**BIOENERGY MINOR**

Bioenergy is renewable energy derived from biomass, including by-products, residues, waste products, and crops and microbes grown specifically for fuel. Development of bioenergy could contribute to long-term environmental and economic sustainability, and help mitigate the climate impact of using fossil fuels. However, developing and establishing bioenergy will require integrating expertise from social, economic, and scientific/technical fields.

The Bioenergy minor is research-based and interdisciplinary, and provides an introduction to bioenergy concepts and issues, along with research experience and professional development. The Bioenergy minor is open to students in majors in science, agricultural sciences, forestry, engineering, earth/ocean/atmospheric sciences, education, social sciences and business, or with permission of the bioenergy adviser.

Required classes for the minor present central bioenergy concepts such as life cycle analysis, feedstocks, feedstock conversions, and sustainability; introduce interdisciplinary research and research methods; expose students to regional bioenergy industries and issues; and provide professional skills and training. Each student will do a mentored bioenergy research project with a participating faculty member, industry or extension partner; write a thesis; and present a public seminar. This transcript-visible minor complements existing majors to help students attain their career or graduate/professional school goals in the growing field of bioenergy.

For further information, contact:

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Corvallis, OR 97331-2911  
541-737-2999  
E-mail: BRR@oregonstate.edu  
Website: http://agsci.oregonstate.edu/brr/

A basic knowledge of chemistry is needed to understand bioenergy core concepts, such as the carbon cycle and pathways of energy conversion. Bioenergy minor students must take CH 122 *GENERAL CHEMISTRY or equivalent. CH 122 *GENERAL CHEMISTRY fulfills Bacc Core requirements and is a prerequisite for WSE 473 BIOENERGY AND ENVIRONMENTAL IMPACT, which is required for the Bioenergy minor.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BRR 350</td>
<td>INTRODUCTION TO REGIONAL BIOENERGY</td>
<td>2</td>
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<tr>
<td>BRR 450</td>
<td>INTERDISCIPLINARY RESEARCH: BIOENERGY FOCUS</td>
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<td>BRR 401</td>
<td>RESEARCH AND SCHOLARSHIP</td>
<td>10</td>
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<td>BRR 403</td>
<td>*THESIS</td>
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<td>BRR 406</td>
<td>PROJECTS-DATA PRESENTATIONS</td>
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<td>WSE 473</td>
<td>BIOENERGY AND ENVIRONMENTAL IMPACT</td>
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Bioenergy Electives Categories

**Technical Electives**

Select one of the following:  
BEE 320 BIOSYSTEMS ANALYSIS AND MODELING  
BEE 472 INTRODUCTION TO FOOD ENGINEERING PRINCIPLES  
BEE 473 INTRODUCTION TO FOOD ENGINEERING PROCESS DESIGN  
BEE 499/BEE 599 SPECIAL TOPICS (Biofuel Feedstocks and Production)  
BIOE 457 BIOREACTORS  
BIOE 490 BIOENGINEERING PROCESS DESIGN  
BOT 321 PLANT SYSTEMATICS  
BOT 331 PLANT PHYSIOLOGY  
BOT 414 AGROLOGY  
BOT 475 COMPARATIVE GENOMICS  
CROP 300 CROP PRODUCTION IN PACIFIC NORTHWEST AGROECOSYSTEMS  
FST 479 FERMENTATION MICROBIOLOGY  
HORT 301 GROWTH AND DEVELOPMENT OF HORTICULTURAL CROPS  
MB 230 *INTRODUCTORY MICROBIOLOGY  
MB 302 GENERAL MICROBIOLOGY  
MB 303 GENERAL MICROBIOLOGY LABORATORY  
MB 312 BACTERIAL PHYSIOLOGY AND METABOLISM  
PBG 430 PLANT GENETICS  
PH 313 *ENERGY ALTERNATIVES  
WSE 210 *RENEWABLE MATERIALS TECHNOLOGY AND UTILIZATION  
WSE 321 CHEMISTRY OF RENEWABLE MATERIALS  
WSE 322 PHYSICAL AND MECHANICAL PROPERTIES OF RENEWABLE MATERIALS  
WSE 324 RENEWABLE MATERIALS LABORATORY  

**Environmental Electives**

Select one of the following:  
BEE 499 SPECIAL TOPICS  
BI 301 *HUMAN IMPACTS ON ECOSYSTEMS  
BI 306 **ENVIRONMENTAL ECOLOGY  
CH 390 ENVIRONMENTAL CHEMISTRY  
ENGR 350 *SUSTAINABLE ENGINEERING  
ENSC 479 **ENVIRONMENTAL CASE STUDIES  
ENVE 321 ENVIRONMENTAL ENGINEERING FUNDAMENTALS  
ENVE 322 FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING  
ENVE 415 ENVIRONMENTAL ENGINEERING LABORATORY  
ENVE 425 AIR POLLUTION CONTROL  
WSE 473 BIOENERGY AND ENVIRONMENTAL IMPACT  

**Social/Economic/Policy Electives**

Select one of the following:  
AEC 250 *INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND POLICY  
AEC 351 *NATURAL RESOURCE ECONOMICS AND POLICY  
AEC 352 *ENVIRONMENTAL ECONOMICS AND POLICY  
AEC 434 *MEASURING RESOURCE AND ENVIRONMENTAL IMPACTS  
AEC 454 RURAL DEVELOPMENT ECONOMICS AND POLICY  
AG 492 TECHNOLOGY TRANSFER IN AGRICULTURE

[^1]: University of California, Berkeley

[^2]: University of California, Berkeley
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<tr>
<td>BA 363</td>
<td>TECHNOLOGY AND INNOVATION MANAGEMENT</td>
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<td>BA 458</td>
<td>INNOVATION AND NEW PRODUCT DEVELOPMENT</td>
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<td>BA 464</td>
<td>NEW VENTURE FINANCING</td>
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<td>CH 374</td>
<td>*TECHNOLOGY, ENERGY, AND RISK</td>
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<td>ED 253</td>
<td>LEARNING ACROSS THE LIFESPAN</td>
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<td>FES 477</td>
<td>*AGROFORESTRY</td>
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<tr>
<td>or NR 477</td>
<td>*AGROFORESTRY</td>
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<td>FES 485</td>
<td>*CONSENSUS AND NATURAL RESOURCES</td>
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<td>FOR 330</td>
<td>FOREST RESOURCE ECONOMICS I</td>
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<td>FW 325</td>
<td>*GLOBAL CRISES IN RESOURCE ECOLOGY</td>
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<td>GEOG 340</td>
<td>*INTRODUCTION TO WATER SCIENCE AND POLICY</td>
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<td>GEOG 451</td>
<td>PLANNING PRINCIPLES AND PRACTICES FOR RESILIENT COMMUNITIES</td>
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<td>SED 459</td>
<td>SCIENCE AND THE NATURE OF INQUIRY</td>
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<td>SOC 418</td>
<td>QUALITATIVE RESEARCH METHODS</td>
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<td>SOC 481</td>
<td>*SOCIETY AND NATURAL RESOURCES</td>
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<tr>
<td>WSE 455</td>
<td>INDUSTRIAL MARKETING IN THE FOREST SECTOR</td>
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Total Hours: 30-35

1 Or another course approved by the Bioenergy advisor that fulfills the intent of the category.

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

Minor Code: 497