Industry Management Interdisciplinary Minor (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/food-industry-management-interdisciplinary-minor/)

Graduate

Graduate Programs in Agricultural and Resource Economics

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees. A description of these programs may be found in the Graduate and Professional Bulletin (http://catalog.colostate.edu/general-catalog/graduate-bulletin/) or on the department’s website (http://dare.agsci.colostate.edu).

Certificate

• Teaching in Extension (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/graduate-certificate-teaching-extension/)

Master's Programs

• Master of Science in Agricultural and Resource Economics, Plan A (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/plan-a-ms/)
• Master of Science in Agricultural and Resource Economics, Plan B (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/plan-b-ms/)
• Master of Agribusiness and Food Innovation Management, Plan C (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/master-agribusiness-food-innovation-management-plan-c/)

Ph.D.

• Ph.D. in Agricultural and Resource Economics (http://catalog.colostate.edu/general-catalog/colleges/agricultural-sciences/agricultural-resource-economics/phd/)
Courses
Subjects in this department include: Agricultural and Resource Economics (AREC) and Agricultural Education (AGED).

Agricultural and Resource Economics (AREC)

AREC 192 Orientation to Agricultural and Resource Econ Credit: 1 (0-0-1)
Course Description: First year course in agricultural and resource economics and agricultural education. Information and skills necessary to succeed in majors and build an inclusive community in the Department of Agricultural and Resource Economics.
Prerequisite: None.
Restriction: Must be a: Undergraduate.
Registration Information: This is a partial semester course. Sections may be offered: Online. Credit not allowed for both AREC 180A1 and AREC 192.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 202 Agricultural and Resource Economics (GT-SS1) Credits: 3 (3-0-0)
Course Description: Introduction to decision-making by consumers, firms, and government and the resulting allocation of resources through markets.
Prerequisite: MATH 117, may be taken concurrently or MATH 118 or MATH 124 or MATH 125 or MATH 141 or MATH 155 or MATH 159 or MATH 160.
Registration Information: Sections may be offered: Online. Credit not allowed for both AREC 202 and ECON 202.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.
Additional Information: Social & Behavioral Sciences 3C, Economic or Political Systems (GT-SS1).

AREC 222 Economics of Food Systems Credits: 3 (3-0-0)
Course Description: Examine the food system using an economic lens. Review the physical, political, and structural context in which the US agricultural system is embedded. Use economic tools and concepts to analyze different components of the food system, as well as potential tradeoffs associated with different policy or other interventions.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 224 Introduction to Agribusiness Entrepreneurship Credit: 1 (0-0-1)
Course Description: Introductory exposure to entrepreneurship for agribusinesses through presentations by industry professionals.
Prerequisite: AREC 202, may be taken concurrently or ECON 202, may be taken concurrently.
Registration Information: Required field trips. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 240 Issues in Environmental Economics (GT-SS1) Credits: 3 (3-0-0)
Also Offered As: ECON 240.
Course Description: Discussion and economic analysis of current environmental issues with special emphasis on the impact of economic growth.
Prerequisite: None.
Registration Information: Sections may be offered: Online. Credit not allowed for both AREC 240 and ECON 240.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
Additional Information: Social & Behavioral Sciences 3C, Economic or Political Systems (GT-SS1).

AREC 305 Agricultural and Resource Enterprise Analysis Credits: 3 (2-2-0)
Course Description: Use of records in agricultural and resource enterprise management; analytical methods, budgets, and planning techniques for improved decision making.
Prerequisite: (CIS 120 or BUS 150 or CS 110) and (AREC 202 or ECON 202).
Registration Information: Sections may be offered: Online. Must register for lecture and laboratory.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 310 Agricultural Marketing Credits: 3 (3-0-0)
Course Description: Market structure, behavior, and performance including futures market and market games theory.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 311 Agricultural and Resource Product Marketing Credits: 3 (3-0-0)
Course Description: Theory and practice of marketing-differentiated agricultural products and natural resource amenities with focus on strategies and market trends.
Prerequisite: AREC 202 or ECON 202.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 325 Personnel Management in Agriculture Credits: 3 (3-0-0)
Course Description: Human resource issues for agribusiness firms. Managing employees, legal issues, negotiation methods, and benefits packages. Workplace professionalism.
Prerequisite: AREC 202 or ECON 202.
Restriction: 
Registration Information: Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
AREC 328 Small Agribusiness Management Credits: 3 (3-0-0)
Course Description: Apply business principles to small food enterprises, agribusinesses and cooperatives.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 335 Introduction to Econometrics Credits: 3 (3-0-0)
Also Offered As: ECON 335.
Course Description: Estimating statistical regression models of economic relationships; treatment of special problems that may arise in analysis of economic data.
Prerequisite: (ECON 204) and (STAT 201 or STAT 204 or STAT 301 or STAT 307 or STAT 311 or STAT 315) and (MATH 141 or MATH 155 or MATH 160).
Registration Information: Credit not allowed for both ECON 335 and AREC 335. Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 340 Introduction-Economics of Natural Resources Credits: 3 (3-0-0)
Also Offered As: ECON 340.
Course Description: Concepts, theories, institutions; analytical methods for economic evaluation of alternative resource use patterns and land use plans.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online. Credit not allowed for both AREC 340 and ECON 340.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 341 Environmental Economics Credits: 3 (3-0-0)
Course Description: Economic theories and analytic frameworks are developed and applied to contemporary problems of the use and protection of the natural environment.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 342 Water Law, Policy, and Institutions Credits: 3 (3-0-0)
Course Description: Legal water issues within the context of historical, social and economic development with emphasis on the southwestern United States.
Prerequisite: None.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 346 Economics of Outdoor Recreation Credits: 3 (3-0-0)
Also Offered As: ECON 346.
Course Description: Application of benefit-cost framework to public planning for outdoor recreation. Topics include non-market valuation, projecting demand, cost of supplying recreation, and regional economic development.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online. Credit not allowed for both AREC 346 and ECON 346.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 375 Agricultural Law Credits: 3 (3-0-0)
Course Description: Laws, regulations, case decisions affecting ranching and farming in the Rocky Mountain area.
Prerequisite: None.
Restriction: Must be a: Junior.
Registration Information: Sections may be offered: Online. Sections may be offered: Online.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 405 Agricultural Production Management Credits: 3 (2-2-0)
Course Description: Economic principles of agricultural production decisions with linear programming analysis of production choices and farm planning.
Prerequisite: AREC 305.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 408 Agricultural Finance Credits: 3 (3-0-0)
Course Description: Monetary affairs of agribusiness and agricultural production emphasizing credit institutions and procurement, investment, and management.
Prerequisite: AREC 305.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 412 Agricultural Commodities Marketing Credits: 3 (3-0-0)
Course Description: Agricultural marketing and agribusiness principles applied to current marketing problems relating to livestock and field and horticultural crops.
Prerequisite: AREC 310.
Registration Information: Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

AREC 415 International Agricultural Trade Credits: 3 (3-0-0)
Course Description: Agricultural trade patterns and institutions; trade theory with applications to agriculture. Current issues in agricultural trade.
Prerequisite: AREC 310 and ECON 204.
Registration Information: Sections may be offered: Online.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.
ARCC 422 Food Supply Chain Management Credits: 3 (3-0-0)
Course Description: Economic analysis of food supply chains studied through industry case studies.
Prerequisite: AREC 311.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 428 Agricultural Business Management Credits: 3 (3-0-0)
Course Description: Economic analysis, organization, and management practices of agriculture and food industries studied through simulation, case study, computer labs.
Prerequisite: (AREC 305) and (AREC 310 or AREC 311).
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ARCC 440 Advanced Environmental and Resource Economics Credits: 3 (3-0-0)
Course Description: Microeconomic techniques to rigorously explore economic decision-making and policy as they apply to environmental and natural resource problems.
Prerequisite: AREC 340 or ECON 340) and (AREC 341 and ECON 306).
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 442 Water Resource Economics Credits: 3 (3-0-0)
Course Description: An in-depth exploration of the role of economics in water resource planning.
Prerequisite: AREC 342 and ECON 306, may be taken concurrently.
Registration Information: Credit not allowed for both AREC 442 and AREC 542.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 444 Economics of Energy Resources Credits: 3 (3-0-0)
Also Offered As: ECON 444.
Course Description: Supply, consumption trends, and projected demand for alternative energy resources in domestic and world perspective; economics of public energy policies.
Prerequisite: ECON 306.
Registration Information: Sections may be offered: Online. Credit allowed for only one of the following: AREC 444, ECON 344, or ECON 444.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 454 Real Estate Appraisal Credits: 3 (3-0-0)
Also Offered As: REL 454.
Course Description: Theoretical principles that underlie real estate appraisal methods. Procedures and practices used in real estate appraisal.
Prerequisite: (AREC 202 or ECON 202) and (AREC 305 or REL 360).
Registration Information: Sections may be offered: Online. Credit allowed for only one of the following: AREC 453, AREC 454, REL 453, or REL 454.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 460 Ag- and Resource-Based Economic Development Credits: 3 (3-0-0)
Course Description: Indicators, tools and approaches for agriculture- and natural resource-based economic development in resource dependent countries and communities.
Prerequisite: ECON 306.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 461A Study Abroad--Italy: Economics of the Renaissance in Modern Italy Credits: 3 (0-0-3)
Course Description: The historical and current economics of agriculture and natural resources in Florence, Tuscany and Italy. Focus on (1) The role of culture, creativity and place in economic development; (2) Italian culture in general; (3) the economic and political history of Florence; and (4) the production, markets and economic importance of culture and natural resource-based industries in central Italy.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sophomore standing. This is a partial semester course. Required field trips. Credit not allowed for both AREC 461A and AREC 482B.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 461B Study Abroad--Italy: Food and Resource Economics Credits: 3 (0-0-3)
Course Description: In-depth investigation of the food and natural resource-based economy of Italy through an applied economics lens. Economics and policy are used to provide insight into the integration of Italian culture and its principal food and natural resource industries. A theoretical basis for different resource management systems are presented including various methods of cost–benefit analysis, utility theory, property rights structures, government institutions, and cultural and ethical considerations.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sophomore standing. This is a partial semester course. Credit not allowed for both AREC 461B and AREC 482A.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ARCC 478 Agricultural Policy Credits: 3 (3-0-0)
Course Description: Formulation, evaluation, and administration of public policies affecting the agricultural and natural resource industries in the United States.
Prerequisite: AREC 202 or ECON 202 or AREC 240 or ECON 240.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ARCC 484 Supervised College Teaching Credits: Var[1-5] (0-0-0)
Course Description: Prerequisite: None.
Registration Information: Maximum of 10 credits allowed in course. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.
**AREC 487 Internship**  
Credits: Var[1-6] (0-0-0)  
Course Description:  
Prerequisite: None.  
Registration Information: May be taken for a maximum of 6 credits.  
Terms Offered: Fall, Spring, Summer.  
Grade Mode: Instructor Option.  
Special Course Fee: No.  

**AREC 505 Agricultural Production Economics**  
Credits: 3 (3-0-0)  
Course Description: Empirical applications of production economic theory for use of inputs and allocation of resources in agricultural, natural resource sectors.  
Prerequisite: (MATH 141) and (AREC 405 or ECON 306).  
Term Offered: Fall.  
Grade Modes: S/U within Student Option, Trad within Student Option.  
Special Course Fee: No.  

**AREC 506 Applied Microeconomic Theory**  
Credits: 3 (3-0-0)  
Also Offered As: ECON 506.  
Course Description: Introduction to mathematical models in modern microeconomics, including choices and demand, production and supply, and market structures and failures.  
Prerequisite: ECON 306.  
Registration Information: Credit not allowed for both AREC 506 and ECON 506.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 507 Applied Welfare and Policy Analysis**  
Credits: 3 (3-0-0)  
Course Description: How policies are crafted to effectively address social issues, especially for agriculture and the environment, and how they impact society.  
Prerequisite: ECON 306.  
Term Offered: Spring.  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 508 Financial Management in Agriculture**  
Credits: 2 (2-0-0)  
Course Description: Systematic approach to understanding and applying financial management in farm businesses.  
Prerequisite: (AREC 408 or FIN 305) and (ECON 306).  
Term Offered: Fall (odd years).  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 510 Agricultural Product Marketing**  
Credits: 3 (3-0-0)  
Course Description: Marketing techniques, industrial organization/competition for agricultural products in US domestic, international trade, and developing country markets.  
Prerequisite: (AREC 310) and (AREC 335 or ECON 335).  
Term Offered: Fall.  
Grade Modes: S/U within Student Option, Trad within Student Option.  
Special Course Fee: No.  

**AREC 511 Opportunities in the Agricultural Value Chain**  
Credits: 2 (2-0-0)  
Course Description: Explores the economics and business structure of operations within the food and agribusiness system, using readings, field trips and guest speakers.  
Prerequisite: None.  
Restriction: Must be a: Graduate.  
Registration Information: Graduate standing. Required field trips.  
Terms Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 512 Innovation in Agribusinesses**  
Credits: 2 (2-0-0)  
Course Description: Core concepts of entrepreneurship within both private and social enterprises. General applications of innovation and entrepreneurship with particular emphasis on the industries that make up the agricultural and food system.  
Prerequisite: None.  
Restriction: Must be a: Graduate.  
Registration Information: Graduate standing. Sections may be offered: Online.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 513 Idea Evaluation in Agricultural Value Chains**  
Credits: 2 (2-0-0)  
Course Description: Processes of identifying and evaluating a new idea, applying strategic and design-thinking principles and tools to explore pathways by which it could grow into a viable agribusiness.  
Prerequisite: None.  
Restriction: Must be a: Graduate.  
Registration Information: Graduate standing. Sections may be offered: Online.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

**AREC 514 Entrepreneurial Accounting and Finance**  
Credits: 2 (2-0-0)  
Course Description: Foundational background in accounting and financial concepts and mastery of financial tools needed to start a new agribusiness.  
Prerequisite: None.  
Restriction: Must be a: Graduate.  
Registration Information: Graduate standing. Sections may be offered: Online.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.
AREC 515 Assessing Agricultural and Food Markets Credits: 2 (2-0-0)
Course Description: Foundational background regarding marketing concepts needed to evaluate the potential market for an agricultural or food product or service, using an economics framework.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 516 Business Economics for the Entrepreneur Credits: 2 (2-0-0)
Course Description: Microeconomic framework that a potential entrepreneur can use to analyze business opportunities. Topics include components of cost and revenue and their relevance for new business ventures, determinants and measurement of consumer demand, and alternate forms of business organization and interaction.
Prerequisite: AREC 202 or ECON 202.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 517 Entrepreneurial Identity and Team Formation Credits: 2 (1-2-0)
Course Description: Students explore their emergent identity as "entrepreneur", including their necessary interdependence on other members of a team when engaged in creative endeavors such as innovation or new business development in the agricultural space.
Prerequisite: AREC 513.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Must register for lecture and laboratory. Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 518 Raising Capital in the Agricultural Sector Credits: 2 (2-0-0)
Course Description: Methods to value a startup business and approaches to identifying sources of capital needed to launch and sustain the startup. Emphasis on unique challenges in and sources of raising capital in the agricultural sector.
Prerequisite: AREC 512 and AREC 514.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 519A New Venture Communication: Interpersonal Interactions Credit: 1 (0-2-0)
Course Description: Communicating in the workplace, both orally and in written form. Development of a succinct business proposal.
Prerequisite: AREC 517, may be taken concurrently.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. This is a partial semester course. Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 519B New Venture Communication: Making the Pitch Credit: 1 (0-2-0)
Course Description: Emphasis on oral communication when trying to sell a business idea to potential investors. Development of tailored presentations to target audience within moments of opportunity.
Prerequisite: AREC 519A.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 520 Intellectual Property in Food and Agriculture Credits: 2 (2-0-0)
Course Description: Explores the critical role that intellectual property plays in commercial activities within the knowledge economy. Emphasis on strategic management of technology through patents and other control mechanisms, thereby allowing startups to survive and thrive in the knowledge economy with special attention to property developed in the agricultural and food systems.
Prerequisite: AREC 518 and BUS 660.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 521 New Food Product Development Credits: 2 (2-0-0)
Course Description: An overview of the food product development process. Topics include strategies, marketing perspectives, quality controls and supply chains in the food system.
Prerequisite: AREC 515.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 528 Applied Agribusiness Decision Tools Credits: 2 (2-0-0)
Course Description: Applications of quantitative tools for managerial decision-making in the context of an agribusiness.
Prerequisite: (AREC 305 or AREC 408 or FIN 305) and (ECON 306).
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

AREC 530 Agricultural Price Analysis Credits: 3 (3-0-0)
Course Description: Agricultural commodity prices related to neoclassical economics, current literature emphasizing management problems.
Prerequisite: None.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
AREC 535  Applied Econometrics  Credits: 3 (3-0-0)  
Also Offered As: ECON 535.
Course Description: Econometric techniques applied to testing and quantification of theoretical economic relationships drawn from both microeconomics, macroeconomics.
Prerequisite: (AREC 335 or ECON 335) and (ECON 304 or ECON 306).
Registration Information: Credit not allowed for both AREC 535 and ECON 535.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 540  Environmental and Natural Resource Economics  Credits: 3 (3-0-0)  
Also Offered As: ECON 540.
Course Description: Theory, methods, and policy in environmental and natural resource economics.
Prerequisite: AREC 506 or ECON 506.
Registration Information: Credit not allowed for both AREC 540 and ECON 540.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 541  Environmental Economics  Credits: 3 (3-0-0)  
Also Offered As: ECON 541.
Course Description: Economics of environmental policy; partial equilibrium and general equilibrium model; pollution; natural environments; population and economic growth.
Prerequisite: ECON 306.
Registration Information: Credit not allowed for both AREC 541 and ECON 541.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 542  Applied Advanced Water Resource Economics  Credits: 3 (3-0-0)  
Course Description: Theory and application of economics in water resource planning.
Prerequisite: (ECON 306 and AREC 342 and STAT 301) and (MATH 141 or MATH 155 or MATH 160).
Registration Information: Credit not allowed for both AREC 542 and AREC 442.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 547  Public Lands Planning and Management  Credits: 3 (3-0-0)  
Course Description: Principles and techniques used by federal land management agencies including Forest Service, Park Service, Fish and Wildlife Service, and BLM.
Prerequisite: AREC 202 or ECON 202.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

AREC 563  Regional Economics-Theory, Methods, and Issues  Credits: 3 (3-0-0)  
Also Offered As: ECON 563.
Course Description: Tools and methods of regional economics, including supply, demand, and externality analysis. Applications to current urban and regional policy issues.
Prerequisite: ECON 306 and ECON 501, may be taken concurrently.
Registration Information: Credit not allowed for both AREC 563 and ECON 563.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 566  Contemporary Issues in Developing Countries  Credits: 3 (3-0-0)  
Also Offered As: SOC 566.
Course Description: Social, economic, and technological factors in developing countries.
Prerequisite: None.
Registration Information: Two or more courses in AREC or ECON or SOC. Credit not allowed for both AREC 566 and SOC 566.
Term Offered: Spring (odd years).
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 570  Methodology of Economic Research  Credits: 3 (3-0-0)  
Also Offered As: ECON 530.
Course Description: Philosophical foundations of science and research. Concepts and skills for planning, performing, reporting, and evaluating economic research.
Prerequisite: ECON 304 and ECON 306.
Registration Information: Credit not allowed for both AREC 570 and ECON 530.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

AREC 572  Social Benefit Cost Analysis  Credits: 3 (3-0-0)  
Course Description: Theory, application of concepts relating to social benefit cost analysis of public projects, policies intended to promote social welfare, and economic growth.
Prerequisite: AREC 202 or ECON 202.
Registration Information: Sections may be offered: Online.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

AREC 586A  New Venture Launch Practicum: Explore and Validate Value Proposition  Credits: 2 (0-0-4)  
Course Description: Team-based development of a new venture or innovation focusing on co-creation of value. Four main areas of competency—(1) entrepreneurial mindset and teamwork; (2) technology and product development; (3) communication and substantiation of value; and (4) business strategy and execution—are developed and demonstrated in the process of preparing to launch a new venture or innovation in the agricultural, food, or related industries.
Prerequisite: AREC 517, may be taken concurrently.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing.
Term Offered: Spring.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.
AREC 586B New Venture Launch Practicum: Communicate, Design, and Iterate Credits: 2 (0-0-4)
Course Description: Team-based development of a new venture or innovation focusing on co-creation of value. Four main areas of competency--(1) entrepreneurial mindset and teamwork; (2) technology and product development; (3) communication and substantiation of value; and (4) business strategy and execution--are developed and demonstrated in the process of preparing to launch a new venture or innovation in the agricultural, food, or related industries.
Prerequisite: AREC 586A, may be taken concurrently.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing.
Term Offered: Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

AREC 586C New Venture Launch Practicum: Final Evaluation, Presentation, and Launch Credits: Var[1-6] (0-0-0)
Course Description: Team-based development of a new venture or innovation focusing on co-creation of value. Four main areas of competency--(1) entrepreneurial mindset and teamwork; (2) technology and product development; (3) communication and substantiation of value; and (4) business strategy and execution--are developed and demonstrated in the process of preparing to launch a new venture or innovation in the agricultural, food, or related industries.
Prerequisite: AREC 586B, may be taken concurrently.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Course may be taken multiple times for maximum of 12 credits total.
Term Offered: Fall.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

AREC 605 Agricultural Production and Cost Analysis Credits: 3 (3-0-0)
Course Description: Empirical application and analysis of production and cost issues in the agricultural and natural resource sectors.
Prerequisite: (AREC 506) and (AREC 535 or ECON 535 or ECON 635 or AREC 635 or ECON 635).
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 606 Microeconomic Analysis I Credits: 3 (3-0-0)
Also Offered As: ECON 606.
Course Description: Advanced price/allocation theory: consumer/producer decisions; uncertainty; market structure; partial/general equilibrium; efficiency/welfare.
Prerequisite: ECON 306 and ECON 501.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both AREC 606 and ECON 606.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 610 Agricultural Marketing and Demand Analysis Credits: 3 (3-0-0)
Course Description: Empirical application and analysis of agricultural marketing and demand issues in the agricultural and natural resource sectors.
Prerequisite: (AREC 506) and (AREC 535 or AREC 635 or ECON 535 or ECON 635).
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 615 Optimization Methods for Applied Economics Credits: 3 (3-0-0)
Course Description: Theory and practice of optimization techniques used in economic applications with emphasis on linear and nonlinear programming.
Prerequisite: AREC 506.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AREC 635 Econometric Theory I Credits: 3 (3-0-0)
Also Offered As: ECON 635.
Course Description: Theory of mathematical statistics and classical linear regression model in context of economic application.
Prerequisite: (AREC 535 or ECON 535) and (ECON 501, may be taken concurrently).
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both AREC 635 and ECON 635.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

AREC 647 Land Use Economics and Spatial Modeling Credits: 3 (3-0-0)
Course Description: Use of spatial data in economic analysis of land use focusing on development patterns, land conservation, spatial externalities and agricultural land.
Prerequisite: (AREC 506 or ECON 506) and (AREC 535 or ECON 535 or ECON 635).
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

AREC 660 Development of Rural Resource-Based Economies Credits: 3 (3-0-0)
Course Description: Economic literature-based exploration of human welfare measures and implications of approaches to agriculture and resource-based economic development.
Prerequisite: AREC 506.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
AREC 678 Agricultural and Resource Policy  
**Credits:** 3 (3-0-0)  
**Course Description:** Evaluate and analyze economic theory, applications and public incentives related to government policies for agriculture and natural resources.  
**Prerequisite:** ECON 306 and MATH 141.  
**Restriction:** Must be a: Graduate, Professional.  
**Term Offered:** Fall.  
**Grade Modes:** Traditional.  
**Special Course Fee:** No.

AREC 699 Thesis  
**Credits:** Var[1-18] (0-0-0)  
**Course Description:**  
**Prerequisite:** None.  
**Restriction:** Must be a: Graduate, Professional.  
**Terms Offered:** Fall, Spring, Summer.  
**Grade Mode:** Instructor Option.  
**Special Course Fee:** No.

AREC 705 Advanced Production and Technological Change  
**Credits:** 3 (3-0-0)  
**Course Description:** Modern theoretical and empirical approaches are applied to understand producer decision-making under uncertainty, technology adoption and effects of innovation, measurements of technical efficiency and productivity, and advanced models of agricultural markets.  
**Prerequisite:** (AREC 605) and (AREC 706, may be taken concurrently or ECON 706, may be taken concurrently) and (AREC 735 or ECON 735).  
**Restriction:** Must be a: Graduate, Professional.  
**Term Offered:** Spring (even years).  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 706 Microeconomic Analysis II  
**Credits:** 3 (3-0-0)  
**Also Offered As:** ECON 706.  
**Course Description:** Advanced topics in microtheory: game theory; market imperfections; adverse selection; principal-agent problems; social choice theory; incentives, etc.  
**Prerequisite:** ECON 606.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 706 and ECON 706.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 710 Advanced Agricultural Marketing Issues  
**Credits:** 3 (3-0-0)  
**Course Description:** Theoretical and modeling issues of consumer demand, market structure, product differentiation and market behavior.  
**Prerequisite:** (AREC 610) and (AREC 706, may be taken concurrently or ECON 706, may be taken concurrently) and (AREC 735 or ECON 735).  
**Restriction:** Must be a: Graduate, Professional.  
**Term Offered:** Fall (even years).  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 735 Econometric Theory II  
**Credits:** 2 (2-0-0)  
**Also Offered As:** ECON 735.  
**Course Description:** Econometrics models and estimators in econometrics, from fully parametric to semiparametric and nonparametric approaches.  
**Prerequisite:** AREC 635 or ECON 635.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 735 and ECON 735. This is a partial-semester course.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 736A Advanced Econometric Methods: Discrete Choice Models  
**Credit:** 1 (1-0-0)  
**Also Offered As:** ECON 736A.  
**Course Description:** Econometrics analysis of: Discrete Choice Models.  
**Prerequisite:** AREC 735, may be taken concurrently or ECON 735, may be taken concurrently.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 736A-C and ECON 736A-C. This is a partial-semester course.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 736B Advanced Econometric Methods: Panel Data Models  
**Credit:** 1 (1-0-0)  
**Also Offered As:** ECON 736B.  
**Course Description:** Econometrics analysis of: Panel Data Models.  
**Prerequisite:** AREC 735, may be taken concurrently or ECON 735, may be taken concurrently.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 736A-C and ECON 736A-C. This is a partial-semester course.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 736C Advanced Econometric Methods: Time Series Models  
**Credit:** 1 (1-0-0)  
**Also Offered As:** ECON 736C.  
**Course Description:** Econometrics analysis of: Time Series Models.  
**Prerequisite:** AREC 735, may be taken concurrently or ECON 735, may be taken concurrently.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 736A-C and ECON 736A-C. This is a partial-semester course.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

AREC 740 Advanced Natural Resource Economics  
**Credits:** 3 (3-0-0)  
**Also Offered As:** ECON 740.  
**Course Description:** Advanced theory, methods, and literature in natural resource economics, including dynamic programming and optimal control.  
**Prerequisite:** AREC 706 or ECON 706.  
**Restriction:** Must be a: Graduate, Professional.  
**Registration Information:** Credit not allowed for both AREC 740 and ECON 740.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.
**Agricultural Education (AGED)**

**AGED 110 Agriculture Production Systems** Credits: 3 (2-3-0)
Course Description: Broad survey of the diverse aspects of Colorado agriculture.
Prerequisite: None.
Registration Information: Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.
Additional Information: Historical Perspectives 3D.

**AGED 220 Understanding Agricultural Education** Credit: 1 (1-0-0)
Course Description: Understanding different agricultural education systems. Understanding delivery models of agricultural education programs.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

**AGED 240 Technical Tool Applications in Ag Education** Credits: 2 (1-3-0)
Course Description: Development of safe competencies and applications related to power and technical tools utilized in school-based agricultural education programs.
Prerequisite: None.
Registration Information: Must register for lecture and lab.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

**AGED 244 Power, Structure, and Tech. Systems in Ag Ed** Credits: 3 (2-3-0)
Course Description: Development of competencies and theory related to agricultural power, structure, and technical systems utilized in school-based agricultural education programs.
Prerequisite: None.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.
AGED 320  Technology Lab for Ag Education  Credit: 1 (0-3-0)
Course Description: Laboratory applications related to the power, structure, and technical systems pathway utilized in school-based agricultural education programs.
Prerequisite: AGED 240, may be taken concurrently or AGED 244, may be taken concurrently.
Registration Information: May be taken twice for credit.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

AGED 330  Program Design and Evaluation in Ag. Literacy  Credits: 3 (3-0-0)
Course Description: Design and evaluate programs in agricultural literacy using experiential methods.
Prerequisite: AGED 220.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 420  Developing School-Based Ag Education Programs  Credits: 3 (3-0-0)
Course Description: Developing knowledge in the approach and delivery of school-based agricultural education programs.
Prerequisite: AGED 220.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

AGED 430  Methods of Agricultural Literacy  Credits: 3 (3-0-0)
Course Description: Prepare and conduct agricultural literacy instructional units to work with a variety of audiences and instructional topics.
Prerequisite: AGED 330.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

AGED 440  Managing Experiences in Ag Ed Laboratories  Credit: 1 (0-3-0)
Course Description: Theory, management and pedagogy of delivering safety instruction and experiential curriculum in secondary agricultural education laboratory settings.
Prerequisite: AGED 420.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

AGED 486A  Practicum: Agricultural Literacy  Credits: Var[1-3] (0-0-0)
Course Description: Experience in the agricultural literacy field.
Prerequisite: (AGED 220) and (AGED 330 or AGED 430).
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 486B  Practicum: On-site Experience in Agricultural Outreach  Credits: Var[1-2] (0-0-0)
Course Description: Formalized training on conducting non-formal agricultural education at the National Western Stock Show.
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 486C  Practicum: FFA  Credits: Var[1-2] (0-0-0)
Course Description: Formalized training on managing FFA experiences, including Career Development Events and Leadership Development Events.
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 487  Internship  Credits: Var[1-6] (0-0-0)
Course Description: Senior standing. Written consent of instructor.
Registration Information: Offered as an online course only. This is a partial semester course. Credit not allowed for both AGED 487 and AGED 581A1.
Term Offered: Spring (even years).
Grade Mode: Instructor Option.
Special Course Fee: No.

AGED 510  American Agricultural Values and Ideology  Credits: 3 (3-0-0)
Course Description: Explore how people have conceptualized agriculture in the United States, how agricultural ideologies have shaped our agricultural values, and how differing agricultural ideologies impact the work in agriculture today and in the future.
Prerequisite: None.
Registration Information: Offered as an online course only. This is a partial semester course. Credit not allowed for both AGED 510 and AGED 512.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 520  4-H and Youth Programs in Extension  Credits: 3 (3-0-0)
Course Description: Youth programs in Extension, including 4-H, are America's largest youth development organization reaching almost 6 million youth. Preparation for a successful career working with 4-H/ youth development programs in Extension as well as other related non-formal education programs.
Prerequisite: AGRI 546.
Registration Information: Offered as an online course only. This is a partial semester course. Credit not allowed for both AGED 520 and AGED 581A1.
Term Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
AGED 525 Agricultural and Extension Teaching Credits: 3 (3-0-0)
Course Description: Use research on effective teaching methods to define and deliver educational programs, courses and presentations in formal and non-formal educational settings in agriculture. Apply organization and instructional methods to evaluate, plan, deliver and assess effective educational programs.
Prerequisite: None.
Registration Information: Graduate standing. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 540 Ag Ed Laboratory Management and Safety Credits: 2 (2-0-0)
Course Description: Theory, management, and pedagogy of delivering safety instruction and experiential curriculum in secondary agricultural education laboratory settings.
Prerequisite: EDCT 420.
Restriction: EDCT 420.
Terms Offered: Fall, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 587 Internship in Extension Credits: Var[1-2] (0-0-0)
Course Description: First-hand experiences in extension programming.
Prerequisite: AGRI 547.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

AGED 600 Evaluation and Applied Research in Extension Credits: 3 (3-0-0)
Course Description: Train extension and other outreach specialists in the basics of program evaluation and research methods. Work with real world scenarios and/or their own field experiences to learn how to strategically design evaluation plans and effectively analyze the data collected. Emphasizing how to improve programming with the collected data.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online. Credit not allowed for both AGED 600 and EDRM 600.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

AGED 698 Agricultural Education Research Credits: Var[1-6] (0-0-0)
Course Description: Must be a: Graduate, Professional.
Restriction: Admission to the Master of Agriculture in Agricultural Sciences, Teacher Development Specialization. Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.