ENVIRONMENTAL SCIENCES UNDERGRADUATE MAJOR (BS, HBS)

This major offers the following option(s):

- Alternative Energy
- Applied Ecology
- Aquatic Biology
- Chemistry and the Environment
- Conservation, Resources, and Sustainability
- Earth Systems
- Environmental Agriculture
- Environmental Policy and Economics
- Environmental Science Education
- Environmental Water Resources

Also available at OSU-Cascades and via Ecampus.

Larry C. Becker, Director
Environmental Sciences Undergraduate Program
104 CEOAS Administration Building
Oregon State University
Corvallis, OR 97331
541-737-1201
Email: ceosas.undergrad@oregonstate.edu
Website: https://ceosas.oregonstate.edu/environmental-sciences-undergraduate-program

An Environmental Sciences undergraduate degree provides a rigorous education that can lead to helping to understand and resolve some of today's most challenging scientific and policy issues—including global climate change, pollution, biodiversity conservation, sustainability, and balancing resource use and preservation. To help reach these objectives, the Bachelor of Science in Environmental Sciences offers an interdisciplinary approach to environmental problem solving. As an Environmental Sciences major, a student completes course work in four general areas:

1. OSU's general education courses (the baccalaureate core)
2. Basic science and math
3. Environmental sciences and humanities core
4. A specialization area

In addition, each student completes a minimum of 3 credits of experiential learning as an internship, research, study abroad, or field course. The BS degree in Environmental Sciences provides excellent training for a variety of careers—including work with federal, state, and local agencies, industry, non-profits, and education—or for graduate school. Students can pursue the BS degree either at the Corvallis campus or online through OSU Ecampus.

Major Code: 657

- Identify and define concepts in the natural sciences (e.g. chemistry, atmospheric sciences, ecology, geology, oceanography, soil science).
- Identify and define concepts in the humanities and social sciences (e.g. economics, environmental law, ethics, resource policy, and human-environment interaction fields like agronomy and geography).
- Integrate concepts in the natural sciences with those in the humanities and social sciences.
- Demonstrate a rigorous cross-disciplinary science base (biological, physical, and social sciences) with a deeper knowledge in a specialization area by using quantitative tools to analyze and interpret data.
- Communicate ideas clearly—orally, graphically, or in writing—to address environmental sciences issues.
- Engage in and experience the application of the environmental sciences beyond the classroom through fieldwork, participation in an internship, research, study abroad, or other forms of experiential learning.

**Major Curriculum**

The Environmental Sciences major requires credits in seven categories: 48 credits of baccalaureate core; 51–53 credits of basic science and math; 27–36 credits of environmental sciences and humanities; 27–31 credits of specialization; 3 credits writing intensive course; 3 credits minimum of experiential learning; and 4–53 credits of elective courses (depends on the number of baccalaureate core electives that will also meet requirements of the major).

**Baccalaureate Core**

The university baccalaureate core course (BCC) requirement is met with 48 credits and a writing intensive course (WIC). The environmental sciences student satisfies the general education requirement by selecting 27 unrestricted credits from the general list of approved courses and 21 credits from a restrictive list of BCC courses, which simultaneously satisfy requirements for the Environmental Sciences major. The WIC and Synthesis requirements are satisfied by courses taken as part of the environmental sciences core curriculum.

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<tr>
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<tr>
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<td>Basic Science and Math Courses</td>
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Environmental Sciences Undergraduate Major (BS, HBS)

### Biology
- **Select one of the following biology series:**
  - **BI 221**  
    - *PRINCIPLES OF BIOLOGY CELLS*
  - **BI 222**  
    - and *PRINCIPLES OF BIOLOGY ORGANISMS*
  - **BI 223**  
    - and *PRINCIPLES OF BIOLOGY POPULATIONS*
  - **BI 204**  
    - *INTRODUCTORY BIOLOGY I*
  - **BI 205**  
    - and *INTRODUCTORY BIOLOGY II*
  - **BI 206**  
    - and *INTRODUCTORY BIOLOGY III*

### Chemistry
- **Select one of the following chemistry series:**
  - **CH 121**  
    - GENERAL CHEMISTRY
  - **CH 122**  
    - and *GENERAL CHEMISTRY*
  - **CH 123**  
    - and *GENERAL CHEMISTRY*

### Math
- **Select one of the following:**
  - **MTH 251**  
    - and *DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS 1*
  - **MTH 252**  
    - and *DIFFERENTIAL CALCULUS & INTEGRAL CALCULUS 1*
  - **MTH 227**  
    - *CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES I & II*
  - **MTH 228**  
    - and *CALCULUS AND PROBABILITY FOR THE LIFE SCIENCES II*

### Physics
- **Select one of the following:**
  - **PH 201**  
    - *GENERAL PHYSICS & GENERAL PHYSICS 1*
  - **PH 202**  
    - and *GENERAL PHYSICS & GENERAL PHYSICS 1*
  - **PH 211**  
    - *GENERAL PHYSICS WITH CALCULUS & GENERAL PHYSICS WITH CALCULUS 1*
  - **PH 212**  
    - and *GENERAL PHYSICS WITH CALCULUS & GENERAL PHYSICS WITH CALCULUS 1*

### Statistics
- **ST 351**  
  - INTRODUCTION TO STATISTICAL METHODS
- **ST 352**  
  - and INTRODUCTION TO STATISTICAL METHODS 1

### Environmental Sciences and Humanities Core

#### Orientation
- **ENSC 101**  
  - ENVIRONMENTAL SCIENCES ORIENTATION 1

#### Natural Environmental Systems
- **Select one Atmosphere course:**
  - **ATS 201**  
    - *CLIMATE SCIENCE 1*
  - **ATS 310**  
    - METEOROLOGY
  - **ATS 420**  
    - CLIMATE PHYSICS
  - **GEOG 323**  
    - *CLIMATOLOGY*

- **Select one Biosphere course:**
  - **BI 370**  
    - ECOLOGY 1
  - **GEOG 324**  
    - *ECOLOGICAL BIOGEOGRAPHY*

- **Select one Geosphere course:**
  - **CSS 205**  
    - *SOIL SCIENCE*
  - **GEO 201**  
    - *PHYSICAL GEOLOGY*
  - **GEO 202**  
    - *EARTH SYSTEMS SCIENCE*
  - **GEO 221**  
    - *ENVIRONMENTAL GEOLOGY*
  - **GEO 322**  
    - SURFACE PROCESSES
  - **GEOG 102**  
    - *PHYSICAL GEOGRAPHY*
  - **SOIL 205**  
    - SOIL SCIENCE
  - **SOIL 206**  
    - and *SOIL SCIENCE LABORATORY FOR SOIL 205 1*
  - **SOIL 395**  
    - *WORLD SOIL RESOURCES*

- **Select one Hydrosphere course:**
  - **FW 456**  
    - FRESHWATER ECOLOGY AND CONSERVATION
  - **GEO 487**  
    - HYDROGEOLOGY
  - **GEOG 340**  
    - *INTRODUCTION TO WATER SCIENCE AND POLICY 1*
  - **GEOG 424**  
    - HYDROLOGY FOR WATER RESOURCES MANAGEMENT
  - **OC 201**  
    - *OCEANOGRAPHY*

- **Select one Human Environment course:**
  - **FW 456**  
    - FRESHWATER ECOLOGY AND CONSERVATION
  - **GEO 340**  
    - *INTRODUCTION TO WATER SCIENCE AND POLICY 1*

### Humans and the Environment
- **Select one Environmental Economics and Policy course:**
  - **AEC 250**  
    - *INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND POLICY*
  - **AEC 253**  
    - *ENVIRONMENTAL LAW, POLICY, AND ECONOMICS*
  - **AEC 351**  
    - *NATURAL RESOURCE ECONOMICS AND POLICY*
  - **AEC 352/ECON 352**  
    - *ENVIRONMENTAL ECONOMICS AND POLICY 1*
  - **AEC 432**  
    - ENVIRONMENTAL LAW
  - **ECON 201**  
    - *INTRODUCTION TO MICROECONOMICS 1*
  - **FOR 462**  
    - NATURAL RESOURCE POLICY AND LAW
  - **FW 324**  
    - FOOD FROM THE SEA
  - **FW 415**  
    - FISHERIES AND WILDLIFE LAW AND POLICY
  - **FW 422**  
    - INTRODUCTION TO OCEAN LAW
  - **FW 462**  
    - ECO SYSTEM SERVICES
  - **GEOG 340**  
    - *INTRODUCTION TO WATER SCIENCE AND POLICY*
  - **GEOG 450**  
    - LAND USE IN THE AMERICAN WEST
  - **GEOG 451**  
    - PLANNING PRINCIPLES AND PRACTICES FOR RESILIENT COMMUNITIES
  - **PPOL 446**  
    - THE POLICY AND LAW OF U.S. COASTAL GOVERNANCE
  - **PPOL 447**  
    - INTEGRATED POLICY: FOOD, ENERGY, WATER, CLIMATE
  - **PPOL 448**  
    - MARINE POLICY IN THE UNITED STATES
  - **PS 473**  
    - US ENERGY POLICY
  - **PS 475**  
    - ENVIRONMENTAL POLITICS AND POLICY 1
  - **PS 476**  
    - *SCIENCE AND POLITICS*
  - **PS 477**  
    - INTERNATIONAL ENVIRONMENTAL POLITICS AND POLICY
  - **SOC 360**  
    - *POPULATION TRENDS AND POLICY*
  - **WGSS 440**  
    - *WOMEN AND NATURAL RESOURCES*

- **Select one Environmental Ethics course:**
  - **ANTH 481**  
    - *NATURAL RESOURCES AND COMMUNITY VALUES*
  - **CH 374**  
    - *TECHNOLOGY, ENERGY, AND RISK*
  - **ES 353**  
    - *ENVIRONMENTAL RACISM*
  - **ES 448/PHL 448/REL 448**  
    - NATIVE AMERICAN PHILOSOPHIES
  - **FES 435/TOX 435**  
    - *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK*
  - **FES 485**  
    - *CONSENSUS AND NATURAL RESOURCES*
  - **FW 340**  
    - *MULTICULTURAL PERSPECTIVES IN NATURAL RESOURCES*
  - **GEO 309**  
    - *ENVIRONMENTAL JUSTICE 1*
  - **PHL 325**  
    - *SCIENTIFIC REASONING*
  - **PHL 440**  
    - *ENVIRONMENTAL ETHICS*
  - **PHL 443/REL 443**  
    - *WORLD VIEWS AND ENVIRONMENTAL VALUES*
  - **PS 461**  
    - ENVIRONMENTAL POLITICAL THEORY
  - **SOC 456**  
    - *SCIENCE AND TECHNOLOGY IN SOCIAL CONTEXT*
  - **SOC 480**  
    - *ENVIRONMENTAL SOCIOLOGY*
  - **SOC 481**  
    - *SOCIETY AND NATURAL RESOURCES*
  - **SUS 331**  
    - *SUSTAINABILITY, JUSTICE, AND ENGAGEMENT*
  - **WGSS 440**  
    - *WOMEN AND NATURAL RESOURCES*

- **Select one Human Environment course:**
  - **AG 301**  
    - *ECOSYSTEM SCIENCE OF PACIFIC NW INDIANS*
  - **BI 301**  
    - *HUMAN IMPACTS ON ECOSYSTEMS*
  - **BI 347**  
    - *OCEANS IN PERIL*
  - **BI 348**  
    - *HUMAN ECOLOGY*
  - **EAH 411**  
    - *PERSPECTIVES IN ENVIRONMENTAL ARTS AND HUMANITIES*
  - **ENSC 479**  
    - *ENVIRONMENTAL CASE STUDIES 1*
  - **FW 324**  
    - FOOD FROM THE SEA
  - **FW 325**  
    - GLOBAL CRISIS IN RESOURCE ECOLOGY
  - **FW 470**  
    - *ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN*
  - **GEO 308**  
    - *GLOBAL CHANGE AND EARTH SCIENCES*
  - **GEOG 203**  
    - *HUMAN-ENVIRONMENT GEOGRAPHY*
GEDG 300  *SUSTAINABILITY FOR THE COMMON GOOD
GEDG 350  *GEOGRAPHY OF NATURAL HAZARDS
GEDG 431  GLOBAL RESOURCES AND DEVELOPMENT
HST 481  *ENVIRONMENTAL HISTORY OF THE UNITED STATES
OC 333  OCEANS, COASTS, AND PEOPLE

SUS 102  *INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY
SUS 350  *SUSTAINABLE COMMUNITIES
WGIS 440  *WOMEN AND NATURAL RESOURCES
WR 462  *ENVIRONMENTAL WRITING
Z 349  *BIODIVERSITY CAUSES, CONSEQUENCES, AND CONSERVATION

Select one Environmental Management course: 3-4

BOT 413/FOR 413  FOREST PATHOLOGY
ENT 331/HORT 331  *POLLENATORS IN PERIL
FES 350/HORT 350  URBAN FORESTRY
FES 355  MANAGEMENT FOR MULTIPLE RESOURCE VALUES
FES 365  *ISSUES IN NATURAL RESOURCES CONSERVATION
FES 412  FOREST ENTOMOLOGY
FES 445/FW 445  ECOLOGICAL RESTORATION
FOR 346  TOPICS IN WILDLAND FIRE
FW 251  PRINCIPLES OF FISH AND WILDLIFE CONSERVATION
FW 323  MANAGEMENT PRINCIPLES OF PACIFIC SALMON IN THE NORTHWEST
FW 326  INTEGRATED WATERSHED MANAGEMENT
FW 435  *WILDLIFE IN AGRICULTURAL ECOSYSTEMS
FW 464  MARINE CONSERVATION BIOLOGY
GED 306  *MINERALS, ENERGY, WATER AND THE ENVIRONMENT
GEDG 430  RESILIENCE-BASED NATURAL RESOURCE MANAGEMENT
GEDG 440  CONFLICT, COOPERATION, AND CONTROL OF WATER IN THE US
GEDG 441  THE WORLD’S WATER
GEDG 452  ENVIRONMENTAL ASSESSMENT
NR 455  NATURAL RESOURCE DECISION MAKING
RNG 341  RANGELAND ECOLOGY AND MANAGEMENT
RNG 355  DESERT WATERSHED MANAGEMENT
RNG 421  WILDLAND RESTORATION AND ECOLOGY
RNG 455  RIPARIAN ECOCYHTROLOGY AND MANAGEMENT
RNG 490  RANGELAND MANAGEMENT PLANNING
TRAL 352  WILDERNESS MANAGEMENT

Experiential Learning 3

Select 3 credits from the following: 3

ENSC 401  RESEARCH AND SCHOLARSHIP
ENSC 403  THESIS
ENSC 410  ENVIRONMENTAL SCIENCE INTERNSHIP

Alternative Approved Courses:

BI 371  *ECOLOGICAL METHODS
BI 373  *FIELD METHODS IN MARINE ECOLOGY
BI 375  FIELD METHODS IN ECOLOGICAL RESTORATION
BOT 341  PLANT ECOLOGY
BOT 440  FIELD METHODS IN PLANT ECOLOGY
RNG 441  RANGELAND ANALYSIS
SOIL 466  SOIL MORPHOLOGY AND CLASSIFICATION

Specialization Area

Approved Certificate:

- Geographic Information Science (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/geographic-information-science-certificate/)

Approved Options (All options under the Environmental Sciences major):

- Alternative Energy (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/alternative-energy-option/)
- Aquatic Biology (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/aquatic-biology-option/)
- Chemistry and the Environment (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/chemistry-environment-option/)
- Conservation, Resources, and Sustainability (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/conservation-resources-sustainability-option/)
- Environmental Agriculture (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/environmental-agriculture-option/)
- Environmental Policy and Economics (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/environmental-policy-economics-option/)
- Environmental Science Education (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/environmental-science-education-option/)
- Environmental Water Resources (http://catalog.oregonstate.edu/college-departments/earth-ocean-atmospheric-sciences/environmental-sciences-bs-hbs/environmental-water-resources-option/)
- Scientific, Technical, and Professional Communication Certificate (https://catalog.oregonstate.edu/college-departments/liberal-arts/school-arts-communication/scientific-technical-professional-communication-certificate/)

The program must contain at least one internship, research, or study abroad experience that provides opportunities for hands-on experience in design and collection of observations in the physical, biological or social environment. Students are urged to work with advisors at an early stage in their study to identify experiences that are appropriate, or discuss alternative approved experiential courses.
This requirement can be met by completing an approved certificate, option, or minor from a participating program in the environmental or closely related sciences, or working with advisors to develop an innovative course cluster to analyze environmental systems.

**Major Code: 657**

### First Year

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<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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<td>MTH 112</td>
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<td>CH 121</td>
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<td>HHS 231</td>
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<td>COMM 218</td>
<td>*INTERPERSONAL COMMUNICATION</td>
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<td>MTH 251</td>
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<td>CH 123</td>
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<td>Bacc Core - Western Culture</td>
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<td>Bacc Core - Difference, Power and Discrimination</td>
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<td>ECON 201</td>
<td>*INTRODUCTION TO MICROECONOMICS</td>
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<td>ATS 201</td>
<td>*CLIMATE SCIENCE</td>
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<td>Winter</td>
<td>BI 222</td>
<td>*PRINCIPLES OF BIOLOGY ORGANISMS</td>
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<td>OC 201</td>
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<td>Bacc Core - Writing II</td>
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<td>*PRINCIPLES OF BIOLOGY POPULATIONS</td>
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<td>*WORLD VIEWS AND ENVIRONMENTAL VALUES</td>
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### Fourth Year

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**Total Credits**: 180