

# Agricultural and Resource Economics

The Department of Agricultural and Resource Economics offers programs leading to PhD degrees. Due to quota limitations, students are rarely admitted for the master's degree, although it may be awarded to students who are pursuing work toward the PhD in our program (or in another field at Berkeley) after fulfillment of the appropriate MS requirements.

The Agricultural and Resource Economics Program is relatively flexible; however, the program stresses economic theory, quantitative methods, and two elective fields defined in consultation with the graduate adviser. Some common elective fields include development economics, natural resource or environmental economics, agricultural policy, and international markets and trade.

## Admission to the University

### Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (<https://grad.berkeley.edu/admissions/choosing-your-program/list/>) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (<https://grad.berkeley.edu/admissions/steps-to-apply/>).

### Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (<https://grad.berkeley.edu/admissions/steps-to-apply/requirements/>). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (<https://guide.berkeley.edu/graduate/degree-programs/>).

### Where to apply?

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

## Curriculum

A,RESEC 201	Production, Industrial Organization, and Regulation in Agriculture	4
A,RESEC 202	Issues and Concepts in Agricultural Economics	4
A,RESEC 210	Probability and Statistics	4
A,RESEC 212	Econometrics: Multiple Equation Estimation	4
A,RESEC 213	Applied Econometrics	4
A,RESEC 219A	Econometric Project Workshop	2
A,RESEC 219B	Econometric Project Workshop	2
ECON 201A	Economic Theory	4
ECON 201B	Economic Theory	4
ECON 202A	Macroeconomics	4
	or ECON 202B Macroeconomics	
MATH 104	Introduction to Analysis	4
	or ECON 204 Mathematical Tools for Economics	

## Agricultural and Resource Economics

### A,RESEC 201 Production, Industrial Organization, and Regulation in Agriculture 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Basic concepts of micro and welfare economics: partial and general equilibrium. Industrial organization: monopolistic competition, vertical integration, price discrimination, and economics of information with applications to food retailing, cooperatives, fishing, and energy.

#### Rules & Requirements

**Prerequisites:** Economics 201A or equivalent or consent of instructor

#### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

#### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

### A,RESEC 202 Issues and Concepts in Agricultural Economics 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

History, institutions, and policies affecting agriculture markets and environmental quality. Producer behavior over time and under uncertainty. Asset fixity and agricultural supply models.

#### Rules & Requirements

**Prerequisites:** Economics 201A-201B or consent of instructor

#### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 1 hour of discussion per week

#### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 210 Probability and Statistics 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This is an introduction to probability theory and statistical inference. It is primarily intended to prepare students for the graduate econometrics courses 212 and 213. The emphasis of the course is on the principles of statistical reasoning. Probability theory will be discussed mainly as a background for statistical theory and specific models will, for the most part, be considered only to illustrate the general statistical theory as it is developed.

### Rules & Requirements

**Prerequisites:** Graduate standing or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Instructor:** Mahajan

## A,RESEC 211 Mathematical Methods for Agricultural and Resource Economists 4 Units

Terms offered: Fall 2015, Fall 2014, Fall 2013

The goal of this course is to provide entering graduate students with the basic skills required to perform effectively in the graduate program and as professional economists. The lectures place heavy emphasis on intuition, graphical representations, and conceptual understanding. Weekly problem sets provide the opportunity to master mechanical skills and computational techniques. Topics covered include real analysis, linear algebra, multivariable calculus, theory of static constrained optimization, and comparative statics.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 212 Econometrics: Multiple Equation Estimation 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Introduction to the estimation and testing of economic models. Includes analysis of the general linear model, asymptotic theory, instrumental variable, and the generalized method of moments. In addition, a survey of time series, analysis, limited dependent variables.

### Rules & Requirements

**Prerequisites:** 211 or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 4 hours of lecture and 1 hour of discussion per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 213 Applied Econometrics 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Standard and advanced econometric techniques are applied to topics in agriculture and resource economics. Techniques include limited dependent variables, time series analysis, and nonparametric analysis. Students will use computers to conduct statistical analyses.

### Rules & Requirements

**Prerequisites:** 211 and 212 or equivalent or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 214 New Econometric and Statistical Techniques 4 Units

Terms offered: Spring 2012, Spring 2011, Spring 2010

Theory and application of new and emerging approaches to estimation and inference. Bayesian, maximum entropy, and other new applications to economic problems will be emphasized. Students will use computers to conduct statistical analyses.

### Rules & Requirements

**Prerequisites:** 211, 213 or equivalent or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 219A Econometric Project Workshop 2 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Techniques for preparing econometric studies, including finding data sources, the reporting of results, and standards for placing research questions with existent literature. With faculty guidance, students prepare approved econometric projects, present projects to the class, provide comments on other student projects, and revise projects in response to faculty and student comments.

### Rules & Requirements

**Prerequisites:** 210, 211, and 212 or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Instructors:** Auffhammer, Sadoulet

## A,RESEC 219B Econometric Project Workshop 2 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

Techniques for preparing econometric studies, including finding data sources, the reporting of results, and standards for placing research questions with existent literature. With faculty guidance, students prepare approved econometric projects, present projects to the class, provide comments on other student projects, and revise projects in response to faculty and student comments.

### Rules & Requirements

**Prerequisites:** 210, 211, and 212 or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Instructors:** Auffhammer, Sadoulet

## A,RESEC 232 Empirical International Trade and Investment 2 Units

Terms offered: Spring 2010, Spring 2009, Spring 2007

Empirical aspects on international trade, foreign investment, and the environment. Issues related to testing various trade models. Topics include: testing trade models (HO, Ricardo, Specific Sector); gravity models; linkages between openness and growth; trade orientation and firm performance; pattern of trade; trade and the environment; labor markets and trade. New topics in international trade with empirical applications, such as trade models with heterogeneous firms, outsourcing and foreign investment.

### Rules & Requirements

**Prerequisites:** Consent of instructor

### Hours & Format

**Fall and/or spring:** 8 weeks - 2 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 241 Economics and Policy of Production, Technology and Risk in Agricultural and Natural Resources 3 Units

Terms offered: Fall 2022, Fall 2017, Fall 2016

This course covers alternative models of production, resource and environmental risk management; family production function; adoption and diffusion; innovation and intellectual property rights; agricultural and environmental policies and their impact on production and the environment; water resources; pest control; biotechnology; and optimal control over space and time.

### Rules & Requirements

**Prerequisites:** 201 and 202, or Economics 201A-201B, or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## **A,RESEC 242 Quantitative Policy Analysis 3 Units**

Terms offered: Spring 2025, Spring 2023, Spring 2022

Production versus predatory government behavior, rent seeking, social waste, and their trade-offs with the provision of growth-promoting public goods. Three failure types are distinguished: market, government, and organizational. The roles of public versus special interests are modeled to determine degree and extent of organizational failures in collective group behavior. Alternative frameworks are used to evaluate various types of policy reform.

### **Rules & Requirements**

**Prerequisites:** 211 or consent of instructor

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## **A,RESEC 249 Agricultural, Food, and Resource Policy Workshop 1 Unit**

Terms offered: Spring 2025, Fall 2024, Spring 2024

Presentation and criticism of ongoing research by faculty, staff and students. Not necessarily offered every semester.

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## **A,RESEC C251 Microeconomics of Development 3 Units**

Terms offered: Fall 2024, Fall 2023, Fall 2022

Theoretical and empirical analyses of poverty and inequality, household and community behavior, and contract and institutions in the context of developing countries.

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 4 hours of lecture per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Also listed as:** ECON C270A

## **A,RESEC C253 International Economic Development Policy 3 Units**

Terms offered: Spring 2024, Spring 2023, Fall 2022, Spring 2022, Fall 2020, Fall 2019, Fall 2018

This course emphasizes the development and application of policy solutions to developing-world problems related to poverty, macroeconomic policy, and environmental sustainability. Methods of statistical, economic, and policy analysis are applied to a series of case studies. The course is designed to develop practical professional skills for application in the international arena.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Also listed as:** DEVP C253/PUB POL C253

## **A,RESEC 259 Rural Economic Development Workshop 1 Unit**

Terms offered: Spring 2025, Fall 2024, Spring 2024

Presentation and criticism of ongoing research by faculty, staff and students. Not necessarily offered every semester.

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## A,RESEC 261 Environmental and Resource Economics 3 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

Theory of renewable and nonrenewable natural resource use, with applications to forests, fisheries, energy, and climate change. Resources, growth, and sustainability. Economic theory of environmental policy. Externality; the Coasian critique; tax incidence and anomalies; indirect taxes; the double dividend; environmental standards; environmental regulation; impact of uncertainty on taxes and standards; mechanism design; monitoring, penalties, and regulatory strategy; emissions markets.

### Rules & Requirements

**Prerequisites:** Ph.D.-level economic theory or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 262 Non-market Valuation 3 Units

Terms offered: Spring 2014, Spring 2012, Spring 2011

The economic concept of value; historical evolution of market and non-market valuation; revealed preference methods: single site demand, multi-site demand, corner solution models, and valuation of quality changes; averting behavior; the hedonic method; contingent valuation; other stated preference methods: ranking, choice, conjoint analysis; the value of life and safety; sampling and questionnaire design for valuation surveys.

### Rules & Requirements

**Prerequisites:** Ph.D.-level economic theory or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 263 Dynamic Methods in Environmental and Resource Economics 3 Units

Terms offered: Spring 2018, Spring 2016, Fall 2013

This course studies methods of analysis and optimal control of dynamic systems, emphasizing applications in environmental and natural resource economics. Continuous-time deterministic models are studied using phase plane analysis, the calculus of variations, the Maximum Principle, and dynamic programming. Numerical methods are applied to discrete time stochastic and deterministic dynamic models.

### Rules & Requirements

**Prerequisites:** Ph.D.-level economic theory or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## A,RESEC 264 Empirical Energy and Environmental Economics 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

This course is designed to help prepare graduate students to conduct empirical research in energy and environmental economics. The course has two broad objectives. The first is to develop an in-depth understanding of specific empirical methods and research designs that are routinely used in the field of energy and environmental economics. The second is to familiarize students with some of the economic theories and institutions that are most relevant to empirical work in this area.

### Rules & Requirements

**Prerequisites:** 212 and 213; or equivalent

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Instructor:** Fowlie

## **A,RESEC 265 Advanced Topics in Environmental and Resource Economics 3 Units**

Terms offered: Fall 2015

Advanced topics in environmental and resource economics. Topics vary and include the economics of land, water, fisheries, forestry, pesticides, endangered species, policy instruments for environmental policy, and empirical evaluations of environmental and resource policy.

### **Rules & Requirements**

**Prerequisites:** Ph.D.-level economic theory and econometrics or consent of instructor

**Repeat rules:** Course may be repeated for credit when topic changes.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of discussion per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

**Instructors:** Berck, Sunding

## **A,RESEC 269 Natural Resource Economics Workshop 1 Unit**

Terms offered: Spring 2025, Fall 2024, Spring 2024

Presentation and criticism of ongoing research by faculty, staff, and students. Not necessarily offered every semester.

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## **A,RESEC 298 Special Study for Graduate Students 1 - 6 Units**

Terms offered: Spring 2025, Fall 2024, Spring 2024

All properly qualified graduate students who wish to pursue a special field of study may do so if their proposed program of study is acceptable to the member here of the staff with whom they work.

### **Rules & Requirements**

**Prerequisites:** Consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 1-6 hours of independent study per week

### **Summer:**

6 weeks - 1-6 hours of independent study per week

8 weeks - 1-6 hours of independent study per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Letter grade.

## **A,RESEC 299 Individual Research 1 - 12 Units**

Terms offered: Spring 2025, Fall 2024, Spring 2024

### **Rules & Requirements**

**Prerequisites:** Graduate standing and consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### **Hours & Format**

**Fall and/or spring:** 15 weeks - 1-12 hours of independent study per week

### **Additional Details**

**Subject/Course Level:** Agricultural and Resource Economics/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.



## A,RESEC 375 Professional Preparation: Teaching of Environmental Economics and Policy 1 - 6 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021

Discussion, problem review and development, guidance of discussion classes, course development, supervised practice teaching.

### Rules & Requirements

**Prerequisites:** Graduate standing, appointment as a graduate student instructor, or consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-2 hours of lecture and 1-2 hours of discussion per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/ Professional course for teachers or prospective teachers

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Formerly known as:** Agriculture and Resource Economics 300

## A,RESEC 400 Professional Training in Research Methodology 1 - 6 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024

Individual training for graduate students in planning and performing research under the supervision of a faculty adviser, intended to provide academic credit for the experience obtained while holding a research assistantship.

### Rules & Requirements

**Prerequisites:** Graduate student researcher appointment

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-6 hours of independent study per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Other professional

**Grading:** Offered for satisfactory/unsatisfactory grade only.

## A,RESEC 602 Individual Study for Doctoral Students 1 - 12 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024

Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for candidates of the Ph.D. May not be used for unit or residence requirements for the doctoral degree.

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-12 hours of independent study per week

### Additional Details

**Subject/Course Level:** Agricultural and Resource Economics/Graduate examination preparation

**Grading:** Offered for satisfactory/unsatisfactory grade only.