Agricultural and Resource Economics

The Department of Agricultural and Resource Economics offers programs leading to the PhD degrees. Because of 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 agriculture in economic development, agricultural policy, natural resource economics, international markets and trade.

Admission to the University

Uniform minimum requirements for admission

The following minimum requirements apply to all programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A minimum grade-point average of B or better (3.0);
3. If the applicant comes from a country or political entity (e.g. Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 570 on the paper-and-pencil test, 230 on the computer-based test, 90 on the iBT test, or an IELTS Band score of at least 7 (note that individual programs may set higher levels for any of these); and
4. Enough undergraduate training to do graduate work in the given field.

Applicants who already hold a graduate degree

The Graduate Council views academic degrees as evidence of broad research training, not as vocational training certificates; therefore, applicants who already have academic graduate degrees should be able to take up new subject matter on a serious level without undertaking a graduate program, unless the fields are completely dissimilar.

Programs may consider students for an additional academic master's or professional master's degree if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.
2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may only apply to one single degree program or one concurrent degree program per admission cycle.

Any applicant who was previously registered at Berkeley as a graduate student, no matter how briefly, must apply for readmission, not admission, even if the new application is to a different program.

Required documents for admissions applications

1. **Transcripts:** Upload unofficial transcripts with the application for the departmental initial review. Official transcripts of all college-level work will be required **if admitted**. Official transcripts must be in sealed envelopes as issued by the school(s) you have attended. Request a current transcript from every post-secondary school that you have attended, including community colleges, summer sessions, and extension programs.
   If you have attended Berkeley, upload unofficial transcript with the application for the departmental initial review. Official transcript with evidence of degree conferral ***will not*** be required if admitted.
2. **Letters of recommendation:** Applicants can request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, not the Graduate Division.
3. **Evidence of English language proficiency:** All applicants from countries in which the official language is not English are required to submit official evidence of English language proficiency. This requirement applies to applicants from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, and most European countries. However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a U.S. university may submit an official transcript from the U.S. university to fulfill this requirement. The following courses will not fulfill this requirement: 1) courses in English as a Second Language, 2) courses conducted in a language other than English, 3) courses that will be completed after the application is submitted, and 4) courses of a non-academic nature. If applicants have previously been denied admission to Berkeley on the basis of their English language proficiency, they must submit new test scores that meet the current minimum from one of the standardized tests.

Curriculum

A,RESEC 201	Production, Industrial Organization, and Regulation in Agriculture	4
A,RESEC 202	Issues and Concepts in Agricultural Economics	4
A,RESEC 211	Mathematical Methods for Agricultural and Resource Economists	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	Macroeconomic Theory	4
or ECON 202B	Macroeconomic Theory	
ECON 204	Mathematical Tools for Economics	3

Agricultural and Resource Economics

A,RESEC 201 Production, Industrial Organization, and Regulation in Agriculture 4 Units
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
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 3 Units
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 - 3 hours of lecture per week

Additional Details

Subject/Course Level: Agricultural and Resource Economics/Graduate

Grading: Letter grade.

A,RESEC 211 Mathematical Methods for Agricultural and Resource Economists 4 Units
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
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
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
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
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
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
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
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
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
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. Course may be repeated for credit when topic changes.

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
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 - 3 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
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 - 3 hours of lecture per week

Additional Details

Subject/Course Level: Agricultural and Resource Economics/Graduate

Grading: Letter grade.

Also listed as: PUB POL C253

A,RESEC 259 Rural Economic Development Workshop 1 Unit
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. Course may be repeated for credit when topic changes.

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
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
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
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
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 269 Natural Resource Economics Workshop 1 Unit
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. Course may be repeated for credit when topic changes.

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
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. Course may be repeated for credit when topic changes.

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
Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

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

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
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. Course may be repeated for credit when topic changes.

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
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. Course may be repeated for credit when topic changes.

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
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. Course may be repeated for credit when topic changes.

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.