Energy and Resources Group

Overview

The Energy and Resources Group (ERG) is an interdisciplinary academic unit of UC Berkeley, conducting programs of graduate teaching and research that treat issues of energy, resources, development, human and biological diversity, environmental justice, governance, global climate change, and new approaches to thinking about economics and consumption. Established in 1973, ERG offers two-year MA and MS degrees in Energy and Resources, as well as a PhD and an undergraduate minor.

The faculty of ERG consists of eight professors of energy and resources plus 100 affiliated faculty members whose main appointments span all five colleges and four of the schools of the Berkeley campus, as well as the University’s Lawrence Berkeley and Lawrence Livermore National Laboratories. The chair is normally drawn on a rotating basis from the affiliated faculty.

There are approximately 60 graduate students enrolled in ERG degree programs; about half of them are doctoral candidates. The students come from a wide variety of backgrounds — engineering, natural sciences, social sciences, and humanities. The characteristics they have in common are an interest in interdisciplinary approaches to energy and resource issues and the intellectual credentials to succeed in a rigorous academic program. All receive training at ERG in the technological, environmental, economic, and sociopolitical dimensions of energy and resource issues while pursuing additional course work and individual research tailored to their interest and backgrounds.

ERG graduates are employed across the U.S. and around the world in universities, governmental and international agencies, legislative staff positions, national laboratories, public and private utilities, other energy and resource companies, consulting firms, and public-interest organizations.

Undergraduate Program

Energy and Resources (http://guide.berkeley.edu/undergraduate/degree-programs/energy-resources): Minor

Graduate Programs

Energy and Resources (http://guide.berkeley.edu/graduate/degree-programs/energy-resources): MA, MS, PhD

Energy and Resources

ENE,RES 24 Freshman Seminar 1 Unit
Terms offered: Fall 2015, Spring 2012, Spring 2011
The Freshman Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Freshman Seminars are offered in all campus departments, and topics may vary from department to department and semester to semester.
Freshman Seminar: Read More [+]

Rules & Requirements

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

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Energy and Resources Group/Undergraduate

Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.
Freshman Seminar: Read Less [-]

ENE,RES 39A Freshman and Sophomore Seminar: Complex Systems, Information Theory, and Big Data 2 Units
Terms offered: Fall 2016
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman and Sophomore Seminar: Complex Systems, Information Theory, and Big Data: Read More [+]

Hours & Format

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

Additional Details

Subject/Course Level: Energy and Resources Group/Undergraduate

Grading/Final exam status: Letter grade. Final exam not required.
Instructor: John Harte
Freshman and Sophomore Seminar: Complex Systems, Information Theory, and Big Data: Read Less [-]
ENE,RES 98 Directed Group Study for Lower Division Students 1 - 4 Units
Terms offered: Fall 2017, Fall 2016, Spring 2016
Lectures and small group discussions focusing on topics of interest that vary from semester to semester.
Directed Group Study for Lower Division Students: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.
Repeat rules: Course may be repeated with consent of department.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Directed Group Study for Lower Division Students: Read Less [-]

ENE,RES 99 Supervised Independent Studies for Freshmen and Sophomores 1 - 4 Units
Terms offered: Fall 2017, Fall 2016, Spring 2016
Supervised research on specific topics related to energy and resources.
Supervised Independent Studies for Freshmen and Sophomores: Read More [+]

Rules & Requirements
Prerequisites: Consent of faculty adviser directing research; lower division standing (3.3 GPA or better)
Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Supervised Independent Studies for Freshmen and Sophomores: Read Less [-]

ENE,RES C100 Energy and Society 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Fall 2016
Energy sources, uses, and impacts: an introduction to the technology, politics, economics, and environmental effects of energy in contemporary society. Energy and well-being; energy in international perspective, origins, and character of energy crisis.
Energy and Society: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Summer: 8 weeks - 6 hours of lecture and 1.5 hours of discussion per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Kammen
Also listed as: PUB POL C184
Energy and Society: Read Less [-]

ENE,RES 101 Ecology and Society 3 Units
Terms offered: Summer 2017 8 Week Session, Fall 2014, Fall 2012
This course introduces students to the many ways in which our lives are intertwined with the ecosystems around us. Topics will include ecological limits to growth, climate change and other threats to biodiversity, the value of ecosystem goods and services, the ecology of disease, ecotoxicology, the evolution of cooperation in ecosystems, industrial ecology, and the epistemology of ecology.
Ecology and Society: Read More [+]

Rules & Requirements
Prerequisites: One college level course, or high school Advanced Placement, in either physics or biology; introductory calculus

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 8 weeks - 6 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Harte
Ecology and Society: Read Less [-]
ENE,RES 102 Quantitative Aspects of Global Environmental Problems 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Human disruption of biogeochemical and hydrological cycles; causes and consequences of climate change and acid deposition; transport and health impacts of pollutants; loss of species; radioactivity in the environment; epidemics.
Quantitative Aspects of Global Environmental Problems: Read More [+]

Rules & Requirements

Prerequisites: Upper division standing; calculus (Math 1A-1B or 16A-16B); physics (7A-7B or 8A-8B), chemistry (1A or 4A), biology (1B or 11), 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: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Harte

Quantitative Aspects of Global Environmental Problems: Read Less [-]

ENE,RES 175 Water and Development 4 Units
Terms offered: Spring 2016, Spring 2014, Spring 2013
This course introduces students to water policy in developing countries. It is a course motivated by the fact that over one billion people in developing countries have no access to safe drinking water, three billion do not have sanitation facilities, and many millions of small farmers do not have reliable water supplies to ensure a healthy crop. Readings and discussions will cover: the problems of water access and use in developing countries; the potential for technological, social, and economic solutions to these problems; the role of institutions in access to water and sanitation; and the pitfalls of the assumptions behind some of today’s popular “solutions.”
Water and Development: Read More [+]

Rules & Requirements

Prerequisites: Upper division standing 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: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: ERG Faculty

Water and Development: Read Less [-]

ENE,RES C176 Climate Change Economics 4 Units
Terms offered: Fall 2017, Fall 2016
This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens.
Climate Change Economics: Read More [+]

Objectives Outcomes

Course Objectives: Students will be familiar with the tools economists use to analyze climate change policy. They will have studied empirical estimates of the costs and benefits of climate policy and have an understanding of the analytical issues that drive research on the economics of climate change. Students will also have gained insight into the practical aspects of modeling the economics of climate change by building a simple integrated assessment model in Excel. They will be able to use that model to do simple analysis of climate change policy themselves.

Hours & Format

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

Additional Details

Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Anthoff
Also listed as: ENVECON C176/IAS C176
Climate Change Economics: Read Less [-]
ENE,RES 180 Ecological Economics in Historical Context 3 Units
Terms offered: Fall 2016
Economists through history have explored economic and environmental interactions, physical limits to growth, what constitutes the good life, and how economic justice can be assured. Yet economists continue to use measures and models that simplify these issues and promote bad outcomes. Ecological economics responds to this tension between the desire for simplicity and the multiple perspectives needed to understand complexity in order to move toward sustainable, fulfilling, and just economies.
Ecological Economics in Historical Context: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer: 8 weeks - 6 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: Energy and Resources Group C180/Environmental Economics and Policy C180
Ecological Economics in Historical Context: Read Less [-]

ENE,RES 190 Seminar in Energy and Resources Issues 3 Units
Terms offered: Spring 2017, Fall 2016, Summer 2016 Second 6 Week Session
Critical, cross disciplinary analysis of specific issues or general problems of how people interact with environmental and resource systems. More than one section may be given each semester on different topics depending on faculty and student interest.
Seminar in Energy and Resources Issues: Read More [+]

Rules & Requirements
Prerequisites: Upper division standing and consent of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of lecture per week
Summer: 6 weeks - 7.5 hours of lecture per week
8 weeks - 2-6 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Seminar in Energy and Resources Issues: Read Less [-]

ENE,RES 198 Directed Group Studies for Advanced Undergraduates 1 - 4 Units
Terms offered: Spring 2016, Fall 2015, Fall 2014
Group studies of selected topics.
Directed Group Studies for Advanced Undergraduates: Read More [+]

Rules & Requirements
Prerequisites: Upper division standing, plus particular courses to be specified by instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Directed Group Studies for Advanced Undergraduates: Read Less [-]

ENE,RES 199 Supervised Independent Study and Research 1 - 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017
Individual conferences.
Supervised Independent Study and Research: Read More [+]

Rules & Requirements
Prerequisites: Enrollment restricted by regulations in General Catalog
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of independent study per week
Summer: 8 weeks - 1.5-15 hours of independent study per week

Additional Details
Subject/Course Level: Energy and Resources Group/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Supervised Independent Study and Research: Read Less [-]
ENE,RES C200 Energy and Society 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Fall 2016
Energy sources, uses, and impacts; an introduction to the technology, politics, economics, and environmental effects of energy in contemporary society. Energy and well-being; energy international perspective, origins, and character of energy crisis.
Energy and Society: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Summer: 8 weeks - 6 hours of lecture and 1.5 hours of discussion per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: Kammen
Also listed as: PUB POL C284

ENE,RES C201 Interdisciplinary Analysis in Energy and Resources 3 Units
Terms offered: Fall 2015, Fall 2014, Fall 2013
Introduction to interdisciplinary analysis as it is practiced in the ERG. Most of the course consists of important perspectives on energy and resource issues, introduced through a particularly influential book or set of papers. The course also provides an introduction to the current research activities of the ERG faculty as well as practical knowledge and skills necessary to successfully complete graduate school in an interdisciplinary program.
Interdisciplinary Analysis in Energy and Resources: Read More [+]

Rules & Requirements
Prerequisites: Open to ERG graduate students only or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructors: Harte, Kammen, Ray

Quantitative Methods for Ecological and Environmental Modeling 3 Units
Terms offered: Fall 2015, Fall 2014, Fall 2013
Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic stress on natural systems. Offered alternate years.
Modeling Ecological and Meteorological Phenomena: Read More [+]

Rules & Requirements
Prerequisites: Integrative Biology 102 or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: Harte
Also listed as: ESPM C211

Quantitative Methods for Ecological and Environmental Modeling: Read Less [-]
ENE,RES C221 Climate, Energy and Development 3 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015, Fall 2014
Graduate seminar examining the role of energy science, technology, and policy in international development. The course will look at how changes in the theory and practice of energy systems and of international development have co-evolved over the past half-century, and what opportunities exist going forward. A focus will be on rural and decentralized energy use, and the issues of technology, culture, and politics that are raised by both current trajectories, and potential alternative energy choices. We will explore the frequently divergent ideas about energy and development that have emerged from civil society, academia, multinational development agencies, and the private and industrial sector.

Climate, Energy and Development: Read More [+]

Rules & Requirements

Prerequisites: Graduate student standing or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Instructor: Kammen

Also listed as: DEVP C221/PUB POL C221

Climate, Energy and Development: Read Less [-]

ENE,RES C226 Photovoltaic Materials; Modern Technologies in the Context of a Growing Renewable Energy Market 3 Units
Terms offered: Fall 2015, Spring 2013, Spring 2011
This technical course focuses on the fundamentals of photovoltaic energy conversion with respect to the physical principals of operation and design of efficient semiconductor solar cell devices. This course aims to equip students with the concepts and analytical skills necessary to assess the utility and viability of various modern photovoltaic technologies in the context of a growing global renewable energy market.

Photovoltaic Materials; Modern Technologies in the Context of a Growing Renewable Energy Market: Read More [+]

Rules & Requirements

Prerequisites: Material Science and Mineral Engineering 111 or 123 or equivalent. Should have a firm foundation in electronic and optical props of semiconductors and basic semiconductor device physics

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Also listed as: MAT SCI C226

Photovoltaic Materials; Modern Technologies in the Context of a Growing Renewable Energy Market: Read Less [-]

ENE,RES 254 Electric Power Systems 3 Units
Terms offered: Spring 2017, Fall 2015, Fall 2014
Provides an understanding of concepts in the design and operation of electric power systems, including generation, transmission, and consumption. Covers basic electromechanical physics, reactive power, circuit and load analysis, reliability, planning, dispatch, organizational design, regulations, environment, end-use efficiency, and new technologies.

Electric Power Systems: Read More [+]

Rules & Requirements

Prerequisites: Physics 7B or 8B or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Electric Power Systems: Read Less [-]
ENE,RES 270 Environmental Classics 3 Units
Terms offered: Fall 2013, Fall 2011, Fall 2009
Motivation: What is the history and evolution of environmental thinking and writing? How have certain "environmental classics" shaped the way in which we think about nature, society, and development? This course will use a selection of 20th-century books and papers that have had a major impact on academic and wider public thinking about the environment and development to probe these issues. The selection includes works and commentaries related to these works that have influenced environmental politics and policy in the U.S. as well as in the developing world. Through the classics and their critiques, reviews, and commentaries, the class will explore the evolution of thought on these transforming ideas.

Environmental Classics: Read More [+]

Rules & Requirements

Prerequisites: Graduate standing

Hours & Format

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

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Instructors: Kammen, Ray

Environmental Classics: Read Less [-]

ENE,RES C271 Energy and Development 3 Units
Terms offered: Spring 2016
This advanced graduate seminar will examine the theoretical frames and models used to examine the linkages between energy and development, and the impacts of one on the other.

Energy and Development: Read More [+]

Rules & Requirements

Prerequisites: Energy and Resources ENE,RES C100 or C200 or Public Policy PUB POL C184 or C284<BR/>Energy and Resources ENE,RES 102<BR/>Environmental Economics and Policy ENVECON C151 or ECON C171 or equivalent Economics course

Hours & Format

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

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Instructor: Kammen

Also listed as: PUB POL C271

Energy and Development: Read Less [-]

ENE,RES 273 Research Methods in Social Sciences 3 Units
Terms offered: Fall 2017, Fall 2015, Spring 2014
This course aims to introduce graduate students to the rich diversity of research methods that social scientists have developed for the empirical aspects of their work. Its primary goal is to encourage critical thinking about the research process: how we "know," how we match research methods to research questions, how we design and conduct our information/data collection, what we assume explicitly and implicitly, and the ethical dilemmas raised by fieldwork-oriented studies.

Research Methods in Social Sciences: Read More [+]

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: Energy and Resources Group/Graduate

Grading: Letter grade.

Instructor: Ray

Research Methods in Social Sciences: Read Less [-]

ENE,RES 275 Water and Development 4 Units
Terms offered: Spring 2016, Spring 2014, Spring 2013
This class is an interdisciplinary graduate seminar for students of water policy in developing countries. It is not a seminar on theories and practices of development through the "lens" of water. Rather, it is a seminar motivated by the fact that over 1 billion people in developing countries have no access to safe drinking water, 3 billion don't have sanitation facilities and many millions of small farmers do not have reliable water supplies to ensure a healthy crop. Readings and discussions will cover: the problems of water access and use in developing countries; the potential for technological, social, and economic solutions to these problems; the role of institutions in access to water and sanitation; and the pitfalls of and assumptions behind some of today's popular "solutions."

Water and Development: Read More [+]

Hours & Format

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

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate

Grading: Letter grade.

Instructor: Ray

Water and Development: Read Less [-]
ENE,RES 276 Climate Change Economics 4 Units
Terms offered: Fall 2017, Fall 2016
This course is a self-contained introduction to the economics of climate change. Climate change is caused by a large variety of economic activities, and many of its impacts will have economic consequences. Economists have studied climate change for more than two decades, and economic arguments are often powerful in policy decisions. The course will familiarize students with these arguments and equip them with the tools to participate in discussions of climate change policy through an economic lens. The graduate-level version of this course requires additional assignments.

Objectives Outcomes
Course Objectives: Students will be familiar with the tools economists use to analyze climate change policy. Graduate students will gain experience writing policy analysis through a series of policy memos. They will have studied empirical estimates of the costs and benefits of climate policy and have an understanding of the analytical issues that drive research on the economics of climate change. Students will also have gained insight into the practical aspects of modeling the economics of climate change by building an integrated assessment model in Excel. They will be able to use that model to do analysis of climate change policy themselves.

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

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: Anthoff

Climate Change Economics: Read More [+]

ENE,RES 280 Energy Economics 3 Units
Terms offered: Fall 2016, Fall 2015, Spring 2015
Input-output and cost benefit analysis applied to energy; exhaustion theory and economics of energy supply; patterns of energy use; trade-offs in energy conservation; the effect of energy policy on supply and demand; projecting future energy and resource supply and use.

Rules & Requirements
Prerequisites: Economics 100A or equivalent; basic calculus or linear algebra

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: Norgaard

Energy Economics: Read Less [-]

ENE,RES 290 Seminar in Energy and Resources 1 - 4 Units
Terms offered: Spring 2016, Fall 2015, Spring 2015
Graduate student presentations and faculty-student discussions of advanced topics in energy and resources. Specific topics vary according to faculty and student interest.

Rules & Requirements
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 2-3 hours of seminar and 0-1 hours of discussion per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.

Seminar in Energy and Resources: Read Less [-]
ENE,RES 290A Seminar in Energy and Resources 3 Units
Terms offered: Fall 2017, Spring 2017
Graduate student presentations and faculty-student discussions of advanced topics in energy and resources. Specific topics vary according to faculty and student interest.
Seminar in Energy and Resources: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Summer: 8 weeks - 6 hours of seminar per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Seminar in Energy and Resources: Read Less [-]

ENE,RES 291 Special Topics in Energy and Resources 1 - 3 Units
Terms offered: Fall 2016, Spring 2012, Spring 2011
Study and critical analysis of advanced topics in energy and resources using interdisciplinary approaches. Specific topics vary according to faculty and student interest.
Special Topics in Energy and Resources: Read More [+]

Prerequisites: Graduate standing or consent of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Special Topics in Energy and Resources: Read Less [-]

ENE,RES 292A Tools of the Trade 2 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Quantitative methods for energy and resource analysis. Topics include linear algebra, differential equations, statistical methods, chemical equilibrium theory, and thermodynamics.
Tools of the Trade: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Tools of the Trade: Read Less [-]

ENE,RES 292B Master's Project Seminar 2 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Required of second-semester Energy and Resources Master's candidates. Topics include the adoption of a research project, research design, presentation of work, and statistical analyses. Introduction to research skills, including Human Subject Research Protocols, research ethics and methodologies. Critical reading and analysis of research papers; development and discussion of project ideas. Students begin to identify and solicit faculty readers for their projects. Students will apply the interdisciplinary methods, approaches, and perspectives learned in the core curriculum.
Master's Project Seminar: Read More [+]

Rules & Requirements
Prerequisites: Energy and Resources 201

Hours & Format
Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: ERG Faculty
Master's Project Seminar: Read Less [-]
ENE,RES 292C Master's Project Seminar 2
Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Required for ERG Master's students in the semester previous to the one in which they plan to file their Project. Development of Master's Project outline and research plan. Identification and solicitation of faculty readers. Evaluation and integration of critical feedback from readers and cohort on project. Topics include the adoption of a research project, research design, presentation of work, and statistical analyses. Students will apply the interdisciplinary methods, approaches, and perspectives learned in the core curriculum. Course requirements include: Attendance and active participation in the sharing and critique of the cohort's final master's projects (50%); draft project outline and final readers confirmed by end of term (50%).
Master's Project Seminar: Read More [+]

Rules & Requirements

Prerequisites: Energy and Resources 201 and Energy and Resources 292B

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: ERG Faculty

Master's Project Seminar: Read Less [-]

ENE,RES 292D Master's Project Seminar 2
Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Required of all ERG Master's students in the semester during which they plan to file their Final Master's Project. This course is intended to assist students in completing their required Master's Projects. and to provide constructive feedback to students on their Final Master's Project oral presentations. The goal is to improve the quality of the research for the ERG Master's Projects and to learn and refine presentation skills for an academic/professional audience.
Master's Project Seminar: Read More [+]

Rules & Requirements

Prerequisites: Energy and Resources 201, 292B, and 292C

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Instructor: ERG Faculty

Master's Project Seminar: Read Less [-]

ENE,RES 295 Special Topics in Energy and Resources 1 Unit
Terms offered: Fall 2017, Spring 2017, Fall 2016
Presentations of research in energy issues by faculty, students, and visiting lecturers. Master's degree students required to enroll for two semesters.

Rules & Requirements

Repeat rules: Course may be repeated for credit.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of colloquium per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Special Topics in Energy and Resources: Read Less [-]

ENE,RES 296 Doctoral Seminar 2 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Lectures, reports, and discussions on current research in energy and resources. Particular emphasis on topics of research interest for current Ph.D. students in the Energy and Resources Group.

Rules & Requirements

Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of independent study per week

Additional Details

Subject/Course Level: Energy and Resources Group/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Formerly known as: 298

Doctoral Seminar: Read Less [-]
ENE,RES 298 Doctoral Seminar 2 Units
Terms offered: Fall 2017, Spring 2016, Spring 2015
Lectures, reports, and discussions on current research in energy and resources. Sections are operated independently and under direction of different staff.
Doctoral Seminar: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Doctoral Seminar: Read Less [-]

ENE,RES 298N Directed Group Study 1 - 3 Units
Terms offered: Fall 2016, Spring 2016, Fall 2015
Informal group studies of special problems in energy and resources.
Directed Group Study: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing and consent of instructor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of directed group study per week
Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Directed Group Study: Read Less [-]

ENE,RES 299 Individual Research in Energy and Resources 1 - 12 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Investigation of problems in energy and resources from an interdisciplinary perspective.
Individual Research in Energy and Resources: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-12 hours of independent study per week
Additional Details
Subject/Course Level: Energy and Resources Group/Graduate
Grading: Letter grade.
Individual Research in Energy and Resources: Read Less [-]

ENE,RES 301 Graduate Student Instructor Practicum 3 Units
Terms offered: Spring 2013, Fall 2012, Spring 2012
Course credit for experience gained in academic teaching through employment as a graduate student instructor.
Graduate Student Instructor Practicum: Read More [+]
Rules & Requirements
Prerequisites: Appointment as a graduate student instructor in the Group and permission of the graduate advisor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 2 hours of seminar per week
Additional Details
Subject/Course Level: Energy and Resources Group/Professional course for teachers or prospective teachers
Grading: Offered for satisfactory/unsatisfactory grade only.
Graduate Student Instructor Practicum: Read Less [-]