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.

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541-737-2999
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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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<thead>
<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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<tr>
<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>BRR 407</td>
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<td>WSE 473</td>
<td>BIOENERGY AND ENVIRONMENTAL IMPACT</td>
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**Bioenergy Electives Category**

**Technical Electives**

Select one of the following: 1 2-4

- 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: 1 2-4

- 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: 1 3-4

- 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
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<tr>
<td>BA 363</td>
<td>TECHNOLOGY AND INNOVATION MANAGEMENT</td>
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<tr>
<td>BA 458</td>
<td>INNOVATION AND NEW PRODUCT DEVELOPMENT</td>
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<tr>
<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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<tr>
<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